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Money Creation: An Introduction

Prof. Dr AP Faure

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AP Faure

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Money Creation: An Introduction
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1 Introduction and early history

1.1 Learning outcomes

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

1. Describe the relationship between money and economic growth.
2. Elucidate the relationship between money and inflation.
3. Discuss the technical aspects of money.
4. Describe the concept of money creation.
5. Appreciate the history of primitive and later forms of money.
6. Describe the forms of money creation in the precious metal coin money age.

1.2 Introduction

Have you ever sat back and thought about what money really is, and what "backs it up", if anything? Have you wondered what causes the amount of money circulating in the economy to increase every year? Instinctively you will know that it does because prices generally increase every year – slightly in some and more-than-slightly in others[1] – and know instinctively that the cause is an increase in the amount of money in circulation. The maxim that inflation is caused by *too much money chasing too few goods* has probably floated through your consciousness a few times.

Have you considered the role that you play in money creation? Whenever you utilise a bank credit facility such as a home loan or an overdraft facility, you and your bank create new money.

Have you pondered the role of the central bank in money creation? You will have heard, seen or read about the central bank's role in setting the repo rate / bank rate / base rate / official rate / discount rate (it's named differently in different countries). What happens after the central bank reduces or increases it and what gives rise to such central bank action? Have you speculated on what actually happens when a central bank says it injected so and so many billions into the economy and felt a little *irritated* because they (or the media reporter) did not elucidate this action?

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You will have experienced share (also called *equity* and *stock*) market booms and the inevitable busts that follow. One of the main underlying causes is money creation, and yet this significant cause is rarely put forward, let alone how it contributes. The story is actually surprisingly simple: banks create money (= bank deposits) by extending loans. Bank loans are obviously extended if there is a demand for loans, and the bank considers the consumer creditworthy / project viable. Underlying the demand for new loans is additional economic activity being financed – *consumption* (C) or *investment* (I), and these are the two components of the *domestic demand* for goods and services, called *gross domestic expenditure* (GDE). It drives economic (called *gross domestic product* – GDP) growth, and impacts on company profits and therefore on share prices, and so on. To complete the "big picture" (the macroeconomy) we need to add *net external / foreign demand*: exports (X = foreign demand for domestic goods) less imports (M = domestic demand for foreign goods) which make up the *trade account balance* (TAB). Therefore the big picture is:

C + I = GDE; GDE + (X – M) = GDP (expenditure on[2]).

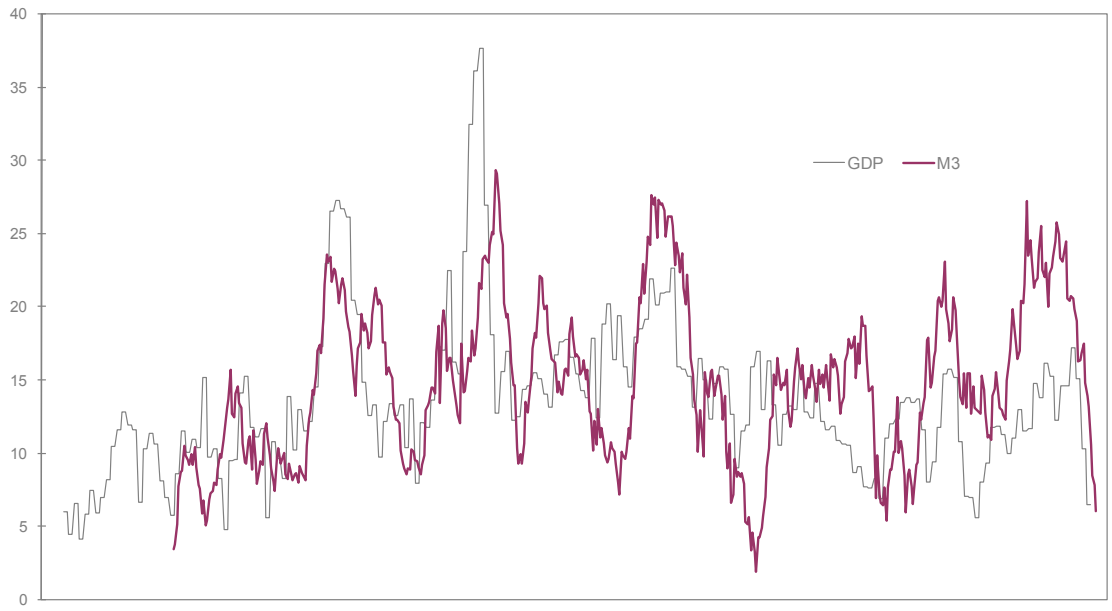

Figure 1: GDP & M3 (yoy%)

A simple time series chart (see Figure 1) will reveal the close relationship between nominal GDP and M3 (a broad measure of money). This is for a particular country for a period of 50 years. Note that the growth rates have never been negative over the period.

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The story of money creation is so astonishing (in that it is truly simple) and the system so fine (caveat: if responsibly managed) that it has to be told in an uncomplicated manner. This text is an endeavour to achieve this ideal. One of the thrusts of these texts is that new bank lending does not begin with a new bank deposit. In fact, the *exact reverse* applies: a new bank deposit (= money) is the consequence of new bank lending, and this is so because we all accept bank deposits as the main *means of payments* (= the definition of money). In the genesis of banking days the bankers, the goldsmiths, who transmuted into bankers, certainly had to take in deposits of precious metal coins before they could lend. However, they soon learned that they could lend money *without taking deposits*.

The second thrust of these texts is to refute the notion that money creation revolves around the so-called reserve requirement (RR) of banks (also called the cash reserve requirement). The perceived dominance of the RR in money creation also has its genesis in the past: in the convertibility of bank notes into gold. However, this "standard" (of money creation management) left the world economic stage in the first half of the twentieth century. It was followed by the requirement that banks hold reserves with the central bank equal to a prescribed percentage of their deposits (the RR ratio). You will understand that this standard imposes a quantitative relationship between banks' reserves with the central bank and bank deposits, and therefore constitutes a powerful money creation management tool.

This tool meant that the central bank had total control over money creation – just by managing the amount of bank reserves with itself (and it has the monopoly to do this). This standard did not last for long because with a quantitative control tool the price of money (= the interest rate) had to be left to its own volition. The consequences in terms of interest rate volatility were quite profound.

This standard gave way to one where interest rates are targeted, i.e. are not left to find their own level, and where the RR became a derivative of the system and not the driving force. Thus, instead of the RR being the kernel of the money creation process, in reality it is only one of many factors that affect bank liquidity. And bank liquidity is completely under the control of the central bank; because of this the central bank is able to manipulate bank lending rates to whatever level it deems propitious in terms of the desired growth rate in bank lending / money creation. Remember: the level of bank lending rates influences the demand for bank loans, and underlying this is GDE growth.

1.3 Money and inflation

We saw above that:

C + I = GDE; GDE + TAB = GDP (expenditure on).

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Of the two components of GDP, GDE is the largest by a long margin in most countries. And of the two components of GDE, C is the largest by a long margin in most countries. Thus C can be seen to be the chief driver of GDP growth. This gives rise to the adage *the consumer is king.* Alfred Marshall, a celebrated economist of the past, spoke of the *sovereignty of the consumer*. For example, in the US consumption expenditure makes up roughly 80% of GDP.

In Figure 1 we illustrated the relationship between M3 and GDP growth. Let's take this a little further. There is a celebrated identity in economics relating to the role of money (a product of the fine mind of Irving Fisher in the early twentieth century) referred to as the *quantity theory of money*:

$$MV = PT.$$

Put simply, over a period (say, a year) a change (Δ) in the money stock, ΔM, times the change in its velocity of circulation, ΔV (which generally is a stable number), is equal to the change in prices, ΔP (i.e. inflation), times the change in the total of economic transactions adjusted for inflation, ΔT (i.e. ΔGDP). Thus, assuming V to be stable, an increase in M will give rise to an increase in *nominal* GDP. Nominal GDP = actual GDP as measured at current prices, that is, not adjusted for inflation (*real* GDP × inflation = *nominal* GDP). If there is no inflation it means that the increase in M is fully translated into an increase in GDP. Basically, this says that M growth plays a major role in driving *additional* economic output and the welfare of the country and its people.

It is an elegant and beautiful feature of the modern monetary system – because it means that funds are always available for new consumption and business projects (C + I). Money creation provides the fuel for economic growth. However, and this is critical, it is only elegant if money creation growth is carefully managed, and this is the formidable task of the central bank. If it is not prudently managed, it transmutes into a monster in the form of inflation, which can be a destructive force in terms of economic growth and employment. Thus in terms of the identity MV = PT, a small increase in M can lead to an equivalent increase in real GDP, while a massive increase in M can lead to an equivalent change in P, or even to a larger increase in P and a decline in real GDP.

What actually happens when M increases at a high level? As we know, underlying an increase in the demand for loans is an increase in the demand for goods and services. If demand is high, and local industry cannot meet supply, local prices will rise (ΔP+), and the exchange rate will fall. Foreign goods will become cheaper / local goods will become expensive, imports will rise, exports will fall, and the TAB will deteriorate. If M rises further and extensively, the vicious circle will be exacerbated.

If money creation is left unchecked, and is a consequence of a government debt trap (when government borrows from the banking sector to pay interest), and if it borrows from the central bank, the consequences are profound.

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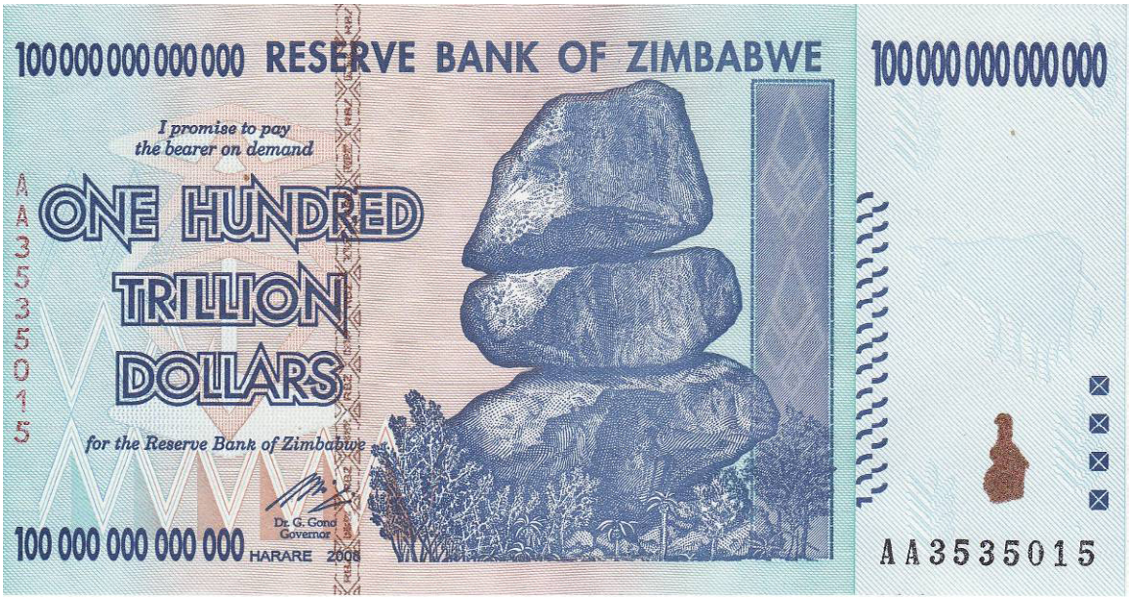
The worst inflation monster the world has experienced is 7 000 000 000 000 000 000 000% pa (7 sextillion % pa) in Zimbabwe in 2008. The previous record was 41 900 000 000 000 000% pa in Hungary in 1946[3]. In the Zimbabwean case GDP growth during the hyper-inflation period was negative every year and the unemployment rate grew to over 90%. The cause was massively excessive money creation.

The largest denomination bank note in the history of the world, for 100 quintillion pengo, was issued in Hungary in 1946. The largest denomination bank note with zeros printed on its face is the Zimbabwean 100 trillion dollar note (see Box 1), issued in 2009[4]. Prior to the issue of this note, thirteen zeros had been lopped off the bank notes (three in August 2006 and ten in August 2008). Following the issue of this note another twelve zeros were lopped off, making it equal to 100 Zimbabwe dollars.[5]

Box 1: largest denomination bank note (with zeros)



The monster side of money was also seen by the developed world in 2008 / early 2009, when the "credit / banking / sub-prime crisis" was at its peak. To a large degree this crisis had its genesis in the excessive creation of money by the credit granted to the many US sub-prime borrowers by the US banks, which led to an artificial and unsustainable boom. It also clearly demonstrated the fact that banks are inherently unstable, and therefore require rigorous regulation by government authorities. It may come as a revelation to young readers that the bank failures seen in this period is not a new phenomenon; history is littered with banking / credit crises and bank failures.

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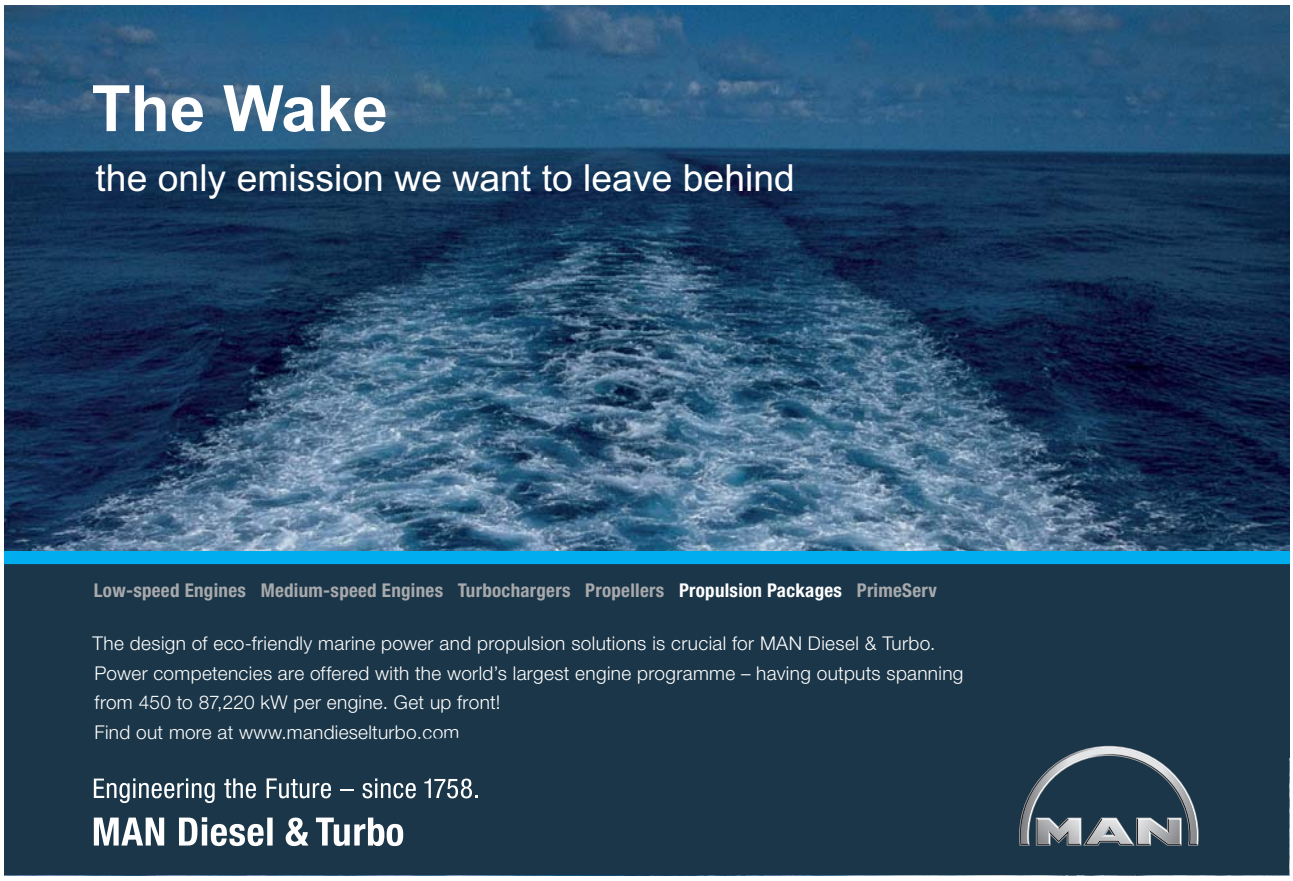
1.4 Money: technical issues

Money has a name: dollar, pound, rupee, franc, rand and so on. One of these or another name is the name of your country's *currency* or, more formally, the *monetary unit*[6] of your country; this will be set down in some statute[7] of your country. The unit (say one dollar) will most likely be made up of sub-units or parts (say 100 cents). This enables prices in your country to be in multiples of one cent[8].

A glance at a bank note will reveal that it is issued by your central bank; so it is a liability of the central bank[9]. If you are in the UK and you have a fifty pound note it will say: *I promise to pay to the bearer on demand the sum of fifty pounds* (see Box 2). In some cases the note will state: *This note is legal tender for the payment of the amount stated thereon* or *This note is legal tender for all debts, public and private* (USD notes). Your note may even state both these phrases.



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Box 2: GBP

What do these lofty phrases mean? The first one means nothing more than the central bank will exchange your weather-beaten bank note for a crispy new one. In days past it meant something more significant; we will discuss this issue in more detail later.

The *legal tender* covenant means that a creditor (think: a creditor provides credit and is therefore owed an amount of money) is legally obliged to accept payment from a debtor (think: a debtor makes a debt and therefore owes money)[10] in the form of bank notes (and coins – although not stated on the coins[11]) to the value specified on the note. If the payment of legal tender money is refused the debt is extinguished[12].

The question arises: does a country only have one currency that is designated legal tender by statute? The answer is yes (usually). This means that only the currency of a country may be used to pay for goods and services in that country (and from abroad after exchanging the local currency for a foreign one). However, in extreme circumstances (as in hyper-inflationary times) in a few countries, other currencies have been declared legal tender. For example, in Zimbabwe in 2009, the Zimbabwe dollar lost all its money attributes / roles (see below) and the South African rand (ZAR) and the US dollar (USD) were declared legal tender. The Zimbabwe dollar went into hibernation for its severe financial winter.

Money's primary role is to serve as a *means of payment / medium of exchange*. The other roles of money will be obvious: *unit of account* (also known as standard of value) and *store of value*[13].

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Unit of account means that records (accounting records in the modern age) can be kept of assets and liabilities in one standard, and that comparisons can be made between the assets and liabilities of different entities and at different times.

Store of value means that the medium of exchange maintains its purchasing value, that is, you can keep the money tucked away (under mattresses in the olden days and in the bank today) and spend it later when it will at least buy the same amount of goods and services as when you received the money.

1.5 The simplicity of money creation

Money is literally created by entries in the accounts of commercial banks, and this takes place when a bank loan / credit[14] is applied for and accommodated by a bank. Thus, when the bank (let's assume for the moment there is only one bank) provides you with a loan facility, such as an overdraft, and you utilise the facility, that is you pay the furniture store for the new LCD TV, the furniture store deposits the money. So, the bank credit granted to you created the new bank deposit (= new money). These are entries in the accounts of the bank: the loan to you is an asset (= it owns) and the deposit is a liability (= it owes).

Sound incredulous? It is, and even more unbelievable is that we homo sapiens are responsible for this because we all *generally accept bank deposits as money*, that is, as a *means of payment / medium of exchange*. In other words we pay for the majority of goods and services we buy by the transfer of bank deposits, which *makes it money*. Notes and coins, the other component of money, are also used to make payments, but bank deposits are overwhelmingly used in this modern age. A new bank deposit is new money created, and it springs from bank credit / loan extension.

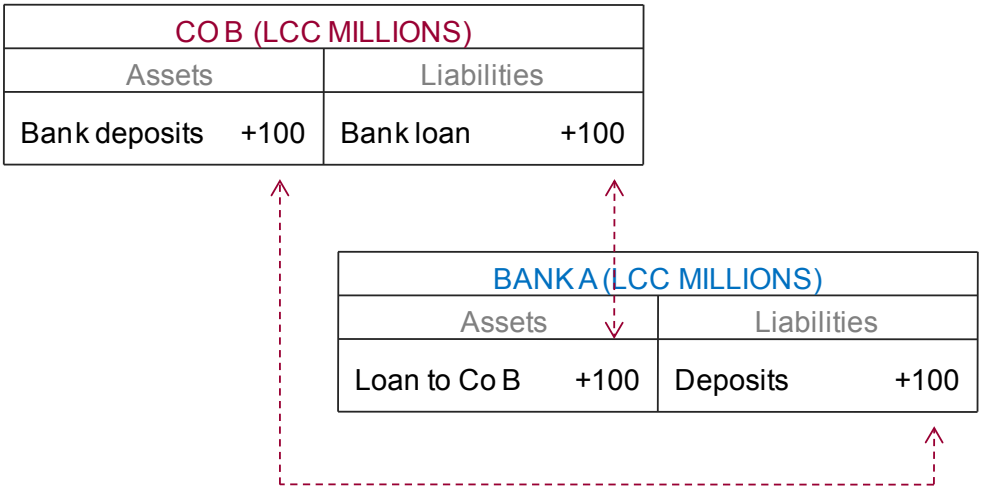

Figure 2

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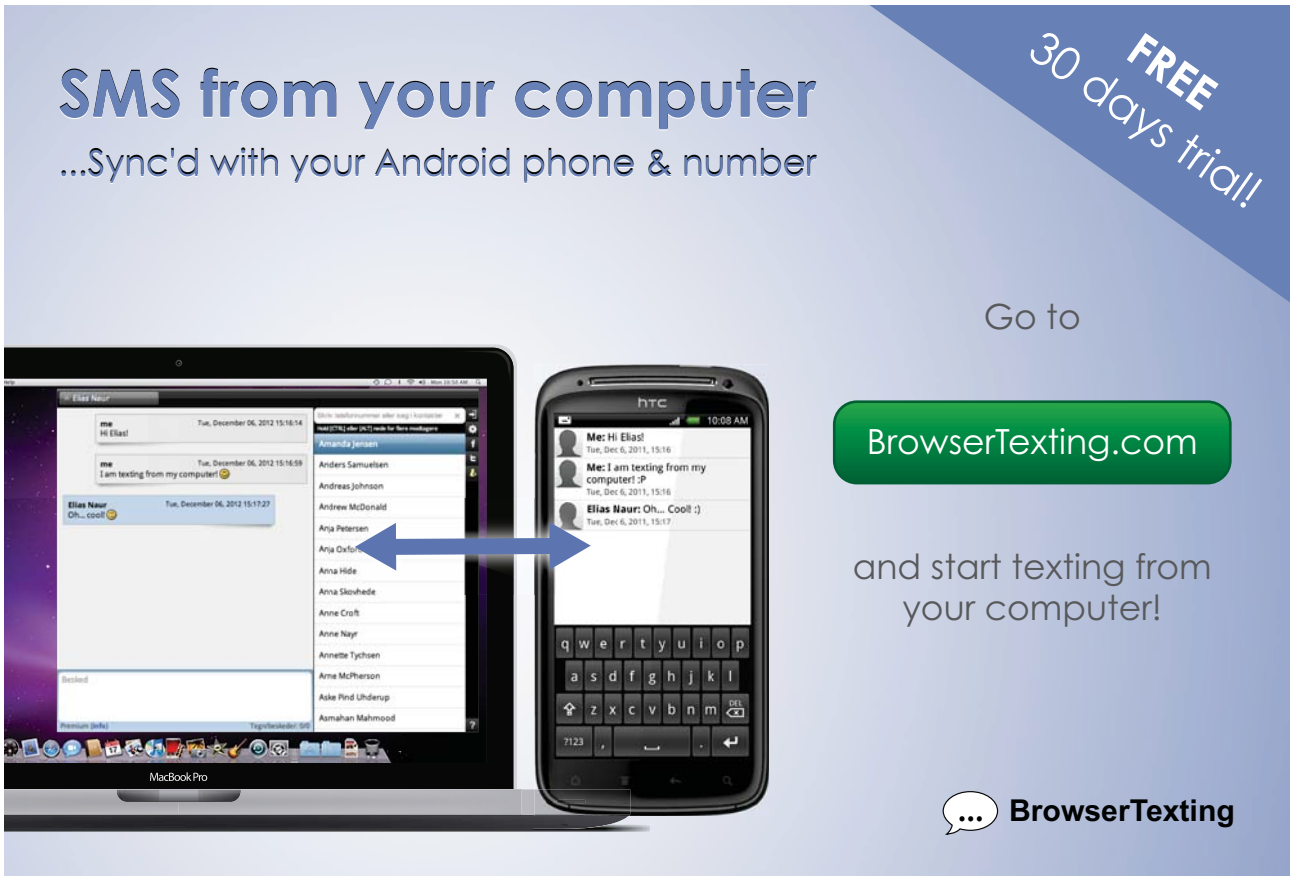
So, now we know that money (M) is comprised of *bank deposits* (BD) which are immediately available[15] or available soon[16] and *bank notes and coins* (let's call these N&C):

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

Another example may be useful: Company A (Co A) which produces goods and wants to sell them, and Company B (Co B) which wants to trade in the goods produced by Co A. Co B does not have the money to do so and approaches Bank A (let's assume that it is the only bank) for a loan of LCC 100 million. It is in the business of lending money and grants[17] the loan in the form of a credit to Co B's bank account in its books. Co B's balance sheet changes as indicated in Figure 2.

Bank A's balance sheet is the converse of Co B's balance sheet as indicated in Figure 2. It will be noted that the deposits of Co B, a member of the non-bank private sector (NBPS) of the economy, have increased, that is, the amount of money (M) in circulation has increased, by LCC 100 million. The increase in M has a balance sheet cause of change (BSCoC): the credit extended to the NBPS. The *actual* cause is the approach by Co B to the bank and the bank accommodating it, i.e. the *demand for loans / credit*.



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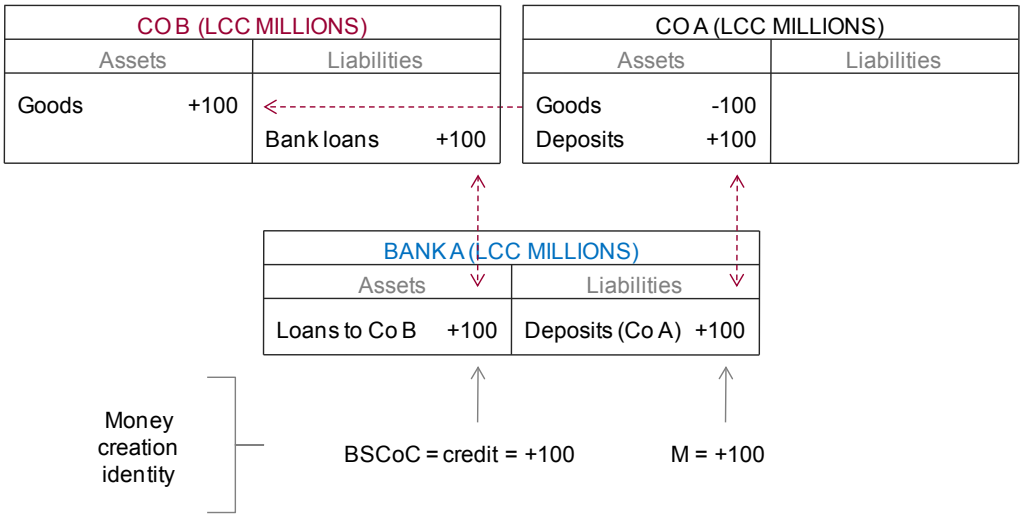

Figure 3

Let us take the transaction a little further. Co B clearly borrowed the money in order to buy goods from Co A. In addition there is a strong financial reason: the interest rate on his new deposit is lower that the bank's lending rate (reflecting the bank's margin). Co B will do an EFT payment to Co A via the internet, show Co A the proof of payment (pop), and take delivery of LCC 100 million worth of goods. The final balance sheet changes are as indicated in Figure 3. (Note that the changes in all the balance sheets balance.)

An alternative to the above is that Co B obtains an overdraft facility of LCC 100 million from the bank. This is more likely in real life, but the outcome is the same. In terms of the money-component identity, M = BD + N&C, we have:

$$\Delta M = +\text{LCC } 100 \text{ million} = \Delta BD = +\text{LCC } 100 \text{ million}.$$

It should be apparent that we also have an identity from Bank A's balance sheet: ΔM = Δcredit to NBPS:

$$\Delta M = +\text{LCC } 100 \text{ million} = \Delta\text{loan to NBPS} = +\text{LCC } 100 \text{ million}.$$

Money was created by accounting entries by a bank. This shatters the notion that a bank must receive a deposit before it can provide credit; the path of causation is: *a bank creates new deposits by providing new credit*. The belief system that money creation rests on something tangible, like silver or gold, should now lie in ruins. This also indicates that banking is a good business; it is, and it is so because we, the general public, *generally accept bank deposits as a means of payment*. This simple reality makes it money.

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A significant question now arises: does this not mean that the banks are able to create loans and its counterpart, money, *ad infinitum*? The answer is a yes, but it is a qualified yes. Because of the phenomenon of banks being able to create money by accounting entries, a *policy on money*, that is, a monetary policy, is required. Also required is exacting bank regulation and robust supervision because, inter alia, the phenomenon of money creation makes banks inherently unstable.[18]

You will have heard of the central bank of your country. You will have read or heard about your central bank's *key interest rate* (KIR – called by different names such as repo rate, discount rate, bank rate, base rate, but we call it by this generic name from here on). Central banks "control" money creation by the banks through its KIR, and in many cases are responsible for the supervision of banks.

In conclusion: money is bank notes and coins plus the short-term bank deposits of the private sector. Banks create money by accounting entries, that is, virtually "out of thin air". In order to cement the understanding of this barely credible reality, and how monetary policy developed and is now implemented, we need to delve back into history to see how it all came about.

1.6 Barter

Money vastly facilitates the exchange of goods and services, that is, economic activity. Before money, goods and services were exchanged by barter. Barter is the exchange of goods and services for other goods and services, and it goes back to the earliest people.

Much evidence that barter took place is found in archaeological sites around the world. In the many sites goods have been unearthed that do not occur naturally in the area. Examples: amber from the Baltic has been found in Austria and France; shells and shell jewellery from the Atlantic coast were unearthed in Switzerland[19].

Barter has obvious disadvantages. Firstly, the exchange of goods and services between two parties takes place only if there is a matching of opposing wants.[20]

If there is no or a partial matching of wants, barter is inconvenient. Jevons in his work of 1875[21] provides a fine example of a lack of matching of opposing wants. A French opera singer, Mademoiselle Zélie, after a performance in the Society Islands during a world tour, was paid one-third of the take, which equalled three pigs, twenty-three turkeys, forty-four chickens, five thousand cocoa-nuts and many bananas, lemons and oranges. She could only consume a small portion of these perishable goods, and fed the livestock with the remainder.

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Mlle Zelie was obliged to donate what she had left before departing. She had provided the audience with a wanted service, but received in return goods that did not match her wants. Jevons suggests that the goods received "might have brought four thousand francs, which would have been good remuneration for five songs", but the absence of a medium of exchange meant that the performer could not be properly remunerated.

Jevons[22] also refers to the existence of a London company in 1875 called The African Barter Company Limited which carried on a barter trade with west coast African countries. The goods bartered were European "manufactures for palm oil, gold dust, ivory, cotton, coffee, gum, and other raw produce." So, barter was alive and well in 1875 and, as we will see later, this was still the case in the first half of the twentieth century is some countries.

	Cabbage	Sheep	Chicken	Pumpkin
Cabbage	x	reciprocal	reciprocal	reciprocal
Sheep	yes	x	reciprocal	reciprocal
Chicken	yes	yes	x	reciprocal
Pumpkin	yes	yes	yes	x

Table 1: Number of prices with four products

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The second disadvantage is equally obvious: the absence of a common standard of values, that is, a price system where all goods have a rate of exchange (i.e. a price) in terms of a common *something*. When a small number of goods are to be exchanged pricing is not a big problem. To demonstrate, assume that there are four products as indicated in Table 1. If there are n products (= 4) there are n^2 combinations of prices (4 × 4 = 16). If we eliminate the price of each product with itself (= 4) we have 12 prices ($n^2 - n$). If we eliminate the reciprocal prices, we divide this number by 2 [$(n^2 - n) / 2$] and arrive at a number of 6. This can be handled easily.

It should be evident that in a barter economy the number of prices increases exponentially as the number of products increases. For example, if there are 10 products there are 45 prices; if there are 50 000 products, there are 1 249 975 000 different prices. A large airliner has 3 million parts = 4 499 998 500 000 prices.

It is obvious that no modern economic system can operate under a barter system. As stated by Newlyn[23]: "The complications of…barter arrangements clearly restrict the opportunity for exchange so severely that little progress could have been made towards a complex exchange economy without the introduction of a common medium of exchange."

The other disadvantage of the barter system is that it is difficult and costly to store value. For example, you can store value in a block of rare wood, but you will need to have a storage place; and you have the added risk of a nest of woodborers adopting the block of wood as a home and pantry.

What happens to the number of prices if one of the products is used as a medium of exchange? Answer: the number of prices reduces to $n - 1$. In the example of four products above, if chicken was used as a medium of exchange, there would be just three prices (compared with six). If there are 50 000 products the number of prices will be 49 999, compared with 1 249 975 000.

1.7 Primitive money

The disadvantages of barter are so large that, as specialisation of production progressed and the number of products to be exchanged increased, a generally accepted means of payment / medium of exchange was adopted by different continents / countries / kingdoms / fiefdoms / communities, etc. By no means did this occur at the same time; each continent / country / kingdom / fiefdom…had a different history in respect of the adoption a common medium of exchange.

Over the centuries, before metal money, many commodities were used as a means of payment, including cattle, cloth, grain, oil, wine, jade, leather, quartz, whales' teeth, wampum (strings of beads), and so on[24]. Perhaps the best known and mostly used non-metal medium of exchange was the cowrie shell (see Box 3).

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Box 3: cowrie shell (with GBP 1)

Photo: AP Faure

The development of primitive money is one of the most significant developments in economic history. It was an essential condition for the shift from subsistence farming toward specialisation and division of labour. It took place over an extended period of time as the many advantages offered by a common medium of exchange were realised[25]. The advantages include:

- Firstly, money splits a single barter transaction into two separate transactions: a purchase and a sale. The matching of opposing wants problem is eliminated.
- Secondly, money creates choices in terms of the timing of transactions: they can be separated in time. This removes obstacles to trade such as geographical distances.
- Thirdly, speed of execution of transactions rises as a result of the portability of a medium of exchange. In barter trade many large products need to be transported to make an exchange. With money, transactions are undertaken immediately, and delivery of one set, and not two, of goods takes place.
- In the fourth place, if the commodity money was durable and in short supply, it acted as a store of value. A producer of cabbages could sell them for money and therefore store value, as opposed to storing a product that will perish before the sale thereof.

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The question arises: did money creation take place in the times of non-metal commodity money? The answer is yes, and it rests on the supply of the commodity used as money. A related question: did the increased money stock lead to inflation? Assuming a large increase in the volume of commodity money, the answer is also in the affirmative.

A fine example is presented by Morgan[26]: when the Japanese invaded New Guinea in 1942 they took along a large volume of cowrie shells, and freely used them for payments. It caused a sharp fall in the value of the cowrie shell (= the cowrie shell could buy less and less as more and more were introduced = its purchasing power was reduced = inflation), prompting an aggrieved district officer to state that it "endangere[d] the economic and financial stability of the district."

Cowrie shells were also extensively used as money in Africa. Davies[27] cites the example of Uganda: shortly before 1800 it took two cowries to purchase a woman (note: this does not mean a woman of easily-transferable affection). As a result of the amount of cowrie shells in circulation having increased dramatically, on the back of increased trade, by 1860 it took one-thousand cowrie shells to purchase a woman of the same quality.[28]

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More or less at the same time, or later in some continents / countries / kingdoms fiefdoms (etc.), as the emergence of non-metal commodity money, primitive (that is, non-coin) metal money also emerged. Prior to primitive man refining his skills as a metallurgist, all metals were regarded as precious – because it was difficult to mine and to make into useful objects. No distinction was made between precious metals and base metals.[29]

Non-coin metal money took on many forms, such as arrow heads, axes, tripods, basins, rings, anklets, gold dust (kept in quills), spears, knives, hoes, spades and so on.[30] It is interesting to speculate on whether *excessive* money creation could take place under such as monetary system. The answer is probably in the negative, and the reasoning is that metal objects took effort to mine and forge. These objects therefore represented production and it was not possible to replicate them easily. In other words there was a natural limit to their supply.

This brings us to the significant advent the precious metal coin, the age when "money was real money"[31].

1.8 Precious metal coin money

A significant step in the history of money was payments of debts by *count* giving way to the use of precious metal money by *weight*. Examples of paying by count in times of barter are two hens for a goose, two geese for a pig, three lambs for a sheep[32], and so on. An example in the non-coin commodity money phase is the payment of one-thousand cowries for a woman in Ghana in 1860. Over time this custom reversed, as we shall see, which is another critical event (that occurred slowly) in the history of money and money creation.

The use of precious metals as non-coin money seems to have a relatively short history – judging by the lack of information in the works of the authorities on the history of money. It is evident that precious metals were wrought into diverse shapes initially, such as "unmarked lumps of various shapes and sizes"[33], and "blobs or 'dumps' "[34], and later into bars of various sizes. They were accepted as a means of payment according to *weight*. Over time these bars were developed into smaller and standardised sizes[35].

Initially these bars carried no name; they just had a standard weight. Their fineness was also an issue, which was later solved by a public authority placing its stamp on each bar as a guarantee of fineness. Davies[36] postulates that this was a practice in Cappadocia as early as between 2250 and 2150 BC: "…where the state guarantee, probably both of the weight and purity of her silver ingots, helped their acceptance as money." Generally these bars were used for large payments. Smaller retail payments were generally made by other non-metallic commodities.

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An obvious and logical step following bars of precious metals was coins of precious metals, and the history of precious metal coinage is a rich one. According to Morgan, the "…earliest coins were probably made by merchants, but the function of coinage was soon taken over by governments."[37] The coinage being taken over by government is significant indeed and it more or less coincided with another momentous step in the history of money: the *naming of coins*.

The naming of coins is a momentous event because it paved the way for the payment of debts by *count* (that is payment by counting a certain number of coins) as opposed to weight and, flowing from this, the debasement of coins by kings and princes (and others), which at times was not infrequent. The debasement of precious metal coins is equivalent to money creation. As we shall see, the enthusiastic activities of kings (etc) in this regard were accompanied by the inevitable – periods of inflation.

The first precious metal coins arose in Lydia in the seventh century BC.[38] Lydia (home of the mythical Midas) was much later to become part of the southern coast of Turkey. The precious metal, electrum, a natural amalgam of gold and silver, was panned from the rivers flowing from the mountains in the region. Initially the metal was made into "blobs or dumps" (as seen earlier). Over time the Lydian metallurgical skill improved and gold and silver were separated from electrum. Also, new separate sources of gold and silver were discovered. Thus separate gold and silver coins appeared. Even when separated into gold and silver "coins", they were initially[39] "…heavy, cumbersome, irregular in size and unstamped." Later they "…were then punch-marked on one side and rather lightly inscribed on the other. Such inscriptions were at first hardly more than scratches, and probably meant more as a guarantee of purity rather than of weight." This made the coins more acceptable but not entirely so in terms of the significant features of coin money: the guarantee of coins in terms of purity and weight, as well their naming – all the features that make them acceptable by *count*.

This came a short while later: "…as they became more regular in form and weight the official authentication was taken to guarantee both purity and weight…" The final step came sometime in the second half of the seventh century BC when "…they had undoubtedly become coins, rounded, stamped with fairly deep indentations on both sides, one of which would portray the lion's head, symbol of the ruling Mermnad dynasty of Lydia." The reigning king at the time was Croesus.

All the features that made precious metal coins acceptable in payments by *count* were in place: the coins were of a standard round size (meaning the weight of each coin was the same) and they were named. The naming and the fact that they were minted by the king meant that the purity was guaranteed. This practice soon spread to neighbour Greece and beyond, spurred on by trade.

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It was the stamps / emblems on the coins that imparted names to them[40]: the lion's head of Lydia, the winged horse of Corinth, the owl of Athens, and so on. Later on city emblems or representations of the gods were stamped on coins. Even later the images of rulers (departed and later alive) were placed on coins: for example, Alexander the Great and Julius Caesar.

The availability of standardised precious metal coin money, as it spread further, soon drove out the other types of money because it was superior to any previous money types. Davies, referring to Jevons, states: "Once it had become available, the increased preference for metallic money is easily appreciated, for… it possessed…to a higher degree that any other material, the essential qualities of good money, namely, cognizability, utility, portability, divisibility, indestructibility, stability of value, and homogeneity."[41]

Of these features of coins, cognizability is correctly placed first. Because coins could be easily recognised (which imparted some of the other qualities of coins – mainly weight and purity of the metal), they could simply be *counted* in the settlement of debts. Because of this feature, and since they were portable (etc), trade was enormously facilitated. It is quite evident that even though different countries had different coinage, exchange rates between them must have been negotiated.

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1.9 Money creation in the precious metal coin money age

1.9.1 Introduction

As stated earlier, the history of coinage (from now on meant to be standardised precious metal, and named, coins, used by count) has a long and rich history. As our main issue here is new money creation, we fast forward to later AD periods, and attempt to answer the questions: how did additional money enter circulation (which applies to the earlier periods) and how did new money creation "out of thin air" take place (which applies to later periods)? The phenomenon of money creation then had a number of forms (the obvious one, de-hoarding, is ignored here because the amounts are small):

- Pillage.
- Counterfeiting.
- New ore discoveries and mining.
- Clipping.
- Debasement.

Before we consider these forms of money creation, it is necessary to pronounce that gold was generally in short supply and highly valued relative to silver. Gold was therefore mainly used for large trade transactions and was later kept by banks and even later by central banks as reserves. International trade credits were settled by the physical transfer of gold. Silver became the principal coin money type.

Strong evidence of this fact is found in medieval Europe[42]. During the reign of Charlemagne (also known as Charles the Great and Charles I, c742–814), who had consolidated a large part of Europe under his rule (called the Carolingian Empire), the role of silver as the medium of exchange was entrenched. This move was started by his father Pepin and "…Charlemagne completed his father's work and gave it its final form." Scholars call the monetary system he created "silver monometallism"[43].

It was in this period that one of the world's main currencies appeared: the pound. The long history of the pound and the fact that a significant episode of new money creation emerged in London in the seventeenth century are the reasons for this text's focus on Britain from here on forward (except in certain cases, as in the following paragraph).

1.9.2 Pillage

As regards the money "creation" form of *pillage*, Morgan[44] provides a fine example. He informs us that there is reason to believe that as Alexander the Great spread his wings in Europe he took possession of large amounts of the treasure hoards of the rulers he subdued and that "…this sudden increase in the supply of money was associated with a violent rise in prices. If this were so, it would be a very early example of monetary inflation, but the evidence is too sparse to be conclusive." He did not elaborate on the sparse evidence.

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1.9.3 Counterfeiting

Counterfeiting was an issue over the ages, including in the coin era. However, we need not belabour this issue because the amounts counterfeited were probably not large enough to cause inflationary episodes. What is interesting about this limited form of money creation is the penalty associated with counterfeiting: according to Pirenne: "…the prospect of being boiled alive [did not] deter counterfeiters from the temptation of exploiting a state of affairs so favourable to them."[45]

1.9.4 New ore discoveries and mining

New silver ore *discoveries* and the mining thereof added to the stock of coins, that is, new money was created. Silver deposit discoveries in Europe were rare, and most of the new silver came from elsewhere. The discovery of America yielded new silver. The Spanish conquerors relieved their new subjects of silver and gold, and in the sixteenth century they opened new mines in the New World which added a steady supply of silver. The Potosi mine (then in Peru, now in Bolivia) yielded the largest amount of silver.[46] As was to be expected, inflation came to pass. Morgan[47] tells us that the new Spanish silver metal "…spread over the whole of Europe and, everywhere, the increase in the supply of money was associated with rising prices."

1.9.5 Clipping

Clipping, a form of debasement, was related to the intrinsic value of the precious metal coins, and the fact that they were easily recognised and named. Clipping was the word for cutting small amounts from coins as well as filing metal from the edge of the coin, making it slightly smaller. The clippers relied on the fact that after clipping, that is reducing the intrinsic value of the silver coins, they would continue to be *recognised* and used for payments. They were quite right and the practice of clipping was widespread.

The practice of clipping was frowned upon but not stopped for many years. Good coins were clipped and put back into circulation leading to all in circulation becoming "bad", i.e. the currency falling well below the legal standard. An example of the legal standard was the reign of William the Conqueror. The main mint was established in the Tower of London (hence the name "the Tower pound" used at the time), and the state adopted for silver coins a standard fineness of 925 parts of pure silver in 1 000, and this came to be known as "sterling silver" and "the ancient and right standard of England".[48] Clipping was one of the reasons for the re-minting of coins and their debasement by the state.

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Box 4: example of clipped coin

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1.9.6 Debasement

Before we consider the principal method of money creation that took place in England in the coin money stage, *debasement of coinage*, we need to consider the origin of the pound and its parts. Under the Carolingian monetary system referred to earlier, the state had sole control of the mint. The basis of the coinage of this system was the *pound*, which replaced the Roman currency. An interesting fact here is that the pound became the unit of account, but it did not have a physical form. This is an important fact when one considers that bank deposit money also does not have a physical form.

Even though the pound did not then exist in physical form, it was declared by the state to be equivalent to a certain fixed number of the coins that did exist, called pence (half-pence also existed). The pence were minted of silver of a standard purity and were of a particular size and weight and stamped with images on both sides. Old duffer readers will recall financial accounts in *pounds, shillings and pence*. What was the shilling? It also did not exist initially; like the pound it corresponded to a certain number of pence.

The silver pence (called pennies) had a weight of 2 grams of silver, and half-pence a weight of 1 gram of silver. A shilling (as already noted it initially also did not exist in physical form) corresponded to 12 pence. The pound corresponded to 240 pence; therefore it had a weight of 480 grams of silver. Clearly, the pound was also equivalent to 20 shillings (20 × 12 pence = 240 pence × 2 grams = 480 grams), and to 480 half-pennies each of which weighed 1 gram.[49]

Minted by the state, which granted to itself the sole right of coinage, the currency was declared legal tender; Pirenne informs: "Extremely severe penalties were promulgated against counterfeiters and those who refused to receive the legal deniers [= old name for pence] in payment were punished."[50] From this expert opinion it is quite clear that counterfeiting was considered a far more severe crime (as indicated above, counterfeiters were boiled alive at one stage) than not accepting the currency. The latter punishment was probably unnecessary because the coins possessed all the qualities of ideal money as expounded by Jevons: cognizability, utility, portability, divisibility, indestructibility, stability of value, and homogeneity.

As noted earlier, the most significant feature of coin money that led to significant new money creation much later was "cognizability", i.e. the fact that the coins were *recognisable* and *named*. The quality "stability of value" (remember the "store of value" role of money?) of the coins is related to its intrinsic value (= value of the precious metal); this is what was compromised in later times, i.e. the coins were *debased*.

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This brings us to debasement of the coinage by the state. There is evidence of state attempts to maintain the standard of coins. For example, when the parts of the pound (pence) were first issued by Charles the Great "… he took the greatest pains to keep up the standard of weight and alloy of its coins."[51] Similarly, Morgan informs that after William the Conqueror's reign (when a new standard for coinage was set as shown above), "[f]rom time to time kings departed from this standard, but such conduct was always viewed with disfavour, and pressure of public opinion forced a return to the standard which was regarded as 'ancient and right'."[52]

However, this was not to be the case for long. Newlyn[53] sets the scene: as soon as "…coins [are] accepted by count rather than by weight…the possibility emerges of a divergence between the bullion value of the coin and its purchasing power[54] as a unit of currency. This possibility opened up the opportunity of 'debasing the coinage' – an opportunity of which, historically, kings have not been slow to take advantage."

After the break-up of the Carolingian Empire in the second half of the ninth century, which led to the formation of separate states, the Charlemagne pound was replaced by other currencies in some of the new territories.[55] The pound remained in others and as we know still remains as the currency of the UK. According to Pirenne, amid the confusion and anarchy after the break-up, the state (kings, feudal princes, and in some cases churches) "…were not slow to usurp the right of coinage…and…in the absence of any effective control, their weight and fineness became more and more debased."

How was the debasing of coinage effected? At times (sometimes frequently) the state would withdraw all coinage from circulation, and mint new coins with the same names, but they were smaller and of less weight (in some cases) but always debased with alloy (i.e. less silver and more base metal). There was a "profit" of course – in the form of *additional coins of the same name* – and these were for the account of (i.e. kept by) the state, to be spent later. The "profit" was given a name later: seigniorage[56], a word that applies today.

Serious debasement of coin money took place on a number of occasions in history. For example, by the end of the fifteenth century, 480 silver pennies were coined from a pound of silver instead of 240 pennies previously. Thus, the *weight* of the penny was reduced (from 2 grams to 1 gram).[57] During the reigns of Henry VIII and Edward VI debasement of the currency took place in the form of reducing the silver content of the coins (i.e. their fineness). From 1542 Henry VIII began reducing the fineness of the coins and this continued through the reign of Edward VI – from 915 parts per 1 000 to 250 parts per 1 000 of silver. This serious debasement of the coinage (= money creation) caused a period of high inflation. Morgan estimated that between 1540 and 1560 prices doubled.

The debasement of the coinage continued in the reign of Elizabeth I. Harrod[58] informs us that "…in the time of Queen Elizabeth 1 the pound [currency] contained only about 4 oz of silver."

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It will by now be evident that this was possible because of the reality of money being accepted by *count* and not weight, which is associated with the naming of money (penny, shilling, etc) and the concept of legal tender. As we saw earlier when governments designate the *names* of coin money as legal tender only these may be used for the tender of payment, *irrespective of the intrinsic value of the coins*. This is why, today, the coins used for payments have almost zero intrinsic value.[59] They may be referred to as *token* coins (defined as coins of which the value of metal is less than their purchasing power).

The debasement of the coins was the early equivalent money creation "out of thin air" as occurs today. As we know, bank notes have zero intrinsic value, and yet they are used for payments with ease; they are also *token money*[60], to which we turn in the next section.

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2 Bank note and deposit money

2.1 Learning outcomes

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

1. Describe the history of the goldsmith-bankers and the origin of bank note money.
2. Elucidate the origin on bank deposit money.
3. Discuss the significance in history of bank note convertibility into gold.

2.2 Introduction

We have discussed the origin of money up to when money was named-coins. We know that irrespective of the intrinsic value of coins, they circulated as the means of payments because they were *named*. This is why they could be debased and new coins created, adding to the amount of money in circulation.

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In this section we discuss the origin of bank note money and bank deposit money, the advent of which in the 17th century completed the components of money as we know them today. Originally (once money was thus comprised), the majority of money was coins. As time elapsed bank notes evolved in convenience (made out to bearer), and later bank deposits grew in volume as their expediency for payments was recognised. Today, bank notes and coins (N&C) are dwarfed by bank deposits (BD) in the components of money. To recapitulate what money is comprised of:

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

In this section we also discuss the "natural" brake on money creation in the past: convertibility of notes into gold coin / bullion, and its later demise. Convertibility was the origin of the reserve requirement (RR), and the demise of convertibility had profound consequences. This section is arranged as follows:

- Bank note money.
- Bank deposit money.
- Bank note convertibility into gold.

2.3 Bank note money

2.3.1 Introduction

It is often erroneously said that bank notes first appeared in London in the seventeenth century, starting with the receipts of the goldsmiths, which a little later morphed into bank notes. The accolade for the first bank notes actually goes to China, and they were printed on leather (of the indigenous deer). This transpired around 118 BC but it was short-lived.[61] The backdrop to this phenomenon is unclear.

The next reference to note issues in China was about 900 years later and these notes were made of paper. It was to be a temporary substitute for the copper coins then circulating because of a shortage of copper. More and more issues took place in the ensuing years / decades and it is reported that by 1020 the total issue of notes had become so excessive that inflation resulted. This practice continued and more bouts of inflation came about. It is clear that the notes were convertible (in that they had a face value denominated in coins), but the amount of coins per bank note was lessening as note issues continued. It is also clear that, as the notes became steadily worthless, citizens attempted to convert the notes. This is gleaned from the fact that in 1294 a proclamation was issued imposing the death penalty on those who refused to accept the notes.[62] It is possible that this could have been the genesis of the concept of legal tender.

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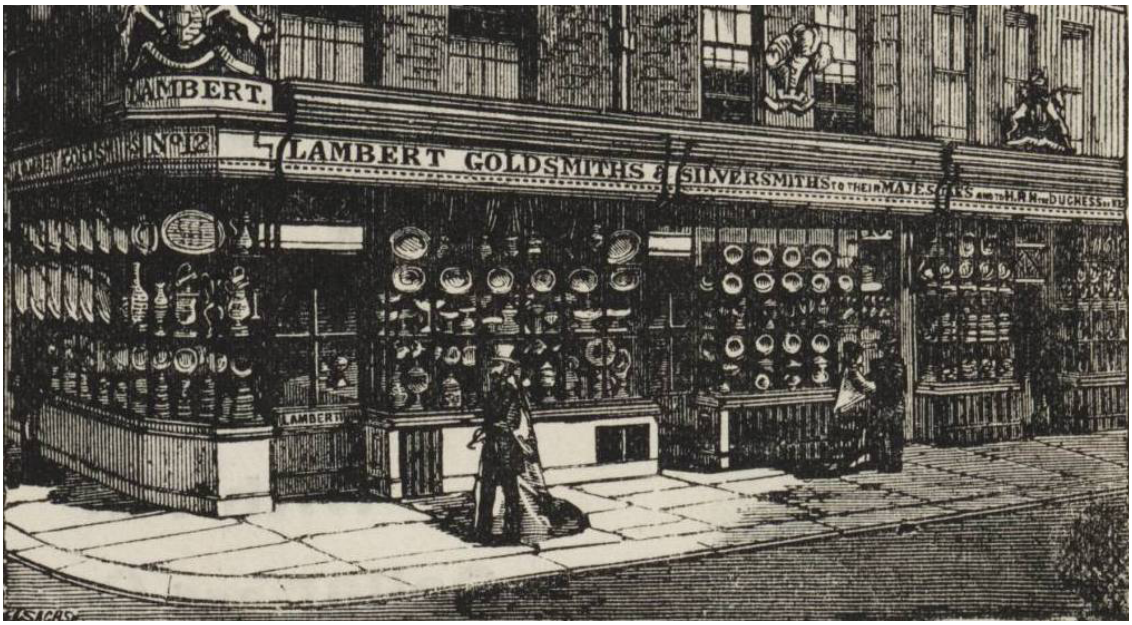
In England, bank note money started life as the receipts issued by goldsmiths (which evolved into the first bankers in England) for deposits of precious metals (gold and silver). Because of their precious metal backing and convenience the receipts became to be used as a means of payment. These receipts were soon made even more convenient by smaller denominations and a bearer covenant (as opposed to the name of the depositor).

Box 1: Lambert goldsmiths, London



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The goldsmith-banks soon discovered that they could make loans with these receipts (later known as bank notes) instead of precious metals: just by issuing new receipts to borrowers. Money creation in the true sense was born. The goldsmith-bankers had a self-imposed limit on bank note (i.e. money) creation: the need to maintain a healthy reserve of gold coins to meet bank notes being converted into gold coins (deposit withdrawals). As we will see, a number of goldsmith-bankers and country banks were not overly concerned with bank note convertibility and many went to the wall with the savings of many depositors.

2.3.2 Precious metal deposits with goldsmiths

For centuries, silver coin was the chief means of payments in England. Gold coins did exist alongside silver coins, but remained in the background because of the complications of bimetallism[63] (which was related to the relative valuation of the gold and silver coins).

Gold coins were introduced to England on the back of international trade and they were mostly used for large payments initially, and as bank reserves later. The volume of gold coins grew steadily over time and became the basis of the British monetary standard, as we shall see later. This started in the middle of the eighteenth century and persisted until 1931.[64]

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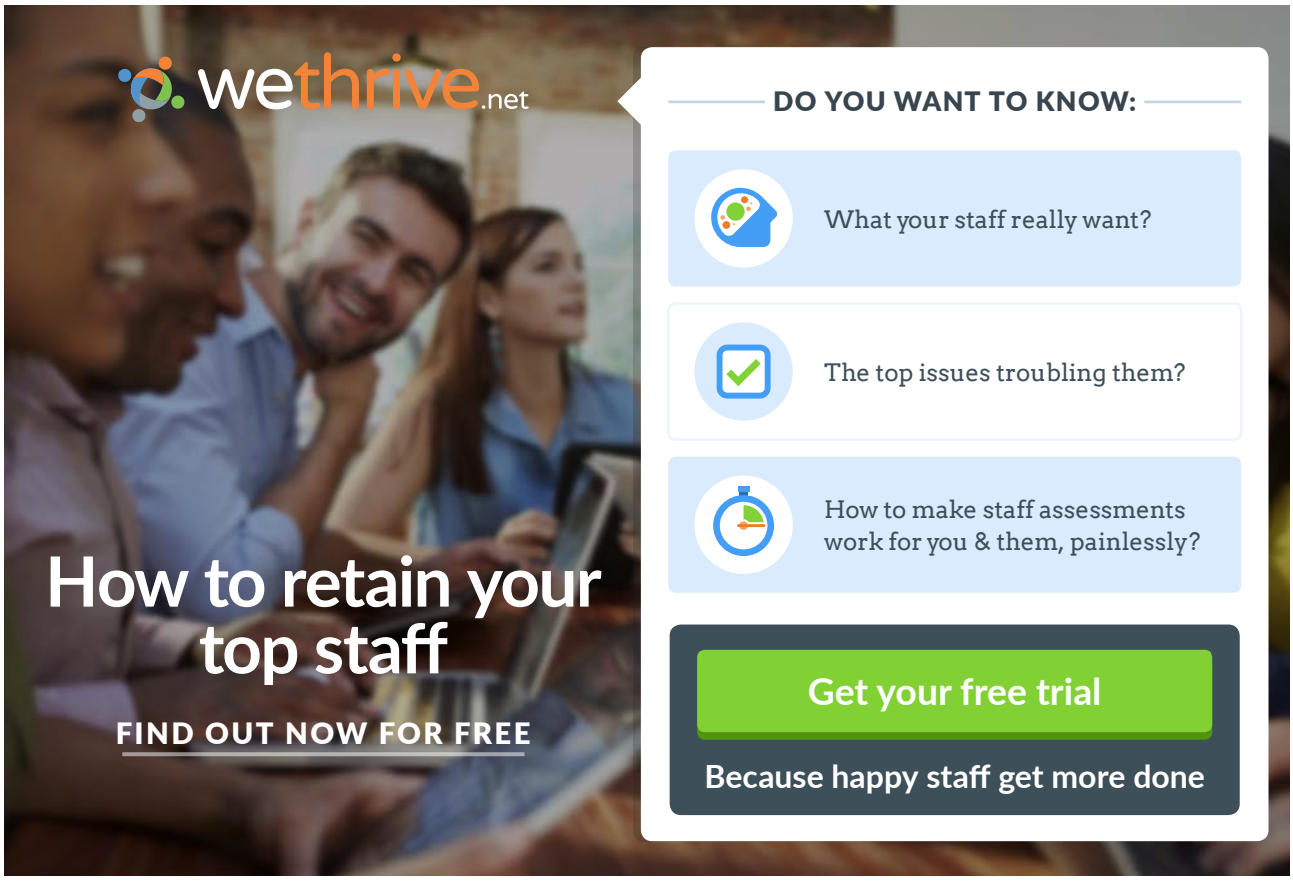
Bank notes as we know them today have their origin in the receipts for gold and silver coins deposited with the gold- and silversmiths for safekeeping (for the sake of brevity we call them goldsmiths from now on). They became London's first bankers, and are rightly called goldsmith-bankers by some authors. Their story in respect of the first bank notes and money creation in a new form is particularly interesting.

It began in the seventeenth century London. The business of the goldsmiths was the production and sale of silverware and traffic in silver and gold coin and bullion, including the exchange of foreign coins for local coins and vice versa (= foreign exchange dealers). As they had secure safe-boxes and were well-entrenched with some banking functions, they naturally were chosen by the wealthier public as a depository for the gold and silver coins. The goldsmiths eagerly embraced these banking functions.

The earliest goldsmith-banker receipt for a precious metal deposit is one issued by Lawrence Hoare in 1633 (see Box 2[65]), and this is the year that is generally accepted as the year when banking actually started in London. Before this, banking activities, such as lending, transferring of money, discounting of bills, and so on, did exist and for a long period, but these functions were performed part-time by a variety of traders such as the wool brogger, the corn brogger, the tax farmer, the pawnbroker, the scrivener and the goldsmith[66].



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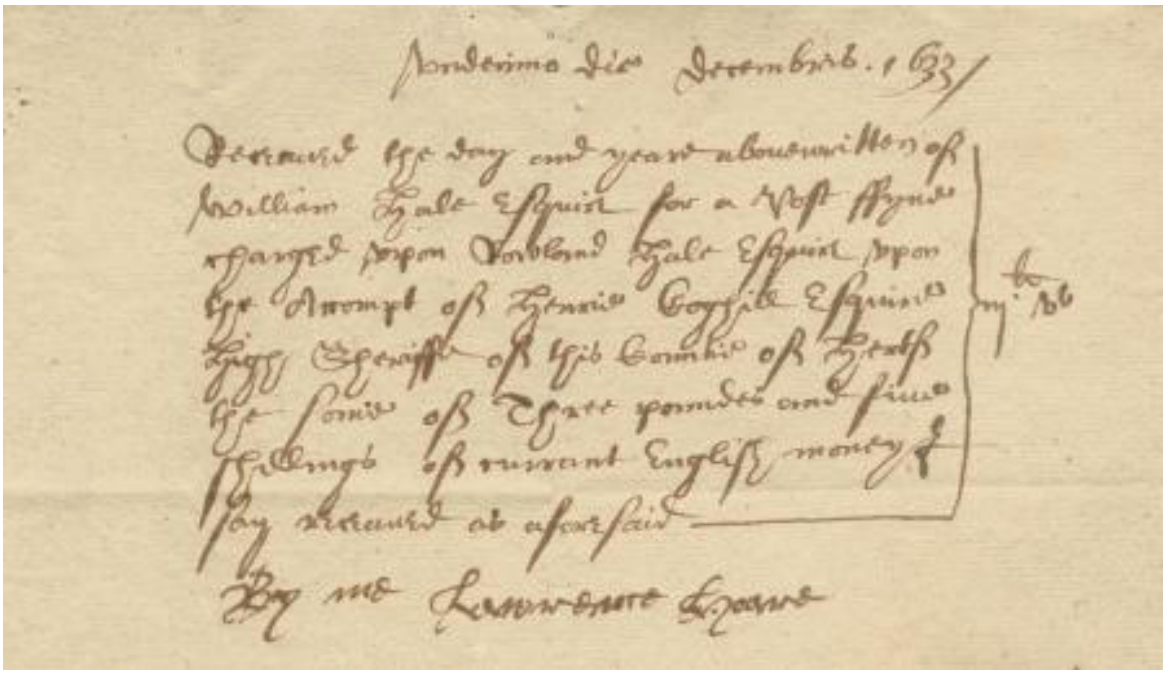
Box 2: earliest surviving goldsmith-banker receipt (1633)



Undecimo die decembris 1633

Receaved the day and yeare abovewritten of William Hale Esquire for a Post Fyne charged upon Rowland Hale Esquire upon the Accompt of Henrie Coghill Esquire High Sheriff of this Countie of Hertf[ordshire] the Sume of Three poundes and five shillings of currant English money I say receaved as aforesaid.

By me Lawrence Hoare

Source: C Hoare & Co

Although deposits of precious metals were made with goldsmiths as early as 1633, most of the wealthy deposited their coins for safekeeping with the Mint in the Tower of London. However, when King Charles I appropriated 200 000 pounds worth of coins in 1640, the wealthy "…no longer trusting the government…resorted to the practice of depositing their money with goldsmiths…"[67] The goldsmiths' new venture as bankers was born, a significant historical event.

They naturally issued receipts for the deposits. Jevons informs: "As acknowledgement of the possession of such sums of money, the goldsmiths gave receipts, and at first these documents were special promises…"[68]

Allow me to present an example, as in Figure 1: Mr A deposited 100 one pound coins[69] with Goldsmith-banker A (by this stage the one pound coin was in existence) who issued a receipt for this amount. So Mr A's total assets did not change; only the composition did. Goldsmith-banker A gained an asset in the form of gold coins and incurred a liability because the receipt he issued was convertible into gold on demand.

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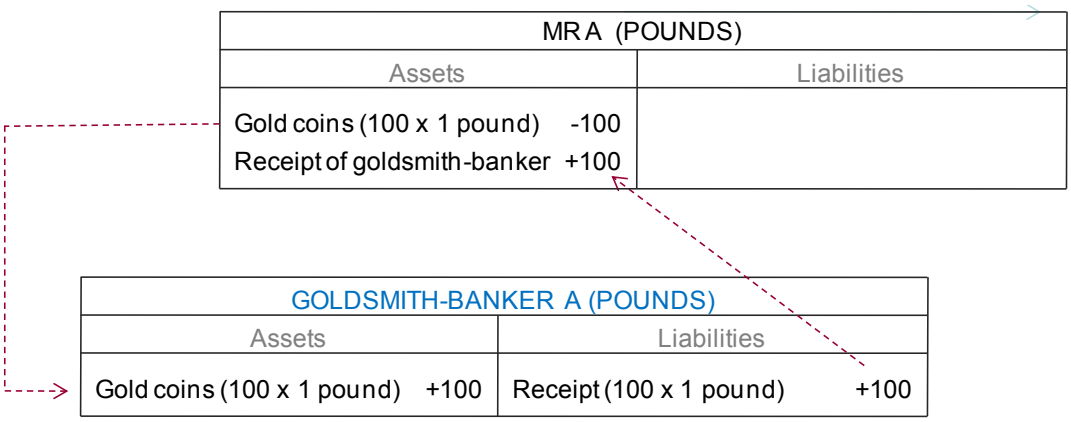

FIgure 1: deposit of gold coins

2.3.3 Precious metal loans by goldsmiths

The goldsmith-bankers also eagerly embraced the business of providing credit. Because they over time became the custodians of many customers' deposits of gold and silver coins, they could safely provide credit in the medium of exchange, coins, i.e. without running short of coins for those who wanted to withdraw their deposits. Let us assume that Mr B obtains a loan / credit of 20 one pound gold coins from Goldsmith-banker A. Their balance sheets change as indicated in Figure 2.

The loan / credit was granted at a rate of interest. This was a significant event. Although paying interest was nothing new, the goldsmith-banker could now afford to pay an attractive rate of interest to depositors, in the hope of attracting even more depositors – because gold deposits enabled the goldsmith-bankers to provide credit (in gold coins).

2.3.4 Goldsmith receipts as a means of payments

An epoch-making event took place just in the mid-seventeenth century, and this was that the deposit receipts of the goldsmith-bankers, which hitherto had been issued in the name of the depositor, were now being issued to bearer, i.e. *the receipts had started being used as a means of payment.* The receipt holders found it possible to use the receipts as a means of payment because they were backed by gold, and were convenient. Thus the recipient of the receipt had a claim on the goldsmith-banker for the amount of gold coins stated on the face of the receipt.[70]

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MR B (POUNDS)			
Assets		Liabilities	
Gold coins (20 x 1 pound)	+20	Loan from goldsmith-banker	+20

GOLDSMITH-BANKER A (POUNDS)			
Assets		Liabilities	
Gold coins (12 x 1 pound)	-20		
Loan extended (Mr B)	+20		

Figure 2: loan of gold coins

This practice became the norm for payments and depositors came later to demand of their goldsmith-bankers receipts in smaller denominations. 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. [Note that the gold coins in the vaults of the goldsmith-bankers are not included – because they are represented by tokens – the receipts.]

This historical event is described by Jevons[71]: "The practice arose of transferring possession by delivery of these receipts, or 'goldsmith's notes' as they were called." Jevons[72] adds that "Such notes are…referred to in…some statutes…hey had become general and not special promises – mere engagements to deliver a sum of money on demand."

2.3.5 Goldsmith loans by the issue of receipts

It did not take long for a goldsmith-banker to realise that if the goldsmith-bankers' receipts were being used as the means of payment, then credit demand could be satisfied not by gold coins, but by the issue of new goldsmith-banker receipts. This was another 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.

Davies, quoting another[73], refers to this event as follows: "…some ingenious goldsmith conceived the epoch-making notion of giving notes [i.e. receipts] not only to those who had deposited metal, but also to those who came to borrow it, and so founded modern banking." It is appropriate from here on we refer to goldsmith-banker receipts as *bank notes* and to the goldsmith-banker as *bank*.

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MR B (POUNDS)			
Assets		Liabilities	
Bank notes of Bank A	+100	Loan from Bank A	+100

BANK A (POUNDS)			
Assets		Liabilities	
Loan extended (Mr B)	+100	Bank notes	+100

Figure 3: loan by issue of bank receipts / notes

An example is in order. Mr B is successful in borrowing 100 pounds from Bank A. Bank A issues bank notes to the value of 100 pounds. Bank A charges Mr B an interest rate of 3.0% per annum. The balance sheets of the parties to the deal change as indicated in Figure 3. Money (= bank notes) was created by the strokes of a pen and by the accompanying accounting entries by a bank!

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The earliest recorded English case of a bank note being used as a means of payment is the 29 February 1668 entry in the diary of Samuel Pepys, Secretary to the Navy. According to Davies, "…he casually mentions sending to his father a note for £600 – issued by the goldsmith Colvill."[74]

2.3.6 Bankers' reserves

It will be evident that prior to this major money creation event the proportion of gold coins underlying the notes of the bankers was 100%. As this new method of bank credit / loan provision increased over time the proportion of gold coins to notes in the collective books of the banks declined. An example may be useful. Let us assume that prior to the event, the bankers had on deposit 1 million one pound gold coins (see Figure 4: top balance sheet). Note that this is a stock – not a change – balance sheet.

BANKING SECTOR (POUNDS)			
Assets		Liabilities	
Gold coins	1 000 000	Bank notes	1 000 000

BANKING SECTOR (POUNDS)			
Assets		Liabilities	
Gold coins	1 000 000	Bank notes	1 500 000
Loans	500 000		

Figure 4: gold coin reserves

If the banks in aggregate had after the date of this balance sheet up to another date made loans of £500 000 by the issue of new bank notes to this value, the banking sector's balance sheet would have appeared as in Figure 4 (bottom balance sheet – again a stock balance sheet). Each £1 bank note would then have been "covered" by gold to the extent of 67% (1 000 000 / 1 500 000 = 0.66666).

This new banking practice of providing credit in this manner of course rested on the principle that a certain *reserve* of gold coins had to be kept in the vault to ensure that gold deposit withdrawals could be met at all times. This was termed *convertibility*, i.e. the notes were convertible into gold to the extent of 100% of the face value (in the above example a one pound gold coin for each one pound bank note). The bank note would have stated something like (and persists in many cases to this day): "I promise to pay to the bearer on demand…"

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The practice of keeping a reserve of gold heralded the banking system and central banking money creation control mechanism called the *fractional reserve system*, on which we will have much to say later on. The control mechanism rests on the fact that a certain proportion of reserves cannot not be exceeded, i.e. when the reserve proportion is at its minimum further bank loans cannot be granted. It is to be noted that many scholars are under the mistaken impression that this system still exists (albeit in a different form) in all countries, and that money creation exclusively revolves around it.

Not much data pertaining to the growth in bank note money in the period under discussion exist. However, Davies informs us that at the time of publication of Adam Smith's Wealth of Nations in 1776, bank money exceeded bank metallic money. *Bank money* by this time was not just *bank note money* but also a close substitute: *bank deposit money*, the subject following this. Its appearance is yet another landmark in banking history.

However, before we get there, *yet another* milestone in English banking and economics, which had major relevance to bank note and bank deposit money creation, and monetary policy much later, must be revealed: formation of the Bank of England. Foreign banks had for an extended time done mainly trade-related business in England, particularly the public banks of Italy, Sweden and Holland. It was also considered prudent to have a public bank to compete with the goldsmith banks, which were becoming much disliked because of their usurious activities (= charging high rates of interest). We are informed by Davies that: "[d]islike of the usurious practices of the goldsmith bankers was a prominent motive stirring on the projectors of potential new institutions."[75] The public, joint-stock Bank of England was formed in 1694.

Box 3: Bank of England in 2010

Source: AP Faure

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2.4 Bank deposit money

2.4.1 Introduction

The major historical shift to the formation of deposit accounts for clients and the transfer of amounts from one account to another is a defining moment in the history of money and money creation. Bank deposit money and the transfer of money from one bank account to another can be traced back to Babylonian times. When England created the bank deposit in the seventeenth century it had many precedents, not only from ancient times but also from other European countries. However, there is no evidence of money creation in this money form. This emerged in England when the goldsmith-bankers created current accounts for customers called "running cashes".

The way was paved for the next significant step in the history of money and money creation: deposit money creation by the banks through the making of loans to the public by simple credits to deposit accounts created for them (i.e. funding of these accounts). This was later refined to the creation of overdraft facilities. The Bank of England was formed in 1694 and was not slow to make loans to the government and to the private sector by credits to current accounts and the issue of new bank notes (on which it eventually had a monopoly).

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2.4.2 Historical backdrop

When this new practice entered English history, it had much history from other parts of the northern hemisphere as precedents. As mentioned, bank deposit money can be traced back to Babylonian times[76]. The then primitive banking operations were carried out by the royal palaces and temples – because they could ensure the security of *deposits*. Deposits first consisted of grain (then regarded as a medium of exchange) deposits in "grain banks" and later other commodities, and even later, precious metals. As in England much later, receipts for the grain deposits were issued and were later used as a medium of exchange. As stated by Davies: "Receipts testifying to these deposits gradually led to transfers to the order not only of the depositors but also to a third party." It is interesting to note that such non-coin-based business preceded coinage by some hundreds of years, that is, it was the reverse of later European advances in money. [77]

The first banking firms of Babylon are unidentified. The oldest for which records do exist was the "Grandsons of Egibi" in seventh century BC Babylon. They performed a variety of business activities and banking. "…they accepted a wide range of deposits. 'Customers could have current accounts with them and could withdraw the whole or parts of certain deposits with cheques.'" A second recorded banking firm was the "Sons of Maraschu". It is notable that while the banking firms of Babylon (and elsewhere) were also engaged in lending, there is no evidence of the creation of money. Loans were made of the underlying assets of paper money but not of newly-created (that is, non-asset-backed) paper money or deposits (it seems).[78]

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Box 4: example of cuneiform tablet from Babylonian times

Hundreds of thousands of cuneiform tablets have been unearthed by archaeologists at various old city sites along the Tigris and Euphrates, particularly Babylon. Many of them were deposit receipts and monetary contracts, confirming the existence of simple banking operations. Source: www.ant3145-mesopotamia.wikispaces.com

One of the essential characteristics of banking is the transfer of deposits from one bank account to another bank account; as we know, this is the principal means of payments today. As seen above, bank accounts and bank account transfers date from Babylonian times. However, this system of transfer was regarded as a rudimentary one until the creation of an efficient giro system[79] of transfer of bank account balances in Ptolemaic Egypt (that is, in fourth century BC). Mainly because of a shortage of metal money, grain had for centuries possessed a medium of exchange status. By the time of the Ptolemies Egypt had a developed an efficient system of grain banks[80] and transfers of deposits, and Egypt is generally honoured as the mother one of the most significant financial innovations in banking history: a system "…that enabled a nationwide circulation and transfer of credit."

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An Egyptologist[81] accounts for the efficient Egyptian payments system as follows: "…the payments were effected by transfer from one account to another without money passing." Not being a finance / economics man the Egyptologist did not grasp the significance of the efficient payments system in the history of money and later money creation: that the *balances* transferred from one account to another were the *means of payment*. And, underlying the deposit account balances was a commodity: grain. Thus, money creation was not an issue here.

Banking services for millennia included not only deposit transfers, but also foreign currency exchange, as well secured and unsecured lending. Heichelheim[82] lists deposit banking, foreign exchange, giro, secured and unsecured lending, internally and externally, as having existed as banking products already as early as the third millennium BC. Notable here is that the function of bank lending that existed then is in danger of being accused as representing new money creation. It was not the case at that stage in history; loans of precious metal coins, grain, other commodities and so on were made, and not, as far as can be ascertained, the creation of new deposits from loans. This epochal step was to come later.

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2.4.3 Banking in Europe

Banking in Europe emerged later on the back of the shifting tides of power and of trade. After the demise of the Roman Empire (27 BC–476 AD) it is recorded that banking emerged again and that the means of payment in Italy was the bank deposit (in addition to coins). Morgan informs us that "…banking was being practised again in Italian cities, probably as early as the twelfth century, and transfers of bank deposits were again being used as a means of payment." However, even though bank deposits were by then a means of payments (i.e. money) the system of transferring payments was not efficient. Morgan refers to it as a "clumsy" system, because the payer had to give the banker an oral instruction and the payee had to signify his agreement in the presence of witnesses. This practice was only improved in the later middle ages (approximately fifth century to sixteenth century) when a forerunner to the cheque emerged in the form of an order which was written and signed by the payer (debtor). [83]

It is recorded that the use of bank deposits as a means of payments during the Middle Ages was not confined to Italy. It was practised in many of the cities of the Mediterranean. The European banks were in general running the business of giro (accepting deposit balances and transferring them from one account to another) and were not permitted to make loans. However, according to Morgan[84], in "…practice the temptation to indulge also in money-lending was too strong; bankers often made loans and sometimes they lost their depositors' money, and were unable to pay them in coin on demand."

It is important to point out here that the loans made were almost certainly made in the underlying commodities of the deposits (i.e. coins) and not in the creation of new deposits from which borrowers could pay debts. In other words new money creation was not taking place when these loans were made.

The temptation of lending by banks was widespread[85] and bad loans caused a number of banks to fail. This led to the call for the establishment of public giro banks, which call was heeded by the authorities. Among the best known of these public giro banks were the Bank of St George of Genoa (1408), the Banco della Piazza di Rialto of Venice (1587), and the Bank of Amsterdam (1609). It is recorded that in time these banks were also tempted to make loans and that the Bank of Amsterdam at one stage "…found itself unable to pay its depositors in coin." (Recall that deposits were convertible into gold.)[86]

According to Morgan, "By this time the merchants of Amsterdam had grown so used to the convenience of making payment through the bank that its deposits continued to circulate and to be accepted at their face value…This is one of the earliest examples of a quality of the means of payment on which most modern monetary systems have come to depend; the essential feature of any medium in which payments are made is not intrinsic value, but general acceptability. The vital thing for anyone receiving a payment is to be sure he can pass on whatever he receives in making payments of his own."[87]

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What is the relevance of the above to the creation of money? It is that bank deposits over time became to be generally accepted as the, and later as the main, means of payment: money. And now we know also that bank account deposits were the medium of exchange a long time before the goldsmith-bankers created the current account in London – they thus had a number of long-standing precedents. The current account and an efficient payments system heralded in fine form the creation of money by simple bookkeeping entries.

2.4.4 Rise of deposit banking in England

It will be recalled that once they had created the bank note and it became generally accepted as a means of payment, the bankers were able to create new money by making loans with new issues of their own notes. The next step, bank deposit money, was a logical inevitability. It also took place in the seventeenth century. Harrod[88] articulated this significant step (which was already established in many parts of the northern hemisphere) as follows:

"The client of a bank might say: 'Look, I do not want those notes of yours; they will only get stolen. Can't we just leave it that I am in credit with you for so much, and can draw upon you as and when I need to?' A credit of this nature may be called a deposit. Eventually, to meet the requirement of such a client, the cheque book was devised. A cheque book may be thought of as tantamount to a bundle of notes, each divisible by a pair of scissors into small parts of various sizes. Payments could be made by this method otherwise than in round sums only. A claim in this form could not be so easily stolen as a bundle of notes, and it has the additional advantage that the whole amount does not have to be withdrawn from the bank at the outset, and that the bank might possibly allow interest on what was temporarily left on deposit."

It seems reasonable to surmise that this development was customer-driven; whether the customer had the notes of the bank or a current account balance at the bank with a cheque book, s/he is in the same situation. S/he could settle debts, i.e. pay, for goods and services as easily with the one as with the other. In fact, with most payments it was more convenient to pay with a cheque, because the amount of the payment could be precise.

The bank deposit current account started life in the books of the goldsmith-bankers as "running cashes" and later became known as "current accounts". As we have seen, with the current account the cheque emerged, and it quickly became acceptable as an *instrument* of the new medium of exchange: the *bank deposit.* The earliest English bank cheque to have survived is dated 1659 and is an order by a Nicholas Davies Vanacker addressed to London goldsmith-bankers, Morris and Clayton, to pay a Mr Delboe "or order" the sum of £400.[89]

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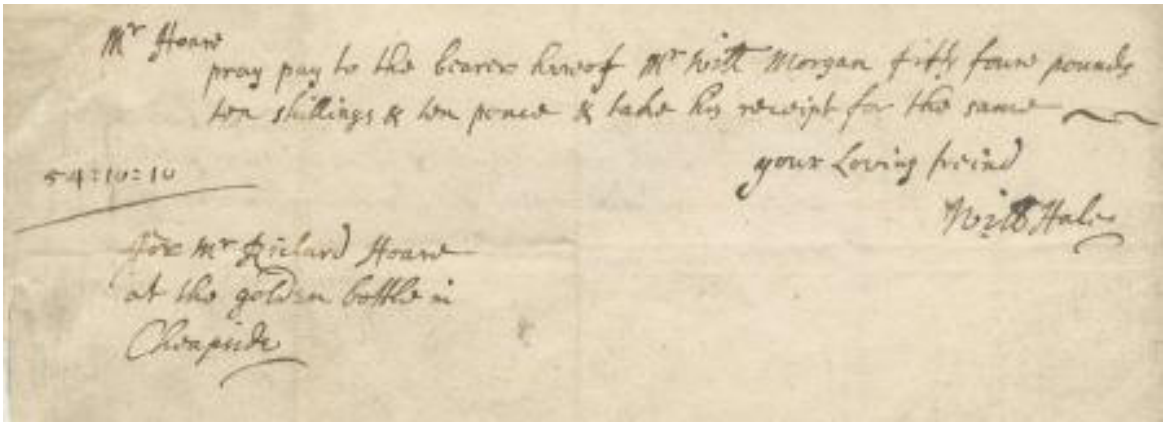
Box 5: example of an early cheque: front (1676)



Mr Hoare
pray pay to the bearer hereof Mr Will[iam] Morgan fifty foure pounds
ten shillings & ten pence & take his receipt for the same
your Loving friend
Will[iam] Hale
54-10-10
For Mr Richard Hoare
at the golden bottle in
Cheapside

Source: C Hoare & Co

In Box 5 we present the obverse of a cheque issued in 1676, and in Box 6 the reverse of the same cheque is offered. The translations (of the company C Hoare & Co mentioned earlier) accompany the original text.

So, in the middle of seventeenth century England, bank deposits became generally accepted as a means of payment, and the cheque became the principal instrument for the transfer of deposits from one person to another. Money (M) was now comprised of: bank notes and coins (N&C) and bank deposit balances (BD) of the non-bank private sector:

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

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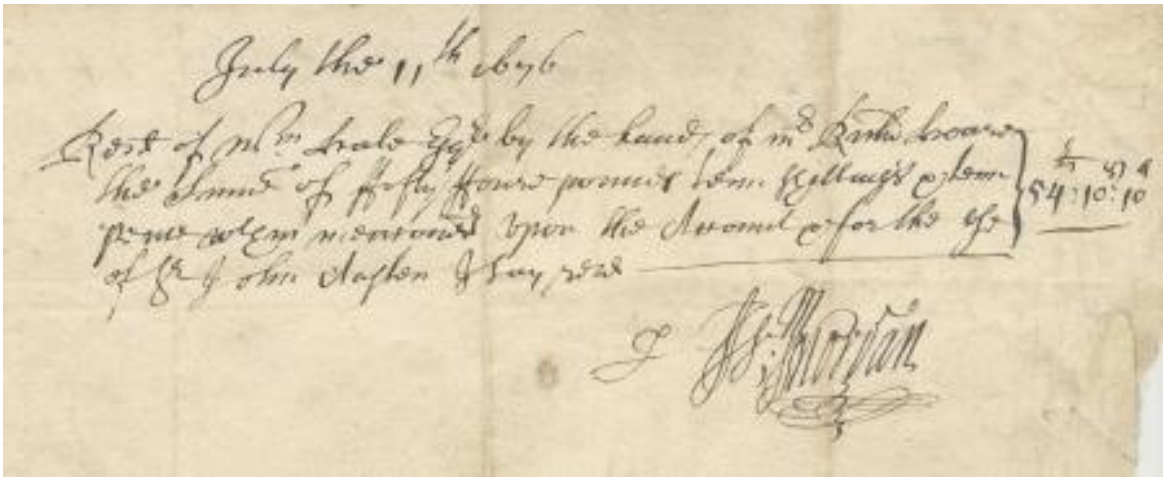
Box 6: example of an early cheque: back (1676)



July the 11th 1676
Rec'd of W'm Hale Esq're by the hands of Mr Rich'd Hoar
the Summe of Fifty Four pounds tenn shillings and tenn
pence when menconed upon the Account & for the use
of Sir John Clayton I say rec'd 54-10-10
W Morgan

Source: C Hoare & Co

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The way was now paved for the next significant step in the history of money and money creation, and this was *deposit money creation* by the banks through the making of loans to the public (and later government) by simple credits to deposit accounts created for them. This was later refined to the creation of the overdraft facility.

It is unfortunate that data on the relative size of the notes and coins in circulation and the stock of bank deposits are scarce. However, Morgan fills us in for 1914 in England: there were less than GBP 40 million of bank notes and about GBP 160 million coins in circulation, and bank deposits amounted to over GBP 1 000 million.[90]

2.4.5 Money creation: household sector

Let us embark on some surmising on how money was created in these early years. Assume that the public in a year borrowed from the banks 11 million pounds; this was granted by the banks in two forms (see Figure 5, which assumes that the money was all borrowed at one time):

- One million pounds in bank notes (some borrowers still wanted this form of money).
- Ten million pounds in loans (credits to the borrowers' current accounts).[91]

Messrs A, B & C did the borrowing to purchase goods from Messrs X, Y & Z to the value of 11 000 000 pounds over the year.

BANKING SECTOR (POUNDS)			
Assets		Liabilities	
Loans	+11 000 000	Bank notes	+1 000 000
		Deposits	+10 000 000
Total	+11 000 000	Total	+11 000 000

MESSRS A, B & C (POUNDS)			
Assets		Liabilities	
Bank notes	+1 000 000	Loans	+11 000 000
Deposits	+10 000 000		
Total	+11 000 000	Total	+11 000 000

Figure 5: moeny creation: bank notes & deposits

Messrs A, B & C pay to Messrs X, Y & Z £1 000 000 in bank notes by handing them over and instruct their bankers by cheque (this is what a cheque accomplishes) to transfer £10 000 000 to their current accounts at their bankers. The balance sheets changes are shown in Figure 6.

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On a net basis Messrs A, B & C's balance sheet changes as indicated in Balance Sheet 1. The banks' collective balance sheet is unchanged from that shown in Figure 5: because the outstanding bank notes just changed hands and the deposit created was transferred from Messrs A, B & C to Messrs X, Y & Z. It will be evident that the amount of money in circulation (the money stock) increased by £11 000 000 and the balance sheet cause of change (BSCoC) was the increase in bank loans. As shown in detail later, when changes in the money stock and its BSCoC are calculated, only the banking sector's balance sheet is analysed.

MESSRS X, Y & Z (POUNDS)			
Assets		Liabilities	
Bank notes	+1 000 000		
Deposits	+10 000 000		
Goods	-11 000 000		
Total	0	Total	0

MESSRS A, B & C (POUNDS)			
Assets		Liabilities	
Bank notes	-1 000 000		
Deposits	-10 000 000		
Goods	+11 000 000		
Total	0	Total	0

Figure 6: payment for goods

BALANCE SHEET 1: MESSRS A, B & C (POUNDS)			
Assets		Liabilities	
Goods	+11 000 000	Loans from bank	+11 000 000
Total	**+11 000 000**	**Total**	**+11 000 000**

The actual cause was the demand for loans from Messrs A, B & C, and underlying this was the demand for goods ($\Delta C = \Delta GDE$) which was supplied Messrs X, Y & Z ($\Delta GDP = \Delta GDE$) who receive the money. This was made possible by the creation of new money by the banks to the extent of £11 00 000 in the form of new bank notes and new bank deposits, that is, the generally accepted means of payment. It will be evident that in the case of new bank notes issued an accounting entry was made and the physical notes were printed, whereas in the case of the bank deposits only the former was effected.

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The creation of money by the goldsmith-bankers as described above is not fiction. It happened in this manner. However, up to now we have probably created the impression that money is created mainly by the banks' lending to the household sector. This is not the case at all. In high inflation times in the distant past the culprit on most occasions was government. We saw earlier how governments debased coin money, based on the fact that coin money was generally accepted by count. Later, governments were not slow to learn that money was to be relatively easily acquired by borrowing from the banks. In fact the creation of the Bank of England was founded on this experience, as we shall see.

2.4.6 Money creation: government sector

In the seventeenth century the banks were substantially engaged in deposit money creation resulting from loans to government in the form of the purchase of the first government bonds (all short-term). They were then called "Exchequer Orders"[92] and essentially were "orders" by government for the Exchequer (= the government tax authority) to pay to the holder of the Exchequer Order an amount (i.e. the amount borrowed) on maturity plus interest on the amount borrowed at stipulated intervals or on maturity. Two points of interest here are the fact that these Exchequer Orders (now called government bonds) were issued against the proceeds of specific taxes at one stage and later against revenue in general[93], and that they were "assignable", meaning that could be "signed" over to a third party, that is, they were negotiable.

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It is also recorded that the goldsmith-bankers were the largest holders of government debt at that time and even "made a market" (that is, quoted buying and selling prices) in these securities.[94] This was a significant step in the history of the bond market.

BALANCE SHEET 2: BANKS (POUNDS)			
Assets		Liabilities	
Loans (bonds)	+1 000 000	Bank deposits	+1 000 000
Total	+1 000 000	Total	+1 000 000

The activity of market making on bonds by the goldsmith-bankers cannot be associated with money creation if their dealing took place in already-issued bonds. To the extent that they bought bonds *at issue* they would have created money, but it is not recorded how they paid government for the new issues. Thus, we can only surmise how this took place. If this was effected by credits to government's accounts by the banks (assuming the banks bought the bonds) (as opposed to the issue of bank notes – although the result is the same) then the creation of money would have been manifested as indicated in Balance Sheet 2 (assuming a new issue of bonds to the extent of £1 000 000). Government's balance sheet would have changed as indicated in Balance Sheet 3.

BALANCE SHEET 3: GOVERNMENT (POUNDS)			
Assets		Liabilities	
Bank deposits	+1 000 000	Bonds in issue	+1 000 000
Total	+1 000 000	Total	+1 000 000

Assuming government spent the funds on goods locally the relevant balance sheets would have changed as indicated in Figure 7 (a reminder: the non-bank private sector is indicated as NBPS).

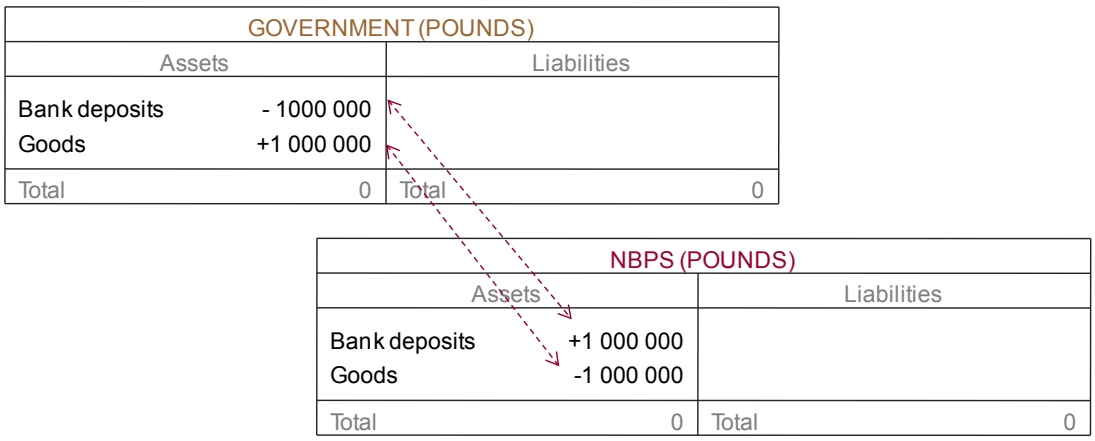

Figure 7: government spending

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The amount of money in circulation (read from the balance sheets of the banks) increased by £1 000 000 million. The BSCoC of the change in money is an increase in bank loans to government, and actual cause is the demand for loans by government (for the purchase of goods).

2.4.7 Money creation: corporate sector

It is also recorded that the goldsmith-bankers' were engaged in the business of buying bills of exchange. The bill of exchange, then also called a "bill on London", was an instrument of lending to merchants. Tied to specific transactions it was a "self-liquidating" loan and also the forerunner of the trade bill and the bank acceptance of later years (which were at the heart of the early money market). A loan to a merchant in the form of buying a bill of exchange with a face value of £1 000 000 would also have resulted in the creation of money as indicated in Balance Sheet 4.

BALANCE SHEET 4: BANKS (POUNDS)			
Assets		Liabilities	
Loans (bill of exchange)	+1 000 000	Deposits (or notes)	+1 000 000
Total	+1 000 000	Total	+1 000 000

We now have two sources of money creation: the demand for loans / credit by the household and corporate sectors (the non-bank private sector – NBPS[95]), and government, which together can be termed domestic loan extension (or DLE). We will later show that there is a third: the activities of banks in the foreign exchange market.

As we have stated a few times in this text, the "discovery" of deposit money creation was probably the most significant event in the history of banking, money and money creation. It liberated economies; Davies[96] puts it as follows: "The new forms of bank money brought a liberating, timely and essential extension to overcome the debilitating constraints of the metallic money supply, and…the bankers offered a range of new financial services beyond the ken of the Royal Mint."

An essential question now arises: was there an intrinsic brake on the monetary system to curb the excessive creation of money and thereby inflation? The answer, which is to be expected from an economist, is yes and no. The "yes" stems from the convertibility of bank notes into gold and the rise of central banking, and the "no" from certain bankers' avaricious disposition and the slow rise of central banking.

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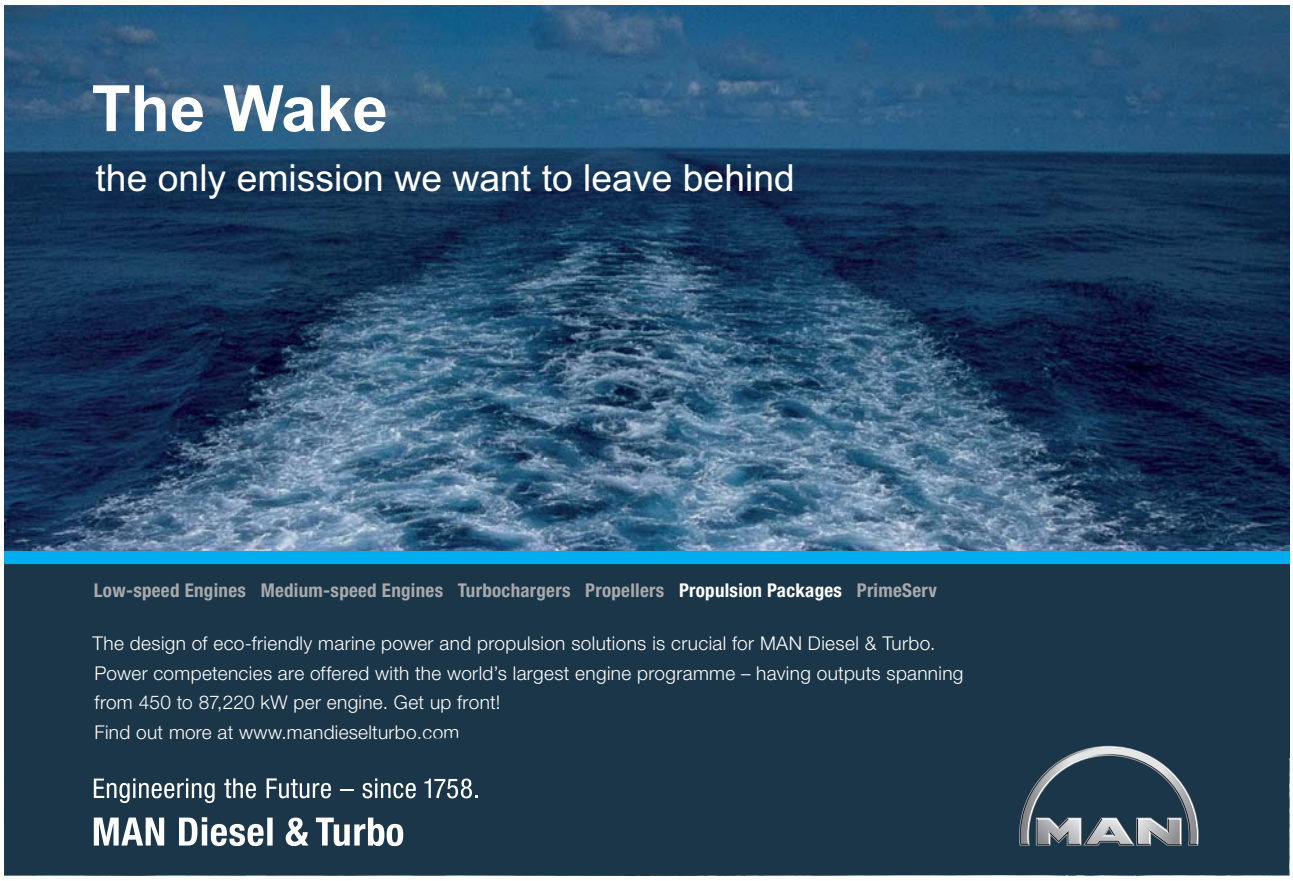
2.5 Bank note convertibility into gold

2.5.1 Introduction

It is reasonable to surmise that the slow rise in deposit money growth (deduced from the 1914 numbers mentioned previously) was a consequence of some factor that can be regarded as an intrinsic brake on excessive money creation at that time. What was this? Essentially it was that bank notes were convertible into gold coins.

Before we proceed with this significant issue it is important to elucidate the situation of bank deposits (as a later addition to money) in respect of money creation. The wonderfully rich literature on the history of money provides few clues as to what constituted the brake on the creation of *deposit money* in early history. We know that bank notes emerged from deposits of gold and silver coins, and that the volume of the latter therefore constituted an intrinsic brake (because of its natural scarcity).

However, bank deposits had a different history; so the question arises: what constituted an intrinsic brake on bank deposit creation? Historical texts are quiet on the issue, but there can be only one conclusion, and it is an obvious one: that bank deposits were convertible into bank notes (and still are), and bank notes were convertible into gold coins. Therefore, holders of bank deposits were in the same position as holders of bank notes: they could convert their bank notes and their bank deposits into gold coins.



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To elucidate this significant issue (of the curbing of money growth), which also constitutes a part of the history of monetary policy, we need to delve back into history.

2.5.2 Convertibility: past and present

We know of the emergence in seventeenth century England of what can be called *token* money, that is, bank notes and bank deposits that have no intrinsic value (as opposed to coins which, made of precious metals and therefore having an intrinsic value, were *real* money). These token monies were convenient for payments, and they were accepted as such because they were also what can be called *representative* monies. This means they were *representative tokens* which were fully convertible into coin money that had an intrinsic value.

This is a significant issue because convertibility gave rise to the need by banks to hold a *reserve of gold coins* so that public demands for the conversion of bank notes into gold were always met. The banks of the earlier centuries knew that not all depositors would arrive at the same time and demand gold for notes. Therefore, they could make loans by the issue bank notes and credits to current accounts (that is create money) up to a point – determined by a "comfortable" reserve of gold. It will be apparent that the larger the reserve of gold coins the higher is the likelihood of meeting demands for gold. Given the natural limit imposed on the supply of gold by the limits of gold ore supply and gold mining technology, there was an intrinsic limit to money creation.

What about modern money? We know that modern money is intrinsically almost valueless. Deposit money (= computer-based accounting numbers) has no intrinsic value at all. We also know that bank notes (= paper money) has no value except the value of the paper on which it is printed, and that coin money has little intrinsic value [= the value of the non-precious (base) metals used to make them]. We also know that modern bank deposit and bank note money is convertible into coin money, and that there is no value benefit to be had in this conversion[97]. And yet we all accept all these forms of money unconditionally as a means of payment. What happened between the era when bank deposits and bank notes were convertible into precious metals and now when they are not?

In a nutshell the answer is twofold. Firstly, money creation and the loss of confidence at times in token money led to utilisation of the convertibility option, which led in turn to suspension of convertibility at times and eventually to permanent inconvertibility. Secondly, at the time of the introduction of permanent inconvertibility, the public had generally come to *completely* accept bank deposits, bank notes and coins by *count*, that is, by face value. Except for high-inflation countries, this is the case worldwide today. The three types of money (coins, notes and deposits) are money because they are generally accepted as a means of payment, and their underpinning is confidence. And herein lays a compelling responsibility: that of maintaining the value of the currency internally and externally. Because money can be created on demand by a borrower from a bank, a strict referee is required: the central bank in its role of implementation of monetary policy.

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What led to the demise of bank deposit and bank note convertibility into gold? In order to answer this significant question we first need to cover the events that inter alia led to the formation of the Bank of England. This bank, which later morphed into a central bank, played a major role in the convertibility issue.

2.5.3 Bank of England

At the time of the early goldsmith-bankers in seventeenth-century London, a number of country banks sprung up and, taking a lead from London, made loans by the issue of bank notes and by creating bank deposits. Many of these banks were tempted to lend indiscriminately and failed when confidence in them caused runs on them. At more or less the same time the London goldsmith-bankers "…had reached a position in late 1671of being so fully loaned up that they refused the king's request for moneys urgently required for the navy."[98]

Box 7: Bank of England in the early days

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It is important to note that "fully loaned up" almost certainly meant that their reserves of gold were at dangerously low levels. It should be evident that, even though the total of gold reserves may have been stable, as the bankers' loans increased the amount of gold per unit of note and deposit (say, per pound) would have decreased – because the increased loan amounts would have manifested in the increasing volume of bank deposits (the money stock). This is extremely significant because it is a reflection of the intrinsic brake on money creation referred to earlier.

The consequences of refusing to satisfy the king's appetite for money were profound. In 1672 the king issued a Proclamation, which came to be known as the infamous "Stop of the Exchequer", which meant that the king reneged on its debt which was held mainly by the goldsmith-bankers. Although many years later they were repaid about half the nominal (face) value of the debt, this spelt the death knell of many of the goldsmith-bankers which had invested heavily in government debt. Their notes became unacceptable as a means of payment, and they could not meet repayments of notes and deposits. Only a few survived, including Richard Hoare (now C Hoare & Co referred to earlier; recall that the bank still exists today).[99]

This and other events (such as the need by government – William and Mary and Parliament – to borrow long-term, to fund the war against Louis XIV and the desire to break the monopoly of the remaining goldsmith-bankers) led to renewed calls for the establishment of a well-capitalised public bank, modelled on the public banks established a few years earlier in Italy and Amsterdam (and elsewhere) referred to earlier, which could play a role in stabilising and maintaining the stability of the monetary system. The Bank of England was formed in 1694, and over time was to perform the functions we now associate with central banking. However, this was not to be formalised until 1946. Before then it was a "normal" bank, but one which was to hold the confidence of the public – except on a few occasions, as we shall see.

A significant step in money history was the granting of a virtual monopoly of the bank note issue to the Bank of England; this occurred not long after its establishment. Other banks were permitted to issue notes only if they were partnerships that had less than six partners.[100] Presumably the government and the Bank of England reasoned that the Bank of England's notes would become *the* means of payments in note form, and that the smaller banks would cease to issue notes because their notes would not be imbued with that essential requirement in banking: confidence.

They were correct. As the Bank of England's notes were winning the confidence of the public most of the London goldsmith-bankers and the other smaller country banks ceased issuing bank notes. The Bank of England also *won the confidence of the goldsmith-bankers*. This was a momentous step in the history of money, money creation and monetary policy. It came to pass that the goldsmith-bankers held *reserves*, not only in gold and silver coins, but in the notes of and deposits with the Bank of England. These came to be known later as the *cash reserves* of the banks, the very epicentre of monetary policy for some time. However, we are getting ahead of ourselves; so back to the seventeenth century we go.

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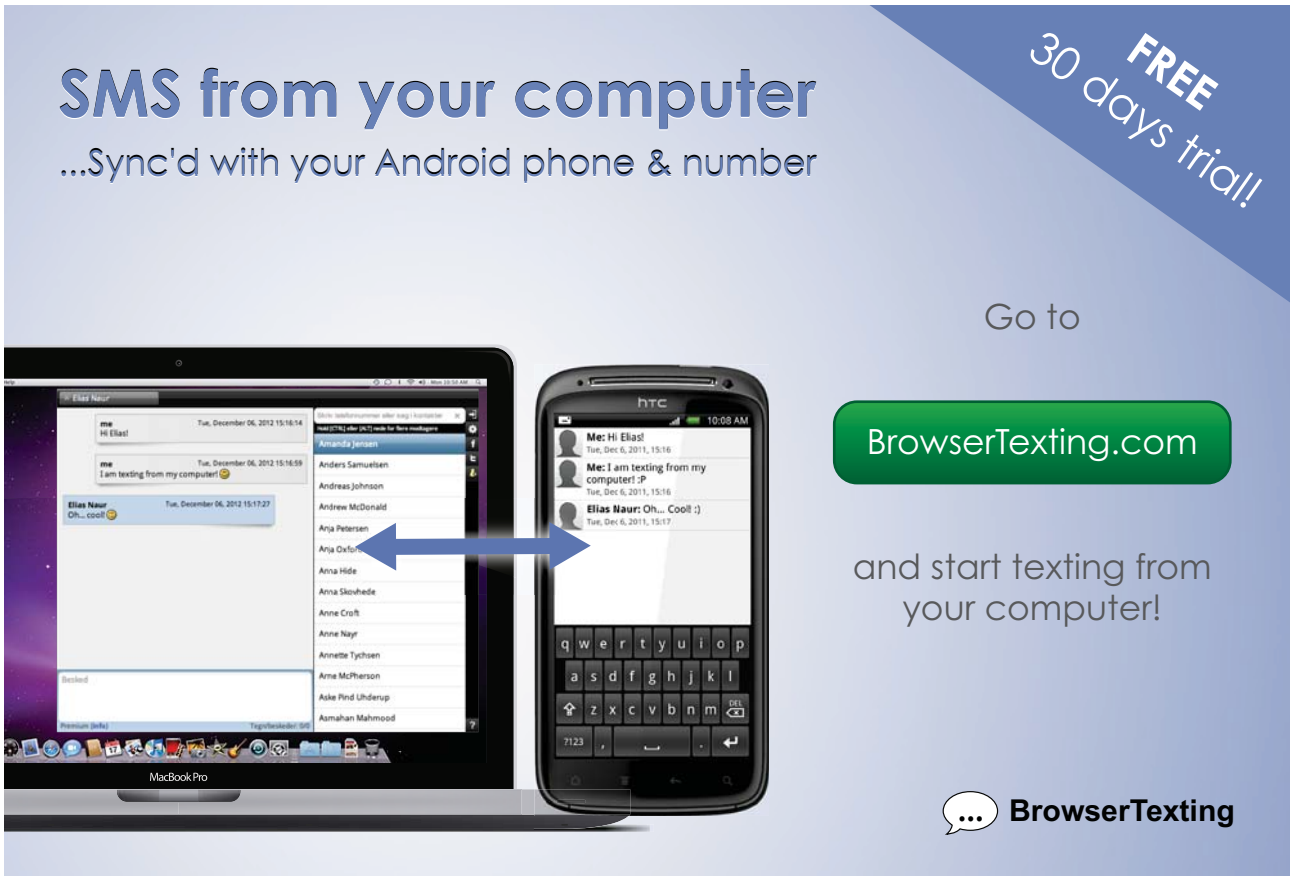
The first goldsmith-bankers to open accounts with the Bank of England were the firms of Richard Hoare (later C Hoare & Co, as we have seen) and Freame & Gould (the forerunner of Barclays Bank). They opened their accounts with the BOE in March 1695[101], and in the course of time the other banks followed suit. This was a presaging of the Bank of England, in its later role of central bank, performing not only the function of *custodian of the reserves of banks*, but also the function of *lender of last resort*, about which we have much to say later.

It is interesting to note that when the right to issue notes was taken away from the banks, they lost a major source of revenue. This development led to another: increased activity of the banks' role of the transfer of deposits by cheque[102] and development of the payments system. The payments system is an integral part of modern banking.

2.5.4 A note on the coins of old

The amount of bank notes in circulation was not as much as that of coins[103] and this persisted until the opening year of WWI (1914). So the main form of reserves for banks, including the Bank of England, was gold coins. The amount of gold coins in England, which were limited because of bimetallism inequalities and other issues / factors, began to increase toward the end of the seventeenth century at the expense of silver coins. The main reason was that the market price of silver metal was increasing relative to gold and thus became undervalued at the mint. The consequence was that silver coins were melted down and as a result silver ceased to be minted as coin money.



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The gold coin in circulation at that time was the *guinea* (first minted in 1663) and the *sovereign* (from 1816). Its value was fixed in 1719 on the advice of Sir Isaac Newton (yes, the celebrated mathematician and physicist!), who was then Master of the Mint, at a value of 21 shillings (equivalent to a mint price for gold of £3 17s 10½d per ounce, fifteen-sixteenths fine). This price was maintained until 1939.[104] The literature is not forthcoming on the background and details of this price. A reasonable conclusion to be drawn is that the level of the price of gold was not a major issue; what was is the fact that the price of gold was *fixed* for a long period, thus ensuring that debasement by kings / governments could not take place. So money creation by re-coining coin money with a lower precious metal content and/or weight could not take place during this period.

In the meantime, another milestone in money history was emerging: that of coins of metallic content *way below their face value* being minted and used for small payments. The latter was a major problem for a long time and gold coins were only suitable for the settlement of large debts. This issue took final form after 1819 when the mint started producing "silver" and "copper" coin money with a metallic content way below their face value: token money. Very quickly these became to be generally accepted as a means of payments. This development is particularly significant because the way was paved for the general acceptability of token money, that is*, the money of the future*.

2.5.5 From convertibility to inconvertibility

We return from a branch to the stem of this text: convertibility of bank notes and deposits into gold. Given a fixed gold price of £3 17s 10½d per ounce, anyone with four one-pound bank notes could walk into the Bank of England's banking hall in London and demand an ounce of gold, fifteen-sixteenths fine (and get some change). This could also be done with the other banks in London and in the country. However, this action was rare for long periods; the Bank of England note was becoming the accepted means of payments countrywide. The inconvertible bank note, another large step in the evolution of money, was for the future.

In the latter part of the eighteenth century and the first part of the nineteenth century many country banks sprouted; in the main they were partnerships of less than six partners. Many of them failed when they squandered the confidence of the public. Newlyn[105] informs that "…the country banks, being confined to partnerships, operated on a small scale and were highly unstable…in the first quarter of the nineteenth century 265 country banks went bankrupt." The ones that did not fail generally had accounts with the larger London banks and/or the Bank of England and were able to meet withdrawals with Bank of England notes and/or gold coins.

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Convertibility of bank notes and deposits into gold in England (and elsewhere) was suspended on two occasions and finally in 1931 when Britain left the "gold standard". It is significant that during these times and after 1931 bank notes became mere tokens, that is, were accepted at their face value.[106] The first period referred to is 1797, when rumours of a French invasion were rife, until 1819. When the rumours emerged there were "runs" on all banks and parliament ordered the Bank of England to suspend payments of notes and deposits in gold coins.

The second period was from the outbreak of WWI in 1914 to 1925. From 1914 a revolution in money history in Britain took place: gold coins were gradually called in and replaced by Bank of England notes. From 1925 to 1931 notes were convertible (into gold bullion[107], not coins, at that stage) but, as this fact was not stated on the bank notes, few people took advantage of this. As noted, the gold standard was abandoned in 1931[108] and since then all forms of money have been used as token money, that is, according to face value and by count. The liabilities of banks[109], that is, bank notes and deposits and coins of little intrinsic value, without any backing of precious metals, had become the generally accepted means of payment: money.

The intrinsic brake on excessive money creation in the form of convertibility of bank notes and deposits was removed. Banks no longer had the need to hold a reserve of gold against bank note and deposit issues. It is this fact that causes some commentators on the monetary system of today to wax hysterical. As we shall see, the system of convertibility was replaced by another, a fine system, which removes the constraint of precious metal availability on economic growth. The mammoth proviso, as we have mentioned, is that the system has to me managed in a non-promiscuous, responsible manner by the referee: the central bank.

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3 Financial system and money market

3.1 Learning outcomes

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

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

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3.2 Introduction

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

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

$$M = BD + N\&C \text{ (both in the “hands” of the NBPS).}$$

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

3.3 The financial system

3.3.1 Introduction

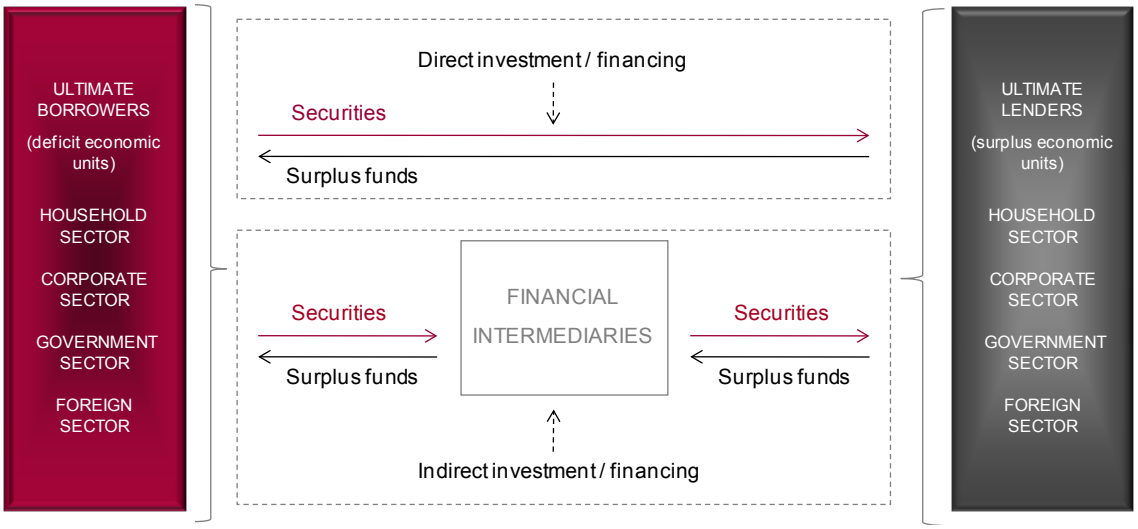

Figure 1: simplified financial system

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

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

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

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

3.3.2 Lenders and borrowers

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

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

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

3.3.3 Financial intermediaries

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

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

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

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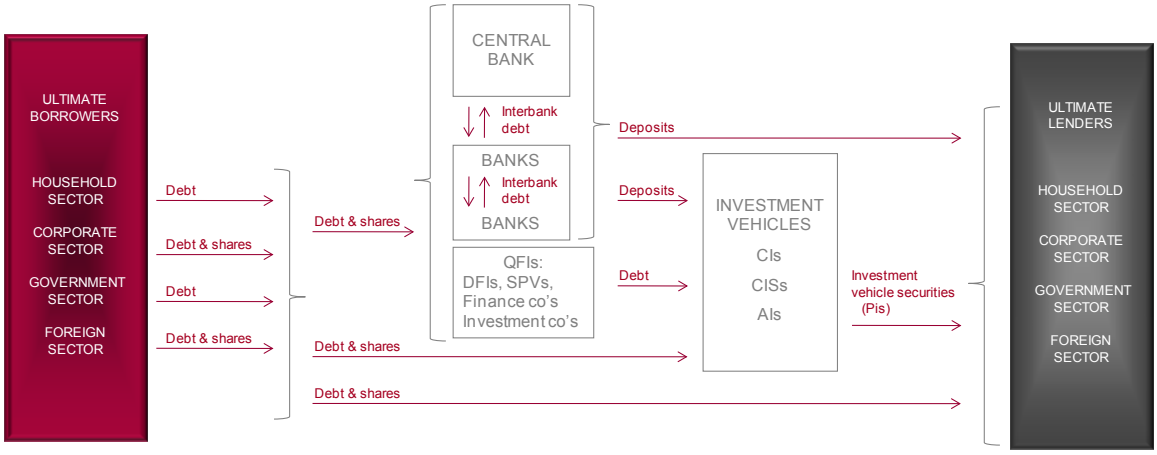

Figure 2: financial intermediaries

Box 1: financial intermediaries

MAINSTREAM FINANCIAL INTERMEDIARIES

DEPOSIT INTERMEDIARIES

Central bank (CB)
Private sector banks

NON-DEPOSIT INTERMEDIARIES (INVESTMENT VEHICLES)

Contractual intermediaries (CIs)

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

Collective investment schemes (CISs)

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

Alternative investments (AIs)

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

QUASI-FINANCIAL INTERMEDIARIES (QFIs)

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

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

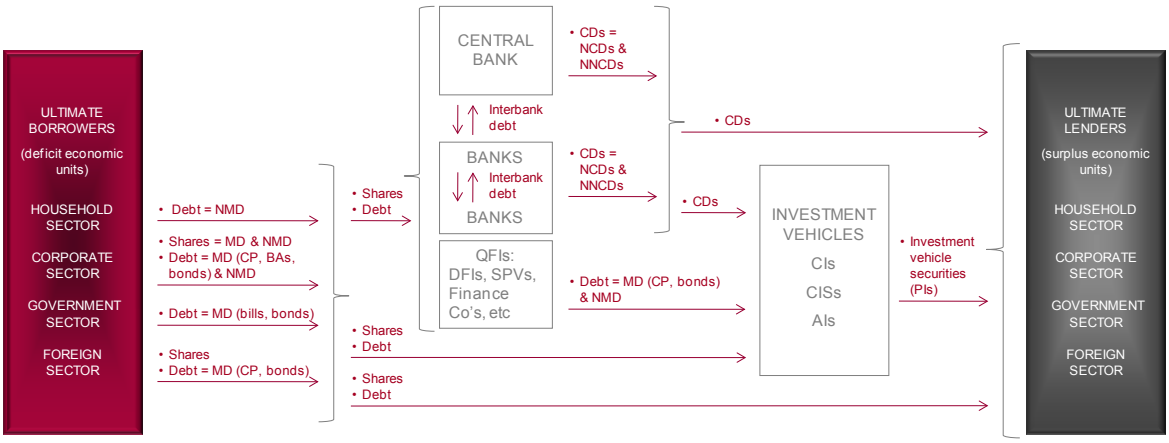
3.3.4 Financial instruments

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

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

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

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



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

Figure 3: financial intermediaries & instruments / securities

There are two categories of financial instruments:

- Debt (and deposits).
- Shares.

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

The *household sector* issues:

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

The *corporate sector* issues:

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

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

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The *government sector* issues:

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

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

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

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

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

The *quasi-financial intermediaries* issue:

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

The above may be summarized as in Table 1.

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

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

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

Table 1: financial instruments / securities

3.3.5 Financial markets

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

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

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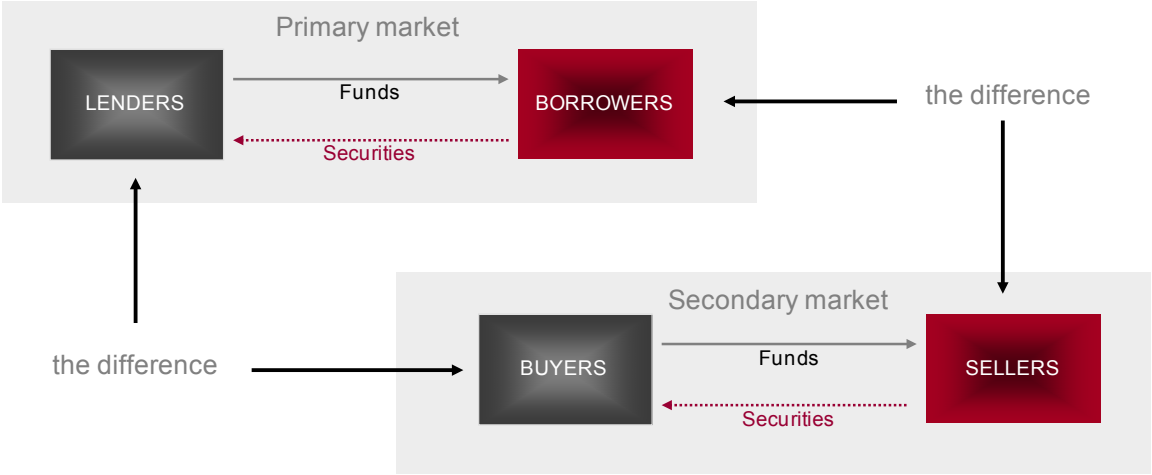

Figure 4: primary & secondary markets

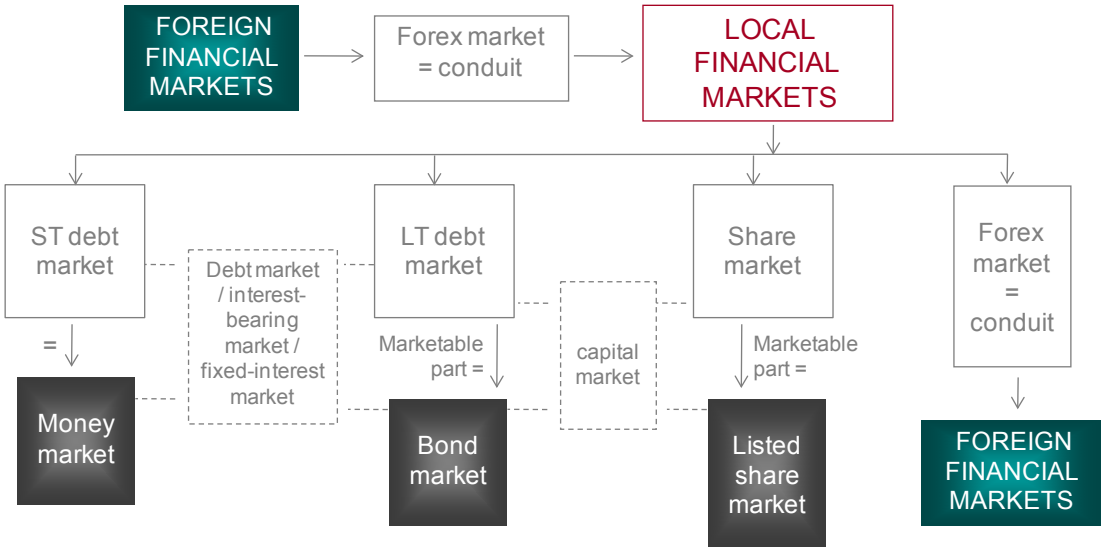

Figure 5: financial markets

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

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

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

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

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

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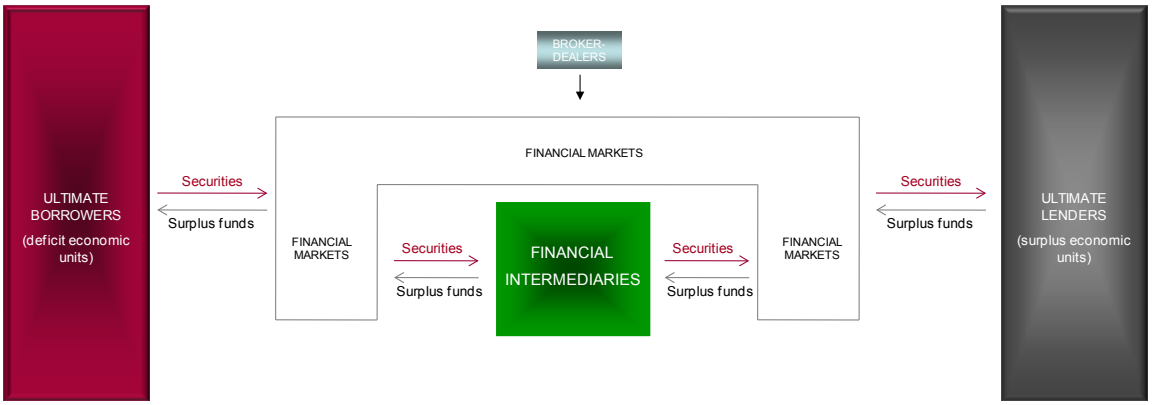

Figure 6: financial markets

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

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

3.3.6 Money creation

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

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

3.3.7 Price discovery

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

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3.3.8 Allied participants on the financial system

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

- Lenders.
- Borrowers.
- Financial intermediaries.

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

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

3.4 The money market

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

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

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

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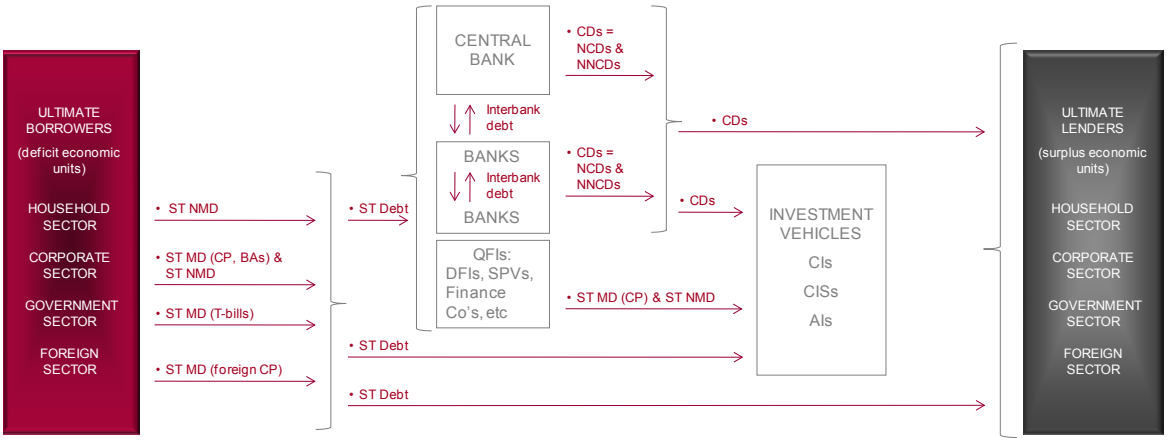
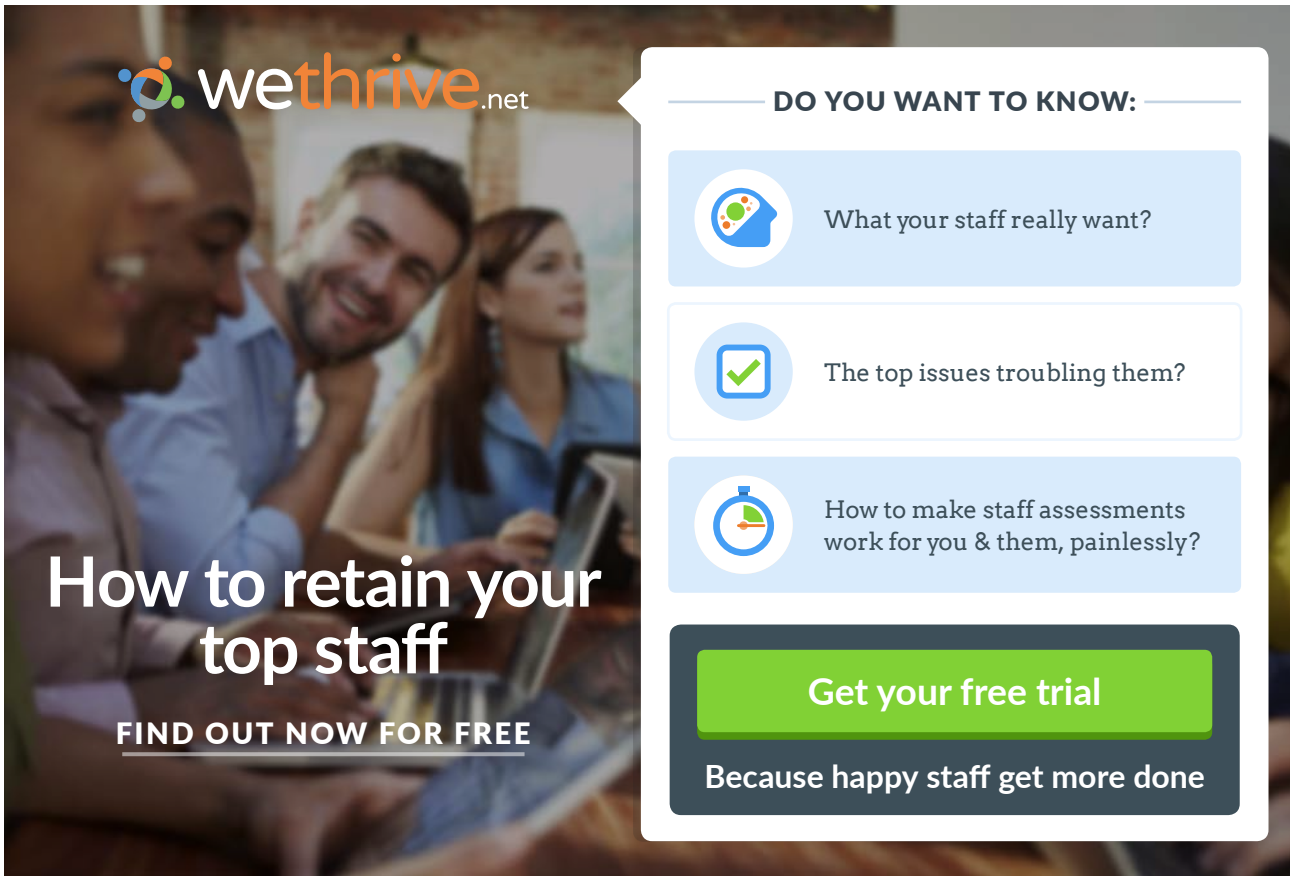


MD = marketable debt; NMD = non-marketable debt; CP = commercial paper; BAs= bankers' acceptances; CDs = certificates of deposit (= deposits); NCDs = negotiable certificates of deposit; NNCDs = non-negotiable certificates of deposit;

Figure 7: money markets



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3.5 Money market interest rates

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

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

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

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

This equation translates to:

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

Using the above numbers we have:

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

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

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

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

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

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

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

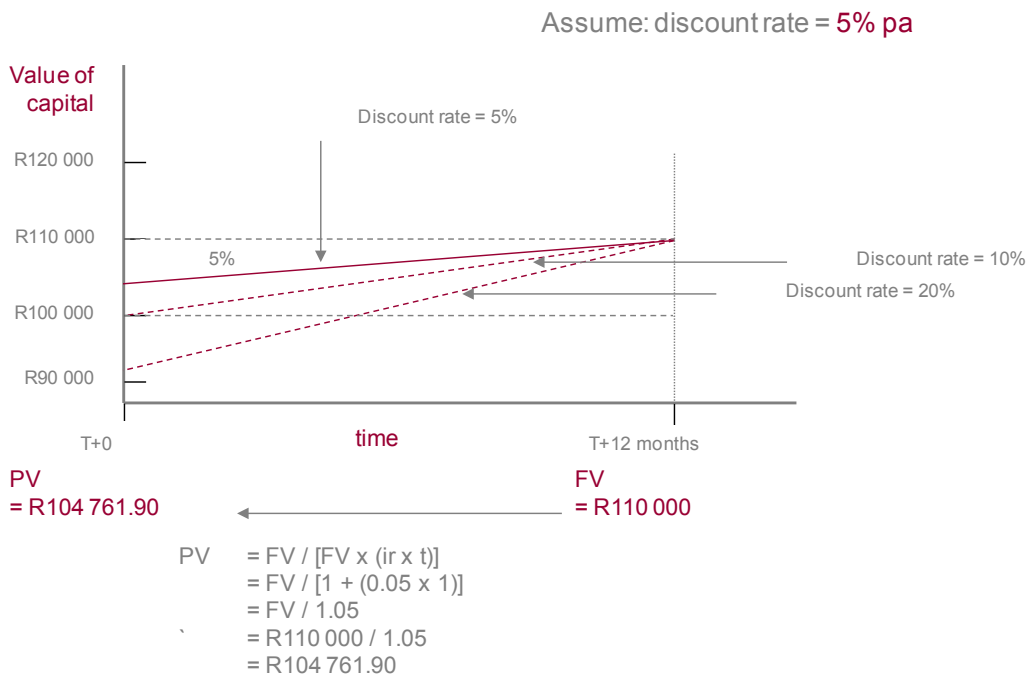

Figure 8: from FV to PV (the principle)

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

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

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

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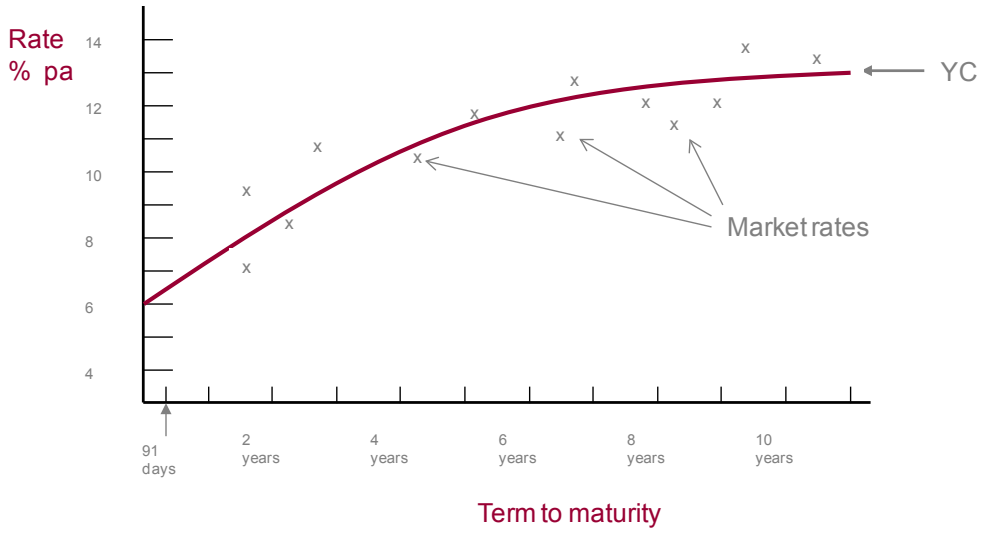

Figure 9: normal yield curve

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

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

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

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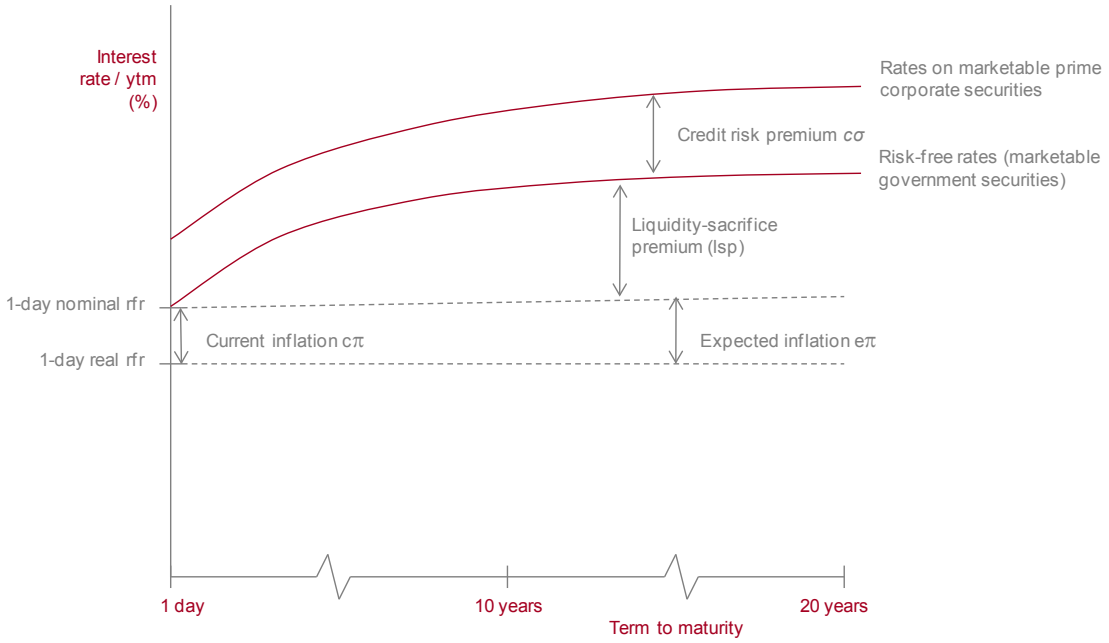

Figure 10: composition of nominal interest rates

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

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

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

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

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

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

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

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

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

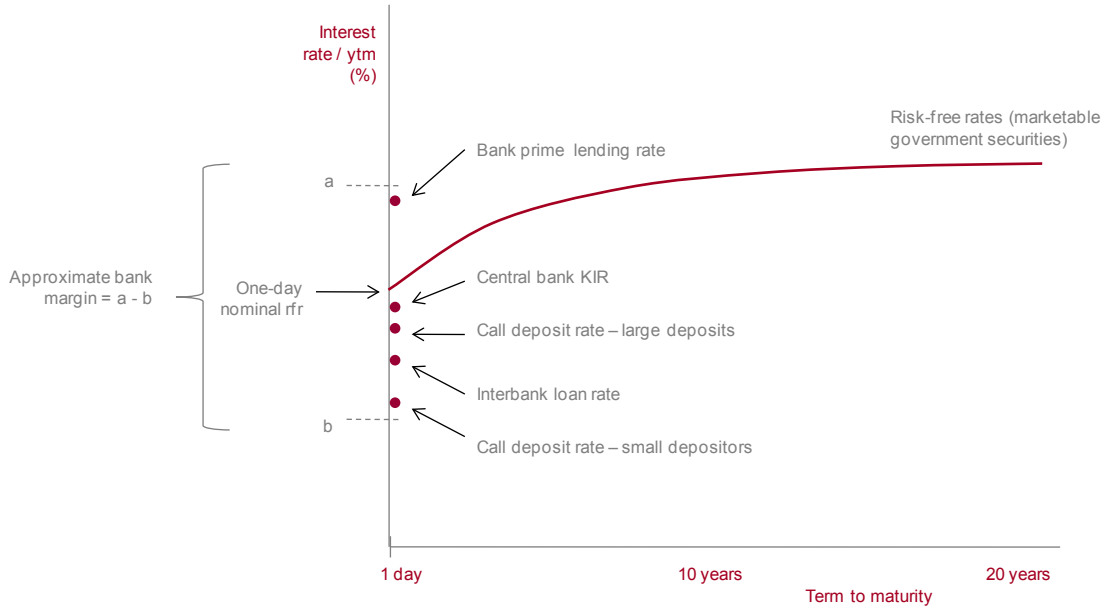

Figure 11: money market rates & bank margin

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

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

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

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

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

3.6 The interbank markets

3.6.1 Introduction

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

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

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

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

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

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

$$TR = RR + ER.$$

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

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3.6.2 The bank-to-central bank interbank market

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

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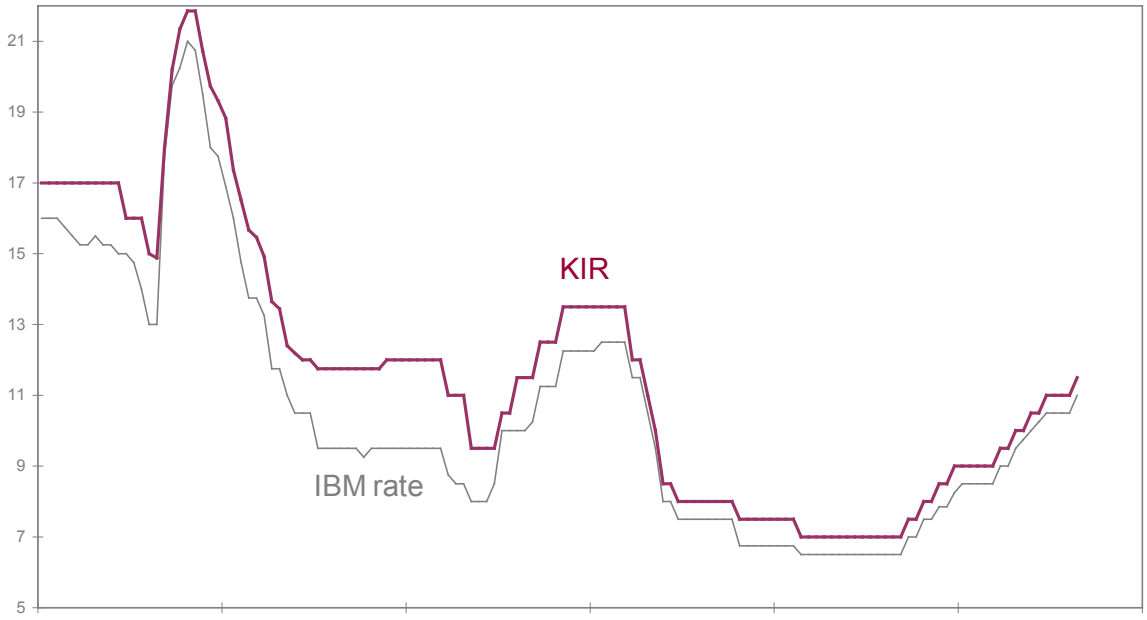

Figure 12: IBM rate & KIR

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

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

3.6.3 The central bank-to-bank interbank market

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

BR = LCC 400 billion.

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

3.6.4 The bank-to-bank interbank market

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

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

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

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

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

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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

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

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

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

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

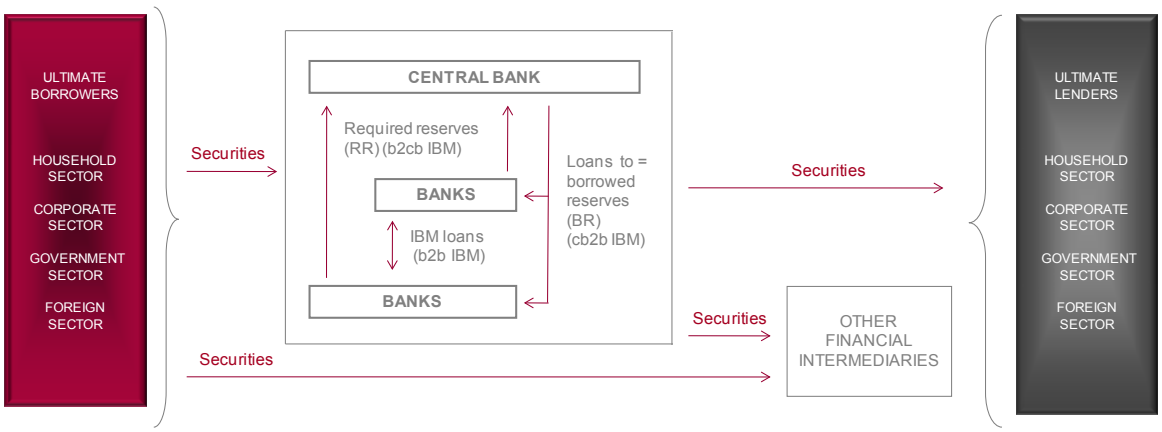

Figure 13: interbank markets

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

We portray the interbank markets in Figure 13.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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4 Money creation: sources & fallacies

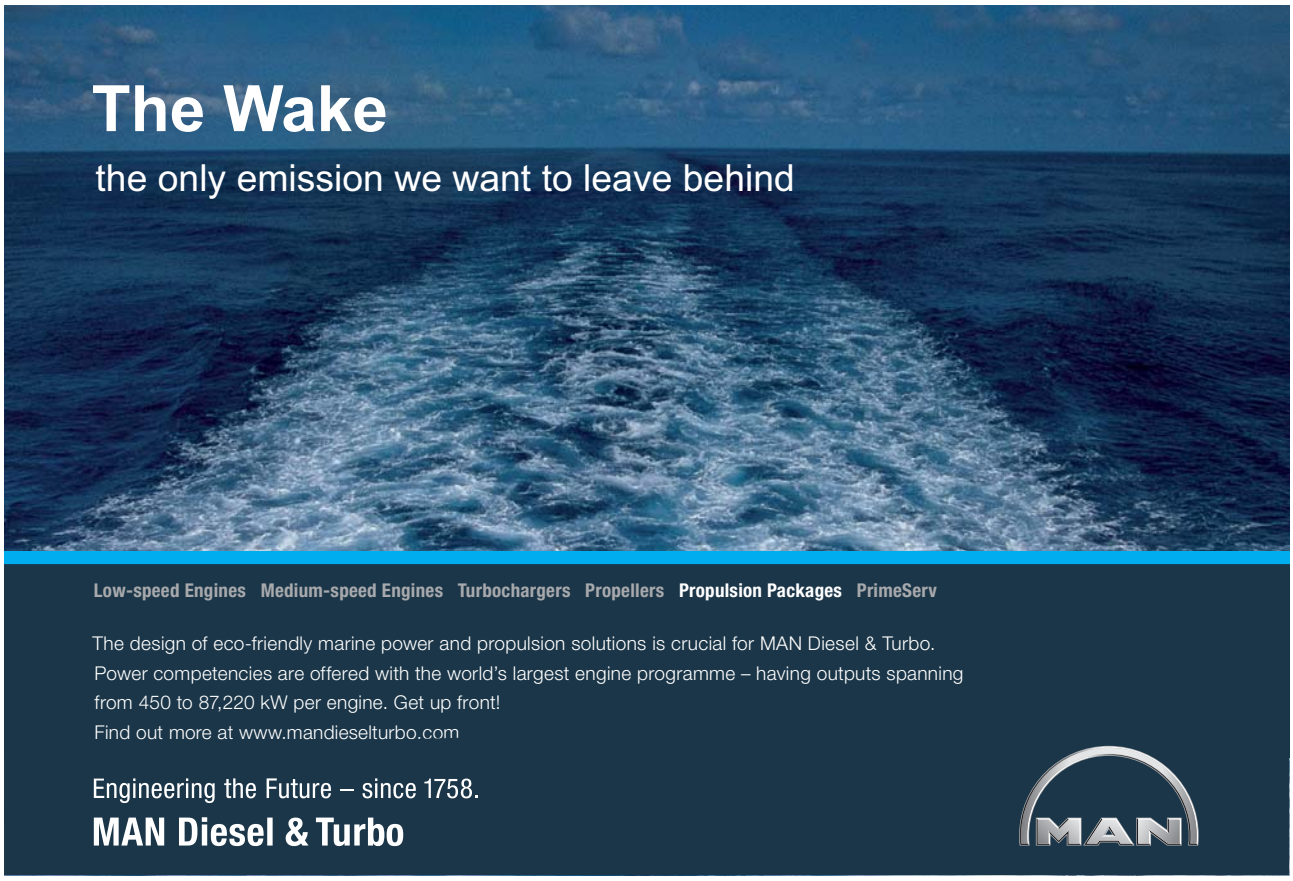
4.1 Learning outcomes

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

1. Describe the balance sheets of the banks and the central bank, and the measurement of money from these.
2. Elucidate the money identity and the sources of money creation.
3. Discuss the fallacies surrounding money creation.

4.2 Introduction

We have discussed the financial system and the money market, which is at the very centre of the financial system. The banking sector is at the very centre of the money market. The banking sector is essentially constituted of the private sector banks and the central bank. These are the institutions which need to be analysed in order to measure money and the sources of money creation.



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Money is bank notes and coins (issued by the central bank) and bank deposits held by the NBPS. Money creation is the outcome of new bank loans to the private and government sectors, as well as the activities in the foreign exchange market – in terms of buying and/or selling activities which end with bank / central bank balance sheet changes.

There are many fallacies surrounding money creation, including the genesis being the receipt by a bank of a new deposit (the error is not identifying where it comes from), and money creation being tied strictly to the reserve requirement (RR) (some countries do not have a RR). This section is arranged as follows:

- Measuring money.
- Money identity: sources of money creation.
- Money creation: the fallacies.

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.

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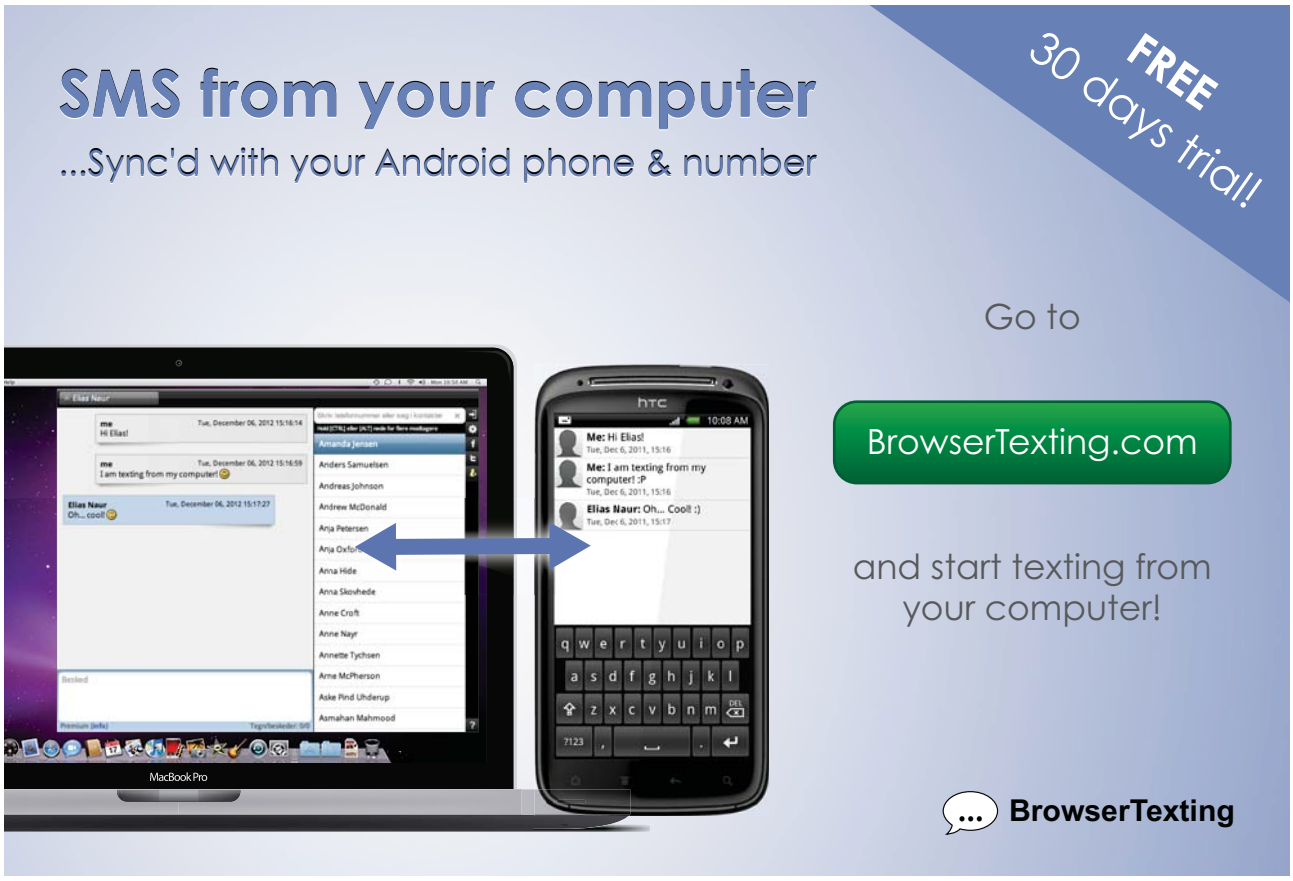
BALANCE SHEET 1: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets	1 000	A. Notes and coins	1 000
E. Loans to government	1 100	B. Deposits	
		1. Government	900
		2. Banks' reserve accounts (TR)	500
F. Loans to banks (borrowed reserves – BR) at the KIR	400	C. Foreign loans	100
Total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

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).

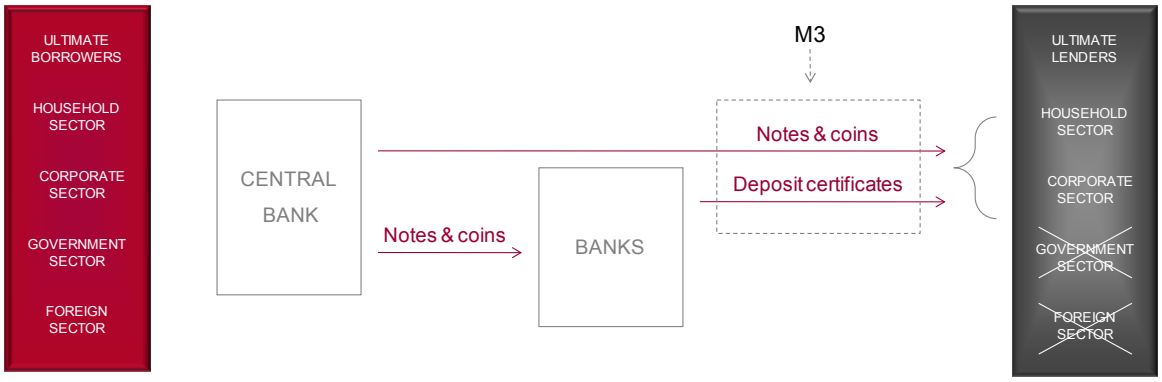

Figure 1: what is money?

BALANCE SHEET 3: MBS (LCC BILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 000	A. Notes and coins of NBPS	900
E. Loans to government	2 100	B. Deposits 1. Government 2. NBPS	900 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
E. Loans to government	1 100	B. Deposits 1. Government 2. Banks' reserve accounts (TR)	900 500
F. Loans to banks (borrowed reserves – BR) at the KIR	400	C. Foreign loans	100
Total	2 500	Total	2 500

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

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

$$\begin{aligned} M3 &= A + B2 \\ &= \text{LCC 900 billion} + \text{LCC 5 000 billion} \\ &= \text{LCC 5 900 billion.} \end{aligned}$$

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.

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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
E. Loans to government	2 100	B. Deposits 1. Government	900
F. Loans to NBPS	3 800	2. NBPS	5 000
		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).

Therefore,

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

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

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

In words:

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

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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.

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

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.

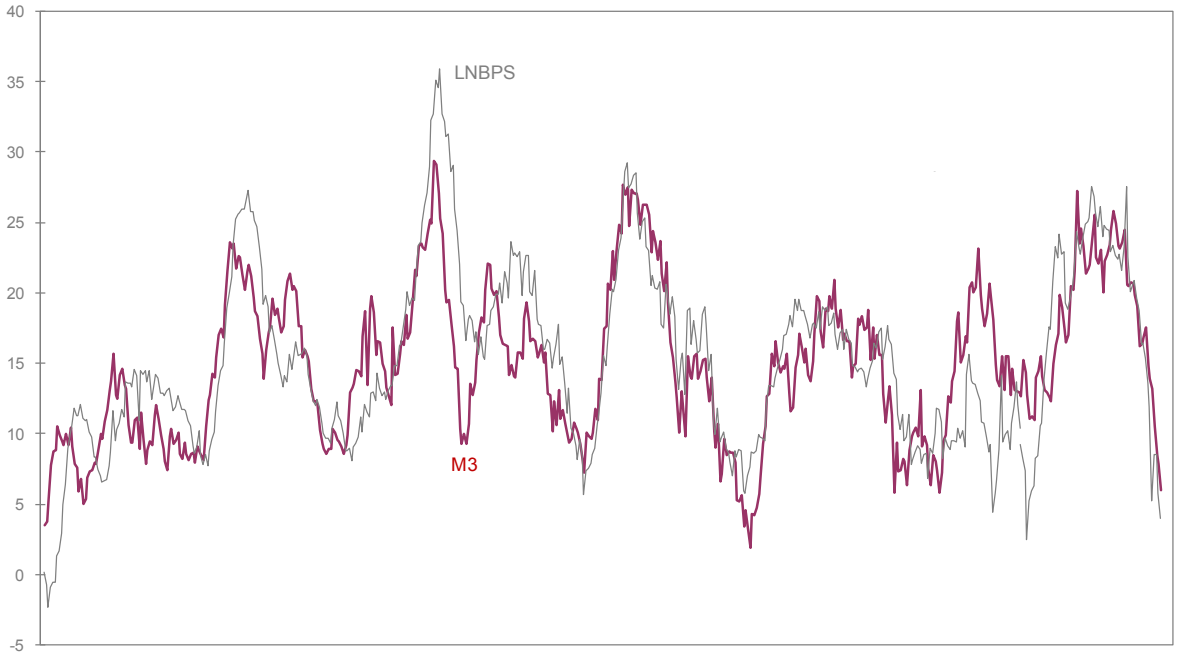

Figure 2: M3 & LNBPS (yoy %)

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 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).

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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

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 US Importer; the exchange rate is USD / LCC 10.0 (see Balance Sheets 11–13).

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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

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

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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.

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.

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4.4.4 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

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.

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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	 +1 000 -1 000
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).

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.

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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

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

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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).

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.

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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 A Reserves with CB (TR) (RR +10)	+100 +10	Deposits of Company A Loan from CB @ KIR	+100 +10
Total	+110	Total	+110

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.

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4.5 Money creation: fallacies

4.5.1 Introduction

Before we begin, another reminder of the reserve requirement (RR) ratio (*r*), and the amount of reserves calculated (R or TR), is required. Most countries have an *r*[124]. This is a statutory requirement in terms of which banks are required to hold on deposit with the CB an amount of funds (required reserves – RR). The RR is a proportion of the amount of deposits the banks have (we assume 10%). Thus if the banks have LCC 100 billion in deposits they are obliged to have LCC 10 billion on deposit with the CB.

A number of critical notes are required here:

- Although rare, there are some countries that do not have a RR.
- In some countries the banks have two accounts:
  - Required reserves accounts in which the RR are held.
  - Settlement account (SA) (over which interbank settlements take place).
- In other countries the banks have just one account: a "settlement" or "reserves" account in which the RR and ER are held and over which interbank settlement takes place. We assume one account called "reserve account".
- Central banks do not pay interest on the banks' RR or ER; this is usually the case, but there are exceptions.[125]
- Because of the latter, the banks have no reason to hold excess reserves (ER) with the CB.
- In many countries N&C rank as RR; therefore if the RR is LCC 100 million and the banks have N&C in portfolio (teller tills, ATMs, etc) to the extent of LCC 30 million, only LCC 70 million is required to be held in the reserve accounts.
- In some countries N&C do not rank as reserves.
- Banks' N&C and their reserve balances (where applicable) are referred to as central bank money (CBM).
- No bank can create CBM; only the CB can do so – by buying assets from the banks (under repo) or making loans to the banks (against collateral of eligible assets = government securities usually).
- Many CBs accommodate the banking system by means of repos (buying assets for a period); as these repos amount to loans, we refer to all CB accommodation as loans.
- When the CB makes a loan to a bank (= provides borrowed reserves – BR) it does so at an "administratively" determined rate (by the MPC): the KIR.

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4.5.2 A bank receives a deposit…

We begin with the *most misguided* pedagogy on money creation. In a nutshell it says that money creation begins with a bank receiving a deposit. It is postulated that if a bank receives a deposit of LCC 100 million, it is obliged to place LCC 10 million (reminder: r = 10%) with the CB (RR). Once this is executed it can lend out LCC 90 million (see Balance Sheets 35–36).

BALANCE SHEET 35: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Reserves with CB (TR) (RR +10) Loans	+10 +90	Deposits	+100
Total	+100	Total	+100

BALANCE SHEET 36: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Bank reserves (TR) (RR +10)	+10
Total	0	Total	+10

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When the loan of LCC 90 million is made, this amount ends up as a deposit with the bank (we assume there is one bank[126]). The bank places 10% (= LCC 9 million) with the CB and lends out the rest (= LCC 81 million) (see Balance Sheets 37–38 = a continuance of Balance Sheets 35–36).

BALANCE SHEET 37: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Reserves with CB (TR) (RR +10 & +9)	+19	Deposits	+100
Loans	+90	Deposits	+90
Loans	+81		
Total	+190	Total	+190

BALANCE SHEET 38: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Bank reserves (TR) (RR +10 & +9)	+19
Total	0	Total	+19

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

$$\begin{aligned}\text{Total deposit creation} &= \text{new deposit} \times (1 / r)\\ &= \text{LCC 100 million} \times (1 / r)\\ &= \text{LCC 100 million} \times (1 / 0.10)\\ &= \text{LCC 100 million} \times 10\\ &= \text{LCC 1 000 million.}\end{aligned}$$

In other words, the money creation process continues until a total of LCC 1 000 deposits have been created (including the original deposit), and this was possible because the original deposit of LCC 100 million could be used as RR = compliance with the reserve requirement. Balance Sheets 39–40 illustrate this.

BALANCE SHEET 39: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Reserves with CB (TR) (RR +100)	+100	Deposits	+1 000
Loans	+900		
Total	+1 000	Total	+1 000

BALANCE SHEET 40: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Bank reserves (TR) (RR +100)	+100
Total	0	Total	+100

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This is the so-called *money multiplier*, and it is expressed as the reciprocal of *r*:

$$\begin{aligned} \text{New deposit creation} &= 1 / r \\ &= 1 / 0.10 \\ &= 10. \end{aligned}$$

Thus, for every LCC 10 in new bank deposits, the total money stock increase is LCC 100.

This is *unadulterated nonsense* and it is so for the following reasons:

- Where does the original deposit come from? One cannot just suck a deposit out of the air. Some balance sheet would have changed in the direction of deposits +LCC 100 million, but what other balance sheet item change compensates for this?
- As we have shown, no bank can create CBM, i.e. it is not possible for a bank to place any amount with the CB, without the CB buying an asset / reducing a liability.
- Note that, because of the flawed starting point in the "explanation", the balance sheet of the CB *does not balance*. So "something" is incorrect, and it is that the CB did not buy an asset or reduce a liability in order to create reserves (CBM) for the bank.

It is quite evident that the deposit originated from a new bank loan, as we expounded above. A final note to this section: it was assumed that there is only one bank; introducing more banks does not alter the principle.

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4.5.3 Deposit of notes and coins

A condition under which the above is plausible is if the original deposit was made in N&C. Let us explore this. If HNW Mrs A deposits LCC 100 million in N&C (which she had in a large tin box under her bed) at the bank her balance sheet will change as indicated in Balance Sheet 41.

BALANCE SHEET 41: MRS A (LCC MILLIONS)			
Assets		Liabilities	
N&C Deposit at bank	-100 +100		
Total	0	Total	0

The bank's balance sheet in Balance Sheet 42 shows Mrs A's deposit 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.

BALANCE SHEET 42: BANK A (LCC MILLIONS)			
Assets		Liabilities	
N&C	+100	Deposit of Mrs A	+100
Total	+100	Total	+100

Because the N&C are surplus to their requirements (in tills and ATMs) and are liabilities of the CB, the bank will deposit them immediately with the CB; the results are shown in (continuous) Balance Sheets 43–44 (note that they balance).

BALANCE SHEET 43: BANK A (LCC MILLIONS)			
Assets		Liabilities	
N&C (from Mrs A) N&C (deposited at CB) Reserves at CB (TR) (RR = +10) (ER = +90)	+100 -100 +100	Deposit of Mrs A	+100
Total	+100	Total	+100

BALANCE SHEET 44: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		N&C Bank reserves (TR) (RR = +10) ER = +90)	-100 +100
Total	0	Total	0

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Because bank deposits increased by LCC 100 million, RR is +LCC 10 million. The balance of LCC 90 million is reserves that are in excess of that required, i.e. the bank now has LCC 90 million in *excess reserves* (ER). As in the case of holding LCC 100 million in non-interest-bearing N&C, the bank now also has an asset (ER) that also bears no interest (RR does not either but it is not a "free" asset). If this situation was sanctioned by the CB (assuming there were no BR before this transaction), interest rates would fall sharply and the bank will feverishly make loans in order to *create a balance sheet that will produce an income*.

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

Maximum deposit increase = ER / *r*
= LCC 100 million / 0.10
= LCC 1 000 million.

The start (the deposit of N&C) and final outcomes are shown in Balance Sheets 45–48.

BALANCE SHEET 45: BANK A (LCC MILLIONS)			
Assets		Liabilities	
N&C N&C Reserves at CB (TR) (RR +100) Loans to NBPS	+100 -100 +100 +900	Deposit of Mrs A Deposits of rest of NBPS	+100 +900
Total	+1 000	Total	+1 000

BALANCE SHEET 46: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		N&C Bank reserves (TR) (RR +100)	-100 +100
Total	0	Total	0

BALANCE SHEET 47: MRS A (LCC MILLIONS)			
Assets		Liabilities	
N&C Deposits at bank	-100 +100		
Total	0	Total	0

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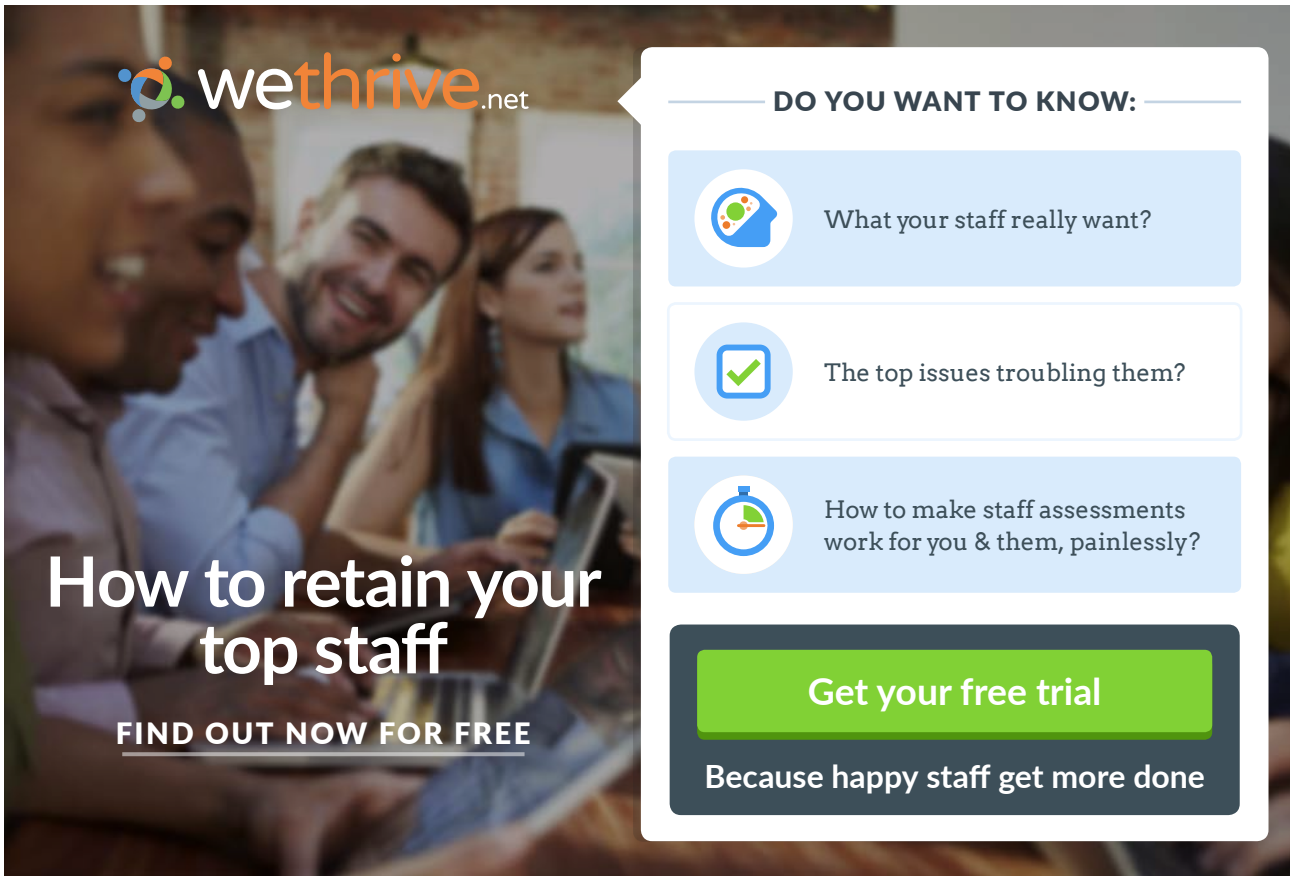
BALANCE SHEET 48: REST OF NBPS (LCC MILLIONS)			
Assets		Liabilities	
Deposits at bank	+900	Loans from bank	+900
Total	+900	Total	+900

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 money, and while the above example is possible, it is misleading to present it as the model of money creation. However, it did demonstrate a critical point: that the banks can only "get rid of" ER in the manner shown. Just as they cannot create CBM, they cannot "get rid of" it, except in the manner shown, which is changing the dividing line between ER and RR (by lending and creating deposits). We will touch upon this later again.

4.5.4 Government spending

It is sometimes expounded that government spending (when government uses the CB as its banker) leads to money creation. Let us assume that government spends LCC 100 million on goods bought from the NBPS (see Balance Sheets 49–52).



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After government spends, the banks have ER of +LCC 90 million. They can now lend up to the point where ER are fully transmuted / absorbed into RR. The end point is the same as in the N&C example above: M3 can increase up to a total of:

ER / *r* = LCC 100 million / 0.10 = LCC 1 000 million.

BALANCE SHEET 49: GOVERNMENT (LCC MILLIONS)			
Assets		Liabilities	
Deposits at CB Goods	-100 +100		
Total	0	Total	0

BALANCE SHEET 50: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Government deposits Bank reserves (TR) (RR = +10) (ER = +90)	-100 +100
Total	0	Total	0

BALANCE SHEET 51: NBPS (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposit at bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 52: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Reserves at CB (TR) (RR = +10) (ER = +90)	+100	Deposits of NBPS	+100
Total	+100	Total	+100

As in the above N&C example, this exposition is misleading, 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 Balance Sheets 53–56).

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BALANCE SHEET 53: GOVERNMENT (LCC MILLIONS)			
Assets		Liabilities	
Deposits at CB Deposits at CB Goods	+100 -100 +100	Bonds	+100
Total	+100	Total	+100

BALANCE SHEET 54: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Government deposits Government deposits	+100 -100
Total	0	Total	0

BALANCE SHEET 55: NBPS (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposit at bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 56: BANK A (LCC MILLIONS)			
Assets		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 NBPS) increased by LCC 100 million and the BSSoC 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 reserves* – because bank deposits have increased (that carry a 10% RR). We omitted this issue in the interests of simplicity. We now correct it in Balance Sheets 57–58.

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BALANCE SHEET 57: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Loans to bank @ KIR	+10	Government deposits Government deposits Bank reserves (TR) (RR = +10)	+100 -100 +10
Total	+10	Total	+10

BALANCE SHEET 58: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Bonds Reserves at CB (TR) (RR = +10)	+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.

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4.5.5 Bank lending by a small commercial bank

It is sometimes alleged that money creation is not possible when the lending bank is a small commercial bank. The bank, it is held, must first find the money before it can lend it out to a borrower. It is a real life issue, and this the way an individual bank will "think" and operate. However, money creation by the *banking system* still takes place in this case.

The small commercial bank (Bank A) will enter the money market and attract a new deposit [equal to the loan (say, LCC 100 million) it is to provide to Company A] from an institution (assume Retirement Fund Z) by offering an attractive deposit rate. Company A's purpose of borrowing is to purchase goods from Company B. Company B banks with Bank B. Retirement Fund Z banks with Bank Z but is happy to move a deposit if the rate is attractive, as in this example. For the sake of pedagogy we will ignore the RR. Keep in mind that Retirement Fund Z is a member of the NBPS.

Bank A obtains a LCC 100 million deposit from Retirement Fund Z, and Bank Z loses the deposit. Bank A credits Company A's current account[127] with LCC 100 million which is spent immediately by making an EFT in favour of Company B at Bank B. Company B despatches LCC 100 million goods to Company A. The changes to the balance sheets are shown in Balance Sheets 59 – 65. (Retirement Fund Z = RFZ.)

BALANCE SHEET 59: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Loans (Company A)	+100	Deposits of NBPS (RFZ)	+100
Total	+100	Total	+100

BALANCE SHEET 60: RETIREMENT FUND Z (LCC MILLIONS)			
Assets		Liabilities	
Deposits at Bank Z Deposits at Bank A	-100 +100		
Total	0	Total	0

BALANCE SHEET 61: COMPANY A (LCC MILLIONS)			
Assets		Liabilities	
Goods	+100	Loans (Bank A)	+100
Total	+100	Total	+100

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BALANCE SHEET 62: COMPANY B (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at Bank B	-100 +100		
Total	0	Total	0

BALANCE SHEET 63: BANK B (LCC MILLIONS)			
	Assets		Liabilities
Reserves at CB	+100	Deposits of NBPS (Co B)	+100
Total	+100	Total	+100

BALANCE SHEET 64: BANK Z (LCC MILLIONS)			
Assets		Liabilities	
Reserves at CB	-100	Deposits of NBPS (RFZ)	-100
Total	-100	Total	-100

BALANCE SHEET 65: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Bank reserves Bank Z Bank B	 -100 +100
Total	0	Total	0

The two banks will find one another in the *b2b IBM* and Bank B will provide an interbank loan to Bank Z at the interbank rate established between them. As you are now familiar with the interbank market I do not need to spell out the entries to you. The critical question is what happened to the amount of money in circulation? A consolidation of the three banks' balance sheets[128] will reveal (see Balance Sheet 66) that M has increased by LCC 100 million and the BSSoC is an increase in bank loans by the same amount. You will know that the real cause is the satisfied demand for loans.

BALANCE SHEET 66: CONSOLIDATED BANKING SECTOR (LCC MILLIONS)			
Assets		Liabilities	
Loans extended (Co A)	+100	Deposits of NBPS (Co B)	+100
Total	+100	Total	+100

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What is the lesson? It is a significant one and is that while individual banks "think" they need to get a deposit before they lend, this is not strictly required because the amount loaned has a counterpart in the form of a new deposit which most likely ends up with another bank (in the case of a small bank lending). In the case of a large bank extending a large loan, it is quite likely that the new deposit (= new money) could end up with itself. If not, it will get to balance its books by an interbank loan from the bank that received the new deposit. It will be evident that in the above we assume that these were the only transactions that took place on that particular business day.

4.5.6 Banks are "fully lent"

In conclusion, a refutation is required of the fallacy that banks at times have no more money to lend because they are "fully lent". From the above you will have gauged that this is not so[129]. A perusal of the balance sheet of any bank will indicate that banks are fully lent at all times; their assets (= mainly loans + CBM) are fully matched by their liabilities (mainly deposits + CB loans) and equity. This is the proof. Note that this is usually the case. In exceptional times, as in the time of so-called quantitative easing (QE I and QE II are examples), the banks have ER, but this is engineered by the CB.

You also know that banks are able to create money by simply making loans, i.e. they expand their balance sheets whenever a borrower asks for a loan, provided the project is sound or the individual can service the new debt. This is the business of banking, and banks compete with one another to get this business.

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So, money is always available – to be created. Governments want banks to manufacture more money because this underlies new economic growth and increases employment. The trick is to manage creation responsibly, which is the turf of the CB.

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5 Bank liquidity management

5.1 Learning outcomes

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

1. Elucidate the concept of bank liquidity.
2. Expound the rationale for maintaining a liquidity shortage.
3. Discuss open market operations and its outcomes in terms of bank liquidity.

5.2 Introduction

Central banks have a monopoly in CBM. A reminder of what CBM is: N&C and the banks' deposits with itself (either required by law = the RR, or voluntarily as in some countries). The central bank (CB) is also the only bank that does not bank elsewhere, i.e. with other banks. Thus, if Bank A purchases TBs from the CB, it pays for them by a debit to its CB settlement account. Conversely, if the CB purchases TBs from Bank A, it will pay Bank A by a credit to its CB settlement account.

These special features of the CB ensure that it, through manipulating its own balance sheet (called open market operations – OMO), has absolute control over bank liquidity. What is bank liquidity? It is the extent of bank surplus reserves with the CB and/ or the extent of its loans to the banks. Balance Sheets 1–2 highlight the balance sheet items that reflect bank liquidity.

A good measure of bank liquidity is the *net excess reserves* of the banking sector with the CB. Bank liquidity is the essential tool in monetary policy. Without CB control over bank liquidity, monetary policy fails. This section covers this crucial element of monetary policy.

From now on when you think "bank liquidity", think about analysing the balance sheet of the CB; liquidity changes will of course also be reflected in the banks' balance sheets, but the primary source of bank liquidity information is the former.

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

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

We know that by providing a loan to you the banking system is manufacturing new deposits, and this is money creation. What does this mean in an economic sense? It means that the economy can expand when individuals, companies and government borrow (remember that the issuing of securities by government and the corporate sector is borrowing). Does this mean that the economy cannot expand without money creation? It can, but only to a limited degree (related to productivity changes).

Money creation drives / reflects a higher level of economic growth. But, excessive money growth can lead to inflation and destroy growth. So, the monetary system is a beautiful system, because there is no shortage of money. However, it has to be carefully managed – by the CB. This is implemented by manipulating the banks' liquidity situation.

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5.3 What is bank liquidity?

What is bank liquidity? In most countries the banks have a reserve requirement, i.e. are obliged to hold required reserves (RR) equal to the total of deposits[130] times the reserve requirement ratio (r):

$$\text{RR} = \text{BD} \times r.$$

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:

$$\begin{aligned}\text{RR} &= \text{LCC } 5\,000 \times 0.1\\ &= \text{LCC } 500.\end{aligned}$$

The balance sheets also show that the banks comply exactly with the reserve requirement: the amount in the reserve account of the banks (collectively) = 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 (in fact, they have no option in this regard). 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:

$$\Delta\text{RR} = \Delta\text{BD} \times r$$

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:

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

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 CBM*; only the CB can manipulate its own balance sheet.

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There is a small proviso here and it relates to N&C. If banks can economise on N&C holdings and/or get depositors to do so, they can take these back to the CB and have their CB accounts credited. This action therefore increases their reserves. However, this is not an issue in practice because banks and the public generally do economise on N&C to the maximum extent possible because no interest is earned on these assets (remember N&C are "deposits" with the CB). Another factor which makes N&C a non-issue in this regard is that they make up a small proportion of the money stock – and that they will disappear in the future in favour of the smart card (the electronic purse / wallet) or something similar. This is enough reason to silence this proviso here. Please note that this is an important issue because some texts on monetary policy complicate the story with the fact that N&C rank as reserves.[131]

We know that all the banks have reserve accounts with the CB in which reserves are held and over which interbank settlement takes place. You know from the earlier discussion that if transactions are confined to the banks, they settle their claims on one another at the final interbank clearing at the end of the business day, and everyone is happy. We have also indicated that the banks keep the balance on these accounts at the minimum because interest is not paid on these accounts.

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Thus, generally, the banks endeavour to have a situation of TR = RR, i.e. they endeavour to have no ER. We say "endeavour" because it is largely out of the banks' sphere of influence, except individually. The CB controls this number. We will see later that there are circumstances where central banks bring about a situation where the banking sector has ER. The circumstances are exceptional. Therefore, any measure of bank liquidity must make allowance for the existence of ER.

So, now we have one part of the measure of liquidity: excess reserves (ER). The other half is bank indebtedness to the CB which, as you now know, in most countries is a permanent feature of the banking landscape: the CB sees to it that the banks (collectively) are indebted to it at all times and without exception. (As we will see later some central banks operate on a "balanced bank system situation".) We will come to how the CB achieves this, so for the moment please just accept it.

A glance at Balance Sheet 3 will reveal that the indebtedness of the banks to the CB is LCC 400 billion (item F), and that the banks' TR is LCC 500 billion (item B2). You will recall that BD = LCC 5 000 billion and that, because the *r* is 10% of BD, RR = LCC 500 billion. Therefore RR = TR = the minimum required, and the banks have no ER on their reserve accounts (item B2).

BALANCE SHEET 3: 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 (BR) @ KIR	400	C. Foreign loans	100
Total	**2 500**	**Total**	**2 500**

So, now we have numbers for the two items that present a picture of the liquidity of the banking system. The liquidity measure is:

Net excess reserves (NER) = excess reserves (ER)
Less: bank indebtedness to the CB (BR)

or, more clearly:

NER = ER – BR.

Putting the numbers to the bank liquidity measure we have:

NER = ER – BR
= LCC 0 billion – LCC 400 billion
= – LCC 400 billion.

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A proper interpretation of this number, – LCC 400 billion, would be: the NER of the banking system is a negative number. The banks have no excess reserves and in fact they are borrowing LCC 400 billion from the CB (= BR). Note that it is a number that has little meaning except that it is negative. This negative number and changes in it *reflect the monetary policy stance of the CB*.

5.4 Rationale for a liquidity shortage

Let us spend a little time on the ultimate aim of the CB in keeping the banks indebted to it. It is an integral part of the monetary policy process as depicted in Figure 1. The ultimate objective of monetary policy is to create the conditions for sustainably high economic growth. What are the conditions? They are stable inflation at a low level (2% pa is the norm in the developed world) and, not shown on the illustration, financial stability[132].

The intermediate objective is to "control" the growth rate in bank loans / money stock (and other indicators which depend on this such as the exchange rate). How do they achieve this? Through monetary policy, which can be said is decisions aimed at achieving the objectives just mentioned. It is executed by the CB. However, the CB has a limited but effective range of tools with which to implement monetary policy: through open market operations (OMO) it influences bank liquidity (as measured by NER) to a negative condition where the banks are indebted to the CB. The CB charges them their KIR.

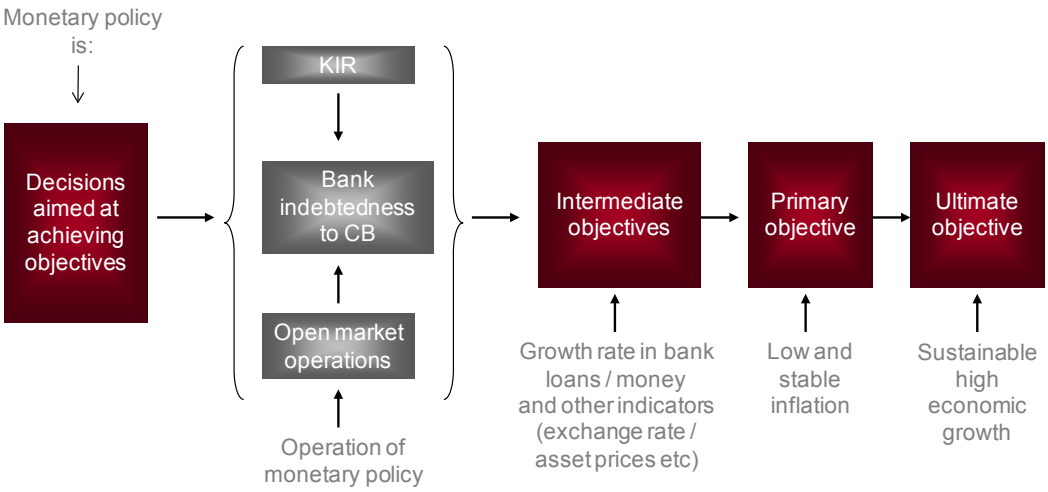

Figure 1: monetary policy

The KIR is a fixed rate administratively determined by the Monetary Policy Committee (MPC) of the CB, and it is changed when deemed necessary. Borrowing from the CB is a liability for the banks, as are deposits. It is by definition the highest rate for one-day money and it has a major influence on deposit rates via the interbank rates. This is so because the banks *endeavour at all times to avoid borrowing from the CB*.

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Each day during business hours the banks compete for deposits, but particularly for call money deposits because these are large blocks of deposits. They "pay up" for these deposits but never more than the KIR because borrowings from the CB are available unlimitedly[133] (in many countries this is called "the borrowing / discount window is always open"). So, the KIR represents a ceiling for one-day call money rates and for the IBM rate. Because the KIR is the highest rate for one-day money and the banks are utilising the CB borrowing facility, it can be said that it "bites" the banks (see Box 1).

As we have seen, the final market where banks are able to settle their positions is at the final IBM clearing at the end of the day. Here the deficit banks bid for the surplus banks' balances. So the final interbank clearing is where banks balance their books – at the interbank rate. This rate is also market-determined at just below the KIR because, as said, CB borrowings are available at the KIR.

Box 1: banks' view of central bank's KIR

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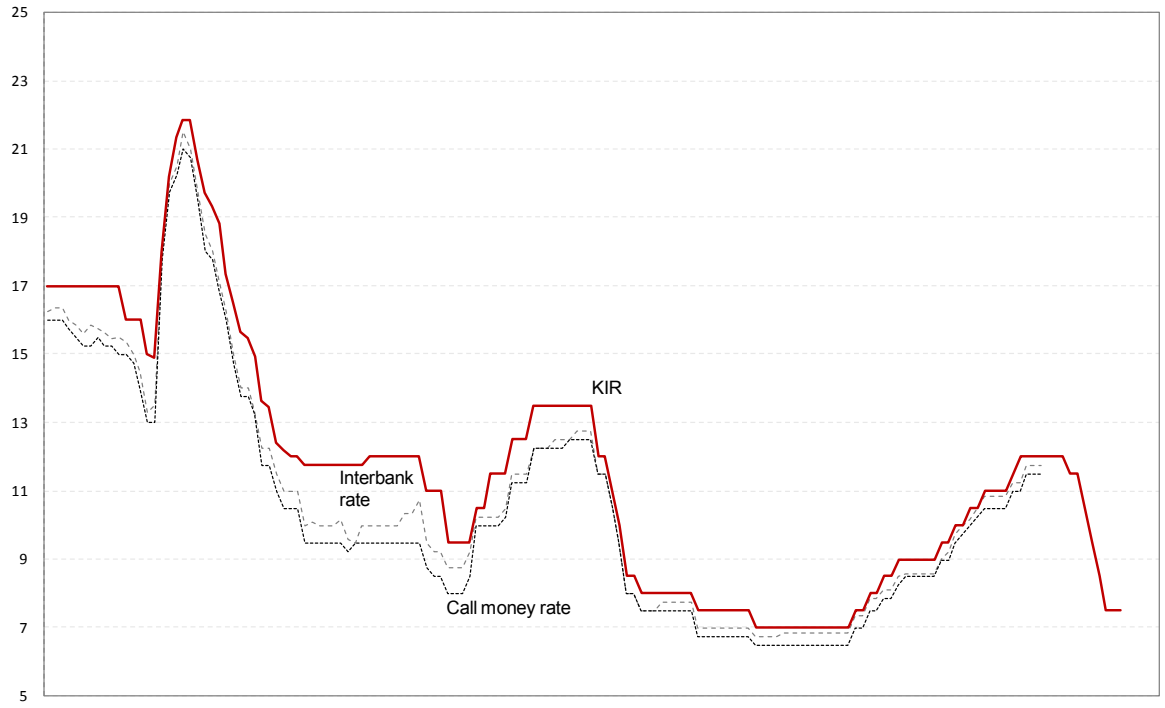

Figure 2: call money rate, IBM rate & KIR

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Master in Finance
Choose the option that fits your profile and discover an innovative methodology of learning at the forefront of global financial education for over 35 years. Boost your career with a highly international and interactive environment in one of the best Business Schools in the World.
MASTER IN FINANCE
Format: FULL-TIME
Av. experience: 1 YEAR
Intake: SEPTEMBER
MASTER IN ADVANCED FINANCE
Format: FULL-TIME
Av. experience: 5 YEARS
Intake: APRIL
GLOBAL MASTER IN FINANCE
Format: BLENDED
Av. experience: 12 YEARS
Intake: OCTOBER
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Figure 2 provides fine evidence of the significance of the KIR in monetary policy: it shows the KIR, the interbank rate and the call money rate for a particular country over a 10-year period. The latter two are market-determined while the KIR is fixed by the MPC. It is quite clear that it represents a ceiling rate: as said, it is so because the banks endeavour to avoid borrowing from the CB. This they, collectively, cannot do, because they cannot create CBM.

The KIR, via the interbank rate and the bank call rates, has a powerful impact on the banks' other deposit rates and, via the bank margin (which the banks endeavour to maximise), the prime lending rate of banks (recall that this is a benchmark rate). We know that deposit money is created by the banks' lending activities, and that the demand for loans is largely influenced by the level of prime rate. So, there we have it in a nutshell: monetary policy is aimed at influencing the banks' prime lending rate and through it the demand for loans which, if satisfied by the banks, creates bank deposit money. If this is successfully achieved, inflation is "managed" at a low level, and thus an environment conducive to high and sustainable growth is created.

The difficulty inherent in monetary policy should be evident. It is essentially twofold. Firstly, what is the correct level of prime? Secondly, the demand for goods and services is what drives economic growth. Money growth, which largely underlies higher economic growth, should be allowed to increase at the level at which the economy can expand to meet the increased demand. What is this level? If growth is too high demand is satisfied by imports and the trade account balance (TAB) goes out of kilter (remember: C + I = GDE; GDE + TAB = GDP). The job of the CB is not a walk in the park, especially if the political masters are permitted to snap at the CB Governor's heels.

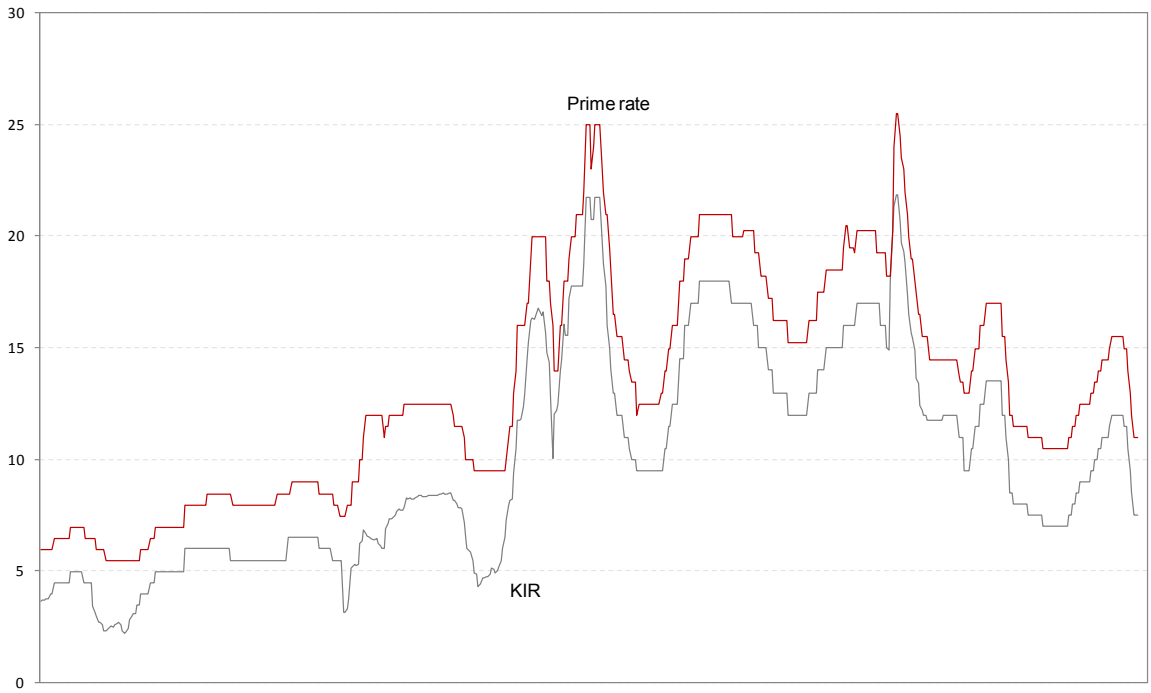

Figure 3: KIR & prime rate (month-ends over 50 years)

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In conclusion, a telling chart is presented (see Figure 3): the relationship between the KIR and prime rate (as at month-ends). This is for a particular country over an almost 50-year period. It shows that the relationship is close indeed (correlation coefficient = 0.99), providing evidence that the KIR has a powerful influence on the banks' prime rate. It also indicates that the CB successfully uses the profit-maximising behaviour of banks to implement monetary policy: they maintain their precious margin whenever the KIR is changed.

A final word: the KIR is only made effective if NER is negative, i.e. if the banks are borrowing from the CB, i.e. if it "bites the banks".

5.5 An analysis of bank liquidity

5.5.1 Introduction

Back to the central bank's balance sheet and open market operations (OMO) (see Balance Sheet 4). We have nauseatingly stated that the CB is able to engineer it so that the banks are always indebted to the CB, i.e. have a BR situation (= negative NER) (proviso: in normal circumstances). We now need to substantiate this statement by introducing you to an analysis of the liquidity of the banking system (or money market). Note that this is not fiction: you can do this analysis yourself with access to your central bank's balance sheet data.

BALANCE SHEET 4: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
		A. Notes and coins	1 000
D. Foreign assets	1 000	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		(RR = 500)	
F. Loans to banks (BR) @ KIR	400	(ER = 0)	
		C. Foreign loans	100
Total	**2 500**	**Total**	**2 500**

You will recall our view that a good measure of bank liquidity is the net excess reserves (NER) of the banking sector, and that it is made up as follows:

$$NER = ER - BR.$$

We also know that ER:

$$ER = TR - RR$$

and that in most countries it is zero because the CB brings about a negative NER situation in order to make the KIR effective.

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As in the case of the *money identity* we can create a *bank liquidity identity* and with this analyse the sources of changes in bank liquidity (which are largely under the control of the CB). Because we are working with a balance sheet, NER = ER – BR must be equal to the remaining asset items less the remaining liability items as follows:

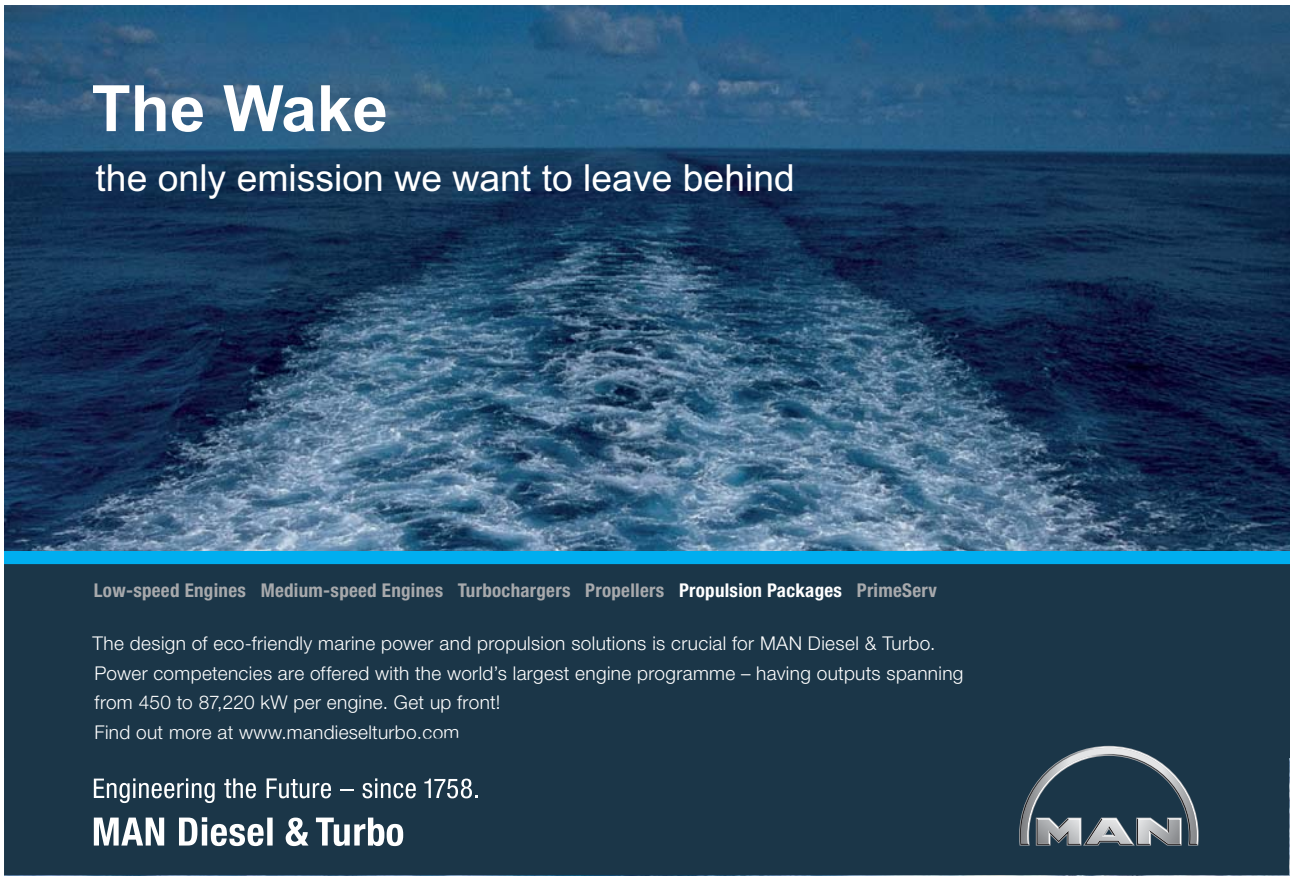
$$\text{NER} = \text{ER} - \text{BR} = (\text{D} + \text{E}) - (\text{A} + \text{B1} + \text{C} + \text{RR}).$$

We have two sets of related items (items D and C, and items E and B1); if we "net" them we create the identity:

$$\text{NER} = \text{ER (part of B2)} - \text{F} = (\text{D} - \text{C}) + (\text{E} - \text{B1}) - \text{A} - \text{RR}.$$

In words, NER (excess reserves, ER, less loans to banks, BR) is equal to:

Foreign assets (FA) – foreign liabilities (FL) = net foreign assets (NFA)
+ Loans to govt (LG) – govt deposits (GD) = net loans to govt (NLG)
- Notes and coins in circulation (N&C)
- Required reserves (RR) (calculated as: TR – ER).



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Presented more clearly we have:

$$NER = ER (= TR - RR) - F = (FA - FL) + (LG - GD) - N\&C - RR$$

or, even more illuminatingly:

$$NER = NFA + NLG - N\&C - RR.$$

This is similar to the money identity, except that here we work *only* with the balance sheet of the CB.

Using the numbers of Balance Sheet 4 we get (LCC billion):

$$\begin{aligned} NER = (TR - RR) - BR &= (500 - 500) - 400 \\ &= -400 \\ &= NFA + NLG - N\&C - RR \\ &= (1000 - 100) + (1100 - 900) - 1000 - 500 \\ &= 900 + 200 - 1000 - 500 \\ &= -400. \end{aligned}$$

These are actual or "outstanding" or "stock" numbers, i.e. numbers at a point in time (when the balance sheets is drawn up). It will be clear that *from one date to the next* (the numbers are usually available as at month ends) we have:

$$\Delta NER = \Delta NFA + \Delta NLG - \Delta N\&C - \Delta RR.$$

We now have an *analysis of bank liquidity*. We are able from one date to the next to calculate the extent by which NER changed and what the balance sheet sources of change/s (BSSoC) were. The real causes are the underlying decisions that led to transactions that gave rise to the changes.

It is important to note that some of the items are passive (the CB does not manipulate them) while the rest are operational (the CB does = OMO). The passive items are:

Notes and coins (item A):

The amount of N&C is determined by the extent to which the banks, companies and households desire to hold them.

Government deposits (item B1):

The amount of government deposits at the CB is determined by government. In some countries government also banks with the banks, and these balances can be used to influence NER (but we will not cover this here).

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Required reserves (item B2 – ER, i.e. TR – ER):

The amount of RR is determined by the volume of bank deposits; recall that RR = BD × *r*. So, the CB has indirect control of this item.

The operational (OMO) items are:

Foreign loans (item C):

The CB decides on whether and to what extent foreign loans are undertaken. However, in some developing countries this decision is made by government, and is a real problem in respect of managing NER.

Foreign assets (item D):

Foreign assets are fully under the management of the CB and foreign assets are often used in OMO – in the form of swaps with the banks. However, as in the case of foreign loans, in some developing countries decisions in this regard are made by government. In the case of donor funds a real problem in respect of managing NER is experienced.

Loans to government (item E):

The central bank's portfolio of government securities constitutes the main operational tool (i.e. OMO tool) in managing NER: by selling and buying treasury bills in the main.

In many countries the CB has another and extremely powerful tool in its arsenal: its own securities. We have left this out in the interests of simplicity, but you should be able to simulate its role after the examples presented below.

It should be evident that the main objective of the CB is to bring about a desired level of NER (mostly negative) and that, in order to do so, it is required to make daily forecasts of the passive items. The outcome of this exercise will determine the extent to which it has to take operational action: OMO. A desired level of NER is the outcome!

5.5.2 Central bank sale of treasury bills

It is time for a few examples (the starting point is Balance Sheet 5). The CB undertakes an OMO and offers LCC 100 billion treasury bills (TBs) on tender with the specific purpose of increasing the indebtedness of the banks, i.e. reducing bank liquidity (NER). Its policy stance is shifting toward the austere side. The banks' tender rates are the lowest (= prices highest) and the TBs are allocated to them. The immediate changes to the relevant balance sheets are indicated in Balance Sheets 6–7.

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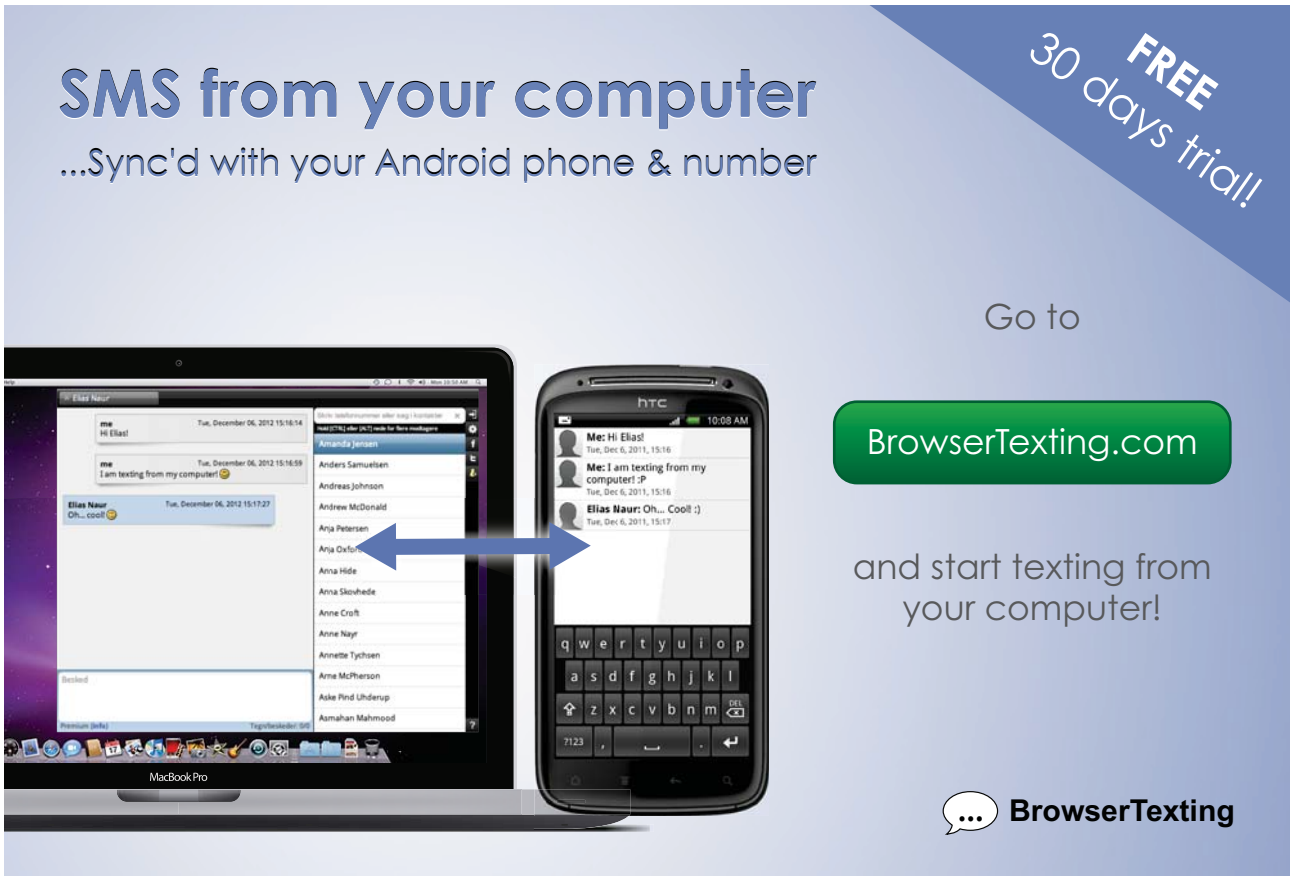
BALANCE SHEET 5: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 000	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		(RR = 500)	
F. Loans to banks (BR) @ KIR	400	(ER = 0)	
		C. Foreign loans	100
Total	2 500	Total	2 500

BALANCE SHEET 6: BANKS (LCC BILLIONS)			
Assets		Liabilities	
TBs	+100		
Reserves at CB	-100		
Total	0	Total	0

BALANCE SHEET 7: CENTRAL BANK: (LCC BILLIONS)			
Assets		Liabilities	
		Banks' reserve accounts (TR)	-100
TBs	-100	(RR -100)	
		(ER 0)	
Total	-100	Total	-100



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The banks paid the CB by EFTs through the payments system. These payments end up as debits on their accounts at the CB.[134] The banks are now short of LCC 100 billion, i.e. they no longer have enough reserves (RR) to satisfy the reserve requirement. This is the only deal done on this day; therefore there are no other funds available in the interbank market. Outcome: the banks have no option by to increase their borrowings from the CB at the KIR. The CB credits their reserve accounts and their balance sheets end up as indicated in Balance Sheets 8–9.

BALANCE SHEET 8: BANKS (LCC BILLIONS)			
Assets		Liabilities	
TBs	+100	Loans from CB (BR)	+100
Total	+100	Total	+100

BALANCE SHEET 9: CENTRAL BANK: (LCC BILLIONS)			
Assets		Liabilities	
TBs Loans to banks (BR)	-100 +100		
Total	0	Total	0

The stock balance sheet now appears as shown in Balance Sheet 10 (changes are highlighted). Thus:

ΔNER (= ΔER – ΔBR)	= 0 – (+100)	= – LCC 100 billion
BSSoC	= ΔNLG	= – LCC 100 billion
Real cause of change	= CB sale of TBs	= OMO.

BALANCE SHEET 10: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
		B. Deposits	
D. Foreign assets	1 000	1. Government	900
E. Loans to government	1 000	2. Banks' reserve accounts (TR)	500
F. Loans to banks (BR) @ KIR	500	(RR = 500)	
		(ER = 0)	
		C. Foreign loans	100
Total	2 500	Total	2 500

From this example you will understand that whenever the CB undertakes a transaction it will appear on the banks' reserve accounts. It will then reflect on the central bank's loans to the banks – because they are either in surplus and repay part of their CB debt or in deficit and increase their CB debt.

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5.5.3 Central bank forex swap deal with banks

In order to cement this significant function of the CB in the implementation of monetary policy into your data bank, we present another example. The central bank's forecast says that government's spending of LCC 100 billion on goods purchased from the NBPS will be cleared in the banking system today. This will increase the banks' liquidity situation (increase NER) which does not fit with the central bank's monetary policy stance. It undertakes an OMO transaction: it sells LCC 100 billion forex to the banks (under a swap deal). See Balance Sheets 1–4.

BALANCE SHEET 11: GOVERNMENT (LCC BILLIONS)			
Assets		Liabilities	
Goods Bank deposits (at CB)	+100 -100		
Total	0	Total	0

BALANCE SHEET 12: NBPS (LCC BILLIONS)			
Assets		Liabilities	
Goods Bank deposits	-100 +100		
Total	0	Total	0

BALANCE SHEET 13: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Forex	+100	Deposits of NBPS	+100
Total	+100	Total	+100

BALANCE SHEET 14: CENTRAL BANK: (LCC BILLIONS)			
Assets		Liabilities	
Forex	-100	Government deposits	-100
Total	-100	Total	-100

The central bank's stock balance sheet appears as in Balance Sheet 15 (see highlights). In terms of the liquidity analysis we have:

ΔNER = 0

BSSoC = ΔNFA = – LCC 100 billion

BSSoC = ΔNLG = + LCC 100 billion

Real cause of NO change in NER = the liquidity creating effect of government spending was neutralised by an OMO transaction undertaken by the CB.

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BALANCE SHEET 15: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
		B. Deposits	
D. Foreign assets	900	1. Government	800
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
F. Loans to banks (BR) @ KIR	400	(RR = 500)	
		(ER = 0)	
		C. Foreign loans	100
Total	2 400	Total	2 400

A comparison of Balance Sheet 15 with the original balance sheet (Balance Sheet 16) will make this transaction more clear. The original numbers that change are indicated in green.

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BALANCE SHEET 16: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets	1 000	A. Notes and coins	1 000
		B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		(RR = 500)	
F. Loans to banks (BR) @ KIR	400	(ER = 0)	
		C. Foreign loans	100
Total	2 500	Total	2 500

5.5.4 Satisfied demand for a bank loan

It will have been noted that we have ignored the effect on the RR of the increased deposits of the NBPS: an increase in RR of LCC 10 billion. This leads to an increase in bank indebtedness to the CB, and therefore to a decline on NER. We have done so in the interests of simplicity. We introduce it now with an example of money creation which means bank loans and deposits have increased, which in turn means that the banks have an increased RR situation.

BALANCE SHEET 17: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to NBPS	+100	Deposits of NBPS	+100
Total	**+100**	**Total**	**+100**

Balance Sheet 17 shows that the banks have made additional loans of LCC 100 billion, and created in the process additional deposits (= money) of the same amount. As we have shown, $\Delta RR = \Delta BD \times r$; therefore in this case the banks are obliged to increase their RR with the CB by:

$$\Delta BD \times r = \Delta RR$$
$$+\text{LCC } 100 \text{ billion} \times 0.10 = 10 \text{ billion.}$$

BALANCE SHEET 18: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to NBPS	+100		
Reserves at CB (TR)	+10	Deposits of NBPS	+100
(RR +10)		Loans from CB (BR)	+10
(ER 0)			
Total	**+110**	**Total**	**+110**

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We have shown that the banks cannot create CBM; therefore they have no option but to borrow (BR) from the CB in order to comply with the increased reserve requirement. Balance Sheet 18 takes Balance Sheet 17 to its final conclusion, and Balance Sheet 19 shows the changes in the balance sheet of the CB.

BALANCE SHEET 19: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to banks (BR)	+10	Reserves of banks (TR) (RR = +10) (ER = 0)	+10
Total	+10	Total	+10

Balance Sheet 20 shows the stock balance sheet of the CB (with the relevant items changed from the original one – see Balance Sheet 21). Again, the items that change are indicated in green.

BALANCE SHEET 20: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 000	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	510
		(RR = 510)	
F. Loans to banks (BR) @ KIR	410	(ER = 0)	
		C. Foreign loans	100
Total	2 510	Total	2 510

BALANCE SHEET 21: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 000	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		(RR = 500)	
F. Loans to banks (BR) @ KIR	400	(ER = 0)	
		C. Foreign loans	100
Total	2 500	Total	2 500

Notable is the fact that the change in NER (-10) brought about by the increase in bank deposits is just one of many factors that can influence NER. In other words the increased reserve requirement is not the driving force in money creation, but a consequence of money creation (this is taken further later again).

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As already said, most central banks around the world have the tools to manipulate NER to any level desired / dictated by the monetary policy stance. In most countries the level is *always* a shade of a negative number and it is often used as an indicator of the stance of monetary policy. And it is always a negative number because – and this is vital – the KIR is only effective if the banks are indebted to the CB.

It is important to note that in this statement, and in the examples presented above, we assumed that the central bank's loan window is always open, and that NER is always negative. As we will show now (and again later), this was not always the case in the past and is not always the case now. In times of crisis central banks have been known to create excess liquidity (ER; a positive NER number) in order to "force" interest rates to levels close to zero in order to stimulate borrowing. As you now know, if you borrow from a bank (↑ LNBPS) the bank creates a deposit (= ↑ M); underlying this is your increased demand for goods – you borrowed in order to buy goods (↑ C = ↑ GDE = ↑ GDP).

5.5.5 Surplus liquidity

Some central banks have major *surplus liquidity* "problems", i.e. a chronically positive NER number. This usually results from donor money (grants in the form of USD / EUR, GBP = forex to the receiving country) which is sold by government to the CB for the local currency for spending. This requires a little elucidation. An example of a positive NER banking system is presented in Balance Sheet 22. The relevant balance sheets items are highlighted; it will be seen that NER = +LCC 200 million (a stock number) (NER = ER – BR = LCC 200 – LCC 0 = LCC 200).

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BALANCE SHEET 22: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 600	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	700
		(RR = 500)	
F. Loans to banks (BR) @ KIR	0	(ER = 200)	
		C. Foreign loans	100
Total	2 700	Total	2 700

As said before, under these conditions the CB loses control over interest rates. Put yourself in the position of the banks that hold the surplus. These balances earn no interest; and the only way to get rid of the surplus is to provide loans cheaply (remember our statement that only the CB can create CBM; by the same token, banks cannot destroy CBM). The extension of new loans creates deposits which carries a reserve requirement. This expansion in lending has to continue up to the point where all the surplus reserves (ER) are "absorbed" into RR. This happens when bank deposits created increases by LCC 2000 million because 10% of this amount is equal to the surplus of LCC 200 million.

As you know, there is an equation for this condition:

$$\begin{aligned}\Delta BD &= ER / r \\ &= \text{LCC 200 million} / 0.10 \\ &= \text{LCC 2 000 million.}\end{aligned}$$

This is why the CB loses control – banks drop lending rates in their desperate endeavour to "get rid of" their surplus reserves (ER). This increases the demand for loans, and therefore money (= deposit) growth takes place, but it has to increase by the reciprocal of the r ($1/r$) in order to have all the ER absorbed into RR.

We now demonstrate how donor funds can lead to a positive NER. The starting point is Balance Sheet 23: the banking system is in a liquidity neutral position: NER = 0.

BALANCE SHEET 23: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 600	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		(RR = 500)	
F. Loans to banks (BR) @ KIR	0	(ER = 0)	
		C. Foreign loans	300
Total	2 700	Total	2 700

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The government of Developing Country receives a donation of USD 10 million (= LCC 100 million at the prevailing exchange rate USD / LCC 10.0) from the World Development Bank (WDB). It maintains its account at US Bank. The transactions are illustrated in Balance Sheets 24–26.

BALANCE SHEET 24: WDB (USD MILLIONS)			
Assets		Liabilities	
Donation Bank deposits	+10 -10		
Total	0	Total	0

BALANCE SHEET 25: US BANK (USD MILLIONS)			
Assets		Liabilities	
		Deposits of WDB Deposits of Dev Country govt	-10 +10
Total	0	Total	0

BALANCE SHEET 26: GOVT OF DEV COUNTRY (LCC MILLIONS)			
Assets		Liabilities	
Forex (deposit at US Bank)	+100	Donation	+100
Total	+100	Total	+100

The government requires the local currency, LCC, in order to spend the funds locally on goods. It sells the forex to the CB. The transactions are illustrated in Balance Sheets 27–29.

BALANCE SHEET 27: US BANK (USD MILLIONS)			
Assets		Liabilities	
		Deposits of Dev Country govt Deposits of Dev Country CB	-10 +10
Total	0	Total	0

BALANCE SHEET 28: GOVT OF DEV COUNTRY (LCC MILLIONS)			
	Assets		Liabilities
Forex (deposit at US Bank) Deposit at Local Country CB	-100 +100		0
Total	0	Total	0

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BALANCE SHEET 29: DEV COUNTRY CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Forex (deposit at US Bank)	+100	Government deposits	+100
Total	+100	Total	+100

The government of Developing Country spends the funds locally on goods. The transactions are illustrated in Balance Sheets 30–33.

BALANCE SHEET 30: GOVT OF DEV COUNTRY (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at CB	+100 -100		
Total	0	Total	0

BALANCE SHEET 31: NBPS (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at banks	-100 +100		0
Total	0	Total	0

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BALANCE SHEET 32: BANKS (LCC MILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 600	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	700
		(RR = 500)	
F. Loans to banks (BR) @ KIR	0	(ER = 200)	
		C. Foreign loans	100
Total	2 700	Total	2 700

BALANCE SHEET 33: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Government deposits	-100
		Bank reserves (TR)	+100
		(RR = +10)	
		(ER = +90)	
Total	0	Total	0

LCC 100 million reserves (TR) were created by the government selling forex to the CB. LCC 10 million of TR becomes RR because bank deposits increased by LCC 100 million, and the balance of LCC 90 million = ER. The stock balance sheet of the CB changes to Balance Sheet 34 (compare it with original Balance Sheet 35). It shows that ER = LCC 90 million = NER. In terms of *changes* we have:

ΔNER		= + LCC 90 million
BSSoC	= ΔNFA	= + LCC 100 million
BSSoC	= ΔRR	= – LCC 10 million
Total BSSoC	=	= + LCC 90 million.

The real cause of change in NER was the donation to government in forex which was sold to the CB, and government spent the funds.

BALANCE SHEET 34: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 700	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	600
		(RR = 510)	
F. Loans to banks (BR) @ KIR	0	(ER = 90)	
		C. Foreign loans	300
Total	2 800	Total	2 800

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BALANCE SHEET 35: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		A. Notes and coins	1 000
D. Foreign assets	1 600	B. Deposits	
		1. Government	900
E. Loans to government	1 100	2. Banks' reserve accounts (TR)	500
		(RR = 500)	
F. Loans to banks (BR) @ KIR	0	(ER = 0)	
		C. Foreign loans	300
Total	2 700	Total	2 700

The obvious course of action for the CB to take, if it is policy to make the KIR effective, is to undertake an open market sale of government securities to the extent of LCC 100 million or more. However, this is often reluctantly done because it will affect the revenue of the CB. It should be accepted there is a price to pay for the proper execution of monetary policy.[135] We will return to this issue again later.

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6 Monetary policy

6.1 Learning outcomes

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

1. Appreciate the relationship between money and inflation.
2. Elucidate the origin of monetary policy.
3. Discuss the present status of monetary policy.
4. Expound on the monetary policy transmission mechanism.

6.2 Introduction

After abandonment of the gold standard, countries' stocks of money were no longer constrained by a shortage of gold. Now it was up to governments to take on the responsibility for maintaining the value of the currency. The temptations were too large and many governments after WWI and WWII could not resist the temptation of creating money by borrowing from their non-independent central bank and the banks.

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There are many examples of inflation after 1931, and a new term came into being: hyperinflation. The highest hyperinflation rate before the new century was recorded in Hungary in 1946. Amazingly, given the norm of sound monetary management examples after 1946, this record was breathtakingly exceeded in 2008 in Zimbabwe, which recorded an inflation rate of over seven sextillion percent per annum.

The source of inflation is excessive demand for loans leading to new money creation. As we know, since 1931, there is no natural brake on loan / money creation. Therefore, there has to be a policy on money creation: monetary policy, which is the primary function of the central bank (CB). And the primary operational tool of the CB is interest rates. Look at it this way: if the public regards bank deposits as the means of payments, and banks are able to create their own liabilities by making loans, there is theoretically an unlimited supply of funding. This is a recipe for close-to-zero interest rates (= limited or no price allocation function), and therefore high demand for loans, and therefore hyperinflation.

We know that hyperinflation creates major distortions and destroys economic growth. Therefore, an institution is required to set interest rates so that an allocation function is in place. This institution is the CB, and its responsibility is profound.

We have all been conditioned to believe that we live in a society / system that is well-ordered by a free market system. The most significant price, interest rates, is not a market-determined price, and central bankers are fallible, as evidenced in the continued existence of the cycles of boom and bust. The question arises: if central banks supervise banks, who supervises the central banks? It is supposed to be government, but governments are not always responsible either. These interesting issues are discussed in this section under the headings:

- Money and inflation.
- A policy on money: then.
- A policy on money: now.
- The path of monetary policy: from interest to inflation.

6.3 Money and inflation

Morgan[136] stated in 1965: "So long as [inconvertible notes and deposits] retain public confidence, they have great advantages of convenience, but they are liable to abuse and, on many occasions in their… history, they have broken down. The government which adopts an inconvertible currency, therefore, takes on a heavy responsibility for maintaining its value…"

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Box 1: Devaluation of money

Zimbabwe, 2008; money to settle a debt: a beer; internet floater; source unknown

It is interesting indeed to note that periods of high inflation in England occurred when the gold standard was suspended in 1797–1819 and 1914–1925. Newlyn[137] informs us that the 1797–1819 period of inconvertibility (which coincided with the French wars) "…produced one of the first major loans inflations and it was followed by one of the most famous inquiries of the many inquiries that have taken place… their report blamed the inflation upon the excessive issues of bank notes by the Bank of England and the consequential excessive issues by the country banks."

We know that Britain also experienced high inflation during the 1914–1925 inconvertibility period, exacerbated by WWI. "Hyperinflation" became a new word in this period, but not in Britain; it reared its ugly head in Germany, also exacerbated by WWI. Germany at that time did not have a convertible currency. We also know that in the period after 1931, when the gold standard was finally done away with, many countries experienced hyperinflation, the highest being that of Hungary in 1946, as referred to earlier.

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We also know that the inflation record of Hungary was finally broken in 2008 / 2009 by Zimbabwe. A reminder: there are no official numbers for the country, but John Robertson, a Zimbabwean economist, estimated the inflation rate to have been about 7 000 000 000 000 000 000 000 (7 sextillion) percent per annum. In 2009 the Zimbabwean dollar lost all its functions and qualities (medium of exchange, store of value and unit of account) when the USD and the ZAR (South African Rand) were officially designated legal tender.

Milton Friedman and Anna Schwartz famously wrote in the nineteen-seventies that "inflation is always and everywhere a monetary phenomenon."[138] Today it is not even debated whether excessive monetary expansion causes inflation. It does! But how it comes about and what the consequences are, are the interesting parts of the equation.

On "how it comes about" we can only present you with a written offering at this stage of the discussion. In order to understand it fully, we need to conjure up the balance sheet analysis again. In short, the CB and the government are to blame. In most countries today the CB is immune to the monetary antics of government. If, for example, government borrowed excessively from the "institutions"[139] and the banks (which could only happen at high rates of interest), the CB will most likely increase interest rates by a large margin to curb the demand for loans (which we know if satisfied creates money). In other words the independent CB will "lean against the wind".

In Zimbabwe the CB never was and still is not independent. The early phase of the inflationary period began with excessive borrowing from the banks by the issuing of treasury bills. This creates deposit money. Because inflation is rising, workers demand higher wages. In Zimbabwe government is the largest employer (civil service, defence force, police, etc.). More securities are issued to the banks which now demand higher rates, and so the process continues until a point of no return is reached: the dreaded *debt trap*. Government borrows more from the banks to pay interest on debt and the debt burden increases so that more is borrowed to pay the higher interest burden and so on and so on….

The government reaches a stage when it realises that a major reason for the sharply rising inflation is the interest burden. It then, via the CB, influences interest rates down. The banks, adversely affected by the high inflation rate, and now lower interest rates (lower than inflation), refuse to buy any further treasury bills. Then the principal hyperinflation cause kicks in: government forces the CB to buy its debt. Not only does this create money, it also creates liquidity in the banking system and interest rates fall further in relation to inflation. From this point on hyperinflation surges and can no longer be stopped.

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On the ground the population loses confidence in the currency. They become reluctant to accept it as a means of payment, preferring to use the little foreign currency that may be available. If they cannot refuse the local money, they spend it as rapidly as possible, because its purchasing power falls quickly. The rush to spend increases prices further. As prices rise rapidly, the producers of goods, such as farmers, hold their produce back from the market. The shortage of goods is exacerbated and prices rise still further.

This process is cumulative and "…the situation soon gets completely out of hand; money ceases to perform its function as a means of payment and the public falls back on foreign currencies or commodities, or even reverts to barter. This process, of course, involves great disorganization of economic life, and the only remedy is to scrap the dislocated currency and replace it…"[140]

The shortage of goods is exacerbated by producers of goods, again like the farmers, transporting their goods over borders at night and selling them for the neighbours' stable currency. In the Zimbabwean case goods were smuggled over borders into South Africa, Mozambique and Botswana. Another factor that played a role at some stages is that government declared that the prices of certain commodities (like maize) were fixed. As input costs (such as fuel and fertiliser) were not fixed the farmers stopped producing because severe losses stared them in the face. Thus, the supply of these goods dried up and prices increased further.

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The consequences of hyperinflation are profound. Production fell sharply, in other words economic output declined. In terms of the identity MV = PT, M increased exponentially, V probably increased as people spent as rapidly as possible, P increased exponentially, while T (real GDP) fell sharply. Although economic numbers dried up in mid-2008, it is reliably reported that unemployment rose to over 90%. With increased poverty, cholera broke out and many thousands died. The demise of many HIV/Aids sufferers was accelerated. People jumped borders nightly to offer their labour in neighbouring countries, not for money but for food. Those that could not find work had themselves apprehended by the across-border immigration authorities – because of the meal that was available. Many of the hunger-refugees were apprehended daily.

As we saw earlier, in early 2009 the Zimbabwean dollar lost all the qualities that made it money. Foreign currencies were adopted as the means of exchange.

In most countries the stock of money in circulation increases virtually each month and the task of the CB is to ensure that the increase remains in the moderate range. The objective (in most cases formalised in an inflation target set by government for the CB) is to ensure that inflation remains in an acceptable range or does not exceed a particular number. Many countries have adopted a target of a maximum inflation rate of 2% per annum. It is evident that this level is an acceptable "price" to pay for the benefits of money creation.

What are the benefits of money creation? The major benefit is that money is available for projects (= investments) and for consumption. This is "regulated" by the private sector banks in the first instance and the CB in the second. The first level involves the screening of the projects of corporations, and the creditworthiness of individuals. The second level involves responsible monetary policy: a policy on money.

As you know, in 2008 neither level of responsibility was effectively executed. The underlying problem, which was not well recognized, was excessive money creation for the previous four to five years. It was a failure of monetary policy (inter alia). However, as indicated in the foregoing, the world experienced worse situations in the past. And we have the satisfaction of knowing that the central banks had the right tools to quickly reverse the 2008/09 recession. These tools have to do with money and the price of money, interest rates, and, judging by the shortness of the recession, they are effective.

6.4 A policy on money: then

6.4.1 Introduction

As we know, money creation is a significant feature of the economic landscape. Without money creation the financial system and the economy cannot expand, except through productivity improvements. Money is created by bank lending and bank lending is controlled by the management of interest rates. However, in the past it was different.

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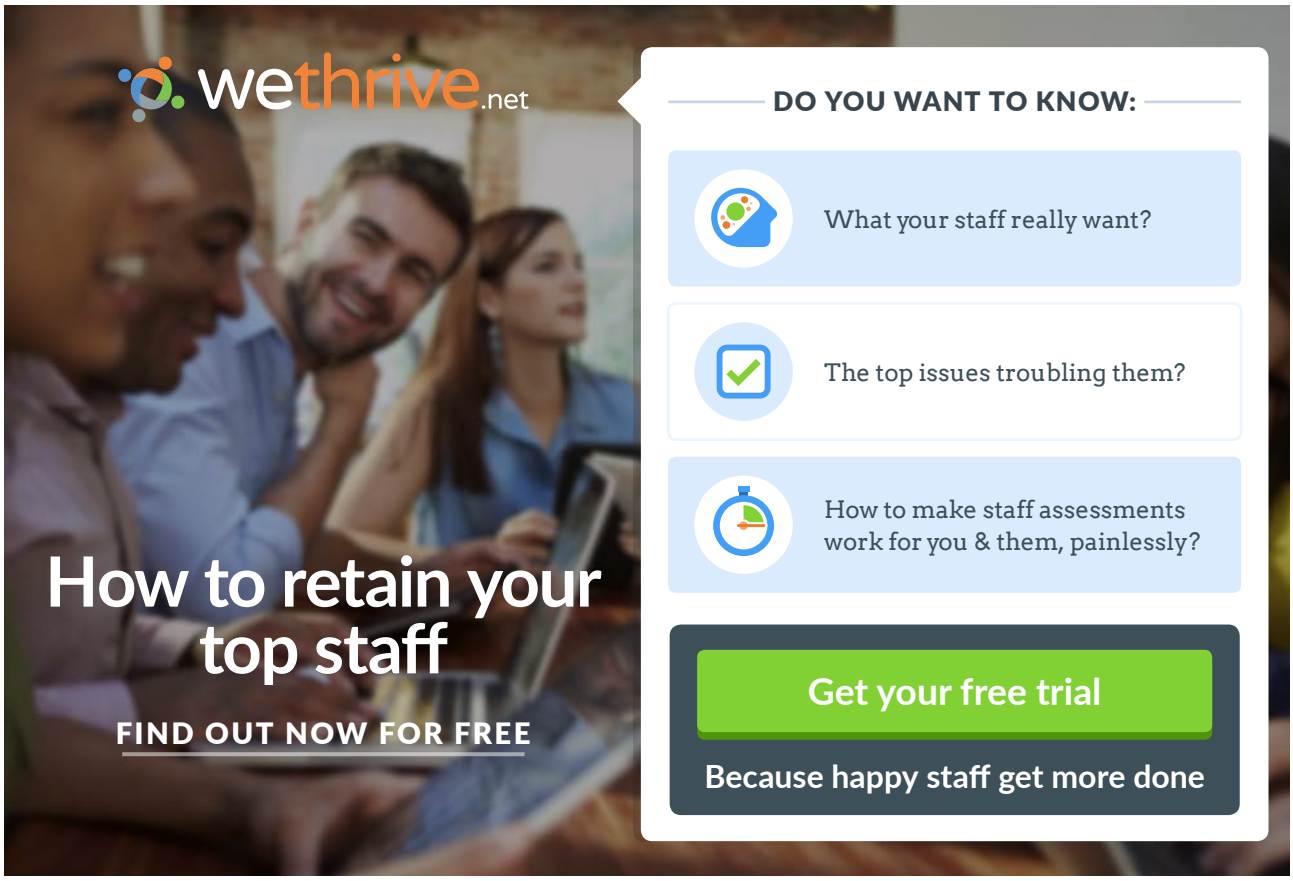
In the distant past and up to the first half of the twentieth century, a number of phases in the history of money and money creation can be identified and each one is a little different in respect of money creation. Essentially, there was a natural brake on money creation (it was not always respected though, with dire consequences) and this was *convertibility of bank liabilities into gold*. This natural brake was abandoned in 1931, and in the short period after this hyperinflation was invented.

The Bank of England over more than two hundred years assumed the functions we now associate with central banking, and their lead was followed by many other countries. The tools of central banking forged over many decades were interest rates, open market operations and required reserves, which were ineffectually implemented in the early days of central banking.

6.4.2 Essence of monetary policy: managing interest rates

Monetary policy is the implementation of decisions made by the MPC that are aimed at achieving the objectives of high and sustainable growth, through the central bank's limited range of instruments, which is to manage money stock growth to a level consistent with the capacity of the economy to expand, in order to avoid inflation rising above an acceptable level. As mentioned earlier, if we take a cue from Britain, Europe and other Old World countries, an acceptable level of inflation is around 2% pa. At this level business's attention is not deflected from business. Thus, with low and stable inflation the economic setting is conducive to growing output (and the dreaded *deflation* – falling prices – is kept at bay).



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With the existing monetary system in place in most countries, money creation drives a higher level of economic growth. Think about this carefully again: the "demanders of bank loans", the borrowers (individuals, companies and government) borrow with the purpose of spending – either on investments (in housing, plant and equipment, inventories, roads, harbours, etc.) or on consumption (new fridges, beds, lounge furniture, etc.). So underlying the demand for loans is higher investment and consumption expenditure. What makes up GDE? Consumption and investment spending does (remember GDE = C + I).

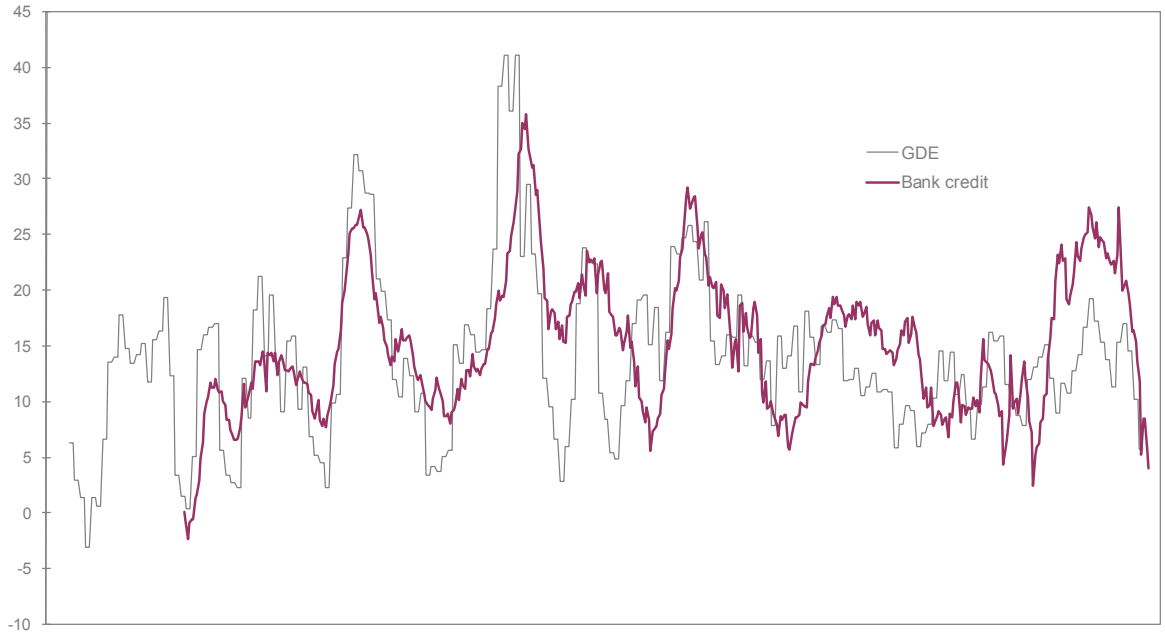

Figure 1: GDE and bank loan extension (yoy %)

So the demand for loans by the NBPS and government and its satisfaction by the banking sector influences economic growth? Yes, indeed. Take a careful look at Figure 1. It shows the year-on-year growth rates for nominal GDE (grey line) and bank loan extension for a particular country over almost fifty years on the same scale. The correlation (coefficient = 0.6) is obviously high, providing strong evidence of the statement. It will be seen that at times the growth rates in both the time series was excessively high (at one stage 35–40% pa). These periods were associated with high inflation periods (see later chart).

Now a vital question: how does the CB manage money stock (and, to a large degree through it, GDE) growth? The answer in the past was a series of tools which we will come to shortly. In these modern times it is interest rates (in most countries) and the target is prime rate (specifically in real terms) because this is the benchmark rate for bank loan extension, i.e. the benchmark rate at which loans are made to the NBPS. As we have seen, this rate is heavily influenced by the central bank's KIR. Chart 2 shows the powerful role that real prime rate plays in influencing GDE growth (over almost 50 years in the same country as in the previous chart). (Prime rate has been advanced by 12 months because of the lag in the effect of policy action.)

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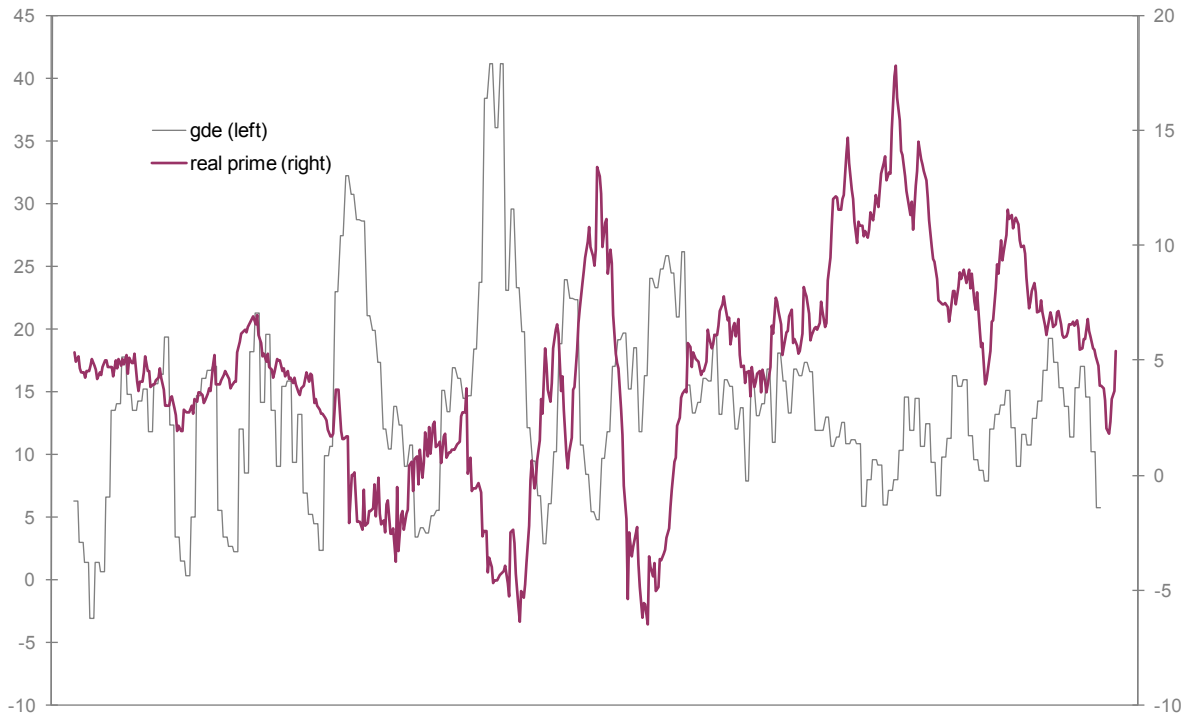

Figure 2: current GDE (yoy %) & real prime (adv 12 months)

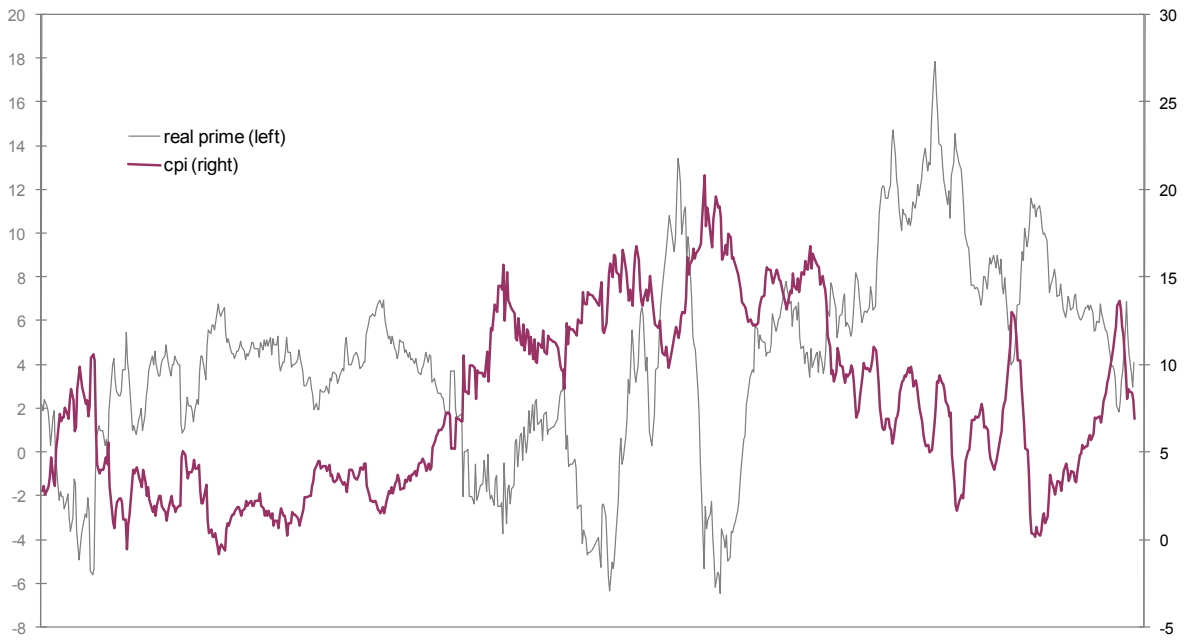

Figure 3: real prim and CPI inflation (yoy %)

Figure 3 is also a telling one. It again shows the real prime rate but now includes inflation as measured by the CPI. The inverse correlation over almost sixty years is quite startling, again indicating the compelling force of interest rates.

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The use of interest rates as the principal operational tool of monetary policy was not always the case. We now briefly go back to history to sketch the development of monetary policy over time, followed by the "models" of monetary policy followed today.

6.4.3 Development of monetary policy: five periods before the Bank of England

The history of monetary policy is closely aligned with the history of banking and of central banking, particularly the history of the Bank of England. As you know, the Bank of England was formed in 1694, and it gradually transmuted into a CB. It is the oldest CB in the world in the sense that it was the first bank "…of issue to assume the position of a central bank and to develop what are now generally recognised as the fundamentals of the art of central banking."[141]

Before central banking emerged in the late seventeenth century in the form of some of the functions of the Bank of England, there were five periods that can be identified on which something can be said about "primitive" monetary policy. The first is the barter period: monetary policy was non-existent because there was no money. The second was the days of primitive money, when the amount of money in circulation could increase only if more of the *generally accepted means of payment* were found or produced, for example, cowrie shells, maize, cattle; however, no institution was charged with the task of monetary control.

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The third period: the days just before precious metal coins, i.e. the brief time of gold and silver nuggets in Lydia, which were used by weight. There was a natural shortage of the metals, so excess money creation and inflation were not issues. The same applied in the fourth period, the precious metal coinage age, except when the kings debased the coins or large amounts of the metals or coins were plundered from enemies or deposits were discovered, as in the case of Spain mentioned earlier. During these stages no institution / body was charged with the task of controlling the volumes of precious metals coins.

However, in the case of debasement, the public had a monetary policy role – in the form or protests against debasement. Later (in England) parliament had a role to play, and it is safe to say that this was the first flicker of monetary policy. As stated by Morgan, in these times "…the only issues which could possibly be called monetary policy concerned the maintenance of the standard, the enforcement of the state prerogative of coinage and the relative values of the precious metals. It was generally held to be an important duty of a ruler to maintain a coinage of fixed weight and fineness though…impecunious governments were often forced into debasement."[142]

During these times an important function was to endeavour to keep the precious metal coins from being lost to the country. Morgan[143] informs us that because coins were in short supply, "…from the end of the thirteenth century the nations of Western Europe were competing vigorously for bullion by prohibiting its export, attempting to compel its import, controlling the foreign exchanges, and trying to secure a favourable balance of trade." It will be evident that the problem then was not excessive money but a shortage of money, prohibiting trade. Numerous laws were passed to curb expenditure on foreign goods, and thus to protect the balance of trade (and thereby the loss of gold to the country).

The fifth period was the goldsmith-banker period in which the creation of bank notes and deposits emerged. Generally this was welcomed because it increased the amount of money in circulation to ease the shortage of gold and silver coins. Monetary policy in respect of the goldsmiths' creation of these new forms of money was non-existent until the formation of the Bank of England and its emerging monetary policy functions. However, there was a natural brake on excessive money creation in the form of convertibility of bank notes and deposits into gold. As we know, despite this, many goldsmith-bankers and country banks failed as a result of indiscriminate lending and not being able to repay depositors (aided, as we saw, by the government reneging on its debt).

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6.4.4 Bank of England: early days: some functions

The Bank of England was formed (in 1694) to fulfil the need for a large and stable bank in England (and Scotland where the Bank of Scotland was formed a little later), to compete with the remaining goldsmith-bankers (whose practices were often frowned upon – such as the high interest rates charged for loans) and to make loans to government (at the time of the French wars – which started in 1689). It was given the sole right to issue bank notes (except for smaller banking partnerships), a right that was entrenched in 1833 when its notes were the only notes declared legal tender. Take a look at Balance Sheet 1, a typical balance sheet of a CB, as a backdrop to this discussion.

BALANCE SHEET 1: CENTRAL BANK (LCC MILLIONS)	
Assets	**Liabilities**
D. Foreign assets	A. Notes and coins
	B. Deposits
E. Loans to government	1. Government
	2. Banks' reserve accounts (TR = RR + ER)
F. Loans to banks (BR) @ KIR	C. Foreign loans

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In its year of establishment, the Bank of England already was beginning to perform some of the functions of modern central banks: it was the (almost) sole issuer of bank notes (item A) (coins were then a liability of government); it was banker to government (item B1); it was making loans to government (item E). We hasten to add that this is not a true, lasting function. Although it started out in this way, making loans to government (by buying their debt instruments) is highly inflationary. This later gave way to the holding of government securities only for OMO purposes.

We saw earlier that shortly after its establishment, the goldsmith-bankers opened accounts with the Bank of England, and deposited gold coins. These deposits with the Bank of England and its notes became to be held by other banks as reserves – to ensure that withdrawals could always be met. As time went by the Bank of England came to be known as the government's banker and agent and its notes "…commanded the greatest confidence and the widest circulation."[144]

The convention of keeping larger balances with the Bank of England "…grew as time went on, and when the wide-spread establishment of the joint-stock banks in England began in 1826, the Bank of England had already come to be regarded as the custodian of the cash reserves of the private banks, and thus of the country's gold reserves." In terms of Balance Sheet 1, we can now tick off items D (foreign assets[145]) and B2 (reserve accounts) of CB functions. This function of "the custodian of the cash reserves of the private banks" was a critical juncture in the history of central banking and monetary policy.

The central banking function of being host to the settlement of interbank claims (over their CB accounts) was embraced in 1854, when "…its position as the centre of the English banking system banking structure was further strengthened…when the plan was adopted of settling the differences between the various banks at the end of each clearing by transfers between their respective accounts at the Bank."[146] The "Bank" referred to was the Bank of England. Initially this was accomplished by the banks meeting in person at the Bank of England, exchanging cheques and settling the differences. As we saw earlier, this is now achieved in electronic fashion (and has been since the advent of computers).

6.4.5 Bank of England: early days: lender of last resort & Bank rate

The function of "lender of last resort" (as reflected in item F in Balance Sheet 1) was assumed a little later. The phrase was coined by Walter Bagehot (1826–1877), an essayist, journalist and businessman, whose book "Lombard Street: a description of the money market" was regarded as the seminal work on the British banking system and money market at the time. This function was executed mainly in periods of crisis in the early days of the Bank of England. According to De Kock[147], "…it was brought home to the Bank that in certain circumstances financial panic could easily be brought about by the fear that the requisite banking facilities could not be obtained, and that it could be promptly allayed by the assurance that all legitimate requirements would be met by the Bank, although at temporary higher rates…"

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The last point is significant: the use of interest rates, and specifically Bank rate[148] (as the KIR was termed then), to influence the banking system. As noted earlier, some central banks still use this term; others use *base rate*, *repo rate*, *discount rate*, and so on. Bank rate then became an instrument of monetary policy; Bank rate was used "…with the object of limiting the demand for accommodation to the most urgent and essential needs and securing the contraction of loans as a whole."[149]

Morgan informs us that Bank rate became an important tool of the Bank of England in the nineteenth century: "The main instrument which the Bank used was the variation of the published minimum rate at which it would discount approved bills of exchange…known as Bank rate…in the crisis of 1847… it was changed eight times…and from henceforth it was firmly established as the Bank's major policy instrument."[150]

It is evident that the Bank received bills for discount from the banks, and it came about that Bank rate (as is the case today) had a major impact on market rates: "A convention soon grew up by which the other banks varied the rates which they charged for overdrafts with variations in Bank rate…a change in Bank rate had an immediate impact on the cost of this form of borrowing. Otherwise, the direct effect of a change in Bank rate was on the rates charged in the discount market."[151] *Discount market* was a name used for the major part of the money market in earlier days (when discount houses – specialised banks – were the main participants).

As noted earlier, the Bank of England was competing also with the banks in the bills of exchange (i.e. prime lending) market. At the same time it was cognisant of its role of controller of the loan creating activities of the banks, as reflected in its Bank rate often being set at higher rates than the market rate – which inevitably led to the market following this course. Morgan[152] tells us that at the beginning of the second half of the nineteenth century the Bank of England "…was torn between these two policies. It had always competed for business…and the profit motive urged the directors still to do so. On the other hand, the difficulties of acting both as competitor and controller grew steadily more apparent and in the 1870s, the practice of keeping Bank rate above market rate became established and has continued ever since."

In these times the Bank of England quickly realised when Bank rate was ineffective: *when the banks had large reserves* – often a result of the Bank's own loan business. You will recall that when a CB extends loans (buys government bonds or in this case bills of exchange), it increases deposits in the banking system. These deposits invariably came back to the Bank of England in the form of deposits by the other banks (= an increase in reserves).

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In these circumstances of high bank liquidity the Bank of England resorted to open market operations (OMO – in this case sales of securities). Morgan[153] tells us: "…suppose that the Bank sold Consoles [= bonds]; the buyers would pay by cheques on their commercial banks; the payment of these cheques would reduce the commercial banks' balances with the Bank of England. And so they would have smaller reserves and could lend less in the money market…these operations were always subordinate to Bank rate, and were used as a means of ensuring that Bank rate was 'effective'." As we saw earlier and will belabour again later, this remains an essential element of monetary policy today.

As we have seen, in the majority of countries, the central bank's KIR has become the primary tool to influence bank loan extension / client loan demand behaviour without resorting to "penal" rates[154]. The other operational "tool" that makes the rate effective is OMO to ensure that the banks are indebted to the CB.

So, by approximately the middle of the nineteenth century the Bank of England pretty much has assumed all of the functions that we all now associate with central banking. It was in this century that most of the European central banks were established, no doubt motivated by the Bank of England. They were followed somewhat later – in the first half of the twentieth century – by the New World countries (America, Canada, South Africa, Australia, New Zealand, Chile, etc) and some Old World countries (China, India, etc). For example, the American Federal Reserve System (of twelve Federal Reserve Banks) was established in 1914, the Central Bank of China in 1928, the Reserve Bank of India and the Bank of Canada in 1935.[155]

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There is an item missing from Balance Sheet 1 (representing the balance sheet of the Bank of England in the past), and this is "loans to NBPS". In its early days the Bank was also competing with the private bankers and was involved in discounting commercial bills of exchange ("discounting" refers to buying them at a discount to face value, the difference being the interest earned; it is simply a means of providing loans to the NBPS, which of course is money creation). The money created then was a combination of NBPS deposits and bank notes, mainly the latter. This lending activity of course meant that as time went by there were more and more deposits / bank notes backed by a more or less unchanged volume of gold reserves, making the Bank vulnerable.

As we know, the Bank of England experienced a number of crises, and it was obliged to suspend convertibility of notes and bank deposits on an number of occasions in these times, semi-finally in 1914, and finally in 1931. The end of convertibility of bank notes and deposits into gold was inevitable, and is related to the simple fact of increasing bank lending to the NBPS, and the gold backing bank notes and deposits, while not reducing absolutely, certainly reduced relatively.

6.4.6 Monetary policy after partial and final inconvertibility

We now come to monetary policy after semi- and final-inconvertibility of bank notes / bank deposits. The world had entered a new era; its economies were no longer constrained by a lack of money. By this time the Bank of England and many other central banks had much experience in the art of central banking. They had all the tools of central banking in place to effectively manage the growth rate in the money stock. The quoins of effective monetary policy were in place: centralised bank reserves, Bank rate, and the ability to make Bank rate effective (OMO).

However, this ability to effectively control money creation was put on hold for many years after 1931. Morgan informs us dramatically that: "During the nineteen years from 1932 to 1951 traditional monetary policy was deliberately thrown over."[156] An era of cheap money and excessive money growth was to take place. The principal instigator, the cause, was government (and the related fact the central banks were subject to the dictates of government), and specifically the swelling budget deficits, which were largely financed by the banking sector, and specifically the central banks. As seen before, a CB purchase of an asset not only creates money it creates reserves (increases bank liquidity), ensuring low interest rates. Low rates were at times reinforced by Bank rate policy. During WWII at one stage "…the Bank of England announced it willingness to buy any Treasury bills offered to it on a 1 per cent basis."[157]

As we have shown, a little time before 1931 (when there was partial inconvertibility), and certainly after 1931, a number of bouts of severe inflation in Europe were experienced, particularly after the World Wars. Morgan tells us that in these times: "The fact not generally appreciated was that…the money supply was accompanied by budget deficits which caused demand to outrun productive capacity."[158] A new phrase emerged – hyperinflation – and the consequences were profound. There were calls to return to the gold standard. This was never to come about again.

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However, following these bouts of severe inflation, the relationship between budget deficits (largely financed by the banking sector) and inflation came to be recognised, and so emerged an appreciation of the importance of the co-ordination of monetary and fiscal policy. Much later this was to be embodied in calls for the independence of central banks, which came about in the nineteen-eighties and -nineties (but only in a handful of countries).

After the Korean War (1950–53) monetary policy returned to "normality" in the sense that it was recognised that inflation was to be avoided and the cause addressed (the main one being large budget deficits financed in the banking sector). Central banks in the following few decades adopted specific economic objectives, which shifted from one period to another between: balance of payments stability, maintaining a fixed and stable exchange rate, low unemployment, high and sustainable economic growth, low inflation (or combinations of these). For example, in 1957 the UK Chancellor of the Exchequer, in announcing the appointment of the Radcliffe Committee stated: "…there is general agreement as to the objectives of monetary policy. This country stands determined to maintain a fixed and stable exchange rate. The primary requisite for this is that we shall be able and determined to avoid inflation at home. Equally, it is also agreed policy to avoid slumps and severe unemployment…. These objectives are not open to question."[159]

Although the Bank of England had all the tools to implement monetary policy, as did many other countries, they were ineffectually utilised in the ensuing few decades – until it was realised that the adoption of an inflation target and success in this regard addressed all the objectives: that low inflation (meaning domestic demand was kept in check) created an environment that was most conducive to economic growth, low unemployment, and balance of payments stability. But this was to come later. In the decades before inflation targeting, the Bank of England, and many other central banks, flirted with monetary policy tools such as: a liquid asset requirements (of which the *cash* reserve requirement was a part) and variations in the ratio, quantitative bank loan ceilings, special deposit requirements, hire-purchase restrictions, and so on. None of them worked effectively.

The tone of monetary policy at this time was set by the 1957 Radcliffe Committee, and the essence of why monetary policy was not effective in the ensuing decades was a reluctance to allow interest rates to play the major role in curbing demand. The Committee stated that: "The Bank cannot restrain the lending operations of the clearing banks by limiting the creation of cash without losing its assurance of stability of the rate on Treasury bills…the Bank of England had chosen stability of the Treasury bill rate."[160] This policy philosophy remained in place until the adoption of inflation targeting. Under inflation targeting the main policy instrument is *interest rate management*, which can only be executed if the *KIR is made effective*, and this can only be achieved if the banks are *permanently indebted to the CB*.

Even though the holy grail of monetary policy was discovered with inflation targeting, all is not well in the State of Denmark. This issue will not be belaboured here, because this is a work on the mechanics of monetary policy; instead we now address the mechanics of monetary policy as applied today.

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6.5 A policy on money: now

6.5.1 Introduction

We know that banks create money by extending loans, and that CB management of the growth rate of money creation is a critical issue. There are three methods or models of monetary policy implementation: (1) the firm required reserves model, (2) the firm borrowed reserves model and (3) the interbank rate model. The first one was flirted with in the past (and even a few central banks do today). The second and last models are about CB control of bank liquidity through open market operations and through this making the CB lending rate to banks effective. The first impact is on the b2b interbank rate. The interbank rate has a major impact on bank deposit rates and, through the margin that banks endeavour to maintain (in the interests of profit maximisation), on bank lending rates. Bank lending rates impact on the behaviour of the NBPS and therefore on the demand for loans; the latter is largely the counterpart of money creation.

Modern monetary policy (modern being from the last quarter of the twentieth century) revolves around the same elements as the Bank of England identified and it was maturing: the reserve requirement (the amount of which we call the RR, and the ratio the *r*), the central bank's lending rate to the banks (the KIR), and open market operations (OMO), which is used to make the KIR effective, through ensuring that the banks are indebted to the CB at all times.

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We hasten to add that while this is the norm, it is not followed to the T by all central banks as we shall see. For example, we will show that not all central banks in this modern age have a reserve requirement (which does not mean that they cannot make loans). Similarly, not all central banks keep the banks in the red at all times; the mere threat of them being forced to borrow from the CB is enough to ensure that the banks' interbank rates (think: Fedfunds market) are closely aligned with the central bank's KIR.

We also hasten to add that in some countries, as Zimbabwe in 2008 / 2009, monetary policy has been conducted in a bewilderingly irresponsible manner. Generally, this can be ascribed to the lack of independence of the CB. Independence from government is a critical factor in the success of monetary policy. As we saw earlier, the co-ordination between monetary and fiscal policies needs to be in place. Ideally, government's deficit should not be financed by the banking sector (= money creation); neither should government borrow in the NBPS (which is mainly the retirement funds and insurers, where money is not created) to such an extent that the private sector's requirements for equity finance are "crowded out". Ideally, government and the CB need to collaborate closely in these matters, and if this is not the case, the CB should be able to carry out a restrictive monetary policy freely.

In this modern age there are essentially three methods (models) of monetary policy. We like to call them: (1) the firm required reserves model (firm-RR model), (2) the firm borrowed reserves model (firm-BR model) and (3) the interbank rate model (IBR model). The latter model is only slightly different to the firm-BR model as you will see.

6.5.2 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 serves 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 2–5); it is the same as the one presented earlier but with the RR and the CB included.

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BALANCE SHEET 2: COMPANY A (NBPS) (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposit at bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 3: COMPANY B (NBPS) (LCC MILLIONS)			
Assets		Liabilities	
Goods	+100	Loans from bank	+100
Total	+100	Total	+100

BALANCE SHEET 4: 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 5: 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):

$$RR = BD \times r$$

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

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

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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).

Clearly this is the extreme case, which we present here to make a point. The central banks that operate this model (few[161] 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.

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 6–7).

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BALANCE SHEET 6: 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 7: 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 8–9.

BALANCE SHEET 8: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Bank reserves (TR) (RR = +1 200) (ER = -1 200)	0
Total	0	Total	0

BALANCE SHEET 9: 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

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.

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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.

6.5.3 Firm borrowed reserves model

At the other extreme is the *firm-BR model*. 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).

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 undertakes OMO to ensure that the banks are borrowing from the CB (or does 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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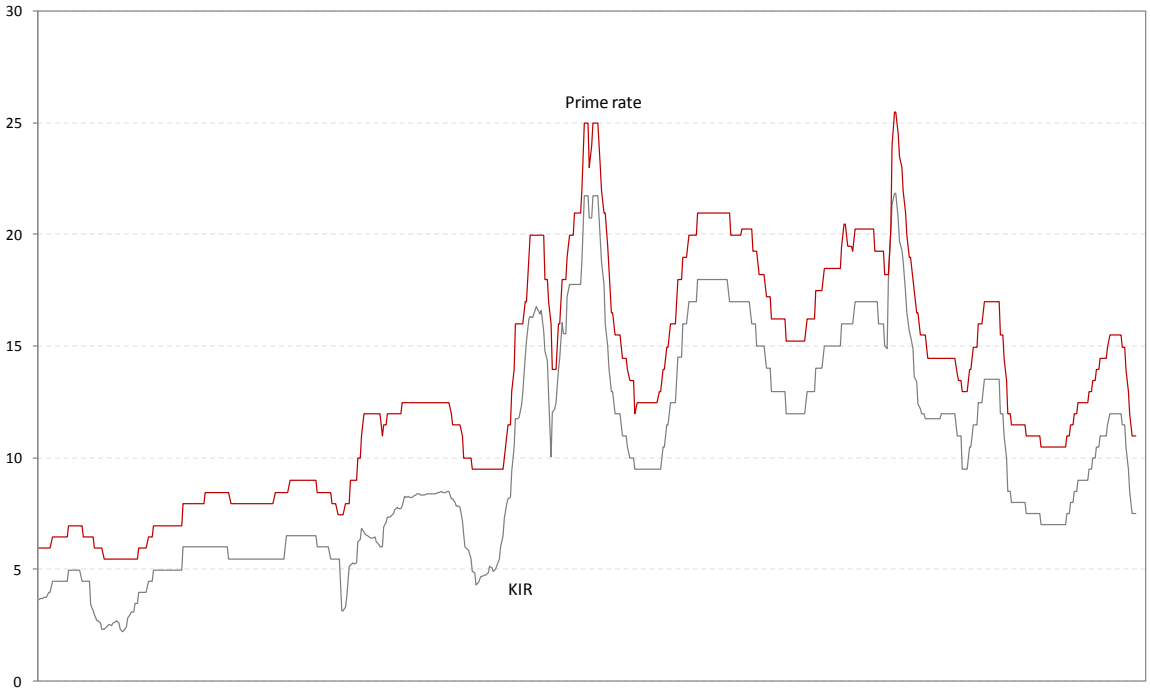

Figure 4: KIR & PR (month-ends over 50 years)

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The Bank of England[162] 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.[163] 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.*
>
> *"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[164] 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.

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

BALANCE SHEET 11: BANKS (GBP BILLIONS)			
Assets		Liabilities	
Bank reserves (TR) (ER = +100)	+100	Deposits of NBPS Loans from CB (BR)	+200 -100
Total	+100	Total	+100

BALANCE SHEET 12: 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[165] has a similar monetary policy execution style (note that "overnight loans" is 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…*
>
> *"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."*

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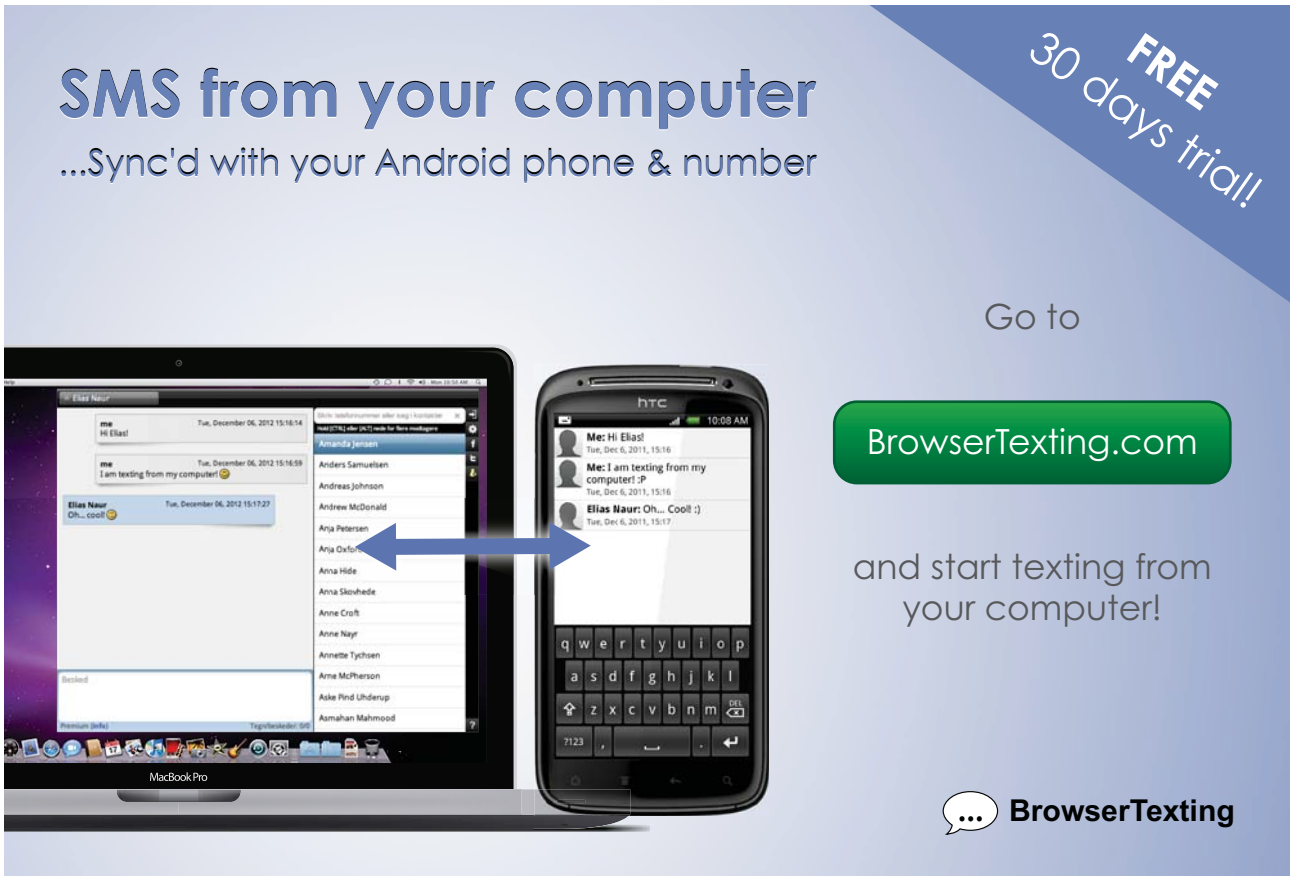
6.5.4 Interbank rate model

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.



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A good example of this method on monetary policy is Canada. The Bank of Canada states:[166]"

> *"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.*
>
> *"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)[167].

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6.5.5 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 $\Delta M \times \Delta V = \Delta P \times \Delta$real GDP (assuming V to be stable), ΔM3 should not exceed the economy's capacity to expand at a rate, Δreal GDP, that will deliver a ΔP 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.

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?

6.6 The 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.

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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 + X – 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 in the bank's 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).

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[168].

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.

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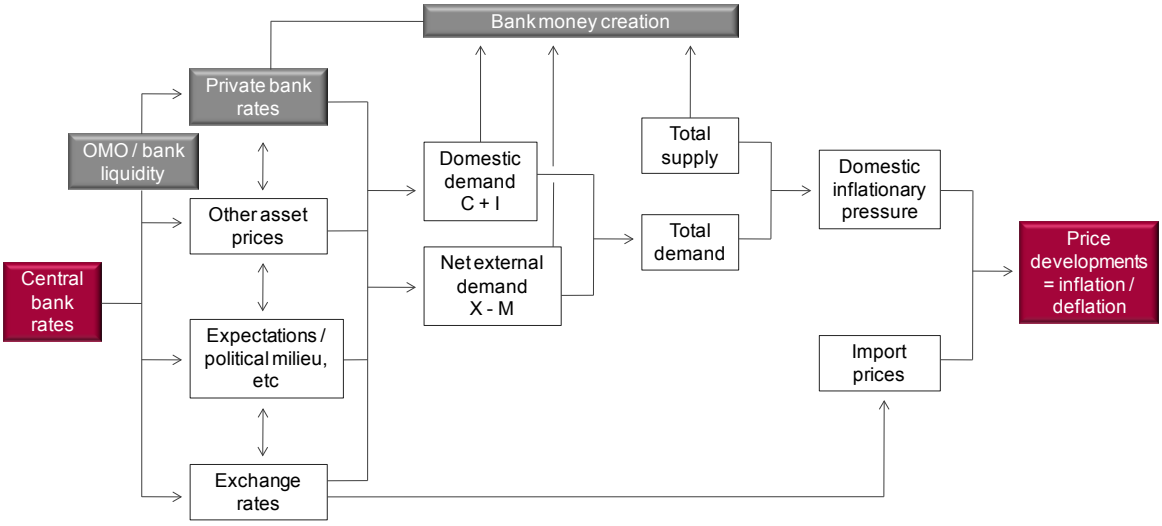

Figure 5: MPTM

The genesis of interest rates is the administratively determined rates of the CB[169]. 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 impacts 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.

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).

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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.

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.

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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 the last couple of years we have seen the ugly side of the monetary system. Money creation was excessive 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.

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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7 Endnotes

1. Some countries have experienced deflation, generally due to a fall in the amount of money in circulation.
2. This is the demand side of GDP; the other is the supply / production side.
3. Source of Hungarian inflation and note: wikipedia.org. Although no official data on the inflation rate in Zimbabwe was available from mid-2008, John Robertson, a Zimbabwean economist, estimated the inflation rate in late 2008 to have been in the region of seven sextillion % pa (= seven followed by 21 zeros). Another source (the Cato Institute, quoted by wikipedia.com) puts the Zimbabwean inflation peak at 89.7 sextillion percent per annum in November 2008.
4. According to my research; also stated by wikipedia.com.
5. John Robertson estimated the Z$ 100 note to have been worth 0.00285 US cents in March 2009.
6. In this text we use the monetary unit "corona" of fictitious country "Local Country". Its currency code is LCC.
7. Usually, the statute that governs the activities of the central bank.
8. Not always, however. If you pay by EFT or cheque, then yes. But, if the smallest denomination coin is 5 cents, then payments by N&C can only be in multiples of 5 cents.
9. In most cases; in some countries it is a liability of government.
10. If Friend A lent money to you, you owe him the money; he is your creditor = a liability in your balance sheet. If you lend Friend B money he owes you the money; he is your debtor = an asset in your balance sheet.
11. There is usually a maximum amount stated in the statute in respect of the tender of coins.

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12. This differs from country to country. In some the debt is not extinguished but, if the creditor sues for his debt, the debtor must pay the money to the court, and the debtor is liable for the costs of the action. See Morgan (1965: 28).
13. There is another: standard of deferred payment, but this one is an outflow of the store of value role. In the interests of your constitutional right…, it will not be elaborated upon here.
14. Note that we use the terms *loan* and *credit* interchangeably.
15. Usually current / cheque (check in the US) / savings / call accounts.
16. Usually accounts for which a short notice period is required.
17. Bank A does a credit check on Co B and a detailed feasibility study on the project for which Co B wants to borrow money and declares Co B creditworthy and the project feasible.
18. There is much historical and recent evidence of the vulnerability of banks. This is an interesting phenomenon, in that some banks literally act like members of the canine species when given unlimited food: they eat until they throw up. Because banks are in the business of lending, when their competitors are rapidly expanding their balance sheets (i.e. lending and creating / getting deposits) some of them will relax their lending criteria and some consequently will fail. Government banking regulation and supervision is critical, for two reasons: (1) banking is a "privileged" business (and they have a moral obligation to the public whose deposits they hold), and (2) banks are inherently unstable. Some hold the view that the authorities should have the right to interfere in bank employee remuneration.
19. Morgan, 1965:9.
20. Newlyn (1971:1) refers to this as "a double coincidence of wants."
21. Jevons, 1875:1–2. He quotes from a "lively" letter printed by M Wolowski.
22. Jevons, 1875:2–3.
23. 1971:1.
24. Davies, 2002:27 and Morgan, 1965:12.
25. A fifth can be added if you are a pedantic economist: *savings in information costs*; it arises from the reduction in the number of prices when a medium of exchange is introduced. As seen, in a barter economy the number of prices to be monitored is vast and therefore unmanageable. A price is no more than information (supply and demand) concerning the relevant good.
26. Morgan, 1965:12.
27. Davies, 2002:36.
28. Davies did not mention the quality issue. It is common sense that a prettier, subservient, caring, loving, well-skilled-in-the-kitchen woman will cost more cowries. Therefore one has to introduce the quality proviso, that is, to make the prices comparable.
29. According to Davies, 2002:45.
30. Morgan, 1965:13; Davies, 2002:46.

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31. An internet search of these and related words will reveal a litany of hysterical protests that we need to return to this age to save the world from the ravages of a monetary system based on debt. We will show that a monetary system that creates money not backed by anything can be an elegant one, which has a significant advantage – that of enabling economic growth that a system of gold-backed money does not have. There is a momentous rider, however, which (as we have said before) is that the monetary system requires rigorous and responsible management by the central bank. *Rigorous and responsible* means ensuring that money growth maintains a close relationship with the production elasticity and the resource-availability of the economy. How this is implemented by central banks across the world today is covered in detail later.
32. Pirenne, 1965:105.
33. Davies, 2002:46.
34. Davies, 2002:62.
35. Morgan, 1965:12.
36. Davies, 2002: 60-61.
37. Morgan, 1965:13.
38. Davies, 2002:61. Sources differ on the period.
39. All quotes in this and the next paragraph from Davies, 2002:63.
40. Morgan, 1965:15–16.
41. Davies, 2002, 47, quoting from Jevons, WS, 1910. Money and the mechanism of exchange. London.
42. Pirenne, 1965:108.
43. Pirenne, 1965:108.
44. Morgan, 1965:15.
45. Pirenne, 1965:114.
46. Davies, 2002:188.
47. Morgan, 1965:20.
48. Morgan, 1965:18.
49. Pirenne, 1965:109.
50. Pirenne, 1965:109.
51. Pirenne, 1965:109.
52. Morgan, 1965:18.
53. Newlyn, 1971:5.
54. Clearly the purchasing power remained unchanged, but the bullion value was reduced.
55. Pirenne, 1945:110.
56. It is actually the profit after deduction of the cost of re-minting.
57. Morgan, 1965:19.
58. Harrod ,1969:5–6.
59. There are times (in periods of high inflation) when the intrinsic value of coins exceeds the purchasing power. It then pays to melt the coin down and sell the metal. In these circumstances, governments are quick to replace the coins with coins of lower intrinsic value.
60. Newlyn, 1971:3, defines token money as follows: "Token money…has…in the limiting case of paper notes, no commodity value whatsoever; its value derives entirely from the fact that it is generally acceptable in exchange for goods and services."
61. Davies, 2002:181.

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62. Davies, 2002:181–183.
63. Newlyn, 1971:6.
64. In this period gold was valued at £3 17s 10½d per standard ounce, eleven-twelfths fine. The principal gold coin in England, the guinea, introduced in 1663, had a value of twenty-one shillings. It was replaced by the sovereign in 1925 by which time major changes to the currency had taken place in the form of token money (money with little or no backing) and bank deposit money. See Newlyn, 1971:6.
65. I am indebted to Pamela Hunter of C Hoare & Co who generously sent me this receipt and cheques shown later, as well as the deciphered texts. The company probably started out as a goldsmith and sometime before 1672 expanded its business to that of a goldsmith-banker at the London address: "at the golden bottle in Cheapside" (see the cheque of 1676 presented later). It moved to Fleet Street in 1690. The company exists to this day as a private banker: C Hoare & Co, and it is still owned by the Hoare family; its illustrious history can be perused at www.hoaresbank.co.uk. It is not known whether Lawrence Hoare was related to the "founder" Richard Hoare, who bought the business from the estate of Robert Tempest who passed away in 1673. The receipt and the cheques shown below were purchased by the company from a dealer in 1924.
66. Davies, 2002:249–250.
67. Jevons, 1875:201.
68. Jevons, 1875:201.
69. In the early days of the goldsmith-bankers there was no one pound coin. The closest was the guinea (made from gold from the Guinea Coast) which was equal to twenty-one twentieths of one pound. For the sake of simplicity, we assume there was a one pound coin. Cannan, 1919:vii.

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70. "On the face of the receipt" later became to be called "face value" and this phrase also spread to securities (my speculation).
71. Jevons, 1875:201.
72. Jevons, 1875:201.
73. Davies, 2002:252, from Withers, 1909:20.
74. Davies, 2002:252.
75. Davies, 2002:256.
76. Babylon was a city-state of ancient Mesopotamia. The latter means "land between the rivers" the rivers being the Euphrates and Tigris; it largely corresponds with Iraq, and included parts of Turkey, Syria and Iran. Babylon was first mentioned in 2400 BC. Source: Wikipedia.
77. This paragraph benefitted much from Davies, 2002:50. He also states that there is much evidence of banking business during the period: "Literally hundreds of thousands of cuneiform blocks…unearthed by archaeologists in the various city sites along the Tigris and Euphrates, many of which were deposit receipts and monetary contracts, confirming the existence of simple banking operations…" The sub-quote is from Orsingher, 1964:1. An example of a cuneiform tablet is presented in Box 4.
78. This paragraph benefitted much from Davies, 2002:50.
79. A giro system opposes to a cheque system of transfer of deposits in that a transfer is made of a known deposit of a payer to a payee, whereas a cheque is given by a payer to a payee and the payee's bank elicits the funds from payer's bank.
80. And a "…central bank in Alexandria, where the main accounts from all the state granary banks were recorded." Davies, 2002:54.
81. Rostovtzeff, 1941:1285; quoted by Davies, 2002:54.
82. Heichelheim, 1958:134; quoted by Davies, 2002:55.
83. This paragraph benefitted from Morgan, 1965:22.
84. Morgan, 1965:22.
85. According to Morgan, 1965:22.
86. This paragraph benefitted much from Morgan, 1965:22–23.
87. Morgan, 1965:23.
88. Harrod, 1969:32.
89. Davies, 2002:251–252, from Spufford, 1988:395. The cheque resides in the Institute of Bankers' library in Lombard Street, London.
90. This paragraph benefitted much from Davies, 2002:50.
91. This was the form of bank lending before the bank overdraft (we surmise). It does not matter because the outcome is the same.
92. Davies, 2002:253-254.
93. It is interesting to note that this covenant lives on today. Many government securities today are payable "out of the revenue and assets" of the government.
94. Davies, 2002:253.
95. Also non-foreign, i.e. domestic.
96. Davies, 2002:239.
97. Except in hyperinflation periods when the value of the metals in coins exceeds their face values and it pays to melt the coins and sell the metal.

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98. Davies, 2002:253–254.
99. It is recorded that some 2500 depositors were affected by this event. Horsefield, 1929; as quoted by Davies, 2002:255.
100. Morgan, 1965:23. The monopoly was fully completed only in 1921.
101. Davies, 2002:261.
102. Morgan, 1965:26.
103. Morgan, 1965:24.
104. This paragraph up this point benefitted much from Morgan, 1965:24.
105. Newlyn, 1971:8.
106. Morgan, 1865:24–25.
107. Introduced in 1925, and known as the Modified Gold Standard. See Newlyn, 1971:9.
108. The gold standard was abandoned in a financial crisis – when the Bank of England was not able to meet the demands for gold from foreign financial centres. See Newlyn, 1971:9.
109. The banks we mention here are the private sector banks and the central bank. Deposits of the public are kept with the private sector banks, while the bank notes and in some cases coins are the liabilities of the central bank. In some countries coins are the liabilities of government.
110. Examples are Reserve Bank of Malawi bills, Bank of Botswana certificates, and South African Reserve bank debentures. They can be regarded as a type of deposit security.
111. Under certain circumstances this is not so, but we are focussed on the normal here; the abnormal is for when you study further.

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112. There are some other valuation techniques but the ones based on discounting future cash flows are the foundation ones. The formula gets a little complicated when there are multiple cash flows in the future (but the principle remains the same).
113. They will also all have different coupons (i.e. the fixed rate payable on each security) and therefore different prices, depending on their market rates. In the bond market an interest rate term, yield to maturity (ytm), is used because of the multiple cash flow in the future. Ytm is an average rate for the term of the security.
114. This refers to credit risk (although there are some countries where a credit risk does exist, i.e. government may renege on the principal and/or interest payments). Generally the finance world thinks of the developed world when they think of the concept rfr. Market risk (the risk of the price moving adversely – down – for you) does exist, but is not at issue here.
115. Even though you think that you are able to sell the bond in the bond market, this is not 100% certain (for example, a war may break out); hence the premium in terms of rate.
116. We said earlier that government securities rates are the lowest rates. This applies to the comparison of investments. When a bank is introduced, the picture is different: because banks are financial intermediaries, their call deposit (and other) rates are lower that the rfr – in order to make a margin, i.e. a profit.
117. The data span is six 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.
118. 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.
119. The singular is applicable because the banks always have the same prime rate – certainly in the vast majority of countries.
120. This is so because the public accepts deposit money as a means of payment.
121. Except "self-imposed" creditworthiness-assessment in the case of individuals and scrutiny of viability in the case of the corporate sector.
122. In many countries central bank accommodation to the banks is granted on an overnight basis (i.e. 1 day). In the repo system adopted in many other countries 1-week auctions are usually held for the majority of the liquidity required, and overnight repos are executed for "fine-tuning" at the end of the final interbank clearing.
123. Note that this style on monetary policy execution is followed by many countries in normal circumstances, including the ECB, the Bank of England, the Bank of Canada, the South African Reserve Bank, and so on. Not all countries follow this style. Some countries follow a policy of not having a liquidity shortage or surplus, while others allow liquidity surpluses. The latter policy is deeply flawed.
124. First introduced in the US, probably shortly after the Federal Reserve System was established in 1914, and followed by other central banks. De Kock, 1946:70.
125. 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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126. 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 revealing principles.
127. The outcome is the same with an overdraft facility granted and utilised.
128. The central bank's balance sheet will be unchanged; so it does not feature in the consolidation.
129. There is a minor exception, as will be pointed out later.
130. Or liabilities in some cases.
131. As we have seen, in some countries N&C do not rank as reserves.
132. As we know, the latter was hardly achieved in the US and elsewhere in 2007/08/09.
133. The statement obviously does not apply to banks which are in trouble and the CB decides to allow them to be liquidated (such as Lehman Brothers in 2008). Some readers will not agree with this statement at all. We urge them to read all six sections before refuting it. It will be seen that, because central banks hold the banks' settlement accounts, this cannot be avoided.
134. If this is difficult to follow, think of the central bank as being the only bank that does not have accounts with the other banks. Thus when it is paid for the TBs (think cheques that are put through the clearing system) the payments are made by debits to the relevant banks' settlement accounts.
135. The author has personal experience of this when he acted as an advisor to a group that is involved in financial services in a number of small countries. This brought the author into contact with a number of central bank officials, including in some cases the central bank governor.
136. Morgan, 1965:31.
137. Newlyn, 1971:8–9.
138. Friedman and Schwartz, 1971.
139. This term usually refers to the retirement funds, the insurers and the unit trusts, that is, custodians of most of the investments of individuals.
140. Morgan, 1965:30.
141. De Kock, 1946:11. De Kock shows that the oldest to be established in terms of date was the Riksbank of Sweden. He also states that the Riksbank took its cues from the Bank of England as it developed into a central bank. The "of issue" refers to the bank note issue.
142. Morgan, 1965:202–203.
143. Morgan, 1965:203.
144. De Kock, 1946:12.
145. In the times of financial crises the Bank borrowed reserves (item C).
146. De Kock, 1946:12.
147. De Kock, 1946:13.
148. The capital B is correct
149. De Kock, 1946:13.
150. Morgan, 1965:212.
151. Morgan, 1965:212
152. Morgan, 1965:213.
153. Morgan, 1965:213.

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154. Providing accommodation to the banks is an essential function of the CB. In times of crisis when some smaller (and sometimes even large) banks are less regarded by the stronger banks the interbank market does not clear effectively (because the larger banks will not make interbank loans to them). The CB then steps in, but only in the case of a bank it does not want to fail. An even more important point is that, as we saw earlier in great detail, whenever a CB does a transaction in the open market (OMO), it either creates reserves (if it buys) or a shortage of reserves (if it sells); in the latter case it has no option but to "accommodate" (i.e. lend to) the bank/s. It has not always been appreciated by central banks that at such times it is unnecessary to charge a penal rate; the prevailing KIR is the highest rate in the market in any case.
155. De Kock, 1946:17–20.
156. Morgan, 1965:217.
157. Morgan, 1965:217.
158. Morgan, 1965:216.
159. Morgan, 1965:202, quoting from Hansard, 9 April 1957, Col. 985.
160. Morgan, 1965:222, quoting the Radcliffe Report.
161. 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).
162. www.boe.co.uk.
163. In this case to avoid deflation; see further below.
164. Bank reserves.
165. www.rba.gov.au.
166. www.boc.co.ca.
167. http://www.federalreserve.gov/monetarypolicy/discountrate.htm.
168. It is based mainly on the illustration presented by the Bank of England at http://www.bankofengland.co.uk/images.
169. Here we ignore the firm-RR model, which is essentially a theoretical model rarely applied today.

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