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**

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.

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):

$$RR = BD \times r.$$

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

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

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:

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

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:

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

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

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.

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.

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.

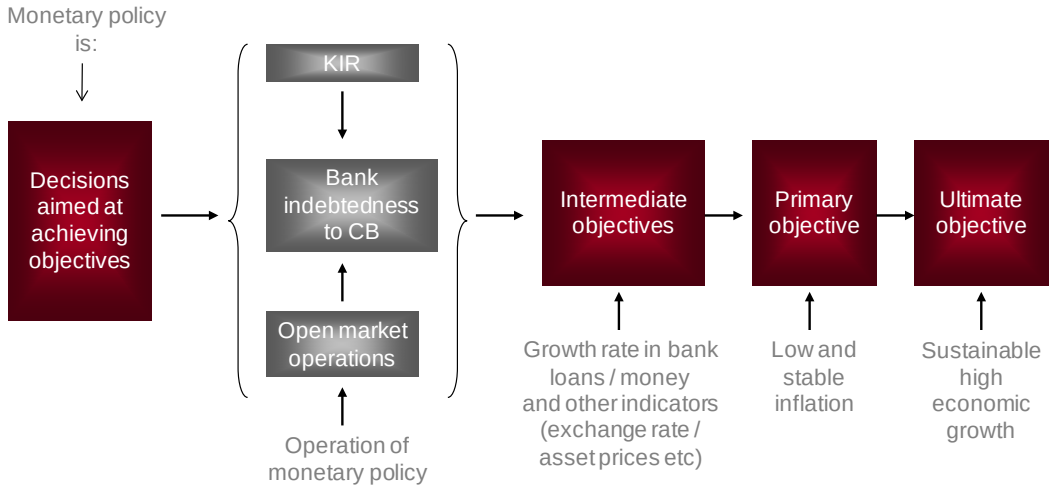

Figure 1: monetary policy

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*.

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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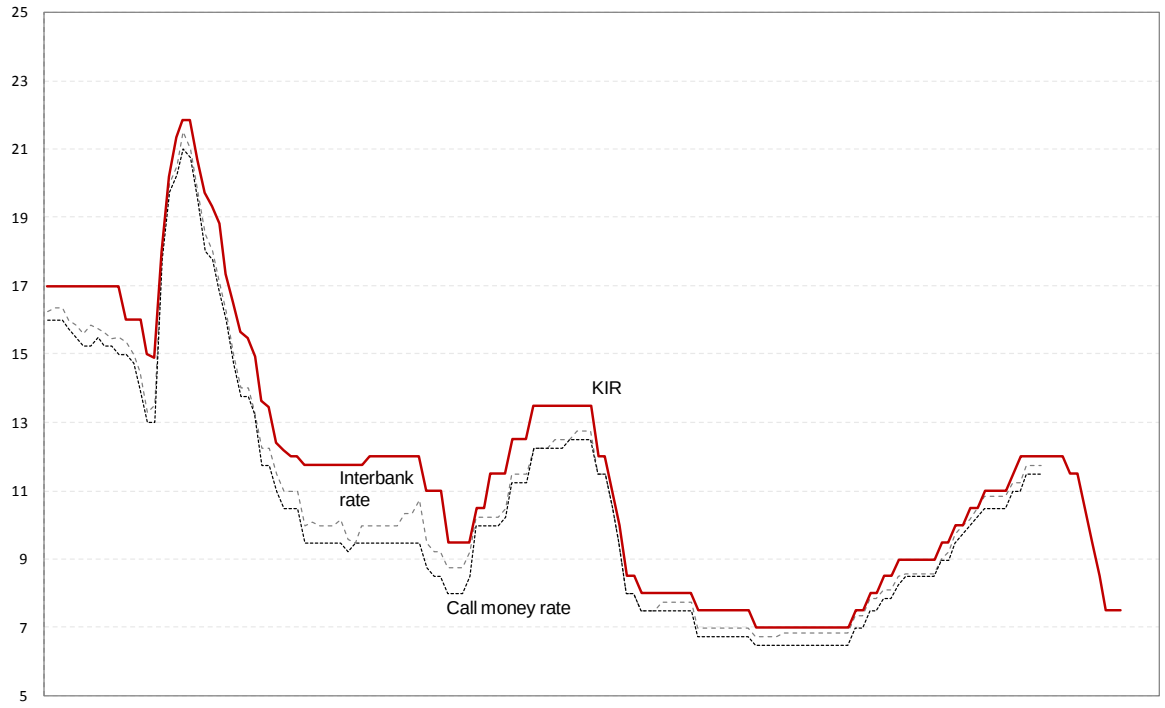

Figure 2: call money rate, IBM rate & KIR

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.

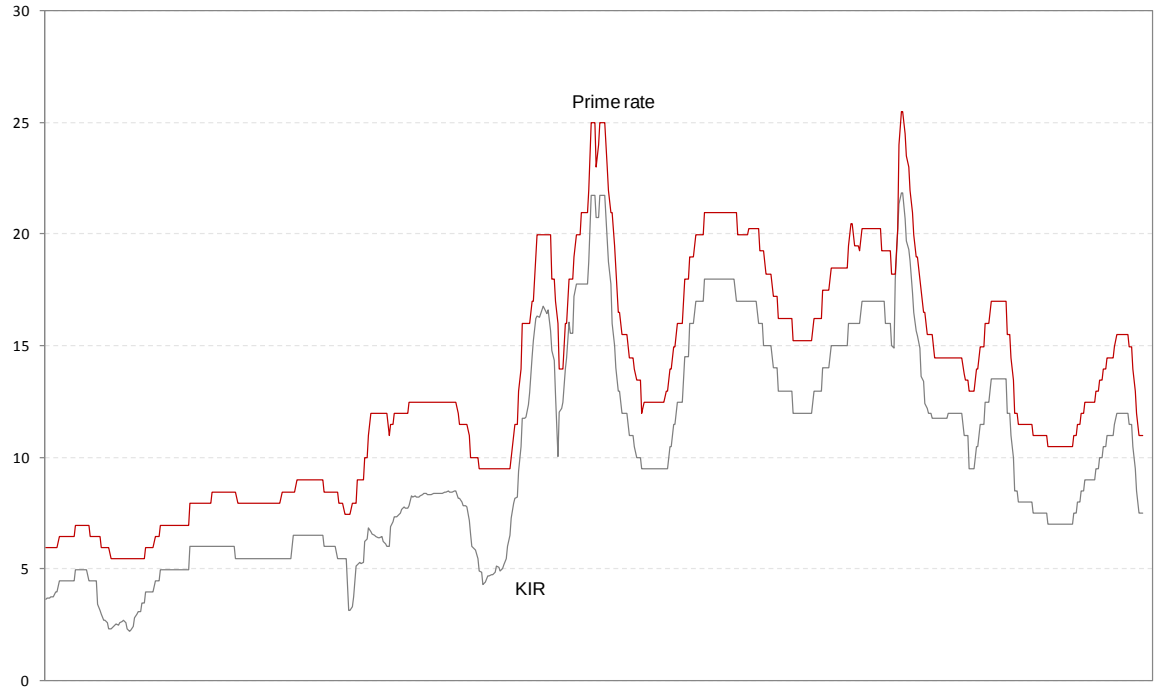

Figure 3: KIR & prime rate (month-ends over 50 years)

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.

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:

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

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

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

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).

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).

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.

BALANCE SHEET 5: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 000	A. Notes and coins B. Deposits	1 000
		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 Reserves at CB	+100 -100		
Total	**0**	**Total**	**0**

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

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.

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.

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.

BALANCE SHEET 16: CENTRAL BANK (LCC BILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 000	A. Notes and coins B. Deposits	1 000
		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**

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).

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).

BALANCE SHEET 22: CENTRAL BANK (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 600	A. Notes and coins B. Deposits	1 000
		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:

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

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**	
D. Foreign assets	1 600	A. Notes and coins B. Deposits	1 000
		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 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

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

BALANCE SHEET 32: BANKS (LCC MILLIONS)			
Assets		**Liabilities**	
D. Foreign assets	1 600	A. Notes and coins B. Deposits	1 000
E. Loans to government	1 100	1. Government 2. Banks' reserve accounts (TR) (RR = 500)	900 700
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 Bank reserves (TR) (RR = +10) (ER = +90)	-100 +100
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**	
D. Foreign assets	1 700	A. Notes and coins B. Deposits	1 000
E. Loans to government	1 100	1. Government 2. Banks' reserve accounts (TR) (RR = 510)	900 600
F. Loans to banks (BR) @ KIR	0	(ER = 90)	
		C. Foreign loans	300
Total	2 800	Total	2 800

BALANCE SHEET 35: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
D. Foreign assets	1 600	A. Notes and coins B. Deposits	1 000
		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.

5.6 Bibliography

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