'Loans First' – Explaining Money Creation by Banks

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Disclaimer: The views expressed in the paper are author's own and do not necessarily represent the views of Reserve Bank of India.

Abstract

Banks *create* deposits in the process of lending. Of the total deposits of the banking systems in India over 4/5th is generated endogenously within the banking system through credit creation. In the context of fractional reserve banking, the traditional description of banking as "acceptance of deposits for the purpose of lending" distorts the perspective in which economics of banking is understood and analyzed. In the real sector liabilities create assets, whereas in the monetary sector, assets create liabilities. The reserve requirements of central bank directly affect banks' deposit intermediation and checks bank leverage. In this context, the concept of asset based cash reserves appears more logically appealing than liability based reserves. As ownership of money equips the owner with the means to stake claim on the finite resources of the world, ability of banks to create money ex-nihilo, places them in a very special category of institutions.

Introduction

The conventional description of banking states that deposits create loans. The other description is just the opposite – loans create deposits. The 'loans first model' of bank credit is not new, dating back to Fisher (1930) and other proponents of theories of endogenous money. For anyone who has observed first hand how banks create credit, 'loans first' model is not a model but a description of reality, verifiable by observation. At a time when the Chicago Plan[1] appears to have been rediscovered [Benes and Kumhof (2012)], we find the time opportune to explain how banks really create money.

Definitions and conventions

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[1] "The key feature of this plan was that it called for the separation of the monetary and credit functions of the banking system, first by requiring 100% backing of deposits by government-issued money, and second by ensuring that the financing of new bank credit can only take place through earnings that have been retained in the form of government-issued money, or through the borrowing of existing government-issued money from non-banks, but not through the creation of new deposits, *ex nihilo*, by banks" The paper concludes, "The critical feature of this model is that the economy's money supply is created by banks, through debt, rather than being created debt-free by the government. Our analytical and simulation results fully validate (all) Fisher's (1936) claims." *The Chicago Plan Revisited,* Jaromir Benes and Michael Kumhof, IMF Working Paper (2012).

For reader's convenience we define right at the outset certain terms and conventions we have used consistently in the paper, which are following.

Banking system is aggregation of all banks in the financial system. In our framework the banking system is represented by a consolidated balance sheet derived by line by line addition of items of assets and liabilities of all banks, but canceling out inter-bank receivables and payables and inter-bank holding of capital. We sometimes refer to the banking system as 'super-bank'.

Cash deposits are deposits flowing into the banking system from outside. These are exogenous deposits in the sense that these deposits have not been created by banks but represent physical deposit of cash. We have used the terms 'cash deposit' and 'exogenous deposit' interchangeably.

Book-entry deposits are just that – deposits created by banks (by book-entries) in the process of extending loans. These deposits do not represent physical deposit of cash. We have used the terms 'book-entry deposits' and 'endogenous deposits' interchangeably.

CRR (cash reserve ratio) means the ratio of central bank reserves banks must maintain in proportion to their demand and time liabilities, as prescribed by the central bank.

Cash reserves are balances maintained by banks in their current accounts with the central bank. In practice, physical cash (vault cash) held by banks also qualify for being reckoned and cash reserves in many jurisdictions. At a practical level physical cash held by banks is negligible; we have therefore ignored the vault cash component in cash reserves of banks, except where specifically stated otherwise. The expressions 'reserves' and 'cash reserves' have been used interchangeably.

Reserve account is the account or accounts banks maintain with the central banks for the purpose of holding cash reserves, excess cash reserves and settlement of transactions.

SLR (statutory liquidity ratio) means the ratio of specified securities banks must maintain in relation to their demand and time liabilities, as prescribed by the central bank.

SLR securities mean securities that qualify for maintaining SLR. In our framework, SLR securities and government securities are one and the same. In practice, a negligible part of SLR securities consists of other 'approved' securities, which we have ignored except for computational purposes in Table-1.

Non-SLR securities are securities that do not qualify for SLR. Bank's investment in non-SLR securities can be both debt and equity types.

LAF or liquidity adjustment facility is the central bank's discount window through which the central bank lends cash reserves to the banks against good collateral, namely government securities. Cash deficit banks resort to LAF borrowing, while cash surplus banks can resort to LAF lending.

G-sec means government securities, both issued by the states and the central government.

Money creation by banks

The text-book model of banking tells us that banking is a business of accepting deposits for the purpose of lending. Section 5(b) of Banking Regulations Act, 1949 defines in the following terms: "*banking* means the accepting, for the purpose of lending or investment, of deposits of money from public, repayable on demand or otherwise, and withdrawal by cheque, draft, order or otherwise". This is the conventional definition of banking[2]. According to this definition banks need an initial deposit of money in order to lend. From this deposit the bank maintains cash reserves[3] as a certain proportion of deposits prescribed by the central bank (cash reserve ratio or CRR, as we know in India), and lends the remainder. The amount thus lent comes back to the bank as deposits, out of which the bank maintains cash reserves and lends again the remainder. This process goes on indefinitely in a geometric progression. Thus if the initial deposit was Rs.100 and CRR was 5%, the process of repeated deposit and lending of the same will create total deposits equal to Rs.100/CRR or Rs.2000. As 5% of Rs.2000 will have to be maintained as cash reserves, the remainder Rs.1900 will be lent out. This description of credit creation can be explained by the following figure.

Exhibit-1			
	Deposit Rs.	**5% CRR**	**Loanable funds**
Bank A	100.00	5.00	95.00
Bank B	95.00	4.75	90.25
Bank C	90.25	4.51	85.74
….			
Total	2000	100.00	1900.00

In this representation, banking is a process of successive channelisation of savings or successive financial intermediation[4].

We argue that this is a flawed description of banking; for a bank does not need any deposit for lending to be possible. When a bank disburses a loan the sum is credited to a deposit account in a bank – either in the same bank or in some other bank. In the first case the bank credits the sum of the loan to a checking account of the borrower. In the second case, the bank transfers funds to the checking account of a third party at the instance of the

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[2] Some authors have considered safeguarding of deposits accepted as integral to banking. This aspect is not relevant to our discussion.

[3] Most central banks—over 90 percent—oblige depository institutions (commercial banks) to hold minimum reserves against their liabilities, predominantly in the form of balances at the central bank. See IMF Working Paper *Central Bank Balances and Reserve Requirements* by Simon Gray.

[4] In this model, of the banking system is cash deficient and unable to raise cash deposits, credit creation cycles starts with injection of reserves by the central bank.

borrower[5], which would be maintained with a different bank. In either case, the recipient of the sum can make payments from the deposit account for purchase of goods or services etc. Any sum credited in a deposit account[6], performs the same function as cash and therefore is money. The process of granting loan involves no more than making a set of book entries – namely, debiting a loan account and crediting a deposit account – in the same or another bank. By granting loans, banks not only create new money that did not exist before granting the loan, they do so by mere book entries.

The word "deposit" indicates an act of putting something at a specific place. Deposit in a bank account literally connotes placing cash into the account. Yet the deposits that banks create by granting loans involve no cash deposit. The borrower whose account is credited with the sum of the loan can spend the whole of it through the banking channel – i.e. by writing cheques. Those who receive payment from the bank's borrower in turn can make whole of their payments by writing cheques on their respective accounts. So long as payments are made through the banking channel the sums circulate in the banking system as deposits and the banking system has no need for cash.

Because granting of loans automatically creates a deposit, banks create an illusion of huge financial intermediation (i.e., if we simply look at increase in deposits). In reality, most of the deposit growth in the banking system is created by granting loans.

This description of banking though very real, may be counter-intuitive to some. After all, one may ask, deposit mobilization is one of the most important business functions of banks. It is plausible to ask, if banks create their own deposits why would a bank need to mobilise deposits? The first part of the answer to the question is that when deposits created by one bank (by giving loans) land in another bank it appears as if the latter bank has mobilized those deposits, which in a sense is true; but the deposits coming into latter bank are deposits brought forth by the process of credit granted by the first bank. These deposits have been created *endogenously* within the banking system. The second part of the answer is that banks indeed need a certain quantum of *exogenous* cash deposits flowing into the banking system from outside (more of this is subsequent sections). For individual banks the process of mobilization of deposits does not distinguish between cash deposits and book-entry deposits, as settlement of all inter-bank transactions, including transfer of deposits from one bank to another, are done in a centralized manner at the central bank.

However, when we look at banks as a banking system, we find that banking system's need for cash deposits from outside the system is far less than the total quantum of deposits generated by the system, as the following table shows. For understanding how a banking system works we need to visualise how various transactions between the banking system and other segments of the economy are reflected in consolidated balance sheet of the banking system.

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[5] For instance, in case of a housing loan the bank may credit the account of the builder maintained with the same or another bank. Typically, in capital expenditure loans the loaned funds are transferred to the account of seller of capital goods.

[6] A deposit account may be a checking account or an account that can be used to fund a checking account – such as term deposits.

Table-1: Deposits created by the banking system (scheduled commercial banks) Rs. in crore							
Year	Bank credit	Non-SLR Investment and OAS	Total book-entry (endogenous) deposits created	Total deposits as per balance sheet	Cash (exogenous) deposits	Ratio of cash deposits to total deposits	Ratio of endogenous deposits to total deposits
(1)	(2)	(3)	(4)=(2)+(3)	(5)	(6)=(5)-(4)	(7)=(6)/(5)	
2000-01	511434	151873	663307	962618	299311	31%	69%
2001-02	589723	176882	766605	1103360	336755	31%	69%
2002-03	729215	169668	898883	1280853	381970	30%	70%
2003-04	840785	147997	988782	1504416	515634	34%	66%
2004-05	1100428	150755	1251183	1700198	449015	26%	74%
2005-06	1507077	165763	1672840	2109049	436209	21%	79%
2006-07	1931189	174919	2106108	2611933	505825	19%	81%
2007-08	2361914	218668	2580581	3196939	616358	19%	81%
2008-09	2775549	293765	3069315	3834110	764795	20%	80%
2009-10	3244788	340790	3585578	4492826	907247	20%	80%
2010-11	3942083	418905	4360988	5207969	846981	16%	84%
2011-12	4611852	495529	5107381	5909082	801701	14%	86%
Source: on Handbook of Statistics on Indian Economy see http://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook of Statistics on Indian Economy. See foot note[7] and *A Profile of Banks: 2011-12, see* *http://www.rbi.org.in/scripts/AnnualPublications.aspx?head=A%20Profile%20of%20Banks*							

Table 2: Statutory reserve ratios as at March-end												
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
CRR	8.00	4.75	4.50	4.50	5.00	5.25	6.00	5.50	5.00	5.75	6.00	4.75
SLR	25	25	25	25	25	25	25	24	24	25	24	24
Total	33.00	29.75	29.50	29.50	30.00	30.25	31.00	29.50	29.00	30.75	30.00	28.75

Table-1 above shows that the share of cash deposits coming into the banking system has been falling consistently from a high of 34% of total deposits as on March 31, 2001 to -1% as on March 31, 2012. We see a general decline in share of cash deposits flowing into the banking system, with corresponding rise in book-entry deposits to 86% in 2011-12. What we also observe is that till 2004-05 cash deposits available to banking system, by and large, was able to meet the cash pre-emption by the central bank (compare Table-1 with Table-2). From 2004-05, the banking system went into increasingly cash deficit position.

Why do banks need cash?

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[7] While all the numbers have been taken from Handbook of Statistics on Indian Economy *Table 47: Scheduled Commercial Banks – Select Aggregates*, the figures for investment in non-SLR and OAS has been computed by deducting the investment in government securities as in Table 47 from total investment as in *Table 63: Consolidated Balance sheet of Scheduled Commercial Banks.* As Table 63 provides data only up to 2010-11, data for total investment for 2011-12 has been taken from *A Profile of Banks: 2011-12* (published by RBI).

Most jurisdictions require banks to maintain cash reserves[8], generally in some proportion to their deposit (more precisely, demand and time) liabilities. Absent reserve requirement, no bank will need any cash if those who own the deposits never encash their deposits. In reality, some deposit owners may like to encash their deposits, in part or full. The propensity of deposit owners to encash their deposits depend on several factors; the principal ones being confidence in the bank/banking system and the prevalence of the cash economy.

Every bank needs to maintain a certain balance in its reserve account to meet requirements arising out of (i) the need to maintain CRR; (ii) to invest in government securities, mainly because of SLR requirement – as a bank cannot purchase government securities without having sufficient balance in its reserve account, (iii) for settlement of inter-bank obligations and (iv) for precautionary reasons. However, transactions between central bank and banks present an accounting asymmetry: whereas banks maintain an account with the central bank, the central bank does not maintain any account with banks[9]. Hence, money payable to or receivable from central bank has to be paid or received in cash.

A bank running short of cash can borrow cash from another that has surplus. This can be achieved by mere book entries: the reserve account of the bank lending surplus cash will be debited and the reserve account of the bank in borrowing cash will be credited. The book entry route avoids the need for the lending bank to actually withdraw cash from its reserve account and lend it to the borrowing bank, who in turn would deposit the same in its own account with central bank. However, if aggregate balance in the reserve accounts of the banking system – which is the sum total of balances in reserve accounts maintained by all banks – were to increase in a given period then it necessarily follows that either cash has been deposited by the banking system with central bank,[10] or the banking system's borrowing from the central bank has increased or a combination of both. To sum up, the banking system's for cash arises on three counts: (i) the deposit owners may encash their deposits, (ii) the need to maintain a certain balance in its account with central bank, and (iii) the need to hold a certain level of government securities (g-sec) for maintaining SLR and storing liquidity.

The need for cash necessitates that the banking system attracts depositors who actually puts cash deposits with the super-bank. Therefore, the deposits of the banking system – and in fact, of any bank – are of two kinds. One is the deposit that the banks create by granting credit; and the other is the deposit that is created by people actually depositing cash with the banks. Though the balance sheets of banks do not distinguish one kind of deposit from the other, the nature of the two types of deposits are very different[11]. The accounting fungibility of cash deposits and book-entry deposits is the source of the fallacy that banks need deposit in order to lend. In reality, the deposits of the banking system, for

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[8] We have based our postulates on the Indian case, which is, by and large, a representative one.

[9] In a situation where the central bank maintains accounts with banks, a banks balance in its reserve account is computed as net of central bank's deposit with the bank.

[10] Either directly in central bank or in the chests, which are extensions of central bank's Issue Department.

[11] It is for this reason that we use the expression "deposit owner", rather than "depositor". The latter expression signifies a person who actually deposits a sum with the banking system.

most part, is created by the banking system itself by giving loans. Essentially, bank credit is self-funding.

The following illustration describes the real mechanics of banking. Let us assume CRR at 5% and SLR at 15%. We also assume that no deposits are taken out of the banking system in cash. Now, suppose the super-bank makes a loan of Rs.100. It will immediately create a deposit of Rs.100. On this deposit the super-bank has to maintain CRR of Rs.5 and SLR of Rs.15. In order to deposit Rs.20 with central bank, the super-bank needs to mobilize cash deposit of Rs.20, failing which it has to borrow from central bank the sum. Let us assume for the moment that the bank mobilizes cash deposits of Rs.20 and deposits the same with central bank. Now the super-bank has to maintain a further cash reserve of Rs.1 and SLR of Rs.3 on the additional Rs.20 deposit as well. This will go on in geometric progression and using the standard formula for sum of infinite geometric progression we have:

Total cash deposit needed = Loan*(CRR+SLR) /[(1-(CRR+SLR)]

The balance sheet will accordingly settle to as in Exhibit-1 below:

Exhibit-1			
Liabilities		**Assets**	
Deposits created by loans	100.00	Loan	100.00
Cash deposits	25.00	Reserve A/c (CRR)	6.25
Total deposits	125.00	Investment in G-Sec	18.75
Total	**125.00**	**Total**	**125.00**

Thus the cash deposit needed by the banking system is a function of the reserve ratio and the quantum of loan the banking system has made.

Degree of deposit intermediation

Let us denote cash deposits and D_c, deposits created by loans as D_L, total deposits as D, CRR as r, SLR as s, loans as L. For convenience we denote total reserve requirement as R= r + s.

To make a loan 'L' the bank must be able to intermediate cash deposit equal to L*R, so as to meet the reserve requirement. On deposit of L*R, the bank has to maintain further reserves of L*R*R and so on. Hence, total reserve requirement equals $D_C = L*[R/(1-R)]$. That is, the bank needs to intermediate minimum cash deposit equal to L*[(R/(1-R)].

Therefore, degree of deposit intermediation= R/(1-R)=(CRR+SLR)/[1-(CRR+SLR)] ….1

To illustrate, given CRR at 5% and SLR as 15%, the total cash needed by the banking system is 25% of the loans it makes. It follows that higher the central bank sets the CRR and SLR, the greater will be need for banking system to intermediate deposits. To be realistic, we can increment R by a fraction representing excess cash reserves the banking system would like to maintain.

In other words, the amount of loans a bank can make is (1-R)/R times the deposit it intermediates, i.e. $L = D_C (1-R)/R$.

Since $L = D_L$,

Endogenous deposit multiplier $= (1-R)/R$ …………………………..2

Equation 1 and 2 demonstrate that the banking system needs to intermediate only a fraction of total deposit it lends and are fundamental to fractional reserve banking.

Further, total deposit $D = D_L + D_C$ ……………. 3

Substituting L for D_L and $L*R + L*R^2 + L*R^3 + --- \infty$ for D_C we have,

$D = L/(1-R)$ …………………. 4

Substituting $D_C(1-R)/R$ for L we have,

$D = D_C(1-R)/R * 1/(1-R) = D_C/R$ ………………… 5

The above equation gives us the conventional deposit multiplier $1/R$. The difference is, however, in direction of causation: the conventional model starts with the infusions of cash deposits equal to D_C in the banking system and ending with total deposit creation equal to D. In our model the bank begins by making the loan L.

Therefore, if the banking system is able to mobilize Rs.100 deposits in cash, the total deposits it can create is [Rs. 100 /(0.05+0.15)] Rs.500. The remainder of the deposits (Rs.500 – Rs.100) represents endogenous deposits. The balance sheet of the banking system will look like Exhibit-2.

Exhibit-2

Liabilities		Assets	
Deposits created by loans	400.00	Loan	400.00
Cash deposits	100.00	Balance with central bank(CRR)	25.00
Total deposits	500.00	Investment in G-Sec (SLR)	75.00
Total	**500.00**	**Total**	**500.00**

Banking system's minimum required cash deposit is $D_C = D*(r+s)$

This is the theoretical minimum D_C the banking system must mobilize. The deposits *minus* the loans give the actual D_C flowing into the banking system. If endogenous deposits are cashed out of the banking system actual cash deposit will be less than theoretical D_C.

If actual total deposits is given by D_A and actual exogenous deposits by D_{CA},

$D_{CA} = D_A - L$ …………………………. (6)

A banking system is cash deficient if $D_{CA} < D_C$. Conversely, if $D_C > D_{CA}$ then the banking system is having surplus cash.

Banking system's borrowing from central bank

As has been stated before, a bank can borrow cash from another bank. However, it is possible that even after banks with surplus cash have lent all surplus cash to banks that are cash-deficient, there could be some banks whose requirement for cash has not been fully met. In this case the banking system is in cash deficit mode. A bank can borrow from central bank the cash it requires or lend to central bank its surplus cash under the LAF window. To the extent banking system avails cash by borrowing from central bank its requirement for cash deposits is reduced. When borrowing from central bank, the banking system does not need to handle physical cash as the transfer of cash can be effected by book entries.

Banks can borrow from central bank only against good collateral (g-sec as per present policy). This means that a bank must hold more g-sec than the minimum holding required to maintain SLR, what is commonly referred to as "excess SLR securities". Theoretically, if the central bank stipulates no limit to the sum it will lend to a bank against good collateral, then with any given quantity of excess SLR securities a bank can build an g-sec portfolio of unlimited size, by a self-feeding cycle of using excess SLR securities to borrow cash from the central bank, then using the same cash to purchase more g-sec and again using the additional g-sec for further borrowing and purchasing more g-sec. As a matter of practice central bank applies a haircut on the collateral ranging typically from 5% to 10%. Besides protecting the central bank against price risk associated with the collateral, the haircut also provides a circuit breaker to the process of creation of an unlimited portfolio of good collateral from a finite quantity of excess good collateral. If the haircut applied is 'h', and initial excess SLR securities (good collateral) is 'e-g-sec', the size of the portfolio of good collateral that bank can build by simply borrowing funds from the central bank is given by e-g-sec / h.

The need for Cash Reserves

Acceptance of cash deposits results in a long position in cash, whereas on the other hand, lending results in short position on cash, as the banking system becomes liable to deliver cash if the demand for withdrawal of book-entry deposits were to materialize. Therefore, banks have a heavily cash oversold positions[12]. Hence, the business of banking can also be seen as shorting cash. Unlike short sale in, say stocks or commodities, in banking the short position in cash is never settled, but indefinitely rolled over – that is, so long as the banking system enjoys confidence of the deposit owners and they do not demand settlement. In other words, bank credit through simultaneous deposit creation results in increasing leverage (cash short position) of the banking system. It is through creation of short cash position of the banking system that expansion in bank credit makes the financial

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[12] Strictly speaking, it can be argued that if banks have obligation to deliver cash in respect of book-entry deposits, the same obligation exists in case of cash deposits as well. Cash deposit is not really a long position in cash, but a zero net position (long in spot and short in forward). Seen whichever way, bank's cash holding is far short of its obligation to deliver cash (which is equal to its demand and time liabilities). While this is true for non-banks and non-financial institutions as well, what separates banks from others is the capacity of the banks to create the short position on their own by mere book entries.

system increasingly fragile, sometimes leading to financial instability. By prescribing cash reserve ratio, the central bank forces banking system to garner cash deposits. This liquidity, quarantined in the central bank, practically forms part of the cash balances available with the banking system, which may be used in times of crisis.

A typical criticism of CRR as store of liquidity is that it is not available to the bank in times of need. While generally central banks can legally allow a bank in crisis to dip into its minimum reserve requirement, they are also generally averse to doing so. This requires banks to maintain larger than regulatory minimum cash reserves. Minimum reserve prescription therefore acts essentially as a circuit breaker for self-feeding credit creation cycle[13]. Cash reserves with the central bank (CRR) act as centralized "margin money" against banks' short cash position and also put a limit on the banking system's capacity to create short cash position. The usefulness of CRR in slowing down build-up of bank leverage was central to the conception of CRR, which in course of time has been overshadowed by prudential regulation of financial system and cooption of capital rules in the monetary policy toolkit.

We have also seen in the earlier section that reserve requirements *compel* the banking system to engage in deposit intermediation. The degree of deposit intermediation directly depends on the level of CRR and SLR (see equations 1 and 2 above). In zero reserve requirement regime deposit intermediation will depend on the level of settlement and precautionary reserves banking system decide to maintain. While recognizing the wane of reserve requirement globally as monetary policy tool, a survey of reserve management practices of 121 central banks worldwide carried out by IMF [Gray (2011)] found that only 9 out of 121 central had no reserve requirement. As reserve ratio directly influences the degree of financial intermediation of banks, reserve requirement also has public policy and political economy ramifications[14]. The current debate on CRR has completely bypassed this aspect.

The mechanics of SLR

Both CRR and SLR act as margin against the short cash position of banks[15], which breaks the circuit of bank-money creation. It is relevant to note that like CRR, SLR also works like margin money. However, though both CRR and SLR create demand for cash within the banking system; investment in government securities (SLR) does not sequester cash from the banking system, except to the extent government holds unspent balances in its account with central bank. As banks invest in government securities, the government's account with central bank gets funded with corresponding depletion in the reserves of banks. The government uses this balance in making its own expenditure. A substantial part of government expenditure is made in cash. Moreover, a large portion of government

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[13] Reserve requirement has also been criticized for not being effective in regulating credit expansion in the US. We feel that the criticism is unfair and not valid, but the debate about the empirical effectiveness of reserve requirement in regulating credit expansion is outside the scope of this paper.

[14] A public policy that prefers capital market to banks for savings intermediation would prefer low reserve requirement.

[15] In many jurisdictions cash reserves or a part of it can be maintained in form of investment in sovereign or other specified securities.

expenditure constitutes payments made to individuals, which though may be credited to individual bank accounts (salaries to governments' own employees, NREGA payments, for example), much of it is eventually taken out in cash.

Reserves maintained by banks in form of SLR can re-enter the banking system as deposits. This can happen in two ways. First, it is possible that the government draws on its balance in its account by making payments through the banking channel and the sums remain in banking channel as deposits. In such situation, the deposit liabilities of the banking system and its reserve balances both will increase. Second a part of cash expenditure made by the government can come back to banks as cash deposits. Both situations result in supply of cash deposits or reserves to the banking system. Government expenditure is an important source of cash deposits for the banking system. This is why whenever the government builds up balance in its account with the central bank (by not spending), the banking system faces shortage of cash. The following illustration will clarify this point.

Let us suppose that the government makes an expenditure of Rs.10 though the banking channel (by cheques), which remains in the banking system. Proceeding with the balance sheet at Exhibit 2, the effect of the transaction will be following.

The expenditure of Rs.10 of made by the government though the banking channel, will bring a deposit of Rs.10 to banking system on its liability side and will increase the system's reserves held with central bank by the same amount (as the government's own balance it its account with central bank will decrease by the same extent). The deposit of Rs.10 here is exogenous deposit as it is accompanied by simultaneous increment in the banking system's reserves (and not loans). After incorporating the above effects, the balance sheet of the banking system will look like as below.

Exhibit-3a			
Liabilities		**Assets**	
Deposits created by loans	400.00	Loan	400.00
Cash deposits	110.00	Reserve a/c balance (CRR)	35.00
Total deposits	510.00	Investment in g-Sec (SLR)	75.00
Total	**510.00**	**Total**	**510.00**
CRR actual = 35/510 = 6.86%			
SLR actual = 75 / 510 = 14.70% [SLR actual = s/(1+s*b), b = 10/75]			
Total reserves = 21.56%			

We note the total reserves of the banking system increases to 21.56% from 20%. This shows that when the government spends the balances in its account through the banking channel liquidity of the banking system improves.

In the next step in our illustration, out of payments made by the government in cash, Rs.5 enters the banking system as cash deposit. The resultant balance sheet will be the following.

Exhibit-3b			
Liabilities		**Assets**	
Deposits created by loans	400.00	Loan	400.00
Cash deposits	115.00	Cash & balance in reserve a/c (CRR)	40.00
Total deposits	515.00	Investment in G-Sec (SLR)	75.00
Total	**515.00**	**Total**	**515.00**
CRR actual = 40/515 = 7.77%			
SLR actual = 75 / 515 = 14.56% [SLR actual = s/(1+s*b), b = 15/75]			
Total reserves =22.33%			

Again, the reserves of the system improve to 22.33% of total deposits. We conclude that any expenditure incurred by the government that comes back to the banking system as deposits (20% of the SLR investment, in our case) has the effect of cash being deposited with the banking system with concomitant improvement in the system's reserves position. The improvement in the system's reserves will help it expand its loan portfolio till the reserve position settles to the statutory minimum of 20%, as shown in the next balance sheet.

Exhibit-3c			
Liabilities		**Assets**	
Deposits created by loans	460.00	Loan	460.00
Cash deposits	115.00	Cash & balance in Reserve a/c (CRR)	28.75
Total deposits	575.00	Investment in G-Sec (SLR)	86.25
Total	**575.00**	**Total**	**575.00**
CRR actual = 28.75 / 575 = 5%			
SLR actual = 86.25 / 575 = 15%			
Total reserves = 20%			

Therefore, SLR does not fully sequester cash from the banking system like CRR. It can be shown that if the part of SLR funds coming back to the banking system is 'b', SLR settles down to a lower level given by

SLR (actual) = s/(1+s*b) ----------------------------- (8) (see Exhibit 3b).

We note therefore that deposit multiplier effect of SLR is effectively higher than that of CRR. Hence if deposit multiplier effect of SLR has to be same as CRR, for given b, SLR needs to adjusted by pitching it up by a factor of (1+s*b). In the same way, if the deposit multiplier of CRR has to be same as SLR, for given b, CRR has to scaled down by the factor of 1/(1+s*b).

To illustrate, in previous example b is 0.20 (15/75). Hence, CRR of 5% is equivalent to SLR of 0.05*(1+0.15*0.20), or 5.15%. With CRR at 4% and SLR at 23% in India[16], assuming b to be 0.20, the effective reserve requirement works out to 25.99% as following:

(a) CRR = 4%
(b) Effective reserve requirement for SLR = 0.23/(1+0.23*0.20) = 21.99%
(c) Effective reserve requirement (a)+(b) = 25.99%

Therefore, effective money multiplier is 1/0.2599 = 3.84. Had CRR itself been 27%, effective multiplier would have been (1/CRR) 3.70. If we know 'b' we can convert SLR into equivalent of CRR using the factor $1/(1+s*b)$.

In reality, the effect of 'b' is lagged, as for the journey of money from government's deposit account in central bank to the deposit accounts of banking system would not happen instantaneously. However, we presume that the lag is quite short and can be ignored.

In the above analysis, we have not considered interest earned on SLR investments. When government pays coupons on its bonds, funds move from Govt.'s account with the central bank to those of the banks. Thus the effect of coupon payment is an increment to 'b'. If the average coupon on SLR investments is 'c' per year, the half yearly coupon will be c/2. We should note that the payment of coupon take place every six months and therefore it will take a maximum of six months for c/2 quantity of funds to move from government's account to banks' accounts. Keeping in view that monetary policy is reviewed half-yearly, we have left coupons out of our framework.

From loans to deposits: the true direction of causation

The central theme emphasized in the above analysis is that banks do not accept deposits for the purpose of lending, but creates deposits by lending the same. Banks *accept* deposits only for the purpose of managing their cash position or liquidity. We know that the asset side of the banks' balance sheets constitutes the sources of money, while the components of money are on the liability side. Though the traditional terminology aptly implies the direction of causation, the traditional definition of banking as "acceptance of deposits for the purpose of lending" puts the cart before the horse. This inverted view of banking could possibly be the reason for the rigid liability-sided monetary policy framework globally in vogue. Traditional representation of bank lending channel of transmission of monetary policy is given as following.

bank reserves ↑ = bank deposits ↑ = bank loans ↑ = investment ↑ = national income ↑

In reality, however, the mechanics of credit creation is given by

bank loans ↑ = bank deposits ↑ = bank reserves ↑

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[16] Reserve ratios prevailing in India in March 2013.

The above causal relation explains why banks go into a tight liquidity situation in periods of fast credit expansion. The above causal relation also intuitively explains why bank lending channel of monetary policy transmission has been generally weak[Bovin, Kiley, Mishkin (2010)].

Asset based capital and reserve requirement

The global financial meltdown has been able to draw the gaze of monetary policy makers away from the liability side of the bank's balance sheet to the asset side. Basel III's rules for counter-cyclical capital and leverage ratio points at the ongoing shift towards an asset based monetary policy paradigm. The BCBS consultative document, "Strengthening the resilience of the banking sector" [BCBS (2009)] set out the following key objectives of counter-cyclical capital (CCB).

(i) Dampen any excess cyclicality of the minimum capital requirement;
(ii) Promote more forward-looking provisions;
(iii) Conserve capital to build buffers at individual banks and the banking sector that can be used in stress; and
(iv) Achieve the broader macro-prudential goal of protecting the banking sector from periods of excess credit growth.

The conventional expected/unexpected loss approaches should be sufficient to meet the first three objectives through counter-cyclical risk weights and dynamic provisioning. It is the fourth objective that provides the key rationale for CCB and also the leverage ratio (LR). Asset based capital requirement (ABCR) has also been advocated by Charles Goodhart and Persaud (2008) and Goodhart (2009) as a monetary policy instrument. However, the case for ABCR has not matured to a point where these can replace liability based monetary policy instruments. A few objections to ABCR are the following. First and foremost, capital can itself be endogenously funded out of bank credit. Even if a prohibition were to be imposed on bank loans for investment in bank capital, such prohibition would almost be impossible to enforce given difficulties associated with enforcing end-use rules. Second, there is meager theoretical / empirical literature on relationship between capital and money. Third, historically, capital has been used to protect creditors against losses, not to regulate credit creation. Fourth, it is yet to be demonstrated that it is more efficient to regulate credit cycles by changing the quantum of capital instead of changing reserve requirements. As noted earlier a recent research shows negative bi-directional Granger-causality between capital and liquidity [Horváth, Seidler and Weillthe (2012), *ibid*].

Thomas Palley (2004, 2007, 2010) has argued for a asset based reserve requirement (ABRR) framework in which banks would have to maintain cash reserves in relation to their assets rather than liabilities as in the traditional framework. A detailed ABRR framework, has also been suggested by Werner (2009). Under the proposed framework, banks would have to hold reserves against different types of assets, with the reserve requirement being adjustable at the discretion the monetary authority. These reserves would consist of liabilities of the central bank and may even include government bonds.

The traditional liability-based reserve requirement is based on liability-to-asset linkage, whereas ABRR impacts assets directly. This is expected to make policy transmission more efficient. The principal benefits of ABRR has been argued as (i) availability of additional instruments in central bank's targets and instrument approach; (ii) correct inappropriate asset allocations by banks and also guide their asset allocations towards socially desirable objectives; (iii) ABRR can change the asset maturity mix by prescribing differential reserve requirements for assets different maturity; (iv) in ABRR framework riskier assets would have higher reserves requirement, which will correct the incentive problem associated with origination of risky assets; (v) ABRR can be useful for controlling asset price inflation by its ability to target a specific asset class, thereby avoiding slowing down the entire economy, (vi) following from (v) monetary stability will result from the fact that the central bank is no more obliged to manipulate the short-term interest rate in order to control asset price fluctuations.

It has also been argued that ABRR can prevent bank-credit generated financial instability [Werner (2009)]. Myftari and Rossi (2007) suggest that central banks can use traditional short term interest rate manipulation in pursuit of price stability, while ABRR will give them a tool to ensure financial stability.

According to a recent research by Detzer (2012) of Institute for International Political Economy, Berlin it was found that ABRR works through a predictable price (of loans) effect, whereas effects of ABCR are hard to predict. Detzer concluded that ABCR do not seem to be the best suited instrument for the purpose of targeting asset price bubbles until their effects are fully understood. Further, due to its higher predictability ABRR framework is more suitable for the task of tackling asset price bubbles.

One possible objection to ABRR could be that the central bank should not "allocate credit". However, in India priority sector norms allocate as much as 40% of credit to certain sectors of the economy. Further, several prudential stipulations have been dynamically changed by central bank keeping in view the imperatives of the real economy – for example, risk weights on housing loans, exposure norms in relation to the infrastructure sector etc. – which also have allocative effects. Therefore, credit allocation is not alien to the current policy framework.

There are, however, some problematic issues associated with ABRR. For example, ABRR can simply move assets from the balance sheets of banks to non-banks and other non-regulated entities. Palley (2009) has argued that it is possible to design regulations that minimize opportunities for regulatory arbitrage associated with ABRR. It is likely that ABRR would prove more effective in controlling pace of credit creation than liability based cash reserves, as ABRR is conceptually rooted in the asset-to-liability causation instead of the traditional liability-to-asset causation framework of money creation [Werner (2009)]. However, ABRR has not been tried in any jurisdiction, except in a limited way in the US insurance sector and there has been little academic and empirical work in this area. It is our endeavour to bring the idea of ABRR on the board, so as to generate debate and encourage research.

Conclusion

Banks create deposits in the process of lending. Of the total deposits of the banking systems in India over 4/5th is generated endogenously within the banking system through credit creation. In the context of fractional reserve banking, the traditional description of banking as "acceptance of deposits for the purpose of lending" is not only anachronous, it distorts the perspective in which economics of banking is understood and analyzed. "A realistic model needs to reflect the fact that under the present system banks do not have to wait for depositors to appear and make funds available before they can on-lend, or intermediate, those funds. Rather, they create their own funds, deposits, in the act of lending" [Benes and Kumhof (2012)].

The recent public discourse on CRR and SLR has completely bypassed the intermediation effect of cash reserves. It has been argued that capital based prudential rules have made cash reserves a redundant instrument of monetary policy. We argue that capital was meant to absorb losses; capital-based rules for regulating credit growth uses capital rules such as CCB and LR as monetary policy instruments, effectiveness of which is yet untested.

Globally, cash reserves rules are liability based. In the real sector liabilities create assets, whereas in the monetary sector, assets create liabilities. The idea of asset based cash reserves appears more logically appealing than liability based reserves and has some clear merits. Richard Werner [Werner (2009)] has provided a reasonably comprehensive framework on ABRR. However, literature on the subject is sparse. The idea of ABRR has opened a new vista of research and experimentation. Besides, both ABCR and ABRR hint at a tacit acceptance that causation of money creation by banks lies on asset side of the banks' balance sheets.

It needs to be emphasized, however, that the purpose of this paper is not to build a case either for reserve requirement or for ABRR; but to provide a proper perspective of banking – one in which, inter-alia, the debate about desirability or otherwise of reserve requirement can be appropriately placed. In a monetary system in which banks themselves create most of the deposit they lend it is a travesty of truth to argue that reserve requirement is some kind of tax on the banking system. As ownership of money equips the owner with the means to stake claim on the finite resources of the world, ability of banks to create money literally out of nothing places them in a very special category of institutions. And it is important that this specialty of banking is never lost sight of.

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