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Money Creation: Advanced Readings

Prof. Dr AP Faure

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Money Creation: Advanced Readings
1st edition
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ISBN 978-87-403-0668-2

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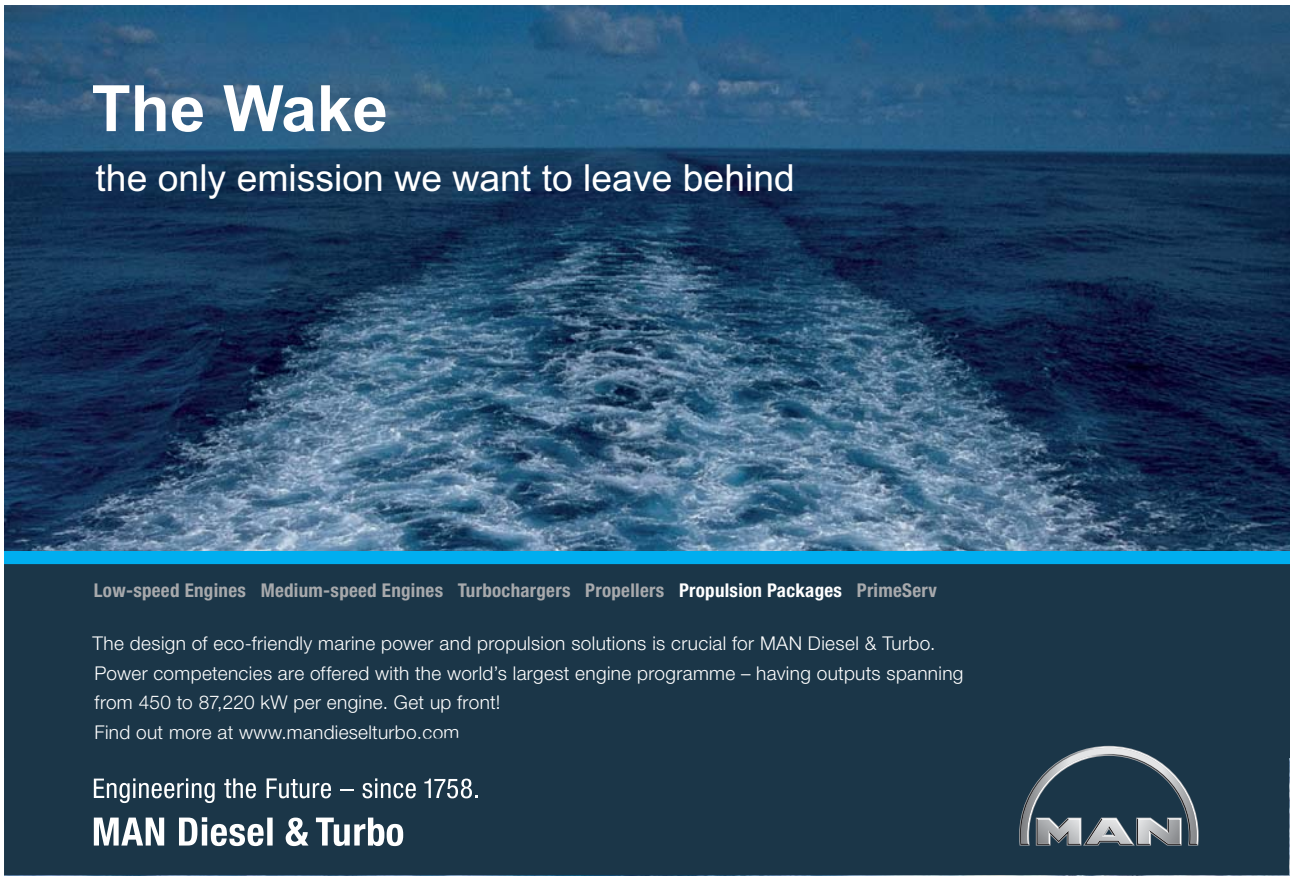

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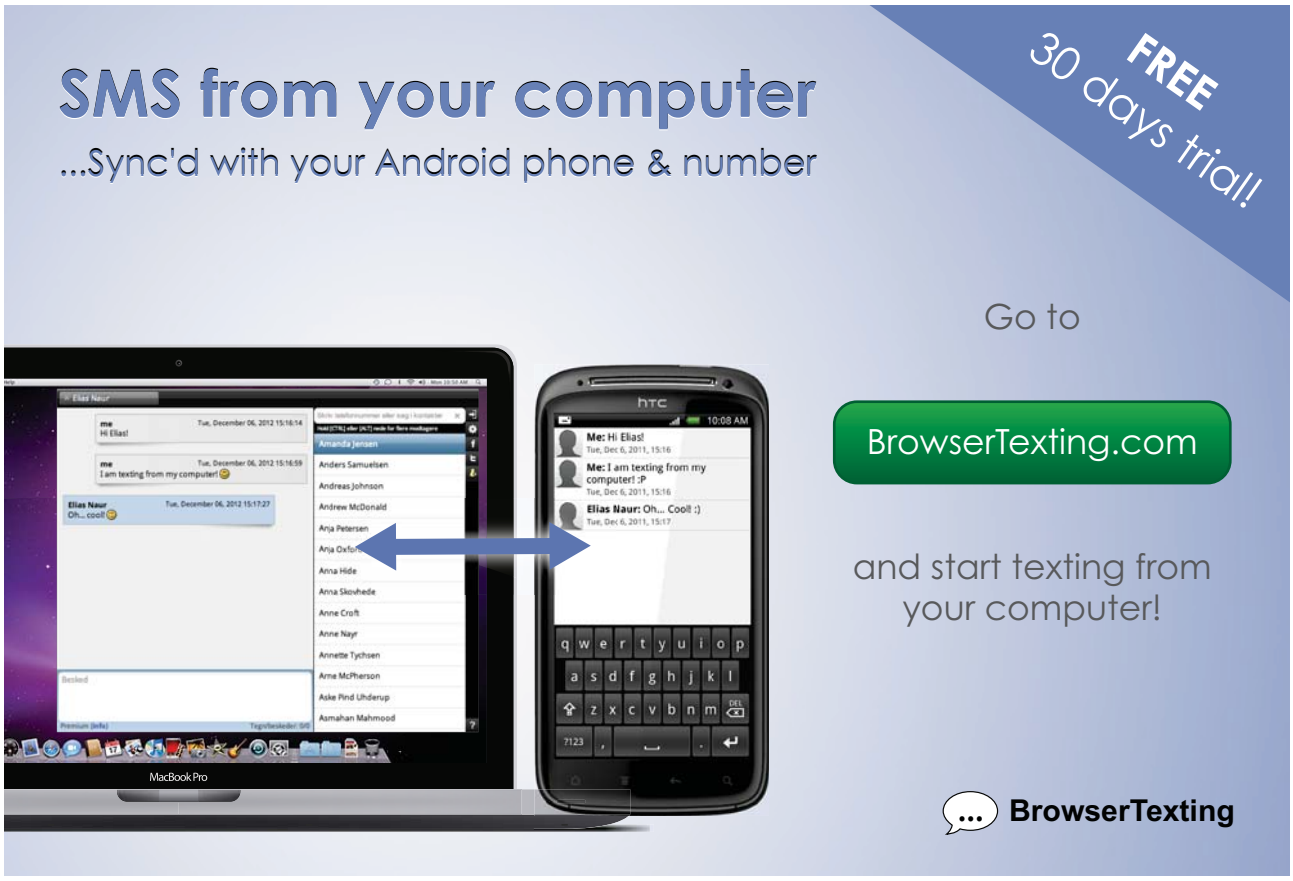

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1 Money creation: the sources 1: general notes

AP Faure[1]

1.1 Abstract

The endogenous-exogenous money debate is a futile one. Exogenous money creation, based on the money multiplier, is not a money creation process. Rather, it is a monetary policy model, but in it money is still created endogenously: bank loans (and foreign asset accumulation by banks) concurrently create new bank deposits (money). This simple fact is obscured by the powerful thesis of Friedmanian Monetarism, and the sharp antithesis of the Post-Keynesian School, as, therefore, is the simple balance sheet analysis of money creation (which disappeared from the literature). This article argues the above, and resurrects the straightforward balance sheet monetary analysis, as the only way to present the sources of money creation. It elucidates the balance sheet sources, as well as the underlying actual sources: the demand for loans (and their satisfaction), and bank decisions regarding foreign asset accumulation. It also covers money destruction.

1.2 Introduction

Why is this issue worth addressing? It is because there has been much debate on it over many decades and, critically, much of the debate has sharply diverted attention from the obvious to seemingly robust academic research. The seemingly robust academic research, largely confined to the US, has led to misleading economic thought and education on monetary matters for many decades.

The statement that the debate has been largely confined to the US is founded on the advent of Friedmanian Monetarism, which emphasises money creation based on the money multiplier. This so-called *exogenous money creation model* contrasts with reality, as we will show, and led to counter-attacks by Post-Keynesians (also largely US-based) who valiantly attempted to "set the record straight" by offering the obvious *endogenous money creation model*. Part of the non-US world looked on in wonder at the futile fuss, and the new terminology.[2]

Unfortunately, the exogenous money model pervaded the learning material used by the world, and still does, despite rumblings (finally!) of rejection, resulting in perverse knowledge on matters monetary. Evidence of this emanates from personal experience, amongst which are:

1. Conducting an online course on money creation (the obvious endogenous money model) on behalf of the United Nations Institute for Training and Research (UNITAR). The attending students are from diverse countries, and from discussions on the discussion forum page it is clear that the exogenous model, without exception, pervades knowledge. By the end of the 5-week course, the students, without exception, are convinced of the reality of the endogenous model, and the fact that the exogenous model is a neat theoretical one.

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2. Teaching at masters degree level for eleven years (prior to this the author was involved in central banking, private sector banking and stockbroking). When the students arrive in my class with an Honours degree, it is a challenge to change their thinking. The last sentence in 1 above also applies here.
3. The author was involved in banking / financial market consulting activities in Africa, and time and again came across multinational agencies' implementation of monetary programmes in various African countries based on the money multiplier. The consultants were US-based.

While the (reality-based) endogenous money model is gaining ground, the detail of the process of money creation is largely absent. This article sets out to rectify this. It also registers opposition to research based on the various measures of the money *stock* (there is no such thing as a money *supply*), and tentatively offers an alternative approach: the other side of the balance sheet.

At the risk of frustrating some academics, but with the interests of students in mind (this is why we are in academia), the reflections are presented here in pedagogic form. The following are the sections:

- The literature.
- Only two models of monetary policy.
- A monetary analysis.
- Private sector demand for bank loans.
- Export receipts purchased by local bank.
- Government issues bonds.
- Increased demand for bank notes.
- Money destruction.
- Bank deposits and the reserve requirement.
- Monetary analysis, given various measures of the money stock.
- A parting thought.
- References.

1.3 The literature

Before Friedmanian Monetarism (Friedman and Schwartz, 1963, 1982) confused the issue, money creation was straightforward: using the now-outmoded terminology, it was, and always has been, endogenous (that is, "forming within"[3]) money creation, as opposed to Friedmanian exogenous (that is, "outside produced") money.

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The literature on the topic is vast, and space constraints prevent us from presenting a detailed literature review. It also seems unnecessary to hark back to the genesis of money creation; however, as Friedmanian Monetarism went off the track of a straightforward line, perhaps a brief reminder will be useful. Money creation began when the goldsmith-bankers of the 17th century discovered that they could make loans by issuing new deposit receipts (later called bank notes) backed by gold previously deposited. As bank notes are nothing but bank deposits, money creation today is the same: when a bank makes a new loan (marketable or non-marketable), it creates a new deposit in the system[4] (except that it is backed by nothing); this is new money [as we know broad money = bank notes and coins (N&C) + bank deposits (BD) held by the non-bank private sector (PS[5])].

As one example of deposit-money creation by extending new bank loans in the literature, we present the view of Prof Ludwig von Mises (von Mises, 1946):

> "Every serious discussion of the problem of credit expansion must start from the distinction between two classes of credit: commodity credit and circulation credit…. Circulation credit is credit granted out of funds especially created for this purpose by the banks. In order to grant a loan, the bank prints banknotes or credits the debtor on a deposit account. It is creation of credit out of nothing."

Prof Von Mises regarded commodity credit as existing lending / borrowing, whereas circulation credit is the concurrent creation of new bank loans and new deposits (or new bank notes, which are also new deposits[6]). When a bank makes a new loan to a company or individual (PS) it simply credits the borrower's deposit account: the money stock (M) (= bank deposits, BD) changes (Δ) and the bank balance sheet source of the change (BSSoC) is the new bank loan to the PS:

$$\Delta M = \Delta BD = \Delta BL.$$

The actual source is of course the demand for the loan by an economic unit for an economic purpose. The causation path is clear:

Demand for bank loans from PS → concurrent ΔBL / ΔM.

Note that the deposit created is a current account deposit initially, that is M1. Thereafter the portfolio decisions of the new holders of the deposit/s may alter its term to maturity, and thereby its slot in the money aggregates. We will say more on this matter later.

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In Monetarist School lore, the reserve requirement (RR; also denotes required reserves) takes centre stage. The RR ratio (r) is the statutorily-set proportion of bank deposits that banks are required to hold with the central bank as deposits. Thus, given this fixed ratio, a money multiplier (m) can be determined: the reciprocal of r. Assuming that r = 10% of deposits, m = 10:

$$m = 1 / r = 1 / 0.1 = 10.$$

Thus, if the banks have reserves (aka *high-powered money*, the *cash base* and the *monetary base* if we exclude N&C[7]) of LCC[8] 400 billion, then M3[9] can be a maximum of 10 times this quantity, that is, LCC 4 000 billion. Balance Sheets 1–2. With M3 at this level the banks are "fully lent", ie they are not able to make new loans, which create new deposits, unless the central bank steps in and creates excess reserves (ER).

BALANCE SHEET 1: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Foreign assets (FA)	100		
Loans to government (LG)	900		
Loans to private sector (LPS)	2 000	Deposits: Private sector (M3)	4 000
Central bank money (CBM):		Loans from central bank	
Notes & coins (N&C)	600	(borrowed reserves: BR)	0
Reserves (total reserves: TR)	400		
(ER = 0)			
(RR = 400)			
Total	4 000	Total	4 000

BALANCE SHEET 2: CENTRAL BANKING (LCC BILLIONS)			
Assets		Liabilities	
		Notes & coins (N&C)	1 000
		Deposits:	
Foreign assets (FA)	1 800	Government sector	1 000
Loans to government (LG)	1 000	Banks (TR)	400
Loans to banks (BR)	0	(ER = 0)	
		(RR = 400)	
		Loans: Foreign sector	400
Total	2 800	Total	2 800

With the creation of ER, which is brought about open market operations (OMO purchases of, say, LCC 10 million bonds) the banking system can make loans and create new deposits up to 10 × ER = LCC 100 million, because at this level ER has shifted to RR, as indicated in Balance Sheets 3–4 (bond purchase, assumed from the banks) and Balance Sheets 5–6 (bank loan and deposit creation).

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BALANCE SHEET 3: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Bonds Reserves (TR) (RR = 0) (ER = +10)	-10 +10		
Total	0	Total	0

BALANCE SHEET 4: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Bonds	+10	Bank deposits (TR) (RR = 0) (ER = +10)	+10
Total	+10	Total	+10

BALANCE SHEET 5: BANKS (LCC BILLIONS)			
Assets		Liabilities	
LPS Reserves (TR) (RR =+10) (ER = -10)	+100 0	Deposits of PS	+100
Total	+100	Total	+100

BALANCE SHEET 6: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Bank deposits (TR) (RR = +10) (ER = -10)	0
Total	0	Total	0

The banking system can expand no further. This is what is known as the "fixed money rule", that is, the central bank has total control over money creation. It was given the label *exogenous money creation*.

Because further explanation requires much space we will end by stating our belief that the above exposition on the essence of Friedmanian Monetarism has *nothing to do with money creation*. Instead, it is a *style / model of monetary policy*, one in which money creation can be controlled exactly. In this model of monetary policy, money is still created endogenously, that is, by the banking system, and it is dependent of the existence of a demand for bank loans.

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This indicates that the Post-Keynesian School (PKS) has erred in its harsh criticism of the Friedmanian Monetarist School (FMS). The FMS proposed a strict monetary rule, and influenced policymakers in many countries, but its influence was short-lived – because of its harsh interest rate consequences. Instead, the PKS should have criticised the *model*, and its endurance in learning material, and not the process of money creation in it. Money can only be created in one fashion: by new bank loans (marketable and non-marketable) [and bank foreign asset (FA) accumulation, although this is usually small], as we will detail a little later.

In conclusion, and in the tradition of a complete literature review, we refer the reader to the literature pertaining to the PKS, and its subcategories: accommodationism, structuralism, and liquidity preference, especially those by Moore (1983a, 1983b, 1988a, 1988b), Palley (1987/88, 1996, 1998). The detail is covered in the Faure references in the References, and a good summary is presented by Haghighat (2011).

1.4 Only two models of monetary policy

To make it clear: there are two models of monetary policy:

- *Money multiplier-focused monetary policy*. This can also be described as the FMS model and as a "firm required reserves model".
- *Interest rate-focused monetary policy*. It can also be described as a "firm borrowed reserves model".

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There is a third model, the *interbank rate model*, but it is a variation of the *interest rate-focused monetary policy model*. As this article is about the sources of money creation, we will not discuss the detail of monetary policy here. The gist of the FMS model has been covered, and we have stated our view that it is a pleasing theoretical model, no longer in vogue in the US (where it was flirted with in the past) as indicated by Carpenter and Demiralp (2010) of the US Federal Reserve Bank and Koc University, Turkey, respectively. They argue:

> "…that the institutional structure in the United States and empirical evidence based on data since 1990 both strongly suggest that the transmission mechanism does not work through the standard money multiplier model from reserves to money and bank loans. In the absence of a multiplier, open market operations, which simply change reserve balances, do not directly affect lending behavior at the aggregate level. Put differently, if the quantity of reserves is relevant for the transmission of monetary policy, a different mechanism must be found…. This paper provides institutional and empirical evidence that the money multiplier and the associated narrow bank lending channel are not relevant for analyzing the United States."

It is common cause that in a monetary system where bank liabilities (deposits) are the principal means of payment, and banks are able to create them by making loans (depending on demand), there can be no market-determined interest price / rate. If interest rates were unfettered in the interest rate-focused model many banks, being keen competitors, will get into trouble, as happened often in the age of the goldsmith-bankers, and as we have seen after the sub-prime banking debacle. The consequences for depositors will be profound. Banks are inherently unstable in such an environment.

In such a system an arbiter is required, and the central bank performs this function. Its primary function is to set the rate of interest on bank loans, because new bank loans are the principal source of new bank deposits (money creation). This is done via its key (or policy) interest rate (KIR), which is made effective by the creation of a permanent liquidity shortage (that is, the existence of a permanent borrowed reserves – BR – condition). The KIR has a direct impact in the bank-to-bank interbank rate, which in turn impacts on wholesale call deposit rates, and in turn on all deposit rates. As banks maintain a more or less fixed "bank margin", the KIR influences the prime lending rate (PR) of the banks (and marketable asset rates), as shown in Figure 1[10]. The level of bank lending rates (PR) influences the demand for bank loans and money creation.

This is the essence of the *interest rate-focused monetary policy model*. There is no other way for the system to be managed. The monetary base is the outcome of bank lending / deposit creation, not the driver. This model recognises that the only process of money creation is bank loan extension (and FA accumulation), and we now move on to the detail of the process of money creation.

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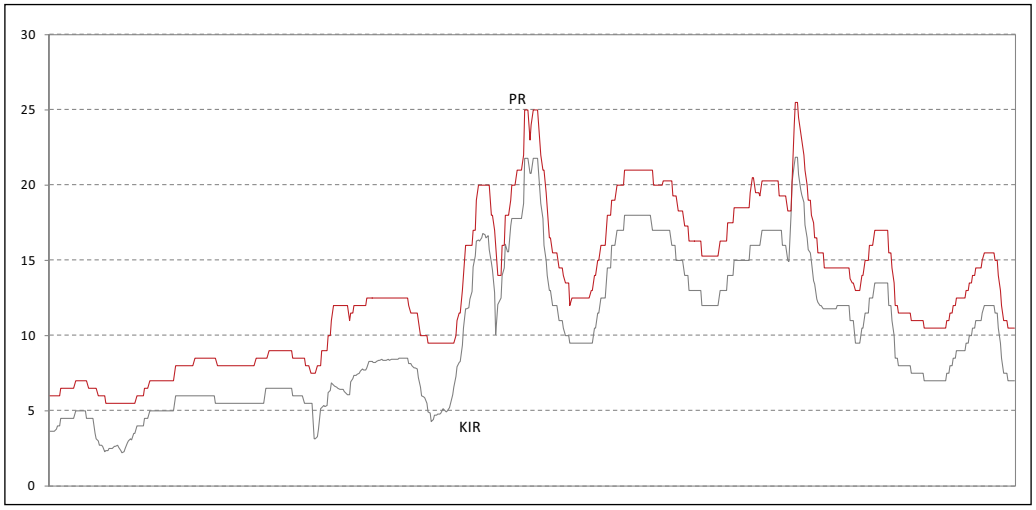

Figure 1: KIR & PR (month-ends over 50 years)

1.5 A monetary analysis

Prior to the dawn of the Friedmanian Monetarism, there was one generally accepted approach to money creation, called the *balance sheet model* (BSM) by some (although there were different approaches within this model, which we will not belabour here). The BSM was similar[11] to the *interest rate-focused monetary policy model* which is the focus here.

With the advent, and appeal, of the *money multiplier-focused monetary policy model* (the FMS model) the literature on the BSM disappeared from the literature. As we have shown, many countries did not embrace this model, and within the US, the PKS appeared in opposition, mainly in the 1980s. Thus, there was tension between the adherents of the two models in the US. Some countries outside the US were also influenced by Monetarism, as indicated by Das (2010):

> "…there were two approaches to money supply determination in India: balance sheet or structural approach and money multiplier approach; the former focused on individual items in the balance sheet of the consolidated monetary sector in order to explain changes in money supply and the latter focused on the relationship between money stock and reserve money; the money multiplier approach emerged strongly as a critic to the balance sheet approach; between January 1976 and January 1978 there was a hot and rich debate between two groups of researchers, one group led by Gupta who believed in the money multiplier theory, the other group of [Reserve Bank of India] economists, who were not accepting this theory; the debate gave rise to a number of research papers."

Countries such as the UK and South Africa were not influenced by Monetarism, and continued happily with the BSM. Thus, this author is not breaking new ground; he is merely resurrecting the BSM, and pleading for the return to sanity in economics students' learning material.

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BALANCE SHEET 7: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Foreign assets (FA)	300		
Loans to government (LG)[12]	900		
Loans to private sector (LPS)[13]	2 000		
Central bank money (CBM):		Deposits: Private sector	4 000
Notes & coins (N&C)	600	Loans from central bank (BR)	200
Reserves (TR)	400		
(ER = 0)			
(RR = 400)			
Total	4 200	Total	4 200

BALANCE SHEET 8: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Notes & coins (N&C)	1 200
		Deposits:	
Foreign assets (FA)	1 600	Government sector	800
Loans to government (LG)[14]	1 000	Banks (TR)	400
Loans to banks (BR)	200	(ER = 0)	
		(RR = 400)	
		Loans: Foreign sector	400
Total	2 800	Total	2 800

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What is the BSM? It is simply the approach followed by many countries' central banks. South Africa is one example (South African Reserve Bank, 2012). We elucidate with an example.

In Balance Sheets 7–8 we present simplified balance sheets[15] of the private banking sector and the central bank. The banks' collective balance sheet, asset side, is made up of foreign assets (FA, aka *foreign reserves*), loans to the government (LG), loans to the private sector (LPS) (which is the largest part), and central bank money (CBM) which is made up of bank holdings of N&C and bank reserves (called total reserves, TR). It is made up of excess reserves (ER) and required reserves (RR), which reflects the statutory RR ratio (r) applied to the private sector deposits of the banks (liability side of the balance sheet).

As seen in Balance Sheet 7, the deposit liabilities of the banks are LCC 4 000 billion. Assuming r = 10% of deposits, the banks are required (RR) to hold LCC 400 billion on deposit with the central bank, which is the case. They are borrowing LCC 200 billion from the central bank (BR, as part of the monetary policy stance of making the KIR effective).

The assets of the central bank are: foreign assets (FA), loans to government (LG), and loans to banks (BR). Its liabilities are: N&C (the total amount issued), government deposits (we assume government only banks with it), loans from the foreign sector and the banking sector's reserves (TR = RR, because ER = 0).

How is the money stock calculated? In the real world central banks, as the compilers of monetary statistics, consolidate the balance sheets of the banks with their own, in the process netting out interbank claims: N&C, TR and BR, ending with a consolidated balance sheet of the monetary banking institutions (MBIs), as indicated in Balance Sheet 9.

BALANCE SHEET 9: CONSOLIDATED BALANCE SHEET OF MBIs (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes & coin	600
D. Foreign assets (FA)	1 900	B. Deposits:	
E. Loans to government (LG)	1 900	1. Government	800
F. Loans to private sector (LPS)	2 000	2. Private sector	4 000
		C. Loans: foreign sector	400
Total	5 800	Total	5 800

Central banks compile this *monetary analysis* (MA) on a monthly basis. What does it mean? It means that the central bank is able to extract the money stock number, as well as the balance sheet counterparts, and to do an analysis of changes from date to date. Using the letters indicated in Balance Sheet 9, this is executed as follows:

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Money stock: what is the amount of the money stock? Assuming we are focused on the money "supply" measure M3 (total PS deposits), it is the sum of bank deposits (BD) and N&C (held by the private sector):

M3 = A + B2
= N&C + BD
= LCC 600 billion + LCC 4 000 billion
= LCC 4 600 billion.

Counterparts: because the balance sheet balances, M3 must be equal to:

= D + E + F – (B1 + C).

If the related balance sheet items (D and C; E and B1) are netted, we get (LCC billion):

M3	= A + B2	= <u>4 600</u> (600 + 4 000)
	= (D – C)	= 1 500 (1 900 – 400)
	+ (E – B1)	= 1 100 (1 900 – 800)
	+ F	= <u>2 000</u>
	TOTAL	= <u>4 600</u>

Thus, the counterparts of the M3 money stock on a particular date are:

Net foreign assets (NFA)	(D – C)
Net loans to government (NLG)	(E – B1)
Loans to private sector (LPS)	(F).

It also tells us that from a date to a date (in practice month-end to month-end) the balance sheet sources of change (BSSoC) of changes (Δ) in M3 can be calculated as follows:

ΔM3 = ΔNFA + ΔNLG + ΔLPS.

We can go further: NLG and LPS represent loans (marketable and non-marketable) to the private and government sectors (netted in the latter case). We can sum them and call it *domestic loan extension* (DLE). Thus:

ΔM3 = ΔNFA + ΔDLE.

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What is the significance of this analysis[16]? It tells us that there are two BSSoC in M3: one foreign and one domestic, and the actual sources of change (ASoC) are real events or decisions. It also tells us about the paths of causation:

In the case of DLE:
ASoC (demand for bank loans) → (bank decisions to grant) → BSCoC (ΔDLE) → ΔM3.

In the case of NFA:
ASoC (bank decisions to buy or sell) → BSCoC (ΔNFA[17]) → ΔM3.

As we indicated earlier, the latter two steps happen concurrently. The following sections elucidate these processes of money creation in more detail.

1.6 Private sector demand for bank loans

The first example is that of Company B wishing to purchase goods from Company A (as inputs in its production), and requires a loan from Bank A for this purpose. The bank evaluates the proposal and agrees to an overdraft facility of LCC 100 million.

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Company B does an electronic funds transfer (EFT) via internet banking and sends the proof of payment to Company A, which delivers the goods. Company A also banks with Bank A. The EFT enters the electronic payments system (EPS) and Bank A receives a debit and a credit on its account at the central bank (all interbank clearing takes place over banks' accounts at the central bank), the equivalents of which are reflected in Bank A's balance sheet.

The changes to all balances sheets are as indicated in Balance Sheets 10–12 (amount = LCC 100 million).

BALANCE SHEET 10: COMPANY A (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at Bank A	-100 +100		
Total	0	Total	0

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

BALANCE SHEET 12: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Loan to Company A	+100	Deposits of Company A	+100
Total	+100	Total	+100

BALANCE SHEET 13: CONSOLIDATED BALANCE SHEET OF MBIs (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG) F. Loans to private sector (LPS)	+100	A. Notes & coin B. Deposits: 1. Government 2. Private sector (PS) C. Loans: foreign sector	+100
Total	+100	Total	+100

Seen in the balance sheet of the MBS (Balance Sheet 13) 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: LPS increased by LCC 100 million. The ASoC was the demand for loans which was satisfied by the bank.

1.7 Export receipts purchased by local bank

Second example: a Local Country exporter, LC Exporter (= member of the PS), exports goods to the value of LCC 100 million to US Importer; the exchange rate is USD / LCC 10.0 (see Balance Sheets 14–16).

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

BALANCE SHEET 15: US IMPORTER (USD MILLIONS)			
Assets		Liabilities	
Goods US Bank deposits	+10 -10		
Total	0	Total	0

BALANCE SHEET 19: US BANK (USD MILLIONS)			
Assets		Liabilities	
		Deposits of LC Exporter Deposits of LC Bank	-10 +10
Total	0	Total	0

There was no change in the money stock [ie 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 10 million) into the local foreign exchange market, and LC Bank decides to buy the USD because it expects the LCC to depreciate against the USD (see Balance Sheets 17–19).

BALANCE SHEET 17: LC EXPORTER (PS) (LCC MILLIONS)			
Assets		Liabilities	
Deposits at US Bank Deposits at LC Bank	-100 +100		
Total	0	Total	0

BALANCE SHEET 18: 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 US Importer Deposits of LC Exporter	-10 +10
Total	0	Total	0

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It will be clear that the balance sheet of LC Bank (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 PS = an increase in M3. In terms of the balance sheet of the MBIs we have changes as indicated in Balance Sheet 20: M3 increased by LCC 100 million and the BSSoC is an increase in NFA (the increased foreign deposit). The ASoC is the transaction, a portfolio decision (the purchase of forex) made by LC Bank.

BALANCE SHEET 20: CONSOLIDATED BALANCE SHEET OF MBIs (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG) F. Loans to private sector (LPS)	+100	A. Notes & coin B. Deposits: 1. Government 2. Private sector (PS) C. Loans: foreign sector	+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 9.995, than when the forex was withheld by LC Bank from the commercial supply / demand forces in the forex market.

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1.8 Government issues bonds

Another example: the government issues LCC 1 000 million bonds and they are purchased by a number of the retirement funds (= members of the PS). The government spends the receipts of the bond issue to purchase goods from Company A (see Balance Sheets 21–24).

BALANCE SHEET 21: GOVERNMENT (LCC MILLIONS)			
Assets		Liabilities	
Goods	+1 000	Bonds	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 22: RETIREMENT FUNDS (PS) (LCC MILLIONS)			
Assets		Liabilities	
Bonds Deposits at banks	+1 000 -1 000		
Total	0	Total	0

BALANCE SHEET 23: COMPANY A (PS) (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at banks	-1 000 +1 000		
Total	0	Total	0

BALANCE SHEET 24: BANKS (LCC MILLIONS)			
Assets		Liabilities	
	0	Deposits of retirement funds (PS) Deposits of Company A	-1 000 +1 000
Total	0	Total	0

It will be evident that M3 has not changed: the PS deposits at the banks remain unchanged. However, if the bonds are purchased by the banks, new money is created (see Balance Sheets 25–28).

BALANCE SHEET 25: GOVERNMENT (LCC MILLIONS)			
Assets		Liabilities	
Goods	+1 000	Bonds	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 26: COMPANY A (PS) (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at banks	-1 000 +1 000		
Total	0	Total	0

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BALANCE SHEET 27: BANKS (LCC MILLIONS)			
Assets		Liabilities	
Bonds (LG)	+1 000	Deposits of Company A	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 28: CONSOLIDATED BALANCE SHEET OF MBIs (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG) F. Loans to private sector (LPS)	+1 000	A. Notes & coin B. Deposits: 1. Government 2. Private sector (PS) C. Loans: foreign sector	+1 000
Total	+1 000	Total	+1 000

As seen in Balance Sheet 28, M3 increased by LCC 1 000 million and the BSSoC is ΔLG (ΔDLE) of the same amount. The ASoC is the issue of bonds, which is a demand for loans, which was satisfied by the banking sector. As we saw, when satisfied by the non-bank PS, M3 is not created.

1.9 Increased demand for bank notes

What happens to the money stock when the public (members of the PS) 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 29–31.)

The answer: no change in M3. The N&C holdings of the PS 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 MBI balance sheet = the central bank's N&C liability less the N&C held by banks. The former was unchanged and the latter decreased by LCC 100 million.

BALANCE SHEET 29: BANKS (LCC MILLIONS)			
Assets		Liabilities	
N&C	-100	Deposits of private sector	-100
Total	-100	Total	-100

BALANCE SHEET 30: PUBLIC (PS) (LCC MILLIONS)			
Assets		Liabilities	
N&C Deposits at banks	+100 -100		
Total	0	Total	0

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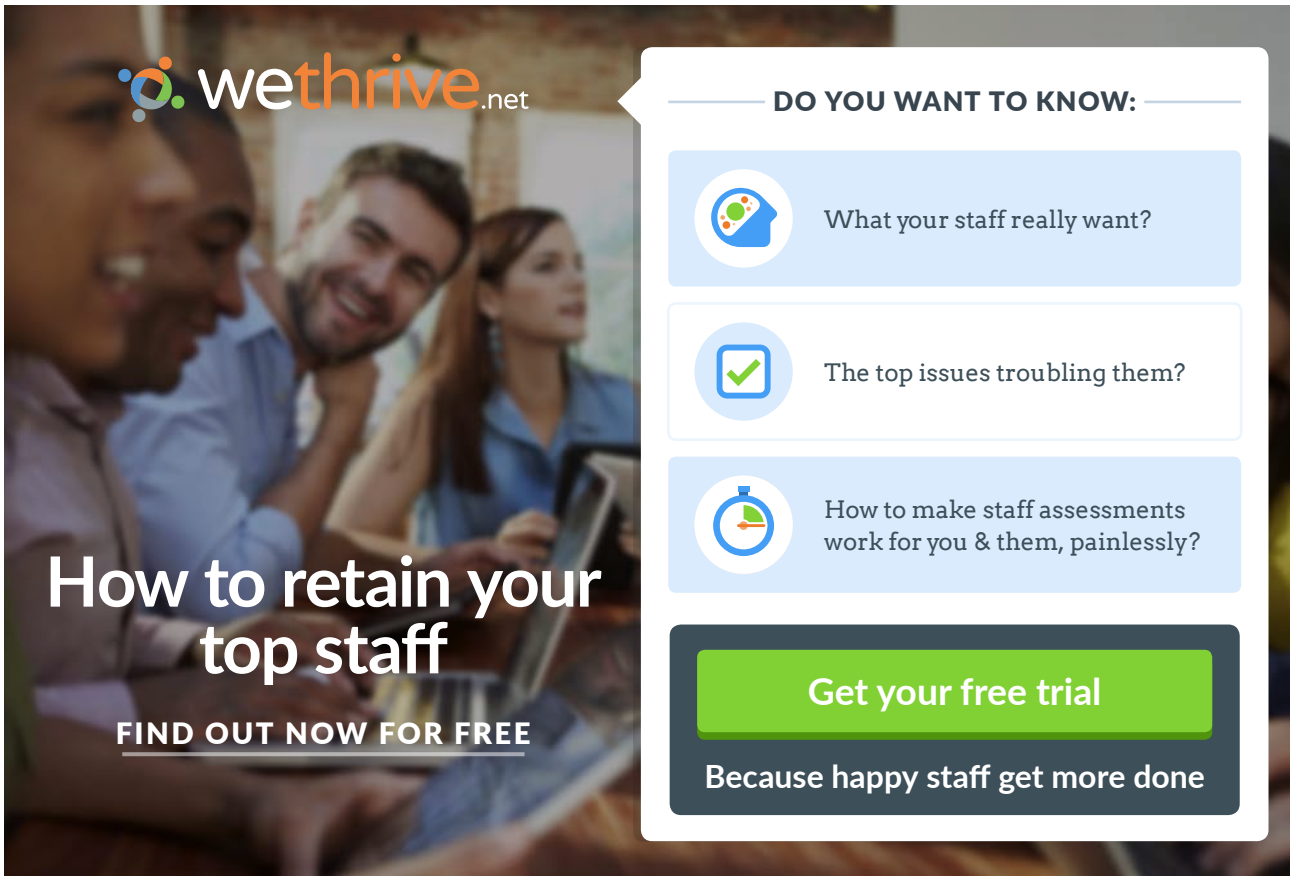
BOX 31: CONSOLIDATED BALANCE SHEET OF MBIs (LCC MILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG) F. Loans to private sector (LPS)		A. Notes & coin (held by PS) B. Deposits: 1. Government 2. Private sector (PS) C. Loans: foreign sector	-100 +100
Total	0	Total	0

1.10 Money destruction

This analysis will not be complete without a note on money destruction. We know that when banks provide new loans (to the government sector or the PS), 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 in all countries.

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 32–33 show this transaction. The position of the MBIs will be the same as that of Bank A (see Balance Sheet 34).



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BALANCE SHEET 32: MRS A (NBPS) (LCC)			
Assets		Liabilities	
Deposit at bank	-50 000	Bank loan	-50 000
Total	-50 000	Total	-50 000

BALANCE SHEET 33: BANK A (LCC)			
Assets		Liabilities	
Loans to private sector (LPS)	-50 000	Deposits of private sector (M3)	-50 000
Total	-50 000	Total	-50 000

BOX 34: CONSOLIDATED BALANCE SHEET OF MBIs (LCC)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG) F. Loans to private sector (LPS)	-50 000	A. Notes & coin (held by PS) B. Deposits: 1. Government 2. Private sector (PS) C. Loans: foreign sector	-50 000
Total	-50 000	Total	-50 000

1.11 Bank deposits and the reserve requirement

As we have seen, by consolidating the balance sheets of the banks and the CB, all interbank claims were netted out. This obscures a most critical 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 as a conclusion.

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 35–38) (the amount of the bank loan = LCC 100 million; the RR ratio = 10% of deposits).

BALANCE SHEET 35: COMPANY A (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at Bank A	-100 +100		
Total	0	Total	0

BALANCE SHEET 36: COMPANY B (LCC MILLIONS)			
Assets		Liabilities	
Goods	+100	Loan from Bank A	+100
Total	+100	Total	+100

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BALANCE SHEET 37: BANK A (LCC MILLIONS)			
Assets		Liabilities	
Loan to Company A Reserves with CB (TR) (ER = 0) (RR = +10)	+100 +10	Deposits of Company A Loan from CB (BR) @ KIR	+100 +10
Total	+110	Total	+110

BALANCE SHEET 38: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Loans to banks (BR) @ KIR	+10	Bank reserves (TR) (ER = 0) (RR +10)	+10
Total	+10	Total	+10

In this example, the RR increase by LCC 10 million (increased deposit of LCC 100 million × 0.10). Because Bank A cannot create central bank money, the central bank will make a loan to the bank (BR). The TR of the banks increases by LCC 10 million (as a result of RR = +LCC 10 million). This is a critical part of the *interest rate-focused monetary policy model* (= similar to the BSM). The loan is automatic (called *accommodationist policy* by the PKS) and is provided at the KIR.

As this article is about the sources of money creation and not monetary policy *per se*, we conclude this discussion by saying that the change in RR is just one of many factors that impact on bank liquidity, and that bank liquidity management by the central bank (in order to make the KIR effective) is an essential ingredient in the *interest rate-focused monetary policy model.*

1.12 Monetary analysis, given various measures of the money stock

For the sake of simplicity, the monetary analysis we presented above used the wide definition of money, M3. However, there are various measures of money ranging from M0 (the monetary base, which is a derived quantity as we have shown, so it will be ignored) to M3 (all deposits of the private sector). There are other measures, up to M5 but, as this is a focused article of sources of money creation, we will not complicate the analysis. Assuming:

M1 = current account + call money deposits,
M2 = M1 + medium-term (MT) deposits, and
M3 = M2 + long-term (LT) deposits (D),

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the monetary analysis can be amended to accommodate their analysis. For example, if one wants to "explain", in balance sheet terms, changes in M1, the monetary analysis will present as follows:

$$\Delta M1 = \Delta NFA + \Delta DLE - \Delta(MTD + LTD).$$

What does this mean? Little, in our view. When we have an increase in either NFA or DLE, M1 money is created. Thereafter, portfolio decisions of the recipients of the M1 money dictate the term of the deposit, that is, where it slots in terms of maturity: M1, M2 or M3. These decisions are based on myriad factors, including expectations of interest rates in the future. It does not change the contribution of NFA or DLE.

1.13 A parting thought

In analyses, particularly money-output growth analyses, given the "stability" of NFA + DLE compared with the various money aggregates, should NFA + DLE not be the dominant determinant. It is obvious that underlying the demand for bank loans (reflected in DLE; NFA is usually insignificant) is economic activity. There are slippages in DLE, but they are relatively minor: bank disintermediation, which includes bank securitisation activities. This is material for further research, specifically DLE-nominal output growth.

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2 Money creation: the sources 2: relationship between credit and money

AP Faure[18]

2.1 Abstract

Despite stout efforts by some scholars to demonstrate the logical and direct relationship between bank domestic credit extension (DCE) and M3 growth (because money creation is the outcome of new DCE), there remains, in much of the literature, a disconnection between these two aggregates. The endogeneity of money creation is not a hypothesis; it is a fact, and one that has existed since a goldsmith-banker wrote out the first receipt (bank note) and handed it to a borrower, as opposed to a depositor of gold coins. This paper clarifies this monetary issue and provides substantiation. It also demonstrates the direct link between DCE growth and nominal GDP growth in the long term.

2.2 Introduction

Many scholars have expounded on the causation path of money creation:

Demand for bank credit → satisfaction by a bank → deposit money creation.

There is one other source (discussed below) but it is minor in most countries. This paper provides a synopsis of the relevant analysis and provides empirical evidence of the direct relationship. It also demonstrates the direct link between bank credit growth and nominal GDP (GDP_N) growth in the long term, thereby also demonstrating the link between the real and monetary economies. The growth in credit demand and its satisfaction by the banks is a reflection of real economic factors, and therefore of actual *additional* aggregate demand/expenditure (ΔGDP_N). When bank credit growth is level GDP_N growth does not take place. The division of ΔGDP_N into price changes (ΔP) and real GDP (GDP_R) is not discussed here.

In much of the literature some scholars seem to regard bank credit and money as two different monetary matters. As we will show, broad money (M3) and bank credit are symmetrical to an extraordinarily high degree (and the reason is obvious). However, this symmetry lessens as one correlates bank credit with narrower measures of money. This is simply because holders of deposits make deposit portfolio shifts: shift them into longer or shorter deposits.

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Critical in this regard is that bank credit growth captures additional spending (aggregate demand) and this measure of additional spending is only subject to dis- and re-intermediation (which is relatively small). Its outcome, M1 creation, can be shifted in terms of term to maturity. Therefore it is more fitting to use bank credit growth in economic analyses instead of M1 and M2. M3 is the only money aggregate which captures the total of bank credit extension[19]; hence the good results with $\Delta M3$ and ΔGDP_N analyses. We will discuss this in detail and provide empirical evidence below. The following are the sections:

- What are bank credit, loans and investments?
- Data.
- A monetary analysis.
- Monetary policy in a nutshell.
- M1, M2 and M3.
- R^2 of DCE and M3.
- R^2 of DCE and GDP_N.
- Concluding remarks.

It will be noted that we do not provide a literature review. This is because the literature is littered with examples.

2.3 What are bank credit, loans and investments?

The terminology relating to bank credit / loans can be somewhat confusing. Usually the term *credit* is associated with *credit* provided by a store (paying off a TV purchase over time), or credit from a bank in the form of the use of a credit card. If one takes a loan from a bank is it a *loan* or *credit*? If one takes out a mortgage *loan* from a bank to purchase a dwelling, is it a *loan* or *credit*? Is a bank's holding of a government bond an *investment*, a *loan* or *credit*?

The answer is that credit and loans are synonyms, and investments such as bonds are credit / loans which are *marketable*, as opposed to ordinary bank loans which are *non-marketable*. Thus, banks make loans / provide credit which falls into two categories: non-marketable and marketable loans / credit.

What is the appropriate term to use? We prefer the term *loans* but bow to the academic norm and use the term *credit* to refer to loans, marketable and non-marketable, to the government and private sectors.

It will be evident that from the point of view of the borrower, s/he is issuing a *debt* IOU, which is a debt *obligation* or a debt *security* (non-marketable or marketable). Balance Sheet 1 provides an example of the balance sheet of a bank. It will be seen that the bank holds a diverse portfolio made up of marketable debt (MD) and non-marketable debt (NMD), which can be divided into *foreign assets* (FA), *credit to government* (CG), and *credit to the private sector* (CPS). We ignore CBM for the moment.

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BALANCE SHEET 1: BANK	
Assets	**Liabilities**
Foreign assets (FA): 1. US Treasury bills (MD) 2. UK government bonds (MD) **Credit to government (CG):** 1. Government bonds (MD) 2. Treasury bills (MD) 3. Loans to local authorities (NMD) **Credit to private sector (CPS):** 1. Mortgages (NMD) 2. Overdraft facilities utilised (NMD) 3. Leases (NMD) 4. Corporate bonds (MD) **Central bank money (CBM):** 1. Notes & coins (N&C) 2. Reserves	Deposits: Private sector Loans from central bank (borrowed reserves at PIR[3])

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To conclude, banks extend credit as follows:

- Foreign loans (usually called foreign assets, FA)
  [FA less foreign sector deposits = net foreign assets (NFA)].
- Domestic credit extension (DCE):
  - Credit to government (CG)
    [less government deposits (GD) = net credit to government (NCG)[20]]
  - Credit to private sector (CPS).

As we will show in detail below, the domestic credit aggregates, NCG and CPS, can be combined and called domestic credit extension (DCE). DCE makes up the overwhelming proportion of a bank's balance sheet.

2.4 Data

The data we present below from the World Bank country database[21] and the frequency is annual. The time series are:

- DCE which the World Bank terms "*net domestic credit (current LCU[22])*". As shown above briefly and will be shown in detail below it is made up of NCG (that is, CG – GD) + CPS. The World Bank's definition is: *"Net domestic credit is the sum of net claims on the central government and claims on other sectors of the domestic economy (IFS line 32)."*
- M3, which is all domestic, non-bank, private sector (ie excluding government) deposits with the banking sector (private sector banks, public sector banks and the central bank). The World Bank terms M3 as "*broad money (current LCU)*", and its definition is: *"Broad money (IFS line 35L..ZK) is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of deposit and commercial paper."*
- GDP_N, which the World Bank terms *"GDP (current LCU)"*. Its definition is well known: "*GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources."*

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2.5 A monetary analysis

BALANCE SHEET 2: BANKS (LCC BILLION)			
Assets		Liabilities	
Foreign assets (FA)	300		
Credit to government (CG)[7]	900		
Credit to private sector (CPS)[8]	2 000		
Central bank money (CBM):		Deposits: Private sector	4 000
Notes & coins (N&C)	600	Loans from central bank (BR)	200
Reserves (Total reserves - TR)	400		
(ER = 0)			
(RR = 400)			
Total	4 200	Total	4 200

BALANCE SHEET 3: CENTRAL BANK (LCC BILLION)			
Assets		Liabilities	
		Notes & coins (N&C)	1 200
		Deposits:	
Foreign assets (FA)	1 600	Government sector	800
Credit to government (CG)[9]	1 000	Banks (TR)	400
Loans to banks (BR)	200	(ER = 0)	
		(RR = 400)	
		Loans: Foreign sector	400
Total	2 800	Total	2 800

The M3 money stock is comprised of notes and coins (N&C) and bank deposits (BD) held by the domestic non-bank private sector (NBPS):

M3 = N&C + BD (held by NBPS).

BALANCE SHEET 4: CONSOLIDATED BALANCE SHEET OF MBS (LCC BILLION)			
Assets		Liabilities	
		A. Notes & coin	600
D. Foreign assets (FA)	1 900	B. Deposits:	
E. Credit to government (CG)	1 900	1. Government	800
F. Credit to private sector (CPS)	2 000	2. Private sector	4 000
		C. Loans: foreign sector	400
Total	5 800	Total	5 800

The stock of M3, as well as the balance sheet sources of changes (BSSoC) in M3, is calculated by central banks, usually monthly, by consolidating the collective balance sheets of the private sector banks with that of the central bank (CB). It is called the consolidated balance sheet of the monetary banking sector (MBS). A simple example is presented in Balance Sheets 2–4. Note that in a consolidation interbank claims [required reserves (RR), excess reserves (ER), borrowed reserves (BR) from the central bank, and N&C] are netted out.

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What is the stock of M3 money in this example? It is (read from Balance Sheet 4) LCC[23] 4 600 billion, calculated as follows:

M3 = N&C + BD
= A + B2
= 600 + 4 000
= 4 600.

The BSSoC (of M3) are:

M3 = D + E + F – (B1 + C).

If the related items (D and C; E and B1) are grouped, we get (LCC billion):

M3	= A + B2	= 4 600 (600 + 4 000)
	= (D – C)	= 1 500 (1 900 – 400)
	+ (E – B1)	= 1 100 (1 900 – 800)
	+ F	= 2 000
	TOTAL	= 4 600

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Thus, the counterparts of the M3 money stock on a particular date are:

Net foreign assets (NFA)	(D – C)
Net credit to government (NCG)	(E – B1)
Credit to private sector (CPS)	(F).

It also tells us that from a date to another date (in practice month-end to month-end) the BSSoC of changes (Δ) in M3 can be calculated as follows:

$$\Delta M3 = \Delta NFA + \Delta NCG + \Delta CPS.$$

If we combine ΔNCG + ΔCPS we get *changes in domestic credit extension* (ΔDCE), such that ΔM3 had two BSSoC, one foreign and one domestic:

$$\Delta M3 = \Delta NFA + \Delta DCE.$$

As said these are the BSSoC. The actual sources are the decisions and actions taken that lead to ΔNFA + ΔDCE, the outcome of which is ΔM3. As said in the abstract, money endogeneity is not a hypothesis; it is a fact and it applies also in the Monetarist School model.

2.6 Monetary policy in a nutshell

The Monetarist hypothesis is a *monetary policy model*, not a method of money creation. In the Monetarist model, money is created as elucidate above, but the quantity of money creation is controlled by a strict money creation rule based on the money multiplier, *m*:

$$m = 1 / \text{reserve requirement (RR) ratio.}$$

Therefore:

$$\Delta M = ER \times (1 / RR \text{ ratio}).$$

This model can be called the *reserves-focussed monetary policy model*, as opposed to the *interest rate monetary policy focussed model.* The former model was flirted with in the distant past and gave way (as a result of interest rate volatility it caused) to the latter model. The *reserves-focussed monetary policy model* is now a text book theoretical model.

It is just simple economic logic that where you have a monetary system in which money is the deposit liabilities of banks (ie they can create money by simply making loans), that the extent of money creation (a quantity) can only be controlled by its price (the lending rate of banks). This is done by (in normal, non-QE, times) by making the policy interest rate of the central bank effective – through a borrowed reserves (BR) condition (either actual, close to, or the threat of).

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2.7 M1, M2 and M3

M3 is the broad money aggregate. Countries also calculate M1 and M2 (and broader measures that M3). As we are dealing with principles here, we will define M1, M2 and M3 simply as follows (all held by NBPS) (short-term = ST; medium-term = MT; long-term = LT):

- M1 = deposits immediately available (call & current account deposits).
- M2 = M1 + other ST and MT deposits (up to 6 months' maturity).
- M3 = M2 + LT deposits (all other deposits > 6 months).

Balance Sheet 5 presents an example. In it (LCC billion):

- M1 = 1 000
- M2 = M1 + other ST & MT deposits = 1 000 + 2 000 = 3 000
- M3 = M2 + LT deposits = 3 000 + 1 000 = 4 000.

BALANCE SHEET 5: CONSOLIDATED BALANCE SHEET OF MBS (LCC BILLION)			
Assets		Liabilities	
		A. Notes & coin	600
		B. Deposits:	
D. Foreign assets (FA)	1 900	1. Government	800
E. Credit to government (CG)	1 900	2. Private sector	4 000
F. Credit to private sector (CPS)	2 000	a. Call & current a/c's (M1): 1 000	
		b. Other ST + MT deps: 2 000	
		c. LT deposits: 1 000	
		C. Loans: foreign sector	400
Total	5 800	Total	5 800

When money is created, someone's current account is credited (assume the BSSoC = ΔLPS = +100 million), that is, M1 money is created:

M1, M2, M3 = +LCC 100 million

BSSoC = ΔNFA = 0
+ ΔNCG = 0
+ ΔCPS = +LCC 100 million
= TOTAL = +LCC 100 million.

Thus, M1, M2 (which includes M1) and M3 (which includes M2) capture it. However, if the new deposit holder shifts the money to a 5-month deposit, M1 will not capture it, but M2 and M3 will. If the new deposit holder shifts the M1 money to a 9-month deposit, neither M1 nor M2 will capture it; only M3 will.

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What is the significance of this? It is significant because the borrower borrowed the funds to spend, driving $\Delta(C + I)$[24] = GDE; GDE + $\Delta(X - M) = \Delta GDP_N$. An analysis of ΔM1 or M2 and ΔGDP_N will be compromised. This does not apply to M3 or to DCE [except that M3 also reflects NFA (which reflects bank and central bank foreign exchange portfolio changes); however, NFA is a minor factor in most countries].

Even when money is not created, a shift in deposit portfolio preferences and/or fixed-deposit term-shortening will also compromise a money-output analysis. In the case of a shift in a NBPS 5-month deposit to a call deposit (on maturity), M2 and M3 will not be affected; only M1 will be. One can do a monetary analysis for each as follows, but the source of ΔM1 will be a "technical" one:

ΔM1		= +LCC 100 million
BSSoC	= ΔNFA	= 0
	+ ΔNCG	= 0
	+ ΔCPS	= 0
	- ΔNon-M1 deposits	= +LCC 100 million (increase -; decrease +)
	= TOTAL	= +LCC 100 million

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In the case of a shift from an existing M1 NBPS deposit to a 9-month deposit, M3 will not be affected; only M1 and M2 will be. One can do a monetary analysis for M1 and M2 as follows, but, again, the source of ΔM1 and ΔM2 it will be a "technical" one:

ΔM1, ΔM2		= -LCC 100 million
BSSoC	= ΔNFA	= 0
	+ ΔNCG	= 0
	+ ΔCPS	= 0
	- ΔLT deposits	= -LCC 100 million (increase -; decrease +)
	= TOTAL	= -LCC 100 million

Concluding remarks: money-output analyses are easily compromised when use is made of M1 and M2 money aggregates. There is a correlation between ΔM1 and ΔM2 with ΔGDP_N but ΔM3 is more suited, and this is so because ΔM3 is the balance sheet counterpart of ΔDCE and ΔNFA. It makes logical sense to use the aggregate that is directly related to ΔGDP_N, that is, ΔDCE, in money-output analyses. We present the empirical evidence below.

2.8 R^2 of DCE and M3

As outlined above, ΔM3 is the counterpart of ΔNFA and ΔDCE, and ΔDCE is the overwhelming BSSoC. Below we present the evidence for a number of countries. It is to be noted that not all countries have data for long periods; we have chosen the larger countries that have.

United Kingdom: LCU raw data (see Figure 1; 1960–2012): $R^2 = 0.994$.

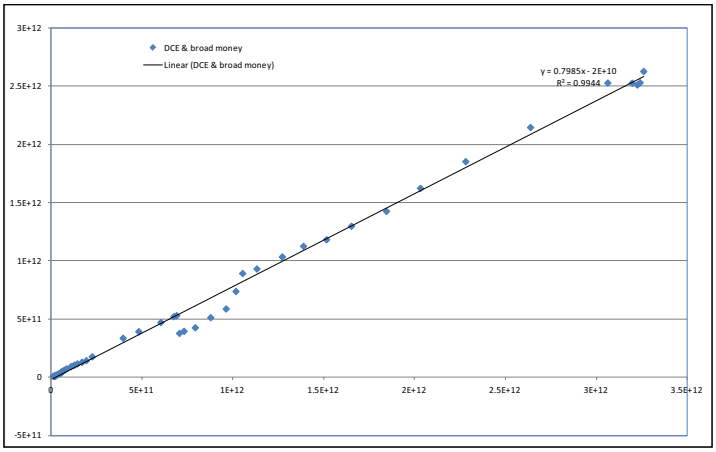

FIgure 1: UK: DCE & M3

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United Kingdom: Change (yoy%) (see Figure 2; 1961–2012): $R^2 = 0.64$.

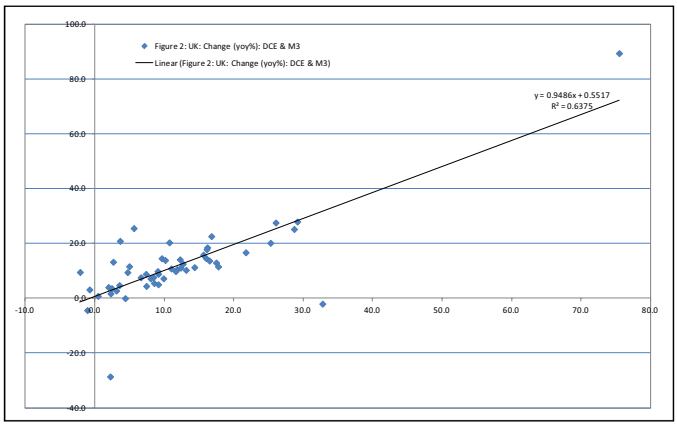

Figure 2: UK: Change (yoy%): DCE & M3

United States: LCU raw data (see Figure 3; 1960–2012): $R^2 = 0.996$.

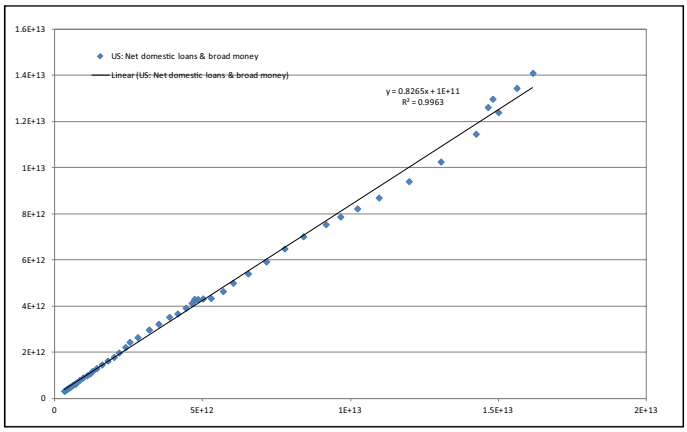

Figure 3: USA: DCE & M3

United States: Change (yoy%) (see Figure 4; 1961–2012): $R^2 = 0.68$.

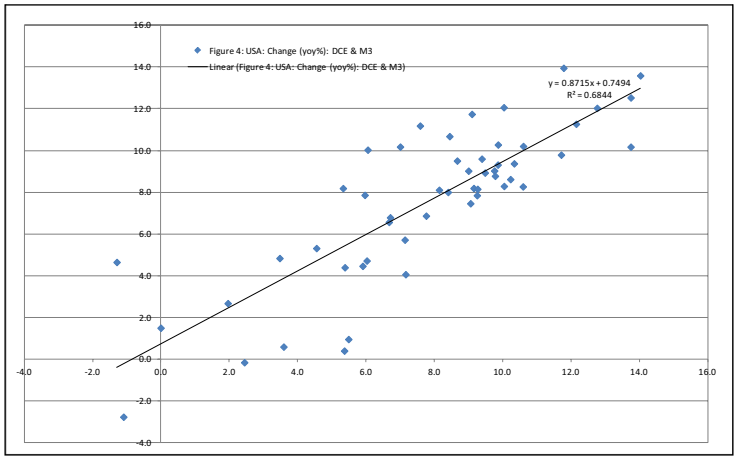

Figure 4: USA: Change (yoy%): DCE & M3

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Canada: LCU raw data (see Figure 5; 1960–2008): $R^2 = 0.97$.

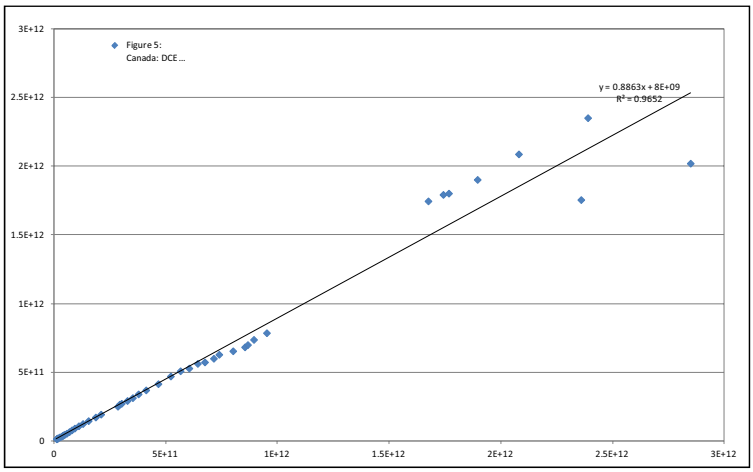
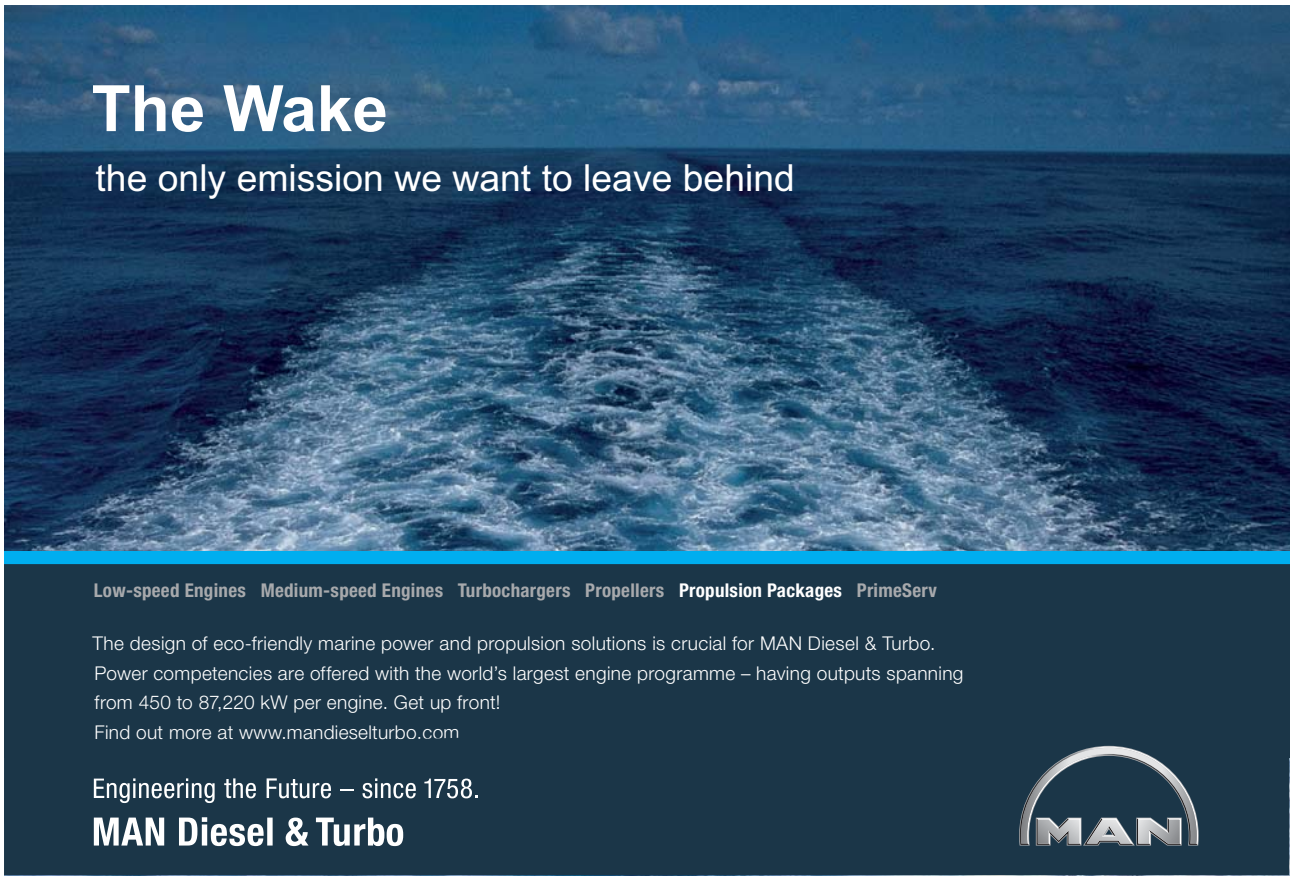


Figure 5: Canada: DCE & M3



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Canada: Change (yoy%) (see Figure 6; 1961–2008): $R^2 = 0.83$.

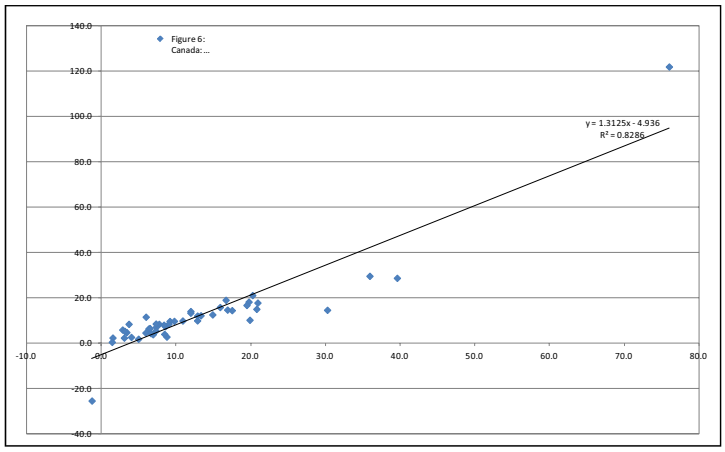

Figure 6: Canada: Change (yoy%): DCE & M3

Japan: LCU raw data (see Figure 7; 1960–2012): $R^2 = 0.98$.

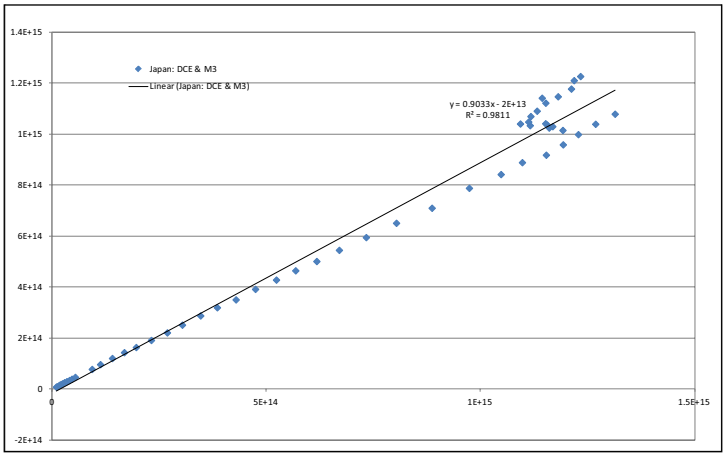

Figure 7: Japan: DCE & M3

Japan: Change (yoy%) (see Figure 8; 1961–2012): $R^2 = 0.89$.

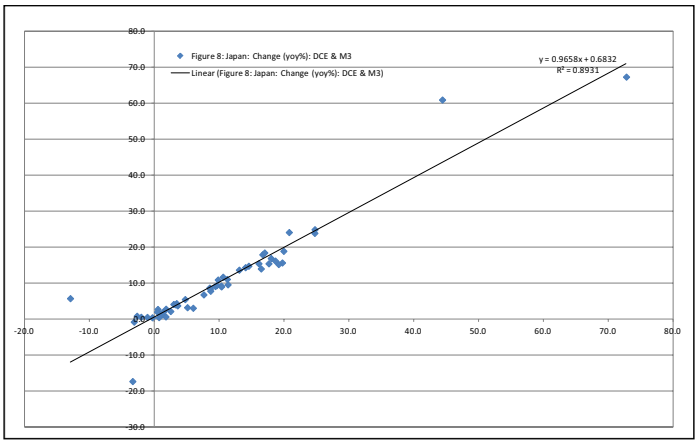

Figure 8: Japan: Change (yoy%): DCE & M3

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New Zealand: LCU raw data (see Figure 9; 1960–2010): $R^2 = 0.98$.

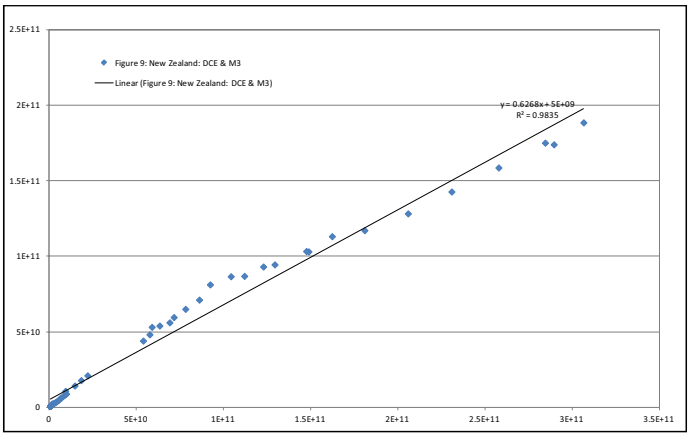

Figure 9: New Zealand: DCE & M3

New Zealand: Change (yoy%) (see Figure 10; 1961–2010): $R^2 = 0.82$.

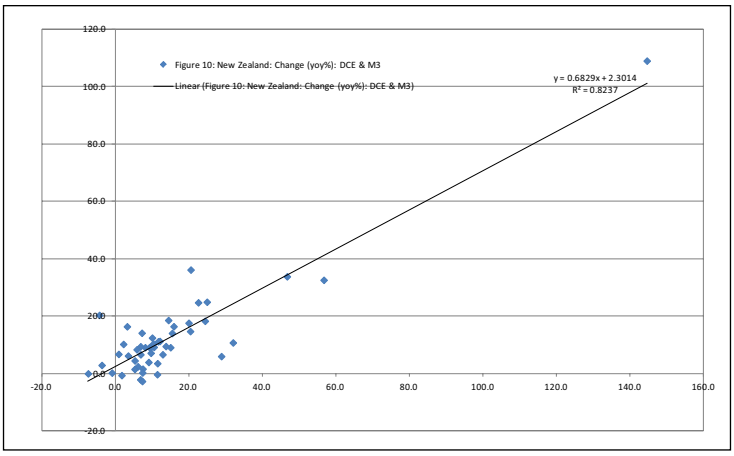

Figure 10: New Zealand: Change (yoy%): DCE & M3

China: LCU raw data (see Figure 11; 1977–2012): $R^2 = 0.998$.

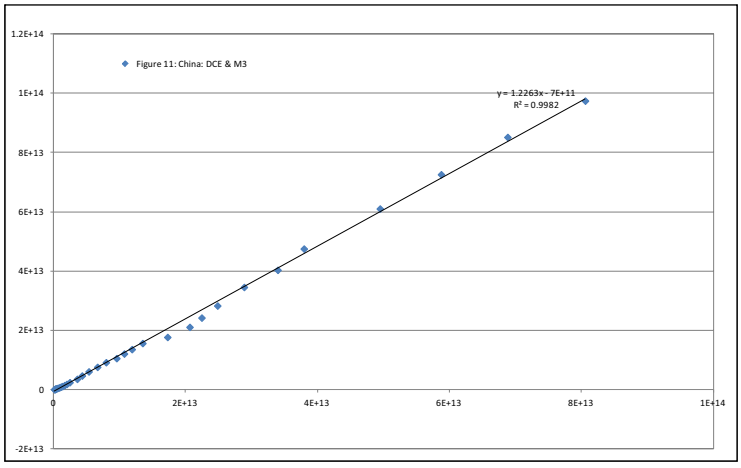

Figure 11: China: DCE & M3

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China: Change (yoy%) (see Figure 12; 1978–2012): $R^2 = 0.74$.

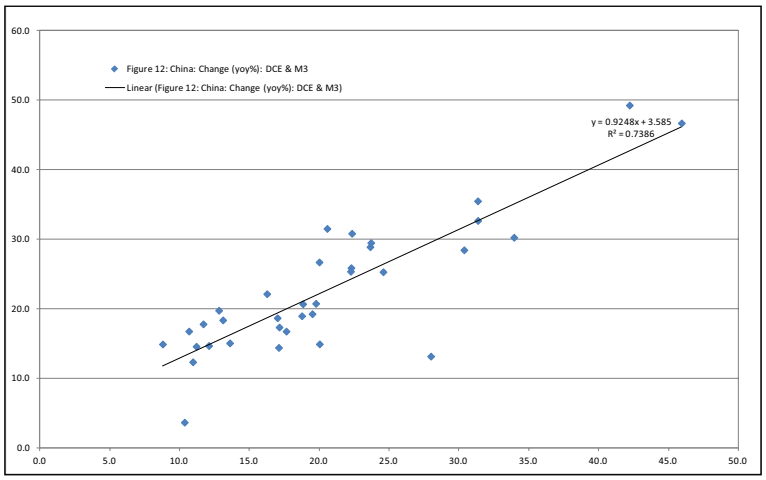
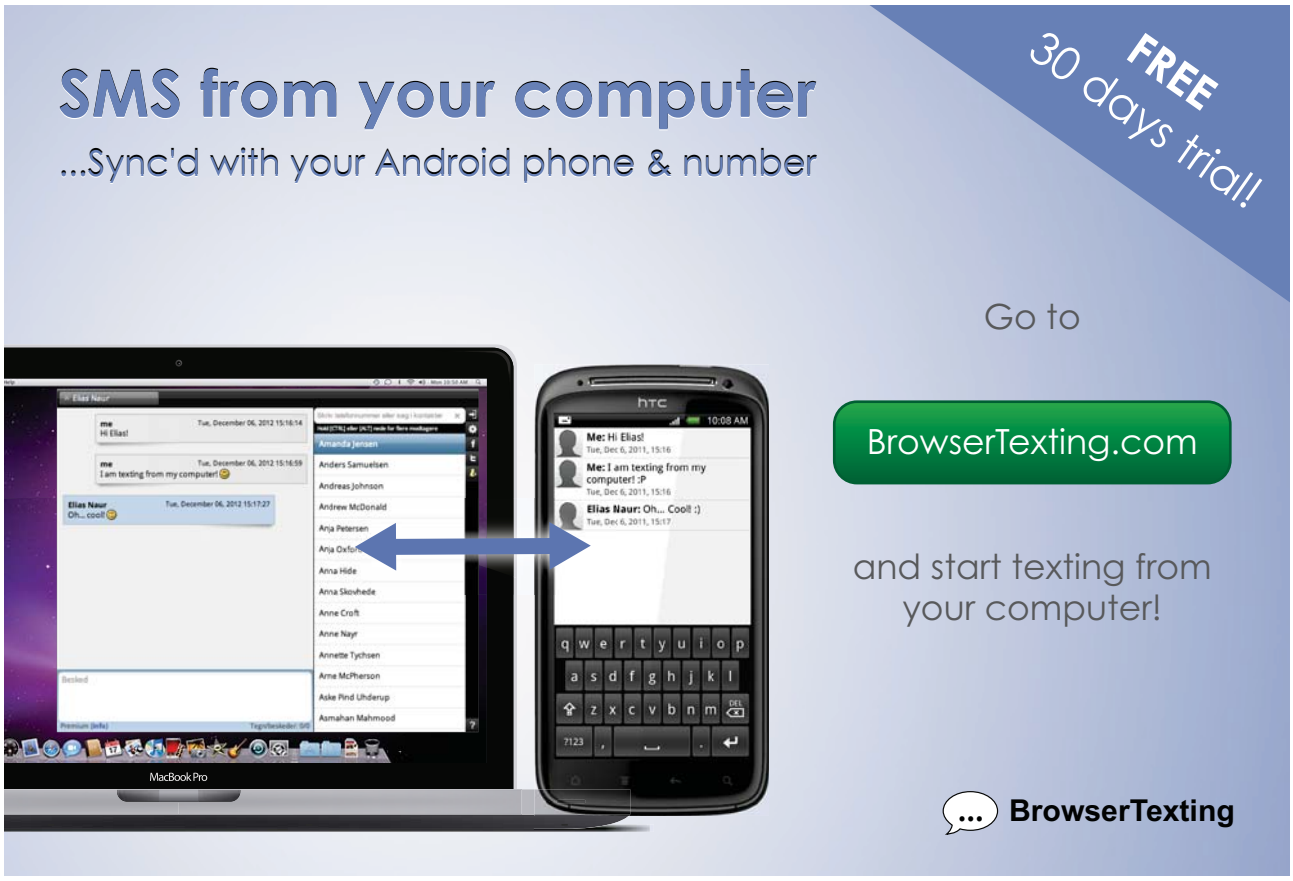


Figure 12: China: Change (yoy%): DCE & M3

The evidence is clear: the association between DCE and M3 (raw LCU data year-on-year changes) is significantly robust. The causation path is obvious: $\Delta DCE \rightarrow \Delta M3$.



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2.9 R^2 of DCE and GDP_N

The close relationship between money and GDP_N is well known. Friedman and Schwartz (1982) were the first to give it much attention, using data for a long period. However, the data was much massaged and it is unclear what monetary aggregate they used. It seems that is was a broad aggregate.

Many other scholars have done similar research with good results when M3 is used. However, the results deteriorate as the money aggregate used narrows. The good money-output relationship results when M3 is used are a result of the fact that M3 robustly reflects DCE. As we have said above, the direct relationship between the real and monetary sectors lies in DCE (which reflects aggregate demand) and GDP_N. When government or the private sector borrows from the banking sector, they do so to spend: C + I spending. As we know C + I = GDE; GDE + (X – M) = GDP. Thus the relationship between DCE and GDP_N is an economically logical one.

We present the empirical evidence for the same countries as above.

United Kingdom: LCU raw data (see Figure 13; 1960–2012): $R^2 = 0.92$.

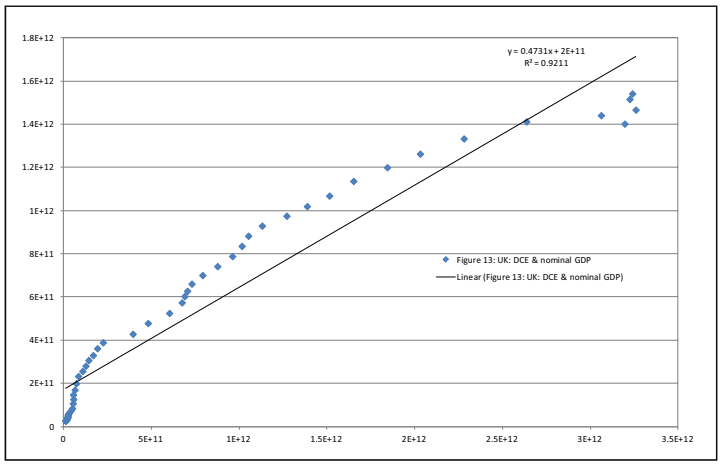

Figure 13: UK: DCE & nominal GDP

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United Kingdom: Change (yoy%) (see Figure 14; 1961–2012): $R^2 = 0.03$.

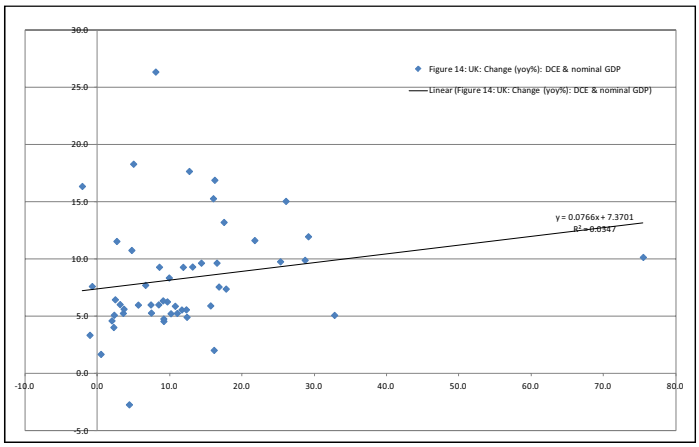

Figure 14: UK: Change (yoy%): DCE & nominal GDP

United States: LCU raw data (see Figure 15; 1960–2012): $R^2 = 0.98$.

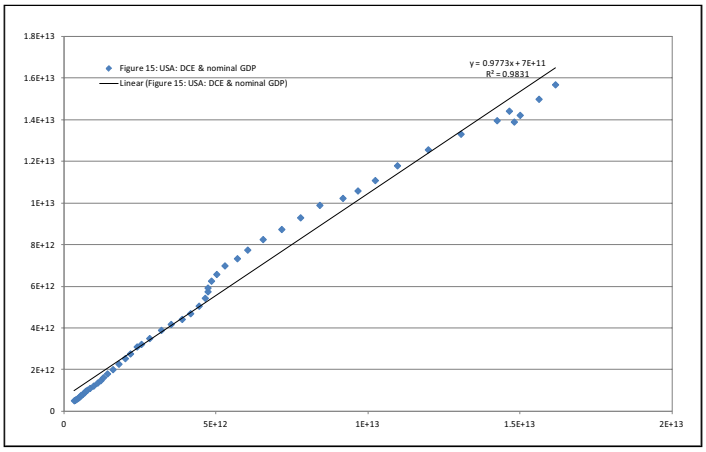

Figure 15: USA: DCE & nominal GDP

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United States: Change (yoy%) (see Figure 16; 1961–2012): R2 = 0.5.

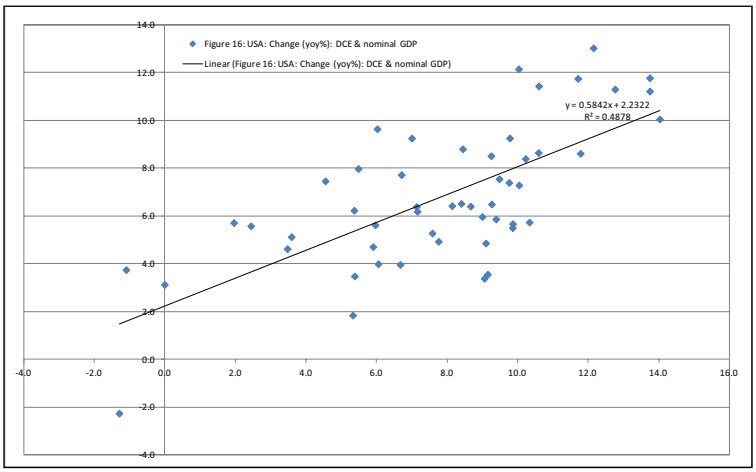

Figure 16: USA: Change (yoy%): DCE & nominal GDP

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Canada: LCU raw data (see Figure 17; 1960–2008): $R^2 = 0.91$.

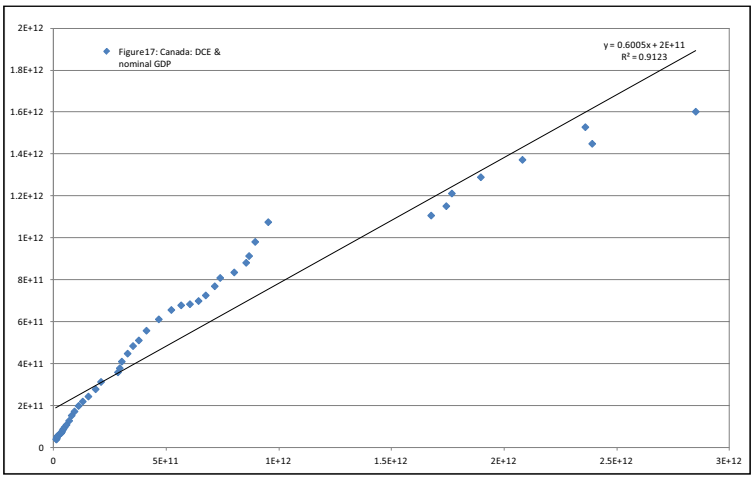

Figure17: Canada: DCE & nominal GDP

Canada: Change (yoy%) (see Figure 18; 1961–2008): $R^2 = 0.4$. [Note: the DCE data was slightly amended. The number for 2001 was 76%. It was preceded by 3.1% for 1999 and 6.5% for 2000, and followed by 4.0% for 2002 and 1.4% for 2003. It is clearly an error. We used the number 5% for 2001.]

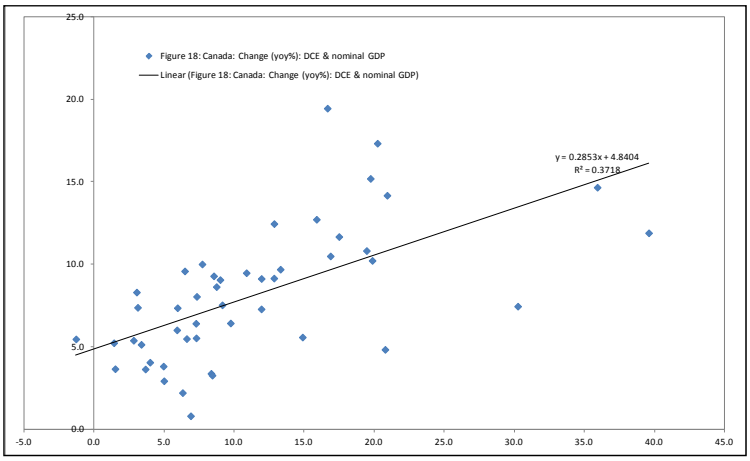

Figure 18: Canada: Change (yoy%): DCE & nominal GDP

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Japan: LCU raw data (see Figure 19; 1960–2012): $R^2 = 0.99$.

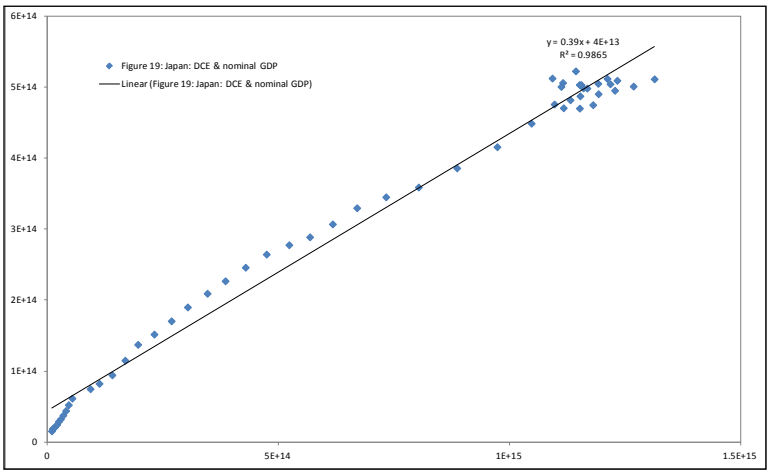

Figure19: Japan: DCE & nominal GDP

Japan: Change (yoy%) (see Figure 20; 1961–2012): $R^2 = 0.6$.

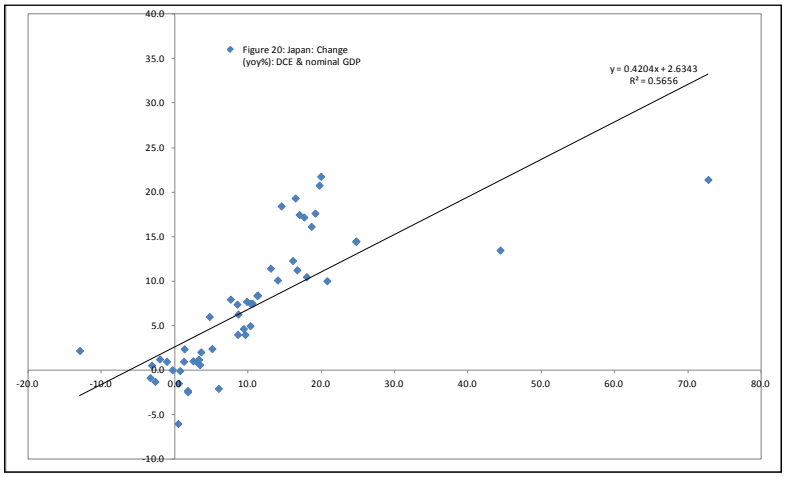

Figure 20: Japan: Change (yoy%): DCE & nominal GDP

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New Zealand: LCU raw data (see Figure 21; 1960–2010): $R^2 = 0.94$. [Note: the GDP_N number for 1970 is not available. An average of the 1969 and 1971 data was used.]

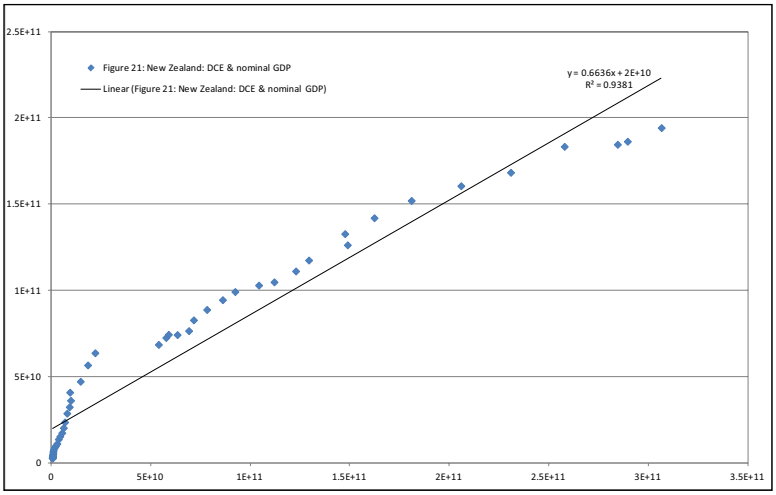

Figure 21: New Zealand: DCE & nominal GDP

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New Zealand: Change (yoy%) (see Figure 21; 1961-2010): $R^2 = 0.05$. [Note that there is a distinct outlier; it is for DCE for 1988 = 145% when $GDP_N = 7.6\%$. It seems to be a data problem. The use of 10% for 1988 (previous year = 20%; following year = 6.9%) delivers a R^2 of 0.3 (see Figure 23).]

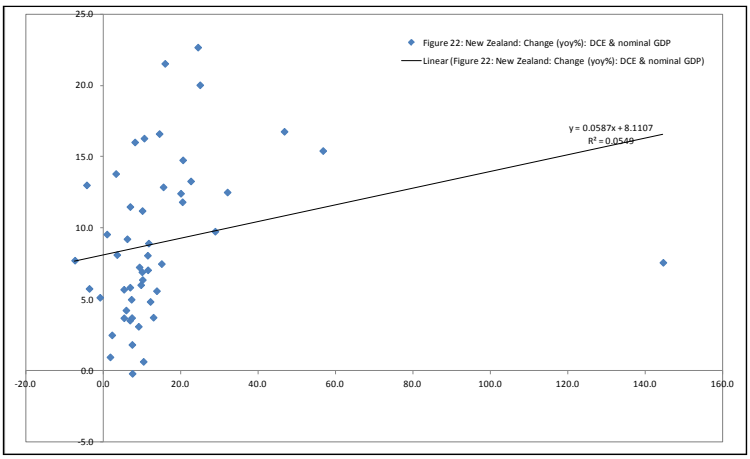

Figure 22: New Zealand: Change (yoy%): DCE & nominal GDP

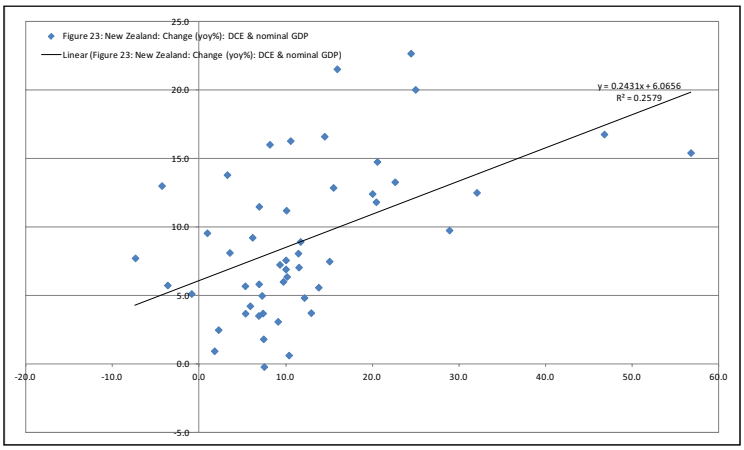

Figure 23: New Zealand: Change (yoy%): DCE & nominal GDP (amended)

China: LCU raw data (see Figure 24; 1977–2012): $R^2 = 0.99$

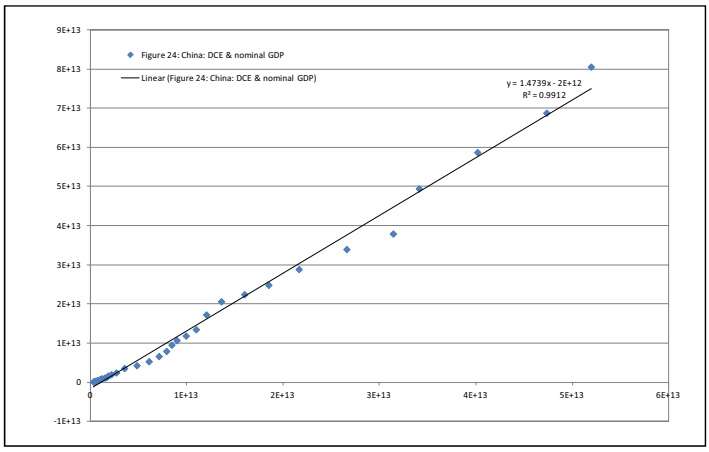

Figure 24: China: DCE & nominal GDP

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China: Change (yoy%) (see Figure 25; 1978–2012): $R^2 = 0.09$.

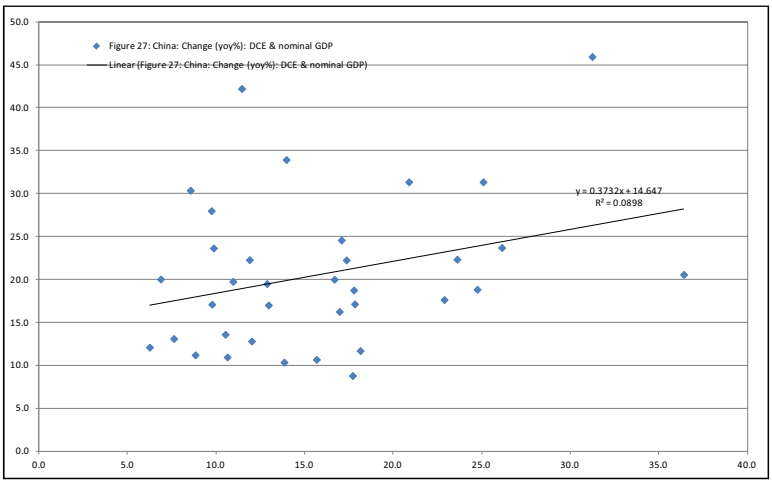

Figure 27: China: Change (yoy%): DCE & nominal GDP

The above is not surprising. Freidman and Schwartz (1982) found (albeit with massaged numbers), that there is a one-for-one relationship between M3 and GDP_N. We maintain that the reason is that M3 is merely the outcome of DCE, and DCE reflects aggregate demand.

The R^2 of changes in DCE and GDP_N is mixed. Some countries exhibit a zero relationship and some reveal a R^2 of up to 0.6 (Japan). This reflects the presence of many other factors that play a role in the shorter term.

2.10 Concluding remarks

Criticism of the above may be levelled in the form that it is not econometrically robust and that such as analysis is required. We agree, but the conclusions are unlikely to be different.

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3 Money creation: misconceptions: quantitative easing creates money

AP Faure[25]

3.1 Abstract

There is a profound misconception amongst certain commentators on money and banking: that quantitative easing creates new money. The misconception is either: (1) that new money is injected into the economy; (2) newly created excess reserves can be used by the banks to make new loans. Neither of these is correct. Quantitative easing, that is, the purchase of securities by the central bank from the banks (usually), may lead to money creation (that is the objective of the policy), but it does create money when the purchases are made. The purchases create excess reserves for the banks, and these reserves cannot be loaned by the banks. The only way that the excess reserves can be employed by banks is by making new loans (underlying which lies the objective of the policy: economic activity), which creates new deposits (money), which carries a reserve requirement, thus shifting the dividing line between excess and required reserves in favour of the latter. This process is helped along by the immediate outcome of excess reserve creation: the lowering of interest rates to a level approximating the cost of banking.

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3.2 Introduction

Quantitative easing (QE) has become almost a normal policy in certain countries at the end of and following the recession of 2007–08. QE amounts to the purchase by the central bank of securities, usually government securities (usually bonds), but sometimes other riskier securities, with the purpose of creating excess reserves for the banks, and encouraging them to lower interest rates across the yield curve.

The purpose of a lower-level yield curve is to encourage business units and consumers to borrow from banks and the other financial intuitions (retirement funds, insurers, unit trusts, etc). Underlying bank and other-source borrowing is consumption (C) and / or investment (I) spending. As is well known, changes (Δ) in C + I = changes in gross domestic expenditure (GDE). It is also well known that ΔGDE + ΔTAB (the trade account balance) = ΔGDP. Usually this policy is accompanied by additional government expenditure, financed by the further issue of government securities (at lower rates under a QE policy).

The purpose of this article to not to discuss the de/merits of the policy, but to point out the "technical" aspects of the policy – in order to enhance comprehension of the significant economic issue of money creation.[26] It is ordered as follows:

- Introduction.
- Literature review: media.
- Literature review: academia and central banks.
- Does quantitative easing create money?
- Quantitative easing creates excess reserves.
- Can excess reserves be loaned out by banks?
- Concluding remarks: the money multiplier is dead.

3.3 Literature review: media

QE began in the US in 2008, and from there spread to other countries, including the UK and Japan, and the policy has been extended in many cases. The popular media, almost without exception, displays misinterpretation of the QE policy. Some examples follow (italics are the author's).

The New York Times (2012):

> "…central banks turn to what economists call 'quantitative easing'…methods of *pumping money into an economy* and working to lower the long-term interest rates…. The most usual approach is large-scale purchases of debt. The effect is the same as *printing money in vast quantities*, but without ever turning on the printing presses. The Fed buys government or other bonds and writes down that it has done so – what is called 'expanding the balance sheet.' The bank then *makes that money available for banks to borrow, thereby expanding the amount of money sloshing around the economy* thereby, it hopes, reducing long-term interest rates."

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BBC (2013):

> "Usually, central banks try to raise the amount of lending and activity in the economy indirectly, by cutting interest rates. Lower interest rates encourage people to spend, not save. But when interest rates can go no lower, a central bank's only option is to *pump money into the economy directly*. That is quantitative easing (QE). The way the central bank does this is by buying assets – usually government bonds – using money it has simply created out of thin air. The institutions selling those bonds (either commercial banks or other financial businesses such as insurance companies) will then have 'new' money in their accounts, which then boosts the money supply."

Financial Times (2013):

> "When interest rates are close to zero there is another way of affecting the price of money: Quantitative Easing (QE). The aim is still to bring down interest rates faced by companies and households and the most important step in QE is that the *central bank creates new money for use in an economy*. Only a central bank can do this because its money is accepted as payment by everybody. Sometimes dubbed incorrectly "printing money" a central bank simply *creates new money* at the stroke of a computer key, in effect increasing the credit in its own bank account. It can then use this new money to buy whatever assets it likes: government bonds, equities, houses, corporate bonds or other assets from banks."

US News (2013):

> "…quantitative easing, a process in which the government purchases assets from banks and private companies in order to *add a set amount of money into the economy*."

Wikipedia (2013):

> "Quantitative easing (QE) is an unconventional monetary policy used by central banks to stimulate the national economy when standard monetary policy has become ineffective. A central bank implements quantitative easing by buying financial assets from commercial banks and other private institutions, thus *creating money and injecting a pre-determined quantity of money into the economy*."

Independent.ie (2013):

> "Massive quantitative easing by central banks around the world *has created huge amounts of new money in the economy.* Much of that cash is being pushed into equity markets, helping push up valuations despite doubts about the underlying health of the global economy."

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3.4 Literature review: academia and central banks

On the other hand, academics and central banks (which implement QE policy) obviously comprehend the policy, its channels of transmission, its possible outcomes, its shortcomings, etc. As said earlier, this article focuses on the technical aspects of QE. As such, the following extracts from academic and central bank articles are selected for their expositions on the first effect of QE: on bank reserves (which we discuss in detail later) (italics are the author's).

Federal Reserve Board of Governors (Bernanke, BS, 2009):

> "Our approach – which could be described as 'credit easing'- resembles quantitative easing in one respect: It involves an expansion of the central bank's balance sheet. However, in a pure QE regime, the focus of policy is the *quantity of bank reserves*, which are liabilities of the central bank; the composition of loans and securities on the asset side of the central bank's balance sheet is incidental."

Bank of England (Benford et al., 2009):

> "…the Monetary Policy Committee (MPC) decided to reduce Bank Rate to 0.5% and to undertake what is sometimes called 'quantitative easing'. This meant that it began purchasing public and private sector assets using *central bank money*."

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Bank of Japan (Shiratsuka, 2010):

> "The BOJ provided ample *excess reserves* by using various tools for money market operations, including an increase in the outright purchase of long-term government bonds."

Bank of England (Joyce et al., 2010):

> "…the Committee also announced that…it would ease monetary conditions further through a programme of asset purchases funded by the issuance of *central bank reserves*."

Blinder, AS (2010):

> "The most obvious approach is to buy one of the risky and/or less-liquid assets, paying either by (i)…or (ii) creating *new base money*, which would increase the size of its balance sheet."

Krishnamurthy and Vissing-Jorgensen (2011):

> "The QE strategy involves purchasing long-term securities and paying by increasing *reserve balances*."

3.5 Does quantitative easing create money?

It will have been noted above that the media made to reference to the QE policy leading to the creation of money ("pumping money into", "printing money", "injecting money into"). The central banks and academics made no reference to money; only to bank reserves.

The money stock (M) is comprised of notes and coins (N&C) and bank deposits (BD) held by the domestic non-bank private sector (NBPS):

M = N&C + BD (held by NBPS).

The stock of M, as well as the balance sheet sources of changes (BSSoC) in M, is calculated by central banks, usually monthly, by consolidating the collective balance sheets of the private sector banks with that of the central bank (CB). It is called the consolidated balance sheet of the monetary banking sector (MBS). A simple example is presented in Balance Sheets 1–3. Note that in a consolidation interbank claims [required reserves (RR), excess reserves (ER), borrowed reserves (BR) from the CB, and N&C] are netted out.

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What is the stock of money in this example? Assuming we are focused on the money stock measure M3 (total private sector deposits), it is (LCC[27] 4 600 billion):

M3 = N&C + BD
= A + B2
= 600 + 4 000
= 4 600.

BALANCE SHEET 1: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Foreign assets (FA)	300		
Loans to government (LG)[28]	900		
Loans to private sector (LPS)[29]	2 000		
Central bank money (CBM):		Deposits: Private sector	4 000
Notes & coins (N&C)	600	Loans from central bank (BR)	200
Reserves (Total reserves - TR)	400		
(ER = 0)			
(RR = 400)			
Total	4 200	Total	4 200

BALANCE SHEET 2: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Notes & coins (N&C)	1 200
		Deposits:	
Foreign assets (FA)	1 600	Government sector	800
Loans to government (LG)[30]	1 000	Banks (TR)	400
Loans to banks (BR)	200	(ER = 0)	
		(RR = 400)	
		Loans: Foreign sector	400
Total	2 800	Total	2 800

BALANCE SHEET 3: CONSOLIDATED BALANCE SHEET OF MBS (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes & coin	600
D. Foreign assets (FA)	1 900	B. Deposits:	
E. Loans to government (LG)	1 900	1. Government	800
F. Loans to private sector (LPS)	2 000	2. Private sector	4 000
		C. Loans: foreign sector	400
Total	5 800	Total	5 800

The BSSoC (= M3) are:

= D + E + F – (B1 + C).

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If the related items (D and C; E and B1) are grouped, we get (LCC billion):

M3	= A + B2	= 4 600 (600 + 4 000)
	= (D – C)	= 1 500 (1 900 – 400)
	+ (E – B1)	= 1 100 (1 900 – 800)
	+ F	= 2 000
	TOTAL	= 4 600

Thus, the counterparts of the M3 money stock on a particular date are:

Net foreign assets (NFA)	(D – C)
Net loans to government (NLG)	(E – B1)
Loans to private sector (LPS)	(F).

It also tells us that from a date to another date (in practice month-end to month-end) the BSSoC of changes (Δ) in M3 can be calculated as follows:

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

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When a QE policy is adopted and implemented, the central bank purchases securities (usually government bonds, but corporate bonds as well at times). Government bonds are loans to government which are marketable, and are therefore part of LG in Balance Sheets 1–3, and of course part of NLG in the monetary analysis presented above. Corporate bonds held by the private sector banks are marketable loans to the corporate sector and are therefore part of LPS in Balance Sheets 2 and 3. Thus, it will be clear that when a central bank buys bonds from the banks they will simply shift from the banks' balance sheet to the central bank's balance sheet. The counterbalancing balance sheets items (bank reserves) will be elucidated in the following section.

The conclusion is thus that when QE is implemented and the bonds are forthcoming from the banks, there is no change in the stock of money. In practice this is overwhelmingly the case. However, to the extent that bonds are forthcoming from non-bank financial intermediaries (such as retirement funds, insurers, unit trusts, etc), the money stock will increase, as indicated in Balance Sheets 4–6 (we assume retirement funds sell government bonds to the central bank to the extent of LCC 100 billion) (we ignore the effect on bank reserves here in the interests of simplicity, but introduce it later).

BALANCE SHEET 4: RETIREMENT FUNDS (LCC BILLIONS)			
Assets		Liabilities	
Bonds Deposits at banks	-100 +100		
Total	0	Total	0

BALANCE SHEET 5: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Reserves at CB (TR)	+100	Deposits of retirement funds	+100
Total	+100	Total	+100

BALANCE SHEET 6: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG)	+100	Bank reserves (TR)	+100
Total	**+100**	Total	**2 800**

In terms of the analysis presented above:

$$\Delta M = +\text{LCC 100 billion}$$

$$BSSoc = \Delta NLG = +\text{LCC 100 billion.}$$

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It must be quickly added that the non-bank financial intermediaries are not be keen to dispose of bonds under a QE policy, because they will be aware that the prices of bonds will rise and the yield curve will move down, bringing with it large capital profits. They will be exchanging high yielding bonds for bank deposits (with almost zero rate of interest).

The QE policy not is designed for this outcome, but for the effect on bank reserves, to which we now turn.

3.6 Quantitative easing creates excess reserves

It is assumed that the banks are not indebted to the central bank (which they are not under a QE policy), and that they are complying with the reserve requirement. The purchase of LCC 100 billion bonds by the central bank will lead to the creation of additional excess reserves to the extent of LCC 100 billion, as indicated in Balance Sheets 7–8.

BALANCE SHEET 7: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Bonds (LG) Reserves at CB (TR) (ER = +100) (RR = 0)	-100 +100		
Total	0	Total	0

BALANCE SHEET 8: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Bonds (LG)	+100	Bank reserves (TR) (ER = +100) (RR = 0)	+100
Total	+100	Total	+100

It is sometimes mistakenly believed that banks, now having abundant ER, are in a position to lend these funds to borrowers. This is not so.

3.7 Can excess reserves be loaned out by banks?

A QE policy is designed to create ER for the banks, and to drive interest rates down to the lowest level possible [which essentially means that deposit rates will be close to zero and bank lending rates (prime rate is the benchmark rate) will be equal to the cost of banking plus a profit margin]. The central bank's policy or key interest rate (KIR) becomes irrelevant, and the west-end of the yield curve will drag down the east-end, that is, long term interest rates will also fall (assisted by the bond purchase programme). In essence the policy is designed to encourage borrowers to borrow from the banks (which creates new money) and the non-bank financial intermediaries, which will prompt, in time, equity funding, and therefore higher aggregate demand and supply (economic output).

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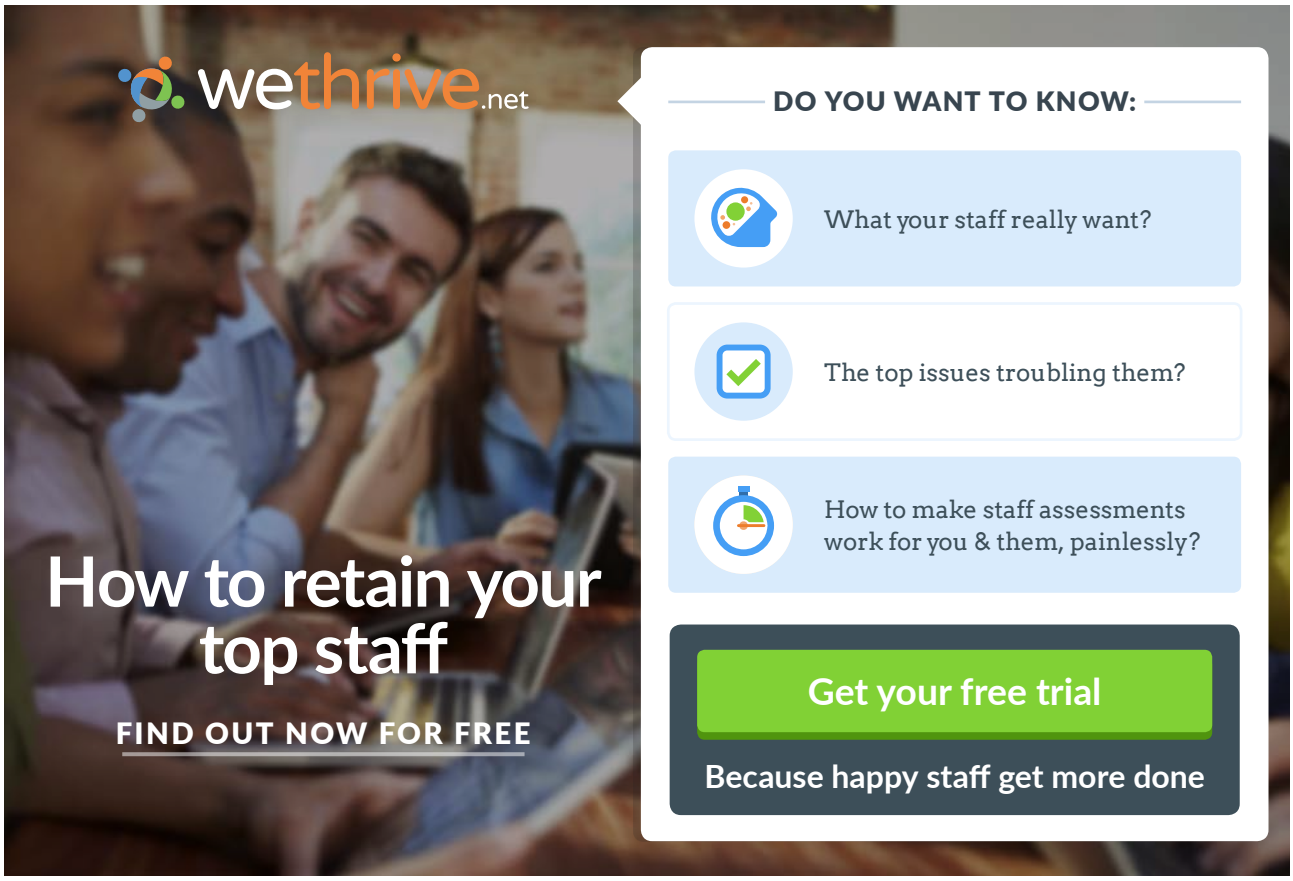
There is another related misconception: that the banks are able to make loans with the newly created ER. This is not so, because no bank is able to create or destroy central bank money (CBM, that is, bank reserves[31]). This can only be achieved through bank lending, which creates new deposits (money), which on which the RR is based.

The process is illustrated in Balance Sheets 9–12. Assuming the central bank creates an ER condition in the banking sector of LCC 100 billion by buying bonds (Balance Sheets 9–10) the banks can only reduce their ER by making loans to the extent of LCC 1 000 billion (assuming the RR[32] = 10% of deposits), that is ER × 1 / 0.1 (Balance Sheets 11–12).

BALANCE SHEET 9: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Bonds (LG) Reserves at CB (TR) (ER = +100) (RR = 0)	-100 +100		
Total	0	Total	0



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BALANCE SHEET 10: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Bonds (LG)	+100	Bank reserves (TR) (ER = +100) (RR = 0)	+100
Total	+100	Total	+100

BALANCE SHEET 11: BANKS (LCC BILLIONS)			
Assets		Liabilities	
LPS (or LG assuming funds spent) Bonds (LG) Reserves at CB (TR) (ER = -100) (RR = +100)	+1 000 -100 +100	Deposits of the PS (money)	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 12: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Bonds (LG)	+100	Bank reserves (TR) (ER = -100) (RR = +100)	+100
Total	+100	Total	100

Note the shift in the dividing line between RR and ER in favour of the former. The net situation is shown in Balance Sheets 13–14.

BALANCE SHEET 13: BANKS (LCC BILLIONS)			
Assets		Liabilities	
LPS (or LG assuming funds spent) Bonds (LG) Reserves at CB (TR) (ER = 0) (RR = +100)	+1 000 -100 +100	Deposits of the PS (money)	+1 000
Total	+1 000	Total	+1 000

BALANCE SHEET 14: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Bonds (LG)	+100	Bank reserves (TR) (ER = 0) (RR = +100)	+100
Total	+100	Total	+100

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It will be evident that a demand for bank loans must exist for this situation to come about – and this is a function of a robust economic environment (amongst myriad other factors), the most element of which is interest rates, specifically, in a QE policy environment, low interest rates. However, such an environment is not a panacea for growth, as it amounts, to use the common idiom, to "pushing on a string", referred to as a liquidity trap by Keynes. It takes the restoring of household and corporate (and sometimes government) balance sheets to climb out of a recession.

3.8 Concluding remarks: the money multiplier is dead

Lest the impression was left that the money multiplier (m = 1 / RR ratio) is not dead, the reader must be reminded that m is a theoretical monetary *model* that was flirted with and abandoned decades ago against the background of profoundly volatile interest rates. A price and a quantity cannot be controlled at the same time.

Monetary policy worldwide amounts to control of the banks' prime rate (PR) (and other lending rates which are usually benchmarked on PR) which is achieved by the creation (in normal, non-QE-policy times) of a liquidity shortage (LSh) in order to make the KIR effective. An effective KIR affords the central bank control over PR and, therefore, the demand for bank loans (as discretion is exercised it is not an exact science). The reserves required by banks, as they make loans and create deposits, are accommodated by the central bank, as part of its control over the LSh. It should be evident that the RR is only one of many factors which influence bank liquidity.

It will be evident that the opposite of an LSh is a liquidity surplus (LSu), a condition created under a QE policy. As noted earlier, under an LSu condition the KIR becomes irrelevant, and interest rates fall to the lowest level possible.

The main instrument of monetary policy, control over interest rates, is founded on the fact that the general public regards certain bank liabilities, N&C and BD, as the means of payments (money). It is the only functional tool a central bank has to control money creation, which is the outcome of new bank loans. The other main tool, open market operations, supports the interest rate tool.

It is time the undergraduate textbooks caught up with reality. They have misled undergraduate (which persists in many cases to graduate and post-graduate) students for too long on this critical economic issue.

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4 Money creation: death of the money multiplier

AP Faure[33]

4.1 Abstract

It persists in part of the literature that there are two monetary policy models: the monetary base-focused model (aka the money multiplier model / strict money-rule model) and the interest rate-focused model. The former only exists in theory because its implementation (for brief periods in a few countries) had severe consequences in terms of interest rate volatility (a major input in business decision-making). The interest rate-focused model relies on interest rates, which are under the control of the central bank, being the restraining factor in the demand for bank loans which, when satisfied by the banks, leads to simultaneous deposit (money) creation. It is still alleged by some that the two models differ in terms of how money is created. This is not so, as money creation is the outcome of net new bank lending in both (only endogenous money creation exists). The difference between the two models is that the one is applied while the other is not. It is time to say goodbye to the money multiplier.

With a few exceptions, undergraduate textbooks persist in presenting the money multiplier as the kernel of monetary theory and policy. In a nutshell, the money multiplier is the reciprocal of the reserve requirement (RR[34]) ratio (*r*), and *r* is the statutorily-set proportion of deposits banks are required to hold with the central bank as deposits.

Bank deposits (BD) held by the private sector (households and companies) are money, the definition of which is "anything" that is "generally accepted as a means of payments." Today, in most countries the vast majority of payments are made by electronic funds transfers (EFTs), when someone's deposit account is debited (reduced) and someone else's is credited (added-to). Similarly, a payment by cheque will result in the cheque writer's deposit account being debited, and the cheque receiver's account being credited.

The other component of the money stock is the quantity of notes and coins (N&C) issued by the central bank (in most cases) held by the domestic non-bank private sector (NBPS). Thus, the broadly-defined money stock (M3) is made up as follows:

M3 = BD + N&C (held by the NBPS).

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To concretise this, we present simplified balance sheets (excluding capital and reserves and other assets and liabilities) of the private banking sector and the central bank (see Balance Sheets 1 – 2). The banks' collective balance sheet, asset side, is made up of foreign assets (generally known as *foreign reserves*), loans to the government and the private sectors (which are the largest part), and central bank money (CBM) which is made up of bank holdings of N&C and bank reserves (called total reserves, TR). The latter is significant: it is made up of excess reserves (ER) and required reserves (RR), which reflects the RR ratio (*r)* applied to the private sector deposits of the banks (liability side of the balance sheet).

The ER amount is assumed to be zero, which fits with reality (in normal circumstances, when quantitative easing is not an appropriate policy). Banks do not wish to hold ER as no interest is paid on TR (in most countries), but they have no choice in the matter. The central bank has absolute control over CBM and BR. We also assume the banks are not borrowing from the central bank (BR = 0; this assumption is relaxed later).

Balance Sheet 1 shows that the deposit liabilities of the banks is LCC[35] 5 000 billion. Assuming an *r* of 10% of deposits, the banks are required (RR) to hold LCC 500 billion on deposit with the central bank. This is the case, and there are no ER.

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BALANCE SHEET 1: BANKS (LCCBILLIONS)			
Assets		Liabilities	
Foreign assets (FA)	900		
Loans to government (LG)[35]	1 000		
Loans to private sector (LPS)[36]	2 000		
Central bank money (CBM):		Deposits: Private sector	5 000
Notes & coins (N&C)	600	Loans from central bank (BR)	0
Reserves (TR)	500		
(ER = 0)			
(RR = 500)			
Total	**5 000**	Total	**5 000**

BALANCE SHEET 2 : CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Notes & coins (N&C)	2 000
		Deposits:	
Foreign assets (FA)	1 800	Government sector	1 000
Loans to government (LG)[38]	2 100	Banks (TR)	500
Loans to banks (BR)	0	(ER = 0)	
		(RR = 500)	
		Loans: Foreign sector	400
Total	**3 900**	Total	**3 900**

The assets of the central bank are: foreign assets, loans to government, and loans to banks (borrowed reserves, BR, assumed to be zero), and its liabilities are: N&C (the total amount issued), government deposits (we assume government only banks with it), loans from the foreign sector and the banking sector's reserves (TR = RR).

What is the amount of the M3 money stock? It is BD + N&C (held by the NBPS):

M3 = BD + (N&C of central bank – N&C held by the banks)
= LCC 5 000 billion + (LCC 2 000 billion – LCC 600 billion)
= LCC 6 400 billion.

What is the money multiplier? As may be seen, the banks comply 100% with the RR: 10% of deposits. Clearly, there is a strict relationship between bank deposits and the RR amount, and because the central bank has a monopoly on CBM, it is able to control the amount of deposit creation. Thus, a money multiplier (m) is in place and is:

$$m = 1 / r$$
$$= 1 / 0.1$$
$$= 10.$$

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Thus, if the banks have reserves of LCC 500 billion, then M3 can be a maximum of 10 times this quantity, that is, LCC 5 000 billion. With M3 at this level the banks are "fully lent", that is, they are not able to make new loans, which create new deposits, unless the central bank steps in and creates ER.

Let us now assume that the central bank decides to increase the money "supply" by LCC 100 billion. It knows that m = 10, and will thus undertake open market purchases of government bonds (LG in marketable form) to the extent of LCC 10 billion. We assume the banks sell the bonds to the central bank. The balance sheet *changes* are shown in Balance Sheets 3–4.

BALANCE SHEET 3: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (bonds = LG) Reserves (TR) (ER = +10) (RR = 0)	-10 +10		
Total	0	Total	0

BALANCE SHEET 4: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (bonds = LG)	+10	Deposits: Banks (TR) (ER = +10) (RR = 0)	+10
Total	+10	Total	+10

The banks have ER of LCC 10 billion. It should be clear that, because m = 10, the banks are able to make new loans, which creates new deposits, up to the point where the ER are absorbed into RR. It should also be evident that the banks are not able to lend out the ER created by the central bank, that is, they cannot intervene in the balance sheet of the central bank (what would the other accounting entry be?).

Neither the central bank nor the banks themselves are able to ensure new lending will take place. The new monetary policy of creating ER translates into the banks, now having a non-earning asset, ER, being encouraged to drop their lending rates to encourage further borrowing. However, new borrowing is dependent on the demand for bank loans, and this is a function of the banks' lending rate (prime rate – PR – is the benchmark rate), and many other factors. This is a significant principle.

Another significant principle innate in the above is the obvious one: a central bank cannot control a quantity (reserves and therefore bank loan / money growth) and the pricing of bank loans simultaneously. In the above example it is hoping for a quantity effect, but interest rates are unfettered.

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On the assumption that a demand for bank loans exists at the lower level of PR, the balance sheet changes will be as indicated in Balance Sheets 5–6. It will be seen that there is a change in the dividing line between RR and ER, leaving TR unchanged.

BALANCE SHEET 5: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to private sector Reserves (TR) (ER = -10) (RR = +10)	+100 0	Deposits: Private sector (M3)	+100
Total	+100	Total	+100

BALANCE SHEET 6: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Deposits: Banks (TR) (ER = -10) (RR = +10)	0
Total	0	Total	0

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The net changes in the balance sheets are indicated in Balance Sheets 7–8. The banking system is now "fully lent". Any further demand for bank loans will cause an increase in interest rates, encouraging the repayment of previous loans to enable others to borrow. Net new lending is not possible in this model (assuming an unrealistic policy). Higher interest rates of course change the internal rate of return (IRR) of new projects, choking off some.

BALANCE SHEET 7: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG = bonds) Loans to private sector (LPS Reserves (TR) (ER = 0) (RR = +10)	-10 +100 +10	Deposits: Private sector (M3)	+100
Total	+100	Total	+100

BALANCE SHEET 8: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG = bonds)	+10	Deposits: Banks (TR) (ER = 0) (RR = +10)	+10
Total	+10	Total	+10

Note that in the above we have ignored the fact that N&C held by the banks are eligible as reserves, that is, that the *monetary base* (MB = TR) is comprised of reserves with the central bank, excluding N&C. This was done in the interests of keeping the argument simple (and in fact exists in practice[39]).

The above exposition reflects the Monetarist view: the money "supply" is seen as a multiple of the MB, and that the MB is determined by the central bank. The MB is the driving quantity and not a derived quantity. As seen above, such a monetary model can exist, and it certainly did exist in the past, but only for brief periods. It was abandoned because a quantity and its price cannot be controlled at the same time. Under the Monetarist model, where quantities are controlled, interest rates are extremely volatile, with severe consequences for business decision-making. Businesses thrive under conditions of relative certainty in the prices of their inputs.

In a monetary system where bank liabilities are the principal means of payments / medium of exchange, that is, a system where banks are able to create them (depending on demand), there can be no market-determined price / rate. In such a system (as in a confined ecological system) an arbiter is required, and history has created the central bank to perform this function. The central bank's primary function is to set the rate of interest on bank loans, because new bank loans are the principal source of new bank deposits (money creation). Thus, the Monetarist approach is deeply flawed, and has become a theoretical model.

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The Post-Keynesians offered the antithesis of Monetarism: that bank lending creates deposits. However, they were perhaps unfair in their criticism. Monetarism in the form of the strict money rule (control the monetary base and money creation is controlled), does not mean that money is created in any other way but by bank lending (in the main). It is a monetary policy model, not a method of money creation. Money can only be created by new net bank lending.

Thus, there are two monetary policy models:

- Monetary base-focused monetary policy.
- Interest rate-focused monetary policy.

The former, as discussed, is a theoretical model. The vast majority of countries adopted the latter approach many decades ago. In a nutshell it amounts to control of the banks' prime lending rate (PR) (and other lending rates which are usually benchmarked on PR) which is achieved by the creation (in normal, non-QE-policy times) of a liquidity shortage (LSh) (= borrowed reserves – BR) in order to make the central bank's policy or key interest rate (KIR effective).

An effective KIR affords the central bank control over PR and, therefore, the demand for bank loans (as discretion is exercised it is not an exact science). The reserves required by banks, as they make loans and create deposits, are accommodated by the central bank, as part of its control over the LSh (BR). (It should be evident that the RR is only one of many factors which influence bank liquidity.) An example of central bank accommodation (in the form of on-demand loans – BR – from the central bank, which is the case in the practice) is presented in Balance Sheets 9–10 (banks make loans of LCC 1 000 billion, which creates LCC 1 000 billion of new deposits; the RR ratio is 10% of deposits):

BALANCE SHEET 9: BANKS (LCC BILLIONS)			
Assets		Liabilities	
LPS (or LG assuming funds spent) Reserves at CB (TR) (ER = 0) (RR = +100)	+1 000 +100	Deposits of the PS (money) Loans from CB (BR) @ KIR	+1 000 +100
Total	+1 100	Total	+1 100

BALANCE SHEET 10: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to banks (BR) @ KIR	+100	Bank reserves (TR) (ER = 0) (RR = +100)	+100
Total	+100	Total	+100

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As said earlier, the main instrument of monetary policy, control over interest rates, is founded on the fact that the general public regards certain bank liabilities, N&C and BD, as the means of payments (money). It is the only functional tool a central bank has to control money creation, which is the outcome of new bank loans. The other main tool, open market operations, supports the interest rate tool.

It will be evident that the opposite of an LSh is a liquidity surplus (LSu), a condition created under a QE policy. Under an LSu condition the KIR becomes irrelevant, and interest rates fall to the lowest level possible.

The money multiplier is a pleasant academic model. As said above, in a monetary system where bank liabilities are the principal means of payments, that is, a system where banks are able to create them by making loans (depending on demand), there can be no market-determined price / rate. If interest rates were unfettered the continued existence of many banks, being keen competitors, will be compromised, as happened in the age of the goldsmith-bankers. The consequences for depositors will be profound. Banks are inherently unstable in such an environment.

In such a system an arbiter is required, and the central bank performs this function. Its primary function is to set the rate of interest on bank loans, because new bank loans are the principal source of new bank deposits (money creation). This is done via its KIR, which is made effective by the creation of a permanent liquidity shortage (the existence of BR).

There is no other way for the system to be "controlled". The monetary base (reserves) is the outcome of bank lending / deposit creation, not the driver. It is time to say goodbye to the money multiplier. And, it is time the undergraduate textbooks caught up with reality. They have misled undergraduate (which persists in many cases to graduate and post-graduate) students for too long on this critical economic issue.

4.2 References

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5 Money creation: reflections of an ex-central banker on exogenous / endogenous money

AP Faure[40]

5.1 Abstract

Exogenous money creation does not exist, but did under a past specie-money system. Central bank control of bank reserves and therefore control of bank deposit (money) creation via the money multiplier can exist, but this has nothing to do with the *process* of money creation. Rather, it is a style or model of monetary management, a style no longer in fashion because of its severe interest rate consequences. New bank deposits (money), also under a reserves-multiplier model, can only be created endogenously – beginning with the existence of a demand for bank loans which, when satisfied by the banks, leads to the simultaneous creation of bank deposits.

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It is heartening that the "home" of the Monetarist School model of money creation (based on the multiplier), the US, is showing distinct signs of recognition of the source of money creation being as described here. Bank reserve quantity changes are an outcome of deposit quantity changes (money creation) and not the driver thereof. Reserve requirement changes are just one of many sources of changes in bank liquidity, which are happily accommodated by the central bank at the policy/key interest rate, to make it effective.

5.2 Introduction

As a new entrant to academia, and with the privilege of central banking[41] and private sector banking[42] experience, I have an urge to present a number of reflections on money creation. Specifically, I wish address the exogenous / endogenous money debate and related issues such as the role of the monetary base, central bank accommodation policy, the balance sheet and actual sources of money growth (or decline), and the direct link between money growth and economic growth.

Why are these issues worth addressing? It is because there has been much debate, some of it sharp [for example, Moore's (1983) dismissal of *Monetary trends in the United States and the United Kingdom*… (Friedman and Schwartz, 1982) with "…the book must be regarded as a noble failure"], there are possibly some misinterpretations of fundamental issues, and because consensus eludes the debate. Most of all, I wish to contribute to settlement of the debate, as it has significant implications for monetary policy.

At the risk of frustrating some academics, but with the interests of students in mind (is this not why we are in academia?), the reflections are presented in pedagogic form.

One simple assumption is made, to enable the reader to focus on the pertinent issues at stake: that bank notes and coins (N&C) are issued by the central bank and that they do not rank as reserves for the banks. This case is not without precedent[43], and makes the analysis a little easier without detracting from the principles.

A literature review is not presented upfront. Instead, the literature is covered as the various issues are presented and discussed. This article has the following sections:

- The banking system and money.
- A monetary analysis.
- A touch of history.
- The reserve requirement and money multiplier.
- A bank liquidity analysis.
- Accommodationism.
- Endogenous money creation.
- Interbank markets and central bank accommodation.

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- Interest rate-focused monetary policy.
- Money multiplier-focused monetary policy.
- Interest rate consequences of a money multiplier-focused monetary policy.
- Quantitative easing.
- Accommodationism and structuralism revisited.
- The "exogenous money" puzzle.
- Recent research from the home of the Monetarist School.
- Further questions.
- References.

5.3 The banking system and money

As an introduction to the following sections it is necessary to briefly describe the banking system. Figure 1 presents the context: the financial system, comprised of the four sectors of borrowers and lenders and the groups of financial intermediaries. The ultimate borrowers issue debt securities (marketable such as Treasury bills and bonds; and non-marketable, such as ordinary bank loans[44]) and share (aka equity or stock) securities. Financial intermediaries buy these and issue their own to finance them.

The banks and the central bank buy debt securities in the main and, to finance them, issue deposit securities [marketable, called negotiable certificates of deposit (NCDs), and non-marketable, called non-negotiable certificates of deposit (NNCDs)]. The investment vehicles buy debt, share and deposit securities and, to finance them, issue unit-based securities, such as unit trusts and participation interests, which are largely non-marketable (except to the issuer in some cases).

The ultimate lenders buy the debt and share securities of the ultimate borrowers, as well as the deposit securities issued by the banks and the unit-based securities of the investment vehicles.

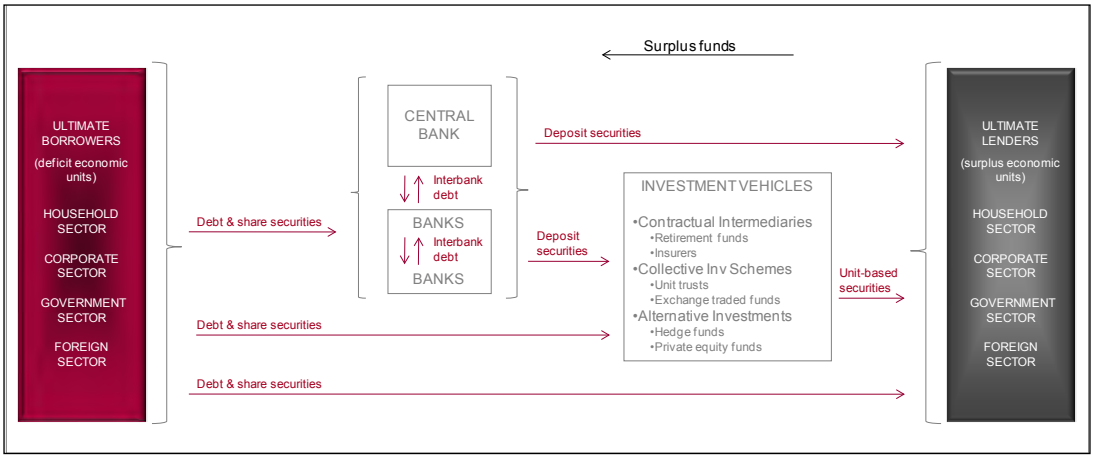

Figure 1: simplified financial system

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The banking system is comprised of the central banks and the private sector banks. Note that we said above that financial intermediaries buy securities and issue their own to finance them. This is not strictly correct. The banks are unique in this respect because they are able also to *create new debt and deposit securities simultaneously*, which is the subject of this paper. This rests on the fact that deposit liabilities of banks are "generally accepted as the medium of exchange / means of payments". This is the definition of money.

BOX 1: BANKS (LCC[45] BILLIONS)			
Assets		Liabilities	
Foreign assets (FA)	100		
Loans to government (LG)[46]	900		
Loans to private sector (LPS)[47]	2 000		
Central bank money (CBM):		Deposits: Private sector	4 000
Notes & coins (N&C)	600	Loans from central bank (BR)	0
Reserves (TR)	400		
(ER = 0)			
(RR = 400)			
Total	4 000	Total	4 000

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BOX 2: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Foreign assets (FA) Loans to government (LG)[48] Loans to banks (BR)	1 800 1 000 0	Notes & coins (N&C) Deposits: Government sector Banks (TR) (ER = 0) (RR = 400) Loans: Foreign sector	1 000 1 000 400 400
Total	2 800	Total	2 800

In Box 1 and Box 2 we present simplified balance sheets[49] of the private banking sector and the central bank. The banks' collective balance sheet, asset side, is made up of foreign assets (aka *foreign reserves*), loans to the government and the private sectors (which are the largest part), and central bank money (CBM) which is made up of bank holdings of N&C and bank reserves (called total reserves, TR). The latter is significant: it is made up of excess reserves (ER) and required reserves (RR), which reflects the statutory RR ratio (r) applied to the private sector deposits of the banks (liability side of the balance sheet).

The ER amount is assumed to be zero, which fits with reality (in normal circumstances, when quantitative easing is not an appropriate policy). Banks do not wish to hold ER as no interest is paid on TR (in most countries), but they have no choice in the matter. The central bank has absolute control over CBM and BR (as we will see). We also assume the banks are not borrowing from the central bank (BR = 0, an assumption which is relaxed later).

Box 1 shows that the deposit liabilities of the banks is LCC 4 000 billion. Assuming r = 10% of deposits, the banks are required (RR) to hold LCC 400 billion on deposit with the central bank. As shown, this is the case, and there is no ER.

The assets of the central bank are: foreign assets, loans to government, and loans to banks (BR, assumed to be zero); its liabilities are: N&C (the total amount issued), government deposits (we assume government only banks with it), loans from the foreign sector and the banking sector's reserves (TR = RR, because ER = 0).

How is the money stock calculated? In reality central banks, as the compilers of monetary statistics, consolidate the balance sheets of the banks with their own, in the process netting out interbank claims: N&C, TR and BR, ending with a consolidated balance sheet of the monetary banking institutions (MBIs), as indicated in Box 3.

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What is the amount of the money stock? Assuming we are focused on the money "supply" measure M3 (total private sector deposits), it is the sum of bank deposits (BD) and N&C (held by the private sector):

M3 = BD + N&C
= LCC 4 000 billion + LCC 400 billion
= LCC 4 400 billion.

BOX 3: CONSOLIDATED BALANCE SHEET OF MBIs (LCC BILLIONS)			
Assets		Liabilities	
		A. Notes & coin	400
D. Foreign assets (FA)	1 900	B. Deposits:	
E. Loans to government (LG)	1 900	1. Government	1 000
F. Loans to private sector (LPS)	2 000	2. Private sector	4 000
		C. Loans: foreign sector	400
Total	5 800	Total	5 800

5.4 A monetary analysis

Central banks compile a *monetary analysis* (MA) on a monthly basis from the consolidated balance sheet of the MBIs. Using the letters indicated in Box 3, this is executed as follows:

M3 = A + B2.

Because the balance sheet balances, M3 must be equal to:

= D + E + F – (B1 + C).

If the related balance sheet items (D and C; E and B1) are netted, we get (LCC billion):

M3 = A + B2 = 4 400 (4 000 + 400)

= (D – C) = 900 (1 900 – 1 000)
+ (E – B1) = 1 500 (1 900 – 400)
+ F = 2 000
TOTAL = 4 400

What does this tell us? It tells us that the "counterparts" of the M3 money stock are:

Net foreign assets (NFA) (D – C)
Net loans to government (NLG) (E – B1)
Loans to private sector (LPS) (F).

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It also tells us that from a date to a date (in practice month-end to month-end) the balance sheet sources of change (BSSoC) of changes (Δ) in M3 can be calculated as follows:

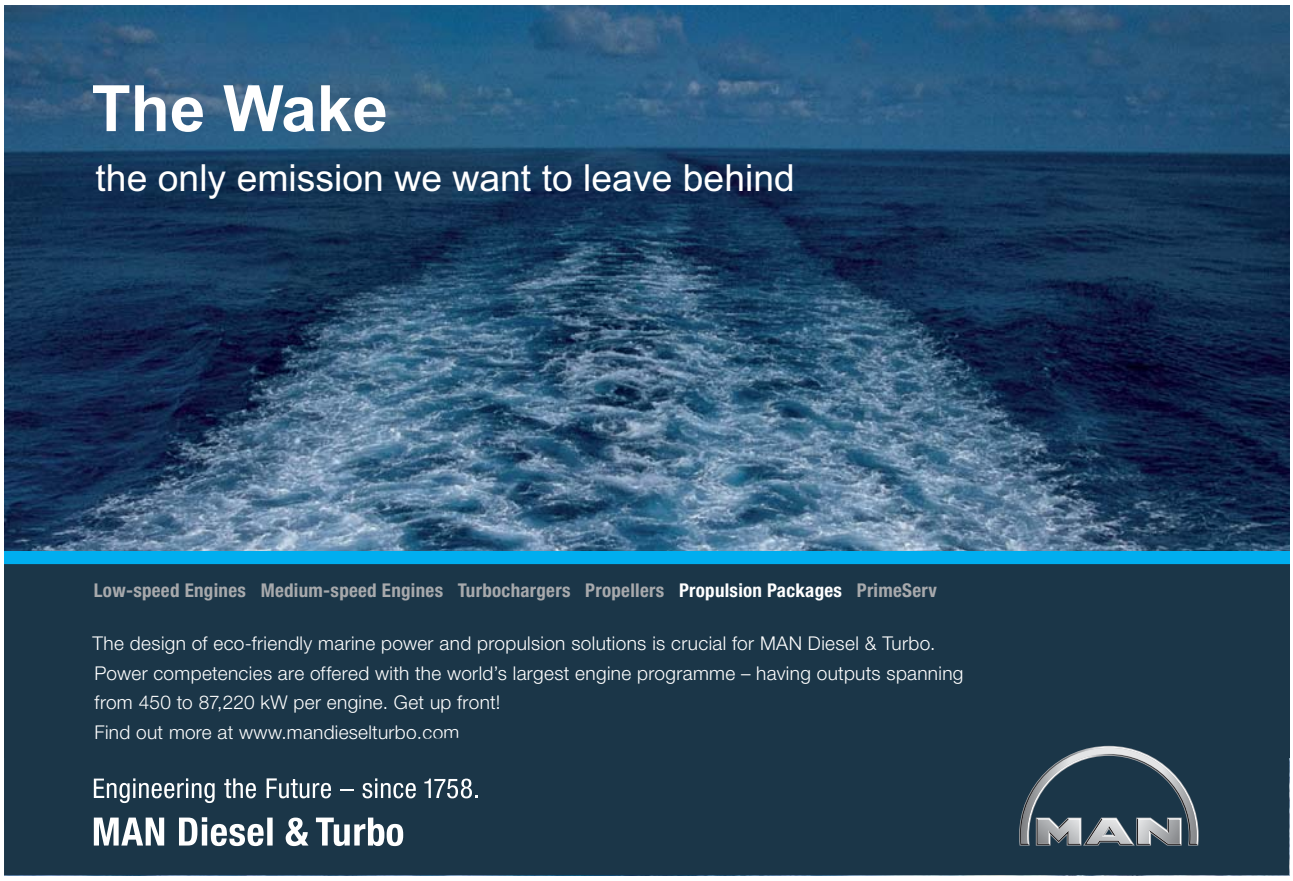
$$\Delta M3 = \Delta NFA + \Delta NLG + \Delta LPS.$$

We can go further: NLG and LPS represent loans (marketable and non-marketable) to the private and government sectors (netted in the latter case). We can sum them and call it *domestic loan extension* (DLE). Thus:

$$\Delta M3 = \Delta NFA + \Delta DLE.$$

What is the significance of this analysis[50]? It tells us that there are two BSSoC in M3: one foreign and one domestic, and the actual sources of change (ASoC) are real [Δ(C + I)] or financial (speculation or forex-reserves motivation) events. When banks or the central bank buy/sell foreign exchange (forex), new deposits (money) are created/destroyed. In essence they are "intervening" in the forex market and there is a quantity and a price outcome. However, there is no doubt about the path of causation:

ASoC (bank decision to buy/sell) → BSCoC (ΔNFA[51]) → ΔM3.



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In the case of DLE, the MA tells us little about the path of causation.[52] What is the path? The answer rests on the reality that bank deposits (note: we are ignoring N&C for a moment[53]) is the medium of exchange, that is, money. They are bank liabilities, and banks are able to create them by making new loans. This is referred to as "endogenous" (that is, "forming within"[54]) money creation. There is no other way. As we will discuss later, under a Monetarism School model, it is the same. The path of causation is:

ASoC (decisions[55] to borrow) → ΔDLE → ΔM3.

It is significant to point out that ΔDLE → ΔM3 is a *simultaneous* monetary event. It is also important to state that bank decisions to purchase *new* marketable loans (treasury bills, bonds, commercial paper) also lead to deposit creation. It will be clear that the decision to borrow rests with the borrower.

5.5 A touch of history

This is in sharp contrast with "exogenous" (that is, "outside produced"[14]) money creation), which was relevant in the days of specie money, such as gold and silver coins. The money stock could only increase by the discovery, extraction and coin production of additional gold and silver.

As is well known, in 17th century London wealthy merchants came to deposit their precious metal coins with goldsmiths, which had safekeeping facilities. This practice was recorded as early as 1633, but it was not widespread as 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…"[56] The goldsmiths' new venture as bankers was born, a significant historical event.

The goldsmith-bankers naturally issued receipts for the coin deposits: "As acknowledgement of the possession of such sums of money, the goldsmiths gave receipts, and at first these documents were special promises…"[17] Box 4 indicates the change in the balance sheet of a goldsmith-banker after the deposit of 100 one-pound gold coins[57] by Mr A, and Box 5 that of Mr A.

BOX 4: GOLDSMITH-BANKER (GBP)			
Assets		Liabilities	
Gold coins (100 x 1 pound)	+100	Receipts / notes	+100
Total	+100	Total	+100

BOX 5: MR A (GBP)			
Assets		Liabilities	
Gold coins (100 x 1 pound) Goldsmith-banker receipts / notes	-100 +100		
Total	0	Total	0

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It came to pass that the deposit receipt holders found it most convenient to use the receipts as a means of payment (money), and, because they were backed by gold, they were readily accepted as such. This practice became widespread and the receipts of the goldsmith-bankers, which hitherto had been issued in the name of the depositor, were issued to bearer.

The next step in the story is probably the most significant one in the history of money: it was "discovered" by the goldsmith-bankers that, instead of making new loans in gold coins (Box 6) (which they were able to do because gold coin depositors would not all withdraw their coins at the same time), they could simply issue new receipts / notes to the borrower (Mr B), as indicated in Box 7 and Box 8.

BOX 6: GOLDSMITH-BANKER (GBP)			
Assets		Liabilities	
Gold coins (10 x 1 pound) Loan to Mr B	-10 +10		
Total	0	Total	0

BOX 7: GOLDSMITH-BANKER (GBP)			
Assets		Liabilities	
Loan to Mr B	+10	Receipts / notes	+10
Total	+10	Total	+10

BOX 8: MR B (GBP)			
Assets		Liabilities	
Goldsmith-banker receipts / notes	+10	Loan from Goldsmith-banker	+10
Total	+10	Total	+10

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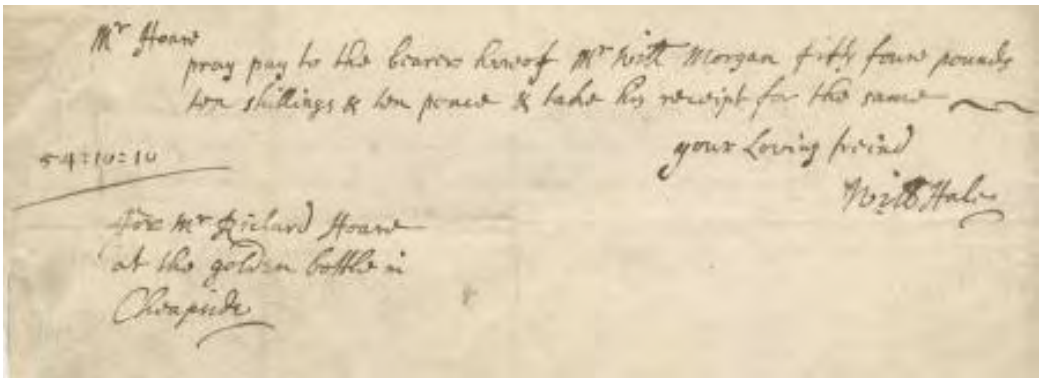
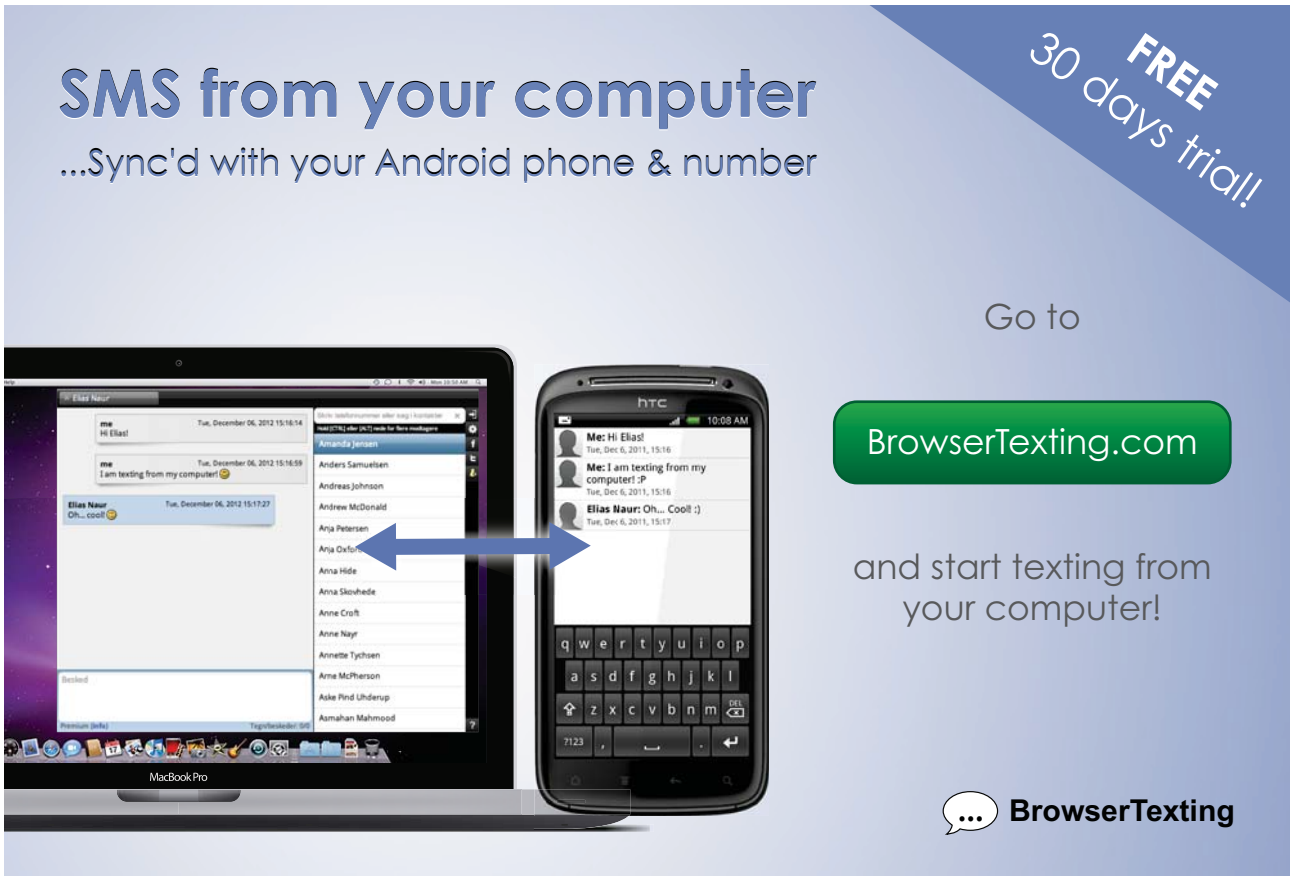
BOX 9: EXAMPLE OF AN EARLY CHEQUE: FRONT (1676)



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[58]

Source: C Hoare & Co, Fleet Street, London. Reproduced with the kind permission of the Curator of the in-house museum.



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Endogenous money creation was born, and persists today. Later the same century, when current deposit accounts (then called "running cashes") were created (essentially just another form of bank notes), a new loan was made by crediting the borrower's deposit account (substitute "Deposit" for "Receipts / notes" in Boxes 7–8). Payments were made by the newly-created instrument of transfer: the cheque (see Box 9 for a 1676 example). The overdraft facility on the current account followed, enabling a borrower to incur the bank debt when the funds were required for payments.

However, there was a brake on the system: the notes of the bankers were convertible into gold coins. 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 of bank notes and credits to current accounts (that is, create money) up to a point – determined by a "comfortable" reserve of 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.

5.6 The reserve requirement and money multiplier

What is the significance of the convertibility of the notes of the bankers into gold coins? It is that the "comfortable" reserve of gold determined by the bankers was a self-imposed *reserve requirement (RR)*. Once this limit was reached, the banks could not make further loans by issuing new notes or deposits (crediting deposit accounts or providing overdraft facilities leading to new loans and deposits).

Thus, endogenous deposit (or note) money creation, the *outcome* of new loans, ground to a halt when the limit of the "comfortable" reserve of gold was reached. After this point, money creation could only resume when new discoveries of gold were made (or plundering took place), and introduced into the system (*exogenous money*). An example is required, which then leads us to another critical issue: the money multiplier.

Assume the plundering of gold in some country by an English king, which is struck into 100 000 one-pound gold coins. The king spends the specie money on local goods and the coins are deposited by the recipients of the coins, as indicated in Boxes 10–12 (note the two steps in Box 11). An introduction of *exogenous money* has taken place.

BOX 10: KING / GOVERNMENT (GBP)			
Assets		Liabilities	
Gold coins (100 000 x 1 pound) Goods	-100 000 +100 000		
Total	0	Total	0

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BOX 11: PUBLIC (GBP)			
Assets		Liabilities	
Goods (1) Gold coins (100 000 x 1 pound) (1) Gold coins (100 000 x 1 pound) (2) Deposits (2)	-100 000 +100 000 -100 000 +100 000		
Total	0	Total	0

BOX 12: BANKS (GBP)			
Assets		Liabilities	
Gold coins (100 000 x 1 pound)	+100 000	Deposits by public	+100 000
Total	+100 000	Total	+100 000

If we also assume that the minimum RR (10% gold coins against deposits) had been reached, the banks, given the introduction of *exogenous* money (which rank as reserves), are now in a position to create new deposits (money) *endogenously* by making new loans. They obviously cannot do so without a demand for new bank loans. Assuming the demand for new bank loans is strong, the banks are able to make new loans, which create new deposits (money), up to the point where the new reserves [which are excess reserves (ER) to the self-imposed RR of 10% of deposits] become RR. This is reached when loans/deposits have expanded by 10 x the ER: GBP 100 000 × 10 = GBP 1 000 000.

This is the origin of the money multiplier (m), which is the reciprocal of the RR ratio, the r:

$$
\begin{aligned}
m &= 1 / r \\
&= 1 / 0.1 \\
&= 10.
\end{aligned}
$$

BOX 13: BANKS (GBP)			
Assets		Liabilities	
Loans Reserves (total reserves: TR) (RR = +100 000) (ER = -100 000)	+1 000 000 0	Deposits by public	+1 000 000
Total	+1 000 000	Total	+1 000 000

As shown in Box 13, loans increased by GBP 1 000 000, which created GBP 1 000 000 of deposits, and there was a shift in reserves from ER to RR, with no change in total reserves. At this point the banking system cannot expand further. Endogenous money creation took place.

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As is well known, the self-imposed *reserve requirement*, the "comfortable" reserve of gold determined by the bankers, was replaced in time by the statutory reserve requirement (RR): a proportion (r) of bank deposits to be held on deposit with the central bank. Most countries have such a requirement, but some do not (England, Canada, Australia, etc). Instead the banks in these countries have a voluntary RR. This is a significant issue, and the *ultimate proof that it is incorrect to assume that modern money creation is tied to the RR* (discussed further below).

5.7 A bank liquidity analysis

Before concretising the endogenous money creation concept (the following section), we need to introduce a *bank liquidity analysis* (BLA), which is compiled by central banks[59].

When one considers the concepts TR, ER, RR and borrowed reserves (BR), one is firmly in the domain of bank liquidity. Bank liquidity is at the very centre of monetary policy, and monetary policy is the domain of the central bank. We therefore consider the balance sheet of the central bank.

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BOX 14: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG)[60] F. Loans to banks (BR)	1 600 1 000 200	A. Notes & coins (N&C) B. Deposits: 1. Government sector 2. Banks (TR) a. (ER = 0) b. (RR = 600) C. Loans: Foreign sector	1 000 800 600 400
Total	2 800	Total	2 800

As shown in Box 14, the assets of the central bank are: foreign assets, loans to government, and loans to banks (that is, borrowed reserves, BR); and its liabilities are: N&C (the total amount issued), government deposits (we assume government only banks with it), loans from the foreign sector and the banking sector's total reserves (TR, which is made up of ER + RR).

The most significant items in terms of bank liquidity are TR (components: ER and RR) and BR. From these items, central banks construct a bank liquidity identity which can be called *net excess reserves* (NER; aka net free reserves in the US):

$$NER = ER - BR.$$

It will be evident that this concept covers the case where banks have excess reserves [ER, such as in quantitative easing (QE) policy situations], as well as when banks are obliged to borrow (BR) from the central bank at the key (or policy) interest rate (KIR), as is the case in normal conditions in many countries such as the UK, the EU countries, Canada, South Africa, Australia, etc.

Because the balance sheet balances we can create another identity as follows:

$$NER = ER - BR$$
$$= B2a - F \qquad = D + E + F - (A + B1 + B2b + C).$$

If we, as in the case of the monetary analysis, pair the related items, we get:

$$NER = B2a - F$$

= (D – C)	Net foreign assets (NFA)
+ (E – B1)	Net loans to government (NLG)
A	N&C
B2b	Required reserves (RR)

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Thus, the counterparts of NER are NFA + NLG – N&C – RR. Using the data in Box 14 we have the following identity (in LCC billion):

NER	= B2a – F	= (0 – 200)	= – 200
= NFA	= + D – C	= + (1 600 – 400)	= + 1 200
+ NLG	= + (E – B1)	= + (1 000 – 800)	= + 200
– N&C	= – A	= – 1 000	= – 1 000
– RR	= – B2b	= – 600	= – 600
TOTAL			= – 200

We also know that any change (Δ) in NER from one date to another will be "explained" as follows:

ΔNER = ΔNFA + ΔNLG – ΔN&C – ΔRR

These are the BSSoC in NER, that is, in bank liquidity. What is the significance of this analysis? The stock NER number tells us that (in this example) the NER of the banks is a negative LCC 200 billion. It is made up of ER (= 0), less the liquidity shortage (LSh) of LCC 200 billion. It can also be seen as LCC 200 billion of TR (LCC 600 billion, which = RR) are borrowed from the central bank (that is, are BR).

When working from one period to another we are able to calculate the changes (Δ) in NER and in the BSSoC. For example (using the numbers in Box 14 as the starting point), if the central bank does an OMO sale of LCC 100 billion bonds, and the banks buy them, ΔNER = –LCC 100 billion to stock amount of –LCC 300 billion (because the LSh increased). The BSSoC = ΔNLG = –LCC 100 billion. The ASoC is the OMO transaction carried out. A critical issue here is that the central bank has no option but to supply the BR at the KIR.

Another example: if the central bank does an OMO purchase of LCC 300 billion bonds (and the banks sell them), the NER will improve by this amount (ΔNER = +LCC 300 billion) to stock NER amount of LCC 100 billion (= a liquidity surplus, LSu) (ER = LCC 100 billion; BR = 0). The BSSoC = ΔNLG = +LCC 300 billion, and the ASoC is the OMO transaction carried out.

A final example, but a significant one for this discussion: if the deposits of the banks increase by LCC 100 billion, being the outcome of new bank loans of this amount, the banks will be required to hold additional reserves of LCC 10 billion (r = 10% of deposits). This amount can only be supplied by the central bank, because no bank other than the central bank can create CBM. Thus, NER will deteriorate by LCC 10 billion (ΔBR = +LCC 10 billion; the LSh increased), and the BSSoC is ΔB2b (the RR amount) by +LCC 10 billion. This is indicated in Box 15 and Box 16. The ASoC is the increase in the money stock by +LCC 100 billion.

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BOX 15: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans Reserves (total reserves: TR) (RR = +10) (ER = 0)	+100 +10	Deposits by public Loans from central bank (BR)	+100 +10
Total	+110	Total	+110

BOX 16: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to banks (BR)	+10	Deposits: Banks (TR) (ER = 0) (RR = +10)	+10
Total	+10	Total	+10

As said earlier, the BLA is done routinely by many central banks. It is a simple analysis of its own balance sheet.

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5.8 Accommodationism

Perhaps the most significant matter in the BLA is differentiation between the BSSoC of ΔNER as follows:

Automatic accommodation BSSoC: ΔNFA, ΔNLG, ΔN&C
Non-automatic accommodation BSSoC: ΔRR.

When deposits shift from one bank to another (see next section for example), the interbank claims are sorted out in the interbank market, which occurs via the banks' accounts at the central bank, with no change in the central bank's balance sheet. However, when the central bank does a sale transaction with the banks [OMO, as (reflected in ΔNFA- or ΔNLG-), or the issue of new N&C (ΔN&C+)], it results in an increase in BR. In these cases, the central bank has no option but to supply the reserves (it is the source of change after all!).

In the case of loan/deposit (money) expansion, and increase in RR occurs, which can be supplied ("accommodated") by the central bank supplying BR. Here we have a difference of opinion regarding the supply of BR:

- The Monetarist School (discussed in detail below) states that the supply of reserves (BR) is not automatic, and it is via this route that money stock growth is controlled.
- The Post-Keynesian School states that the increase in the RR is automatically accommodated by BR supplied by the central bank.

The latter school is divided on the topic into *Accommodationists* (led by Moore et. al: see Moore, 1988b,) and *Structuralists* (led by Palley et. al: see Palley, 1987/88; Palley, 1996). The former believe central bank accommodation is 100% automatic, while the latter believe there are circumstances in which targeting interest rates and the monetary base are appropriate, because "…the real world is complex, and where germane, these complexities need to be captured."

This important issue is taken up again later, after a discussion on endogenous money creation, the only kind that can exist in a non-specie monetary system.

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5.9 Endogenous money creation

In order to concretise the earlier discussion on endogenous money creation, I offer an example, which is done within the framework of the MA and the BLA.

First example: Company B requires goods as inputs in its production process and wishes to purchase them from Company L. It does not have the funds and approaches Bank B for a loan. As Company B's balance sheet and the production project are sound Bank B grants an overdraft loan facility of LCC 100 million. Company B makes an electronic funds transfer (EFT, by internet banking) to Company L's current account at Bank L, and Company L delivers the goods to Company B. The balance sheet changes of the companies are shown in Boxes 17–18.

BOX 17: COMPANY B (LCC MILLIONS)			
Assets		Liabilities	
Goods	+100	Loans from Bank B	+100
Total	+100	Total	+100

BOX 18: COMPANY L (LCC MILLIONS)			
Assets		Liabilities	
Goods Deposits at Bank L	-100 +100		
Total	0	Total	0

As two banks are involved, the settlement of interbank claims must take place. Worldwide this takes place over the accounts that banks are required to have with the central bank. As shown in Box 19, Bank B is short of reserves and Bank L has an excess (ER). Assuming the banks have no BR, Bank L will instruct the central bank to debit its account and credit Bank B's account.

BOX 19: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
		Deposits: banks (TR) (Bank B = -100) (Bank L = +100)	0
Total	0	Total	0

After this transaction, the balance sheets of the private sector banks will be as shown in Boxes 20–21.

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BOX 20: BANK B (LCC MILLIONS)			
Assets		Liabilities	
Loan (Company B)	+100	Interbank loan from Bank L	+100
Total	+100	Total	+100

BOX 21: BANK L (LCC MILLIONS)			
Assets		Liabilities	
Interbank loan to Bank B	+100	Deposits (Company L)	+100
Total	+100	Total	+100

There is no RR against interbank loans, but there are against public deposits. Thus, Bank L is obliged to deposit an additional LCC 10 million with the central bank. This is to be done once the bank has certified its monthly return of deposits (etc) with the central bank, which usually takes place 3 weeks after the month-end. Thus, if the above transaction took place on 1 July, Bank L will only have to deposit the additional RR on 21 August[61]. This is mentioned as further proof of the divorce of money creation from the RR (elucidated further later).

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How does Bank L get the LCC 10 million additional RR? It cannot create CBM, and has no option to take a loan from the central bank on 21 August, as indicated in Boxes 22–23.

BOX 22: BANK L (LCC MILLIONS)			
Assets		Liabilities	
Reserves (TR) (RR =+10) (ER = 0)	+10	Loan from CB @ KIR	+10
Total	+10	Total	+110

BOX 23: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
Loans to Bank L @ KIR	+10	Bank deposits (TR) (RR = +10) (ER = 0)	+10
Total	+10	Total	+10

What has happened to the money stock and to bank liquidity? In the case of money we, as per the MA above, consolidate the balance sheets of the two banks and the central bank, the outcome of which is shown in Box 24 (note the netting out of interbank claims).

BOX 24: CONSOLIDATED BALANCE SHEET OF MBIs (LCC MILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA) E. Loans to government (LG) F. Loans to private sector (LPS)	0 0 +100	A. Notes & coin B. Deposits: 1. Government 2. Private sector C. Loans: foreign sector	0 0 +100 0
Total	+100	Total	+100

ΔM3 = +LCC 100 million and the BSSoC is ΔLPS = +LCC 100 million. The ASoC is the demand for bank loans by Company B, which was satisfied by Bank B. The path of causation in the money creation process was:

Demand for bank loan → Simultaneous bank loan (ΔDLE) & deposit (ΔM3) creation.

Company B required the loan for production investment purposes. Thus, there is a direct link between the monetary system and the real economy:

Bank loan (ΔDLE) & deposit (ΔM3) → Δ(C + I) = ΔGDE; ΔGDE + Δ(X – M) = ΔGDP[62].

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New money (ΔM3+) was created endogenously (simultaneously with ΔDLE+). As already said, this is the only way (together with ΔNFA and ΔNLG) in which new money can be created. Exogenous money creation does not exist in the modern monetary system. Rather, what is called *exogenous money creation* is a style of monetary policy (more later).

What about the change in bank liquidity? As shown earlier, the BLA involves only the balance sheet of the central bank. Box 25 (in changes) shows the outcome: ΔNER = -LCC 10 million, a result of ΔBR +LCC 10. The BSSoC is ΔRR = +LCC 10 million, while the ASoC is the increase in bank loans/deposits, which is the outcome of a satisfied demand for a bank loan, which was utilised for economic activity.

BOX 25: CENTRAL BANK (LCC MILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA)	0	A. Notes & coins (N&C)	0
E. Loans to government (LG)	0	B. Deposits:	
F. Loans to banks (BR)	+10	1. Government sector	0
		2. Banks (TR)	+10
		a. (ER = 0)	
		b. (RR = +10)	
		C. Loans: Foreign sector	0
Total	+10	Total	+10

5.10 Interbank markets and central bank accommodation

The previous section touched upon one part of the interbank market (IBM). There are three parts to the IBM:

- The bank-to-bank IBM (b2b IBM), which is the market in which banks settle interbank claims on one another (as in the example above). In this market a market-determined interbank loan rate (IBMr) is determined – which takes its cue from the KIR.
- The bank-to-central bank interbank rate (b2cb IBM), which is largely[63] a one-way market: the holding of RR with the central bank. In most countries interest is not paid on RR. However, during QE conditions, some central banks do pay interest on RR and ER.
- The central bank-to-bank IBM (cb2b IBM), which is largely[64] a one-way market: the provision of loans to the banks at the KIR.

The latter IBM is of critical importance in those countries that follow an interest rate-focused monetary policy, such as the UK, Canada, Australia, South Africa, etc. This policy approach contrasts with the Monetarist School approach, which essentially is focused on a strict "money rule", based on the RR and the money multiplier. [Post-Keynesian economists refer to the former as an endogenous money creation approach and to the latter as an exogenous money creation approach.] We return to the latter approach (which we call the money multiplier-focused approach) after the following section which discusses the former approach.

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5.11 Interest rate-focused monetary policy

In normal (non-QE) conditions much of the developed world's monetary policy is conducted through an operational variable: interest rates. It begins with the KIR paid on BR, which is a forced condition on the banking system. For example, in South Africa (even during slack economic conditions) the banks have for longer than four decades experienced a permanent BR liquidity condition.

Thus, the banks borrow (BR) from the central bank on permanent basis, which the central bank is able to bring about because it has monopoly-management of its own balance sheet. The outstanding amount of BR presently (2012) is in the region of ZAR 16 billion (NER = -16 billion), which is less than 1% of liabilities. The banks pay the KIR on their BR.

The immediate objective of the central bank (see Figure 2) is to "set" the prime lending rate of the banks (PR, the benchmark rate for LPS – the main BSSoC of money), and so influence the demand for bank loans (an intermediate objective) to a sustainable level. The primary and ultimate objectives are obvious and are not pursued further in this paper.

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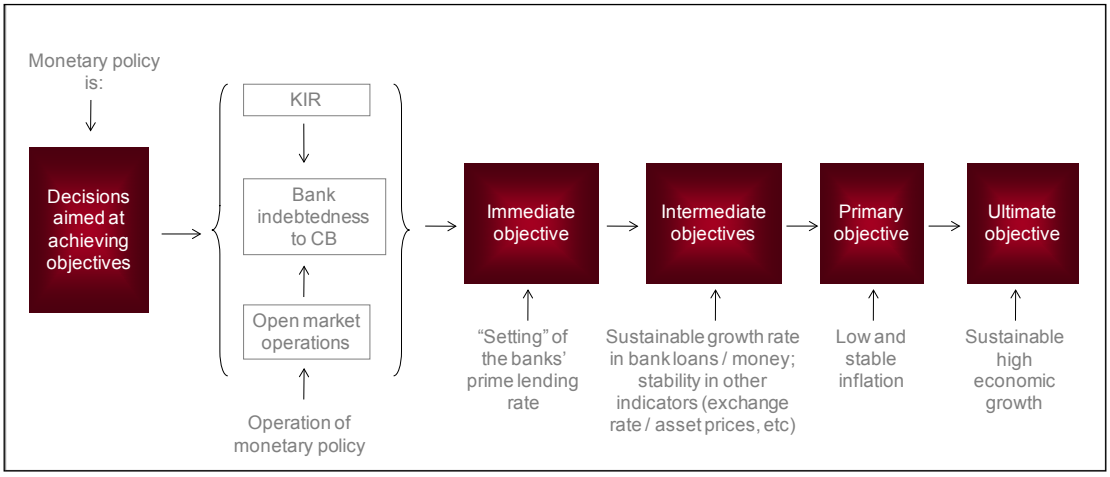

Figure 2: path of monetary policy

Following is a summary of the KIR's transmission path to the banks' PR, inflation and economic growth. It can be seen as part of the monetary policy transmission mechanism (MPTM).

- The central bank, through open market operations (OMO) creates a liquidity shortage (LSh) and, in most countries in normal circumstances, maintains it permanently. This means it "forces" the banks to borrow from it at all times. The borrowing term is short (usually 1 day to 7 days).
- It levies its KIR on these BR.
- The b2b IBM, the market in which banks settle interbank claims on one another, takes its cue from the KIR. See Figure 3[65].
- The b2b IBM rate has a major impact on the banks' deposit rates (wholesale call money rates in the first instance and other short-term deposit rates in the second, and so on). See Figure 3.
- As the banks maintain a steady margin, deposit rates impact on bank lending rate (PR). See Figure 4[66]. It is significant that the correlation coefficient between the KIR and PR for the period 1960 to the present = 0.99.
- The level of PR (especially in real terms) influences the private sector's demand for bank loans (LPS in the MA). (Government borrowing tends to be interest rate insensitive.)
- Interest rate changes also have a major impact on asset prices which through the "wealth effect" influence consumption and investment (C + I = GDE) behaviour.
- ΔDLE is the main counterpart of ΔM3.
- The growth rate in demand (ΔGDE), financed to a large degree by ΔDLE and reflected in ΔM3, has a major impact on price developments (inflation).
- The inflation rate is a major input in business decisions.
- Business decisions impact on economic growth and employment.

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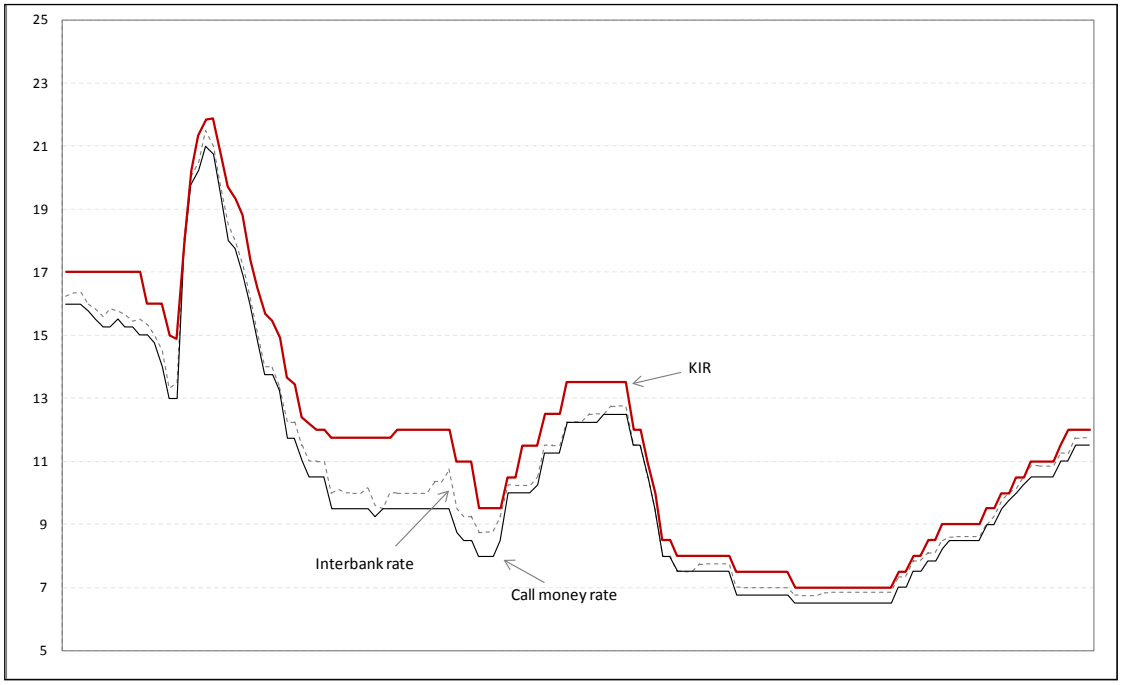

Figure 3: call money rate, interbank rate & KIR

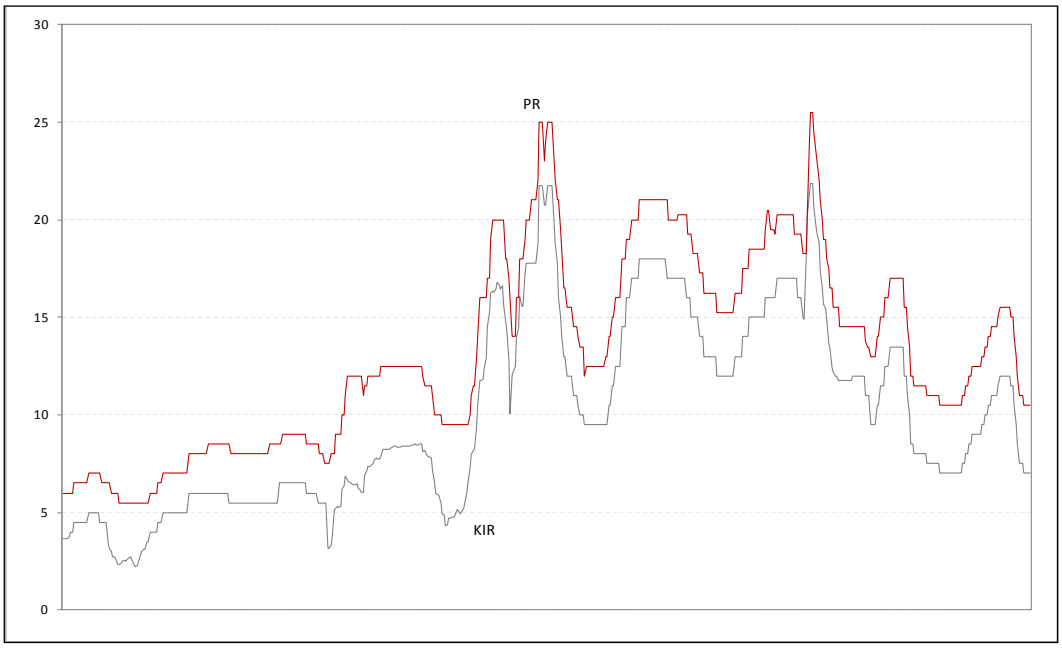

Figure 4: KIR & PR (month-ends over 50 years)

The above is by no means robust economics. It is designed to in a nutshell elucidate the essence of the interest rate-focused monetary policy style.

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It is critical to point out that, as the banks' loans/deposits increase under this system, the central bank is at all times willing to accommodate the increased RR at the KIR (which it does in the form of BR). As we have seen, it is policy to ensure that a BR exists on a permanent basis, and this is maintained at whatever level the central bank desires. Its objective is to make the KIR effective. Thus, in this system the RR *is a quantity that is a consequence of money creation and not a quantity that steers money creation*. It is just one of the many factors that affect bank liquidity (NER/LSh), an issue that central banks deal with every day.

As we saw earlier, the Post-Keynesian School call this *Accommodationist* policy. This is not some academic exercise; it exists in practice in many countries, including those mentioned earlier. Here we provide evidence from two countries: the UK and South Africa. With reference to the UK, Howells (2005:1) writes:

> "…while post-Keynesians may have thought they were fighting in heroic isolation, most economists involved with the real world of monetary policy-making in practice took much the same view. The consequence is that we can find empirical investigations of issues relating to the endogeneity in a wide range of locations."

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In the South African case, money endogeneity has never been in question. In 1984, the Commission of Inquiry into the Monetary System and Monetary Policy in South Africa (1984:A15) wrote (italics are in the original text):

> The…purpose of these operations…is not to have some direct and pre-determined effect on the amount of the banks' cash reserves. Instead, it is to compel banking institutions … to make use of the central bank's accommodation facilities at the discount window *at the interest rates that are charged by the central bank for such accommodation*…Once the banking system has to make use of discount window accommodation, a change in the central bank's accommodation rates (traditionally Bank rate) normally has a quick and roughly commensurate[67] effect on the market rates…. In other words, the high cost of cash reserves at the discount window – rather than the limited *amount* of cash reserves made available – acts as the prime deterrent to unduly rapid expansion of the banks' balance sheets and the money supply."

While this clearly spells out the endogenous nature of money creation in South Africa (which is also the UK et.al model), the Commission (1984:A14-15) recognised that a Monetarist School model can exist and did exist in the US:

> "Under the 'American' system, the central bank uses…open market operations…to destroy or create cash reserves…for the express purpose of exerting some desired quantitative effect on the *amount* of…reserves. In this approach, the central bank may set itself a *target* for what it believes the amount of the banks' total or non-borrowed cash reserves should be…in order to bring about some target rate of growth of the money supply."

We now turn to the Monetarist School model.

5.12 Money multiplier-focused monetary policy

In the money multiplier-focused style of monetary policy (known as Monetarism) the RR takes centre stage. We explained earlier that the money multiplier (m) is the reciprocal of the reserve requirement (RR) ratio (r), and r is the statutorily-set proportion of deposits banks are required to hold with the central bank as deposits (assuming r = 10% of deposits):

$$m = 1 / r = 1 / 0.1 = 10.$$

Thus, if the banks have reserves (aka *high-powered money*, the *cash base* and the *monetary base* if we exclude N&C) of LCC 400 billion, then M3 can be a maximum of 10 times this quantity, that is, LCC 4 000 billion. This is indicated in Boxes 26–27. With M3 at this level the banks are "fully lent", ie they are not able to make new loans, which create new deposits, unless the central bank steps in and creates ER.

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BOX 26: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Foreign assets (FA)	100		
Loans to government (LG)	900		
Loans to private sector (LPS)	2 000		
Central bank money (CBM):		Deposits: Private sector (M3)	4 000
Notes & coins (N&C)	600	Loans from central bank (BR)	0
Reserves (TR)	400		
(ER = 0)			
(RR = 400)			
Total	4 000	Total	4 000

BOX 27: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Notes & coins (N&C)	1 000
		Deposits:	
Foreign assets (FA)	1 800	Government sector	1 000
Loans to government (LG)	1 000	Banks (TR)	400
Loans to banks (BR)	0	(ER = 0)	
		(RR = 400)	
		Loans: Foreign sector	400

Let us now assume that the central bank decides to increase the money "supply" by LCC 100 billion. It knows that $m = 10$, and will thus undertake OMO purchases of government bonds (LG in marketable form) to the extent of LCC 10 billion. We assume the banks sell the bonds to the central bank. The balance sheet *changes* are shown in Boxes 28–29.

The central bank has created ER of LCC 10 billion. It should be clear that, because $m = 10$, the banks are now able to make new loans, which creates new deposits, up to the point where the ER are transmuted into RR. It should also be evident that the banks are not able to lend out the ER created by the central bank, that is, they cannot intervene in the balance sheet of the central bank (what would the other accounting entry be?).

BOX 28: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG)	-10		
Reserves (TR)	+10		
(ER = +10)			
(RR = 0)			
Total	0	Total	0

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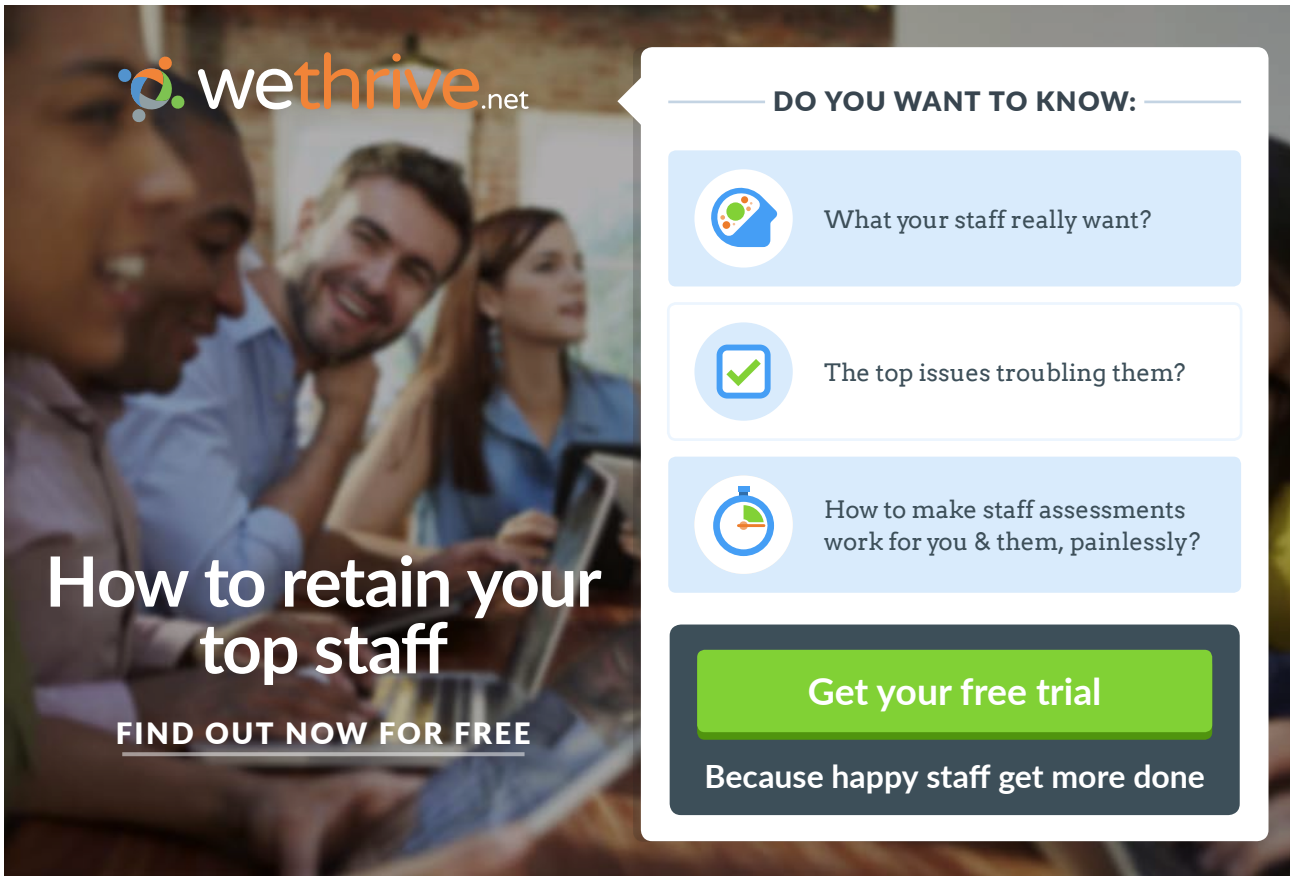
BOX 29: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG)	+10	Deposits: Banks (TR) (ER = +10) (RR = 0)	+10
Total	+10	Total	+10

Neither the central bank nor the banks themselves are able to ensure new lending will take place. The new monetary policy of creating ER translates into the banks, now having a non-earning asset, ER, being encouraged to drop their lending rates to encourage further borrowing. On the assumption that a demand for bank loans exists at the lower level of bank lending rates, the balance sheet changes will be as indicated in Boxes 30–31. It will be seen that there is a change in the dividing line between RR and ER, leaving TR unchanged.



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BOX 30: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to private sector (assumed) Reserves (TR) (ER = -10) (RR = +10)	+100 0	Private sector deposits (M3)	+100
Total	+100	Total	+100

BOX 31: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Deposits: Banks (TR) (ER = -10) (RR = +10)	0
Total	0	Total	0

The net changes in the balance sheets are indicated in Boxes 32–33. The banking system is now "fully lent". Any further demand for bank loans will cause an increase in interest rates, encouraging the repayment of previous loans to enable others to borrow. New net lending is not possible in this model. Higher interest rates of course change the internal rate of return (IRR) of new projects, choking off some.

BOX 32: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG) (bonds) Loans to private sector (assumed) Reserves (TR) (ER = 0) (RR = +10)	-10 +100 +10	Deposits: Private sector (M3)	+100
Total	+100	Total	+100

BOX 33: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to government (LG) (bonds)	+10	Deposits: Banks (TR) (ER = 0) (RR = +10)	+10
Total	+10	Total	+10

It should be evident that in such a system a *strict money creation rule* is in place. The CB is able to "control" the rate of money creation to exactly 10 times the ER created. In practice (in normal times) it would not create ER to a vast extent, but in small increments, more or less consistent with the demand for bank loans.

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5.13 Interest rate consequences of a money multiplier-focused monetary policy

A significant economic principle enters the picture here, and it is an obvious one: a central bank cannot control a quantity (reserves and therefore bank loan / money growth) and the pricing of bank loans (the PR) simultaneously. In the above example it is hoping for a quantity-effect, but interest rates are unfettered.

In this regard, the Commission (1984:A15), with reference to the "American" system wrote"

> "The determination of the level and structure of interest rates in this system may then be left… to the free operation of market forces, as was in essence done in the United States for some time before October 1979."

It is clear from this extract that such a monetary system (money multiplier-focused monetary policy) did exist (or was flirted with) in the US at one stage. In this regard Palley (1998) says:

> In practice, we seldom see the monetary authority targeting the base, though there was a period in the late 1970s and early 1980s when the Fed appeared to be verging on this practice. Given initial expectations of economic activity derived from its econometric models and other sources, the Fed targeted the money supply. As price and financial market data emerged, the Fed sought to extract signals from this data about the real economy, and responded by adjusting the quantity of base[68] in a fashion that it thought would get it back to its money supply target. These adjustments then caused a rise in interest rates. Ultimately, the policy was abandoned because the effect on interest rates was disastrous, and the Fed's belief in the usefulness of targeting monetary aggregates waned."

Thus, such a system can, and did exist in a fashion, but it is a *style or model of monetary policy*. In theory it can be implemented as follows: in order to not lose control over interest rates (implemented through the KIR as in the interest-rate focused model elucidated above), the central bank would need to ensure that ER is created through OMO purchases in small increments consistent with the demand for bank loans. Thus, in this system, the banks would hover between having almost no ER and being close to a BR condition. This makes the KIR effective. This is a model followed in some countries, notably the US, and in some African countries.[69]

5.14 Quantitative easing

Quantitative easing (QE) is a policy relevant to the money multiplier model, but it also has an interest rate dimension, which is perhaps another sign of the shift in the US from a money multiplier-focused monetary policy to an interest rate-focused monetary policy.

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What is QE? It is bank reserves policy aimed at reducing bank lending rates to the lowest level possible in order to stimulate the demand for bank loans. As noted, there is a direct link between the private sector's demand for bank loans/deposit (money) creation and the real economy. Thus, stimulation of the economy through bank lending/deposit creation is the ultimate objective.

It is executed by the vast purchase (OMO) of securities by the central bank from the public and banking sector (the rates on the deals are attractive in order to ensure the purchases take place) and therefore the creation of vast amounts of ER. The principle rests on the profit-maximisation behaviour of the banks: under QE conditions [that is, having vast amounts of non-interest- or low-interest-bearing assets (ER)], the banks are coerced to pay zero or very low interest rates on deposits and thereby, via the bank margin, ensure that bank lending rates are at the lowest level possible, encouraging an increase in the private sector's demand for bank loans. This is somewhat like "pushing on a string", but it is perhaps a sound policy in certain conditions.

5.15 Accommodationism and structuralism revisited

Thusfar this paper has argued that money creation can only come about by bank loans/bank deposit (money) creation and that the monetarist model is a style of monetary policy, the extremes of which are:

- Interest rate-focused monetary policy, and
- Money multiplier-focused monetary policy.

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The former model is practiced in many parts of the world, and, as we have shown, the latter was flirted with in the past, but is no longer. Palley (1996), in this regard, correctly says (italics added):

> "…there are two principal differences between accommodationists and structuralists. The first concerns differences in the treatment of the interaction between the policy authority's policy reaction functions and the asset and liability management activities of banks. In particular, the standard accommodationist model is based on the special case of complete accommodation by the monetary authority. The second concerns the feasibility of conducting policy through adjustments of the monetary aggregates. Accommodationists assert that the central bank can only conduct policy by adjusting interest rates, while structuralists maintain that quantity-based procedures are also theoretically possible. From a structuralist standpoint, the frequency with which these alternative reaction functions have been adopted is a matter for the historical record on monetary policy. *It may well be the case that the policy of 'interest rate' management is more common, which would make it empirically more relevant, but not theoretically exclusive.*"

This reference is significant: recognition that the money multiplier-focused monetary policy model has to all intents and purposes been relegated to a theoretical model.

5.16 The "exogenous money" puzzle

In referring to *Monetary trends in the United States and the United Kingdom: their relation to income, prices and interest rates, 1867–1975* (Friedman and Schwartz, 1982) Moore (1983a) states that Friedman and Schwartz:

> "…simply claim that monetary change is always and everywhere exogenous. They never address the forces behind the supply function of nominal money. In so doing they ignore the entire literature on monetary policy in the United Kingdom, which is unanimous in the fact that it has always been pursued through Bank Rate policy, and never through cash base control."

Monetarism is portrayed by Moore (1983b) as the antithesis Post-Keynesian monetary economics (vice versa also applies).

> "Most people have a basic misunderstanding of the manner in which the Federal Reserve implements monetary policy. Students of economics across the country are still taught how the Fed increases or decreases bank reserves to regulate the quantity of bank deposits. The money stock (M) is a favorite exogenous variable in countless models. Movements of the chosen monetary aggregate are attributed to a specific policy or action by the Federal Reserve.
>
> "This traditional view of the bank money creation process relies on the bank reserves-multiplier relation (M = Bm). The Fed is posited to be able to affect the quantity of bank deposits, and thereby the money stock, by determining the nominal amount of the reserve base (B) or by changing the reserve multiplier (m).

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Moore (1983b) goes on to state that the following statement (Meltzer, 1969) is an example of evidence of empirical application the reserves-multiplier relationship, and therefore of the Monetarist School standpoint: ("On such evidence Monetarists hold that the money stock is properly considered an exogenous variable."):

> "85 percent of the variance of the monthly change in money…resulted from changes in the monetary base and changes in Treasury deposits at commercial banks in the current and previous month."

Moore (1983b) furthermore states that:

> "…the direction of causality is precisely the reverse of that held by the conventional view. There is now mounting evidence that the traditional characterization of the money supply process, which views changes in an exogenously controlled reserve aggregate as 'causing' changes in some money stock aggregate, is fundamentally mistaken. Although there is a reasonably stable relationship between the high-powered base and the money stock, and between the money stock and aggregate money income, the causal relationship implied is exactly the reverse of the traditional view. Both the base and the money stock are in fact endogenous. The evidence suggests that the quantity of bank intermediation is determined primarily by the demand for bank credit."

Moore (1983b) presents the following statement by Holmes (1969) as proof:

> "In the real world banks extend credit, creating deposits in the process, and look for the reserves later."

As an ex-central banker in a country whose monetary model is based on the UK system, this is conventional wisdom.

An important question now arises: is there such a major difference between the Post-Keynesian School standpoint and the Monetarist School one, as far as the *actual process of money creation* is concerned? We know that the Monetarist model is one in which the fixed relationship between the RR and bank deposits brings about a situation where the growth in bank deposits (money creation) can be controlled by management of the quantity of reserves which is under the control of the central bank. But this says (and the Post-Keynesians say) *nothing about actual money creation*. For example, Moore (1983b) correctly says that:

> "…the traditional characterization of the money supply process, which views changes in an exogenously controlled reserve aggregate as 'causing' changes in some money stock aggregate, is fundamentally mistaken."

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This explains the Monetarist School model but does not elucidate the *process of money creation* under it, as outlined in the above section *Money multiplier-focused monetary policy.* A reminder: the central bank creates ER by buying financial assets, and then the banking system (assuming a demand for bank loans exists) creates deposits (money) by extending loans (as per the Post-Keynesian model).

This is the puzzling aspect: while the supply of bank reserves is controlled (exogenously) under the Monetarist model, the actual money creation process is endogenous: bank loans and bank deposits are created simultaneously (if a demand for bank loans exists). The money creation process cannot occur any other way.

The answer lies in how the Monetarist School viewed the process of money creation. Are Friedman and Schwartz not aware of the endogenous process of money creation when they state (Friedman and Schwartz, 1963:58) (italics added):

> "The sharp rise in the stock of money from 1868 to 1872 was primarily a consequence of the spread of deposit banking. This both induced the public to hold a larger ratio of deposits to currency and *enabled the banking system to create more dollars of deposits* per dollar of vault cash."[70]

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Similarly, Friedman and Schwartz (1963:221) stated:

> "…which meant that the banking system was able to create $3 of money [deposits] per $1 created by the monetary authorities."

Friedman and Schwartz (1963:56) also make reference to 1879 when only six states had reserve requirements against deposits. Surely (it cannot be claimed that) they did not believe that money creation ceases if there is no reserve requirement? Is the conclusion not that the Post-Keynesian School in its reaction to the Monetarist School is referring to a *monetary policy model* rather than the *process of money creation* under the Monetarist School model? The Monetarist School model can exist, and was flirted with in the past, but no longer does as a result of the serious interest rate consequences of the model. The model thus reverts to a theoretical model, and belongs in this esoteric space in an age when the generally accepted medium of exchange is bank deposits. Is monetary policy empirically not simply as described earlier in the section *Interest rate-focused monetary policy?*

5.17 Recent research from the home of the Monetarist School

As we have shown, the UK and many other countries (including South Africa) have always followed the endogenous money creation model: create and maintain a liquidity shortage to make the KIR effective; it has a direct influence on the b2b IBM rate and therefore deposit rates and, via the bank margin, strongly influences bank lending rates; these rates have a major impact on the demand for new bank loans which, when satisfied by the banks, simultaneously creates new deposits (money); the influence of new deposits on RR is an outcome, not the driver of new deposit creation.

It is heartening that the "home" of the Monetarist School model of money creation, the US, is showing distinct signs of acceptance / recognition of this model. For example, Carpenter and Demiralp (2010) of the Federal Reserve and Koc University, Turkey, respectively, argue:

> "…that the institutional structure in the United States and empirical evidence based on data since 1990 both strongly suggest that the transmission mechanism does not work through the standard money multiplier model from reserves to money and bank loans. In the absence of a multiplier, open market operations, which simply change reserve balances, do not directly affect lending behavior at the aggregate level. Put differently, if the quantity of reserves is relevant for the transmission of monetary policy, a different mechanism must be found…. This paper provides institutional and empirical evidence that the money multiplier and the associated narrow bank lending channel are not relevant for analyzing the United States."

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In their conclusion, Carpenter and Demiralp (2010) state (it links with the section on QE above):

> "Since 2008, the Federal Reserve has supplied an enormous quantity of reserve balances relative to historical levels as a result of a set of nontraditional policy actions. These actions were taken to stabilize short-term funding markets and to provide additional monetary policy stimulus at a time when the federal funds rate was at its effective lower bound. The question arises whether or not this unprecedented rise in reserve balances ought to lead to a sharp rise in money and lending. The results in this paper suggest that the quantity of reserve balances itself is not likely to trigger a rapid increase in lending. To be sure, the low level of interest rates could stimulate demand for loans and lead to increased lending, but the narrow, textbook money multiplier does not appear to be a useful means of assessing the implications of monetary policy for future money growth or bank lending."

5.18 Further questions

As this article is a long one, it is time to conclude it. We do so with a number of questions, which require rumination:

5.18.1 What happens after loan/deposit creation?

When a new bank loan is made, the new deposit created is will be a current account balance. Thereafter changes take place, such as a shift of part of the new balance to a 90-day fixed deposit. This of course means that the broad money stock measure, M3, does not change.

However, if an analyst is focused on a narrow measure, say M1, a decline will be recorded after the shift. Similarly, in the case of no new money creation, the maturity of a 360-day deposit, which will be reflected in a call money account, will be recorded as an increase in M1.

What is the significance of this? It is that the various measures of money can often be misleading. Should the focus of analysis perhaps be on the BSCoC in M3, NFA and DLE, rather than the measures of money? Because loan/deposit creation is simultaneous, new money creation is reflected in the BSCoC, and remains so. AS we pointed out, there is a direct linkage between the demand for new bank loans and *additional* aggregate demand.

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However, there is no perfect analysis. There are conditions under which analysis of bank loan/deposit creation falls short: bank dis-intermediation and re-intermediation. Is this not a minor problem compared with bank deposit maturity shifts, as banks are in the intermediation business and wish to remain intermediated? This argument also falls short when one considers the creation by banks of special purpose vehicles (SPVs), for the purpose of shifting of, for example, mortgage advances off-balance sheet. But perhaps the remedy in this case is easy: capture the balance sheets of the SPVs as part of the MA (the banks have the data).

5.18.2 Is there a demand for money?

Is the stock of money, and maturity shifts hereafter, not the outcome of portfolio decisions, rather than the *demand* (for transactions, speculative…reasons) for money? Is it also not true to say that if some people want to hold more bonds instead of money when rates are high, that the money stock will not change – because the bond sellers will get bank deposits and the buyers of bonds will lose deposits?

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5.18.3 Is money "supply" a misnomer?

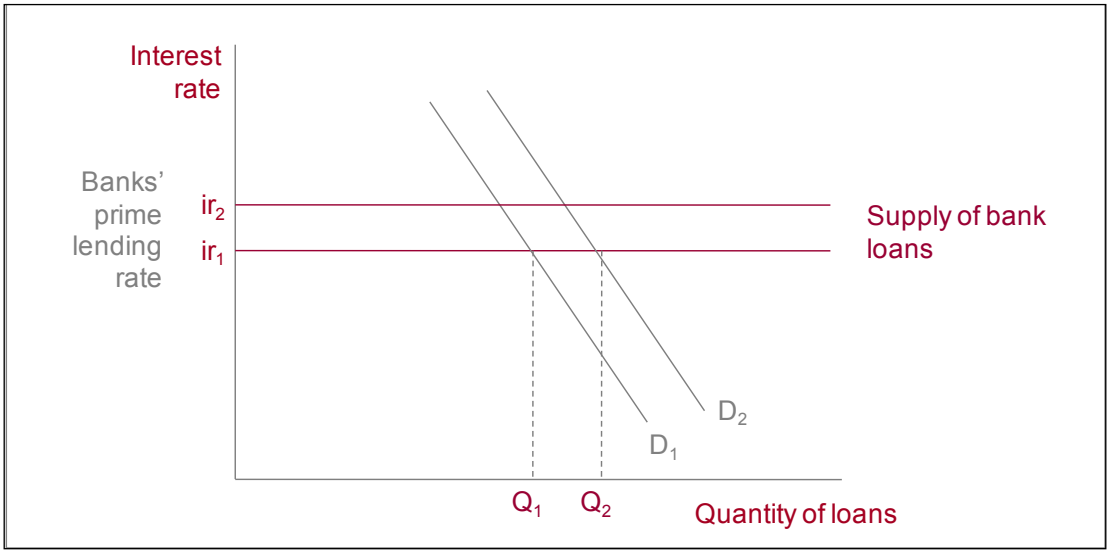

Figure 5: supply of & demand for bank loans

We know that money is BD (plus N&C) held by the non-bank private sector, and we know that new money is created by new bank loans (ΔDLE + ΔNFA). When money is measured by central banks they consolidate the balance sheets of the MBIs and derive M3 from this (and the BSSoC). Most economists call this magnitude the money *supply*.

Is this a useful term when ΔM3 it is the outcome of new bank loans? Does "supply" not fit better with the supply of loans, which is theoretically unlimited (subject to the demand for loans, which is a function of the level of interest rates as determined by the central bank – specifically bank lending rates), as indicated in Figure 5.

Once new money is created, has the *stock* of money, ie the amount of money in circulation, not increased, rather than the *supply*?

5.18.4 Is it time to say goodbye to the money multiplier?

The Monetarist model is a pleasing theoretical model. In a monetary system where bank liabilities are the principal means of payments, and banks are able to create them by making loans (depending on demand), there can be no market-determined price / rate. If interest rates were unfettered in the interest rate-focused model many banks, being keen competitors, will get into trouble, as happened often in the age of the goldsmith bankers, and as we have seen after the sub-prime banking debacle. The consequences for depositors will be profound. Banks are inherently unstable in such an environment.

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In such a system an arbiter is required, and the central bank performs this function. Its primary function is to set the rate of interest on bank loans, because new bank loans are the principal source of new bank deposits (money creation). This is done via its KIR, which is made effective by the creation of a permanent liquidity shortage (that is, the existence of a permanent BR condition).

There is no other way for the system to be managed. The monetary base is the outcome of bank lending / deposit creation, not the driver. Is it not time to say goodbye to the money multiplier?

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6 Money creation: empirical evidence of endogeneity

AP Faure[71]

6.1 Abstract

Many scholars have fought valiantly to change perceptions on the process of money creation. However, misconceptions remain in place some quarters. In order to demonstrate empirically that a new bank loan creates a new bank deposit (without the bank having to recruit a new deposit), the author approached a small bank, undertook a loan and asked for the amount of the loan to be credited to a newly-created current account in the same bank his name. When an overdraft facility is utilised to pay a seller for goods purchased who banks at a different bank, the outcome is the same. This article elucidates the processes.

6.2 Introduction

Many scholars have fought valiantly to change perceptions on the process of money creation. Many of them are academics, but most are central bankers, and academic ex-central bankers, the reason being that in most cases central banks are responsible for compiling the monetary statistics which are extracted from the consolidated balance sheet of the monetary banking sector (MBS – private sector banks and central bank). This resulting analysis (sometimes called the *monetary analysis*) shows the components of M3 (or other money aggregates in which case there are minor differences):

Notes and coins (N&C) + bank deposits (BD) held by the domestic non-bank private sector (NBPS):

M3 = N&C + BD (held by NBPS),

as well as the balance sheet counterparts (BSC) of M3 (or other monetary aggregates) as follows (on a particular date):

Net foreign assets (NFA)
Net loans to government (NLG)
Loans to private sector (LPS).

From one date to another (usually monthly) the analysis indicates the balance sheet sources of changes (Δ) (BSSoC) in M3 (or other monetary aggregates) as follows:

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

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One can of course combine ΔNLG + ΔLPS and call it changes in *domestic loan extension* (ΔDLE), making the BSSoC twofold:

$$\Delta M3 = \Delta NFA + \Delta DLE,$$

which can also be seen as the source of ΔM3 being only one: *loan extension*, split into foreign (ΔNFA[72]) and domestic (ΔDLE).

The actual causes of changes are of course the decisions and actions that underlie the BSSoC. Of these BSSoC, the most significant is ΔLPS, as is indicated in Figures 1–2 (South African data).

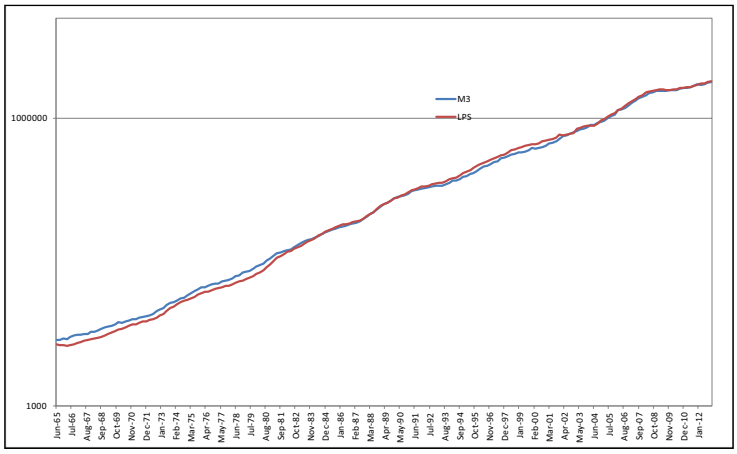

Figure 2: Log scale: M3 and LPS

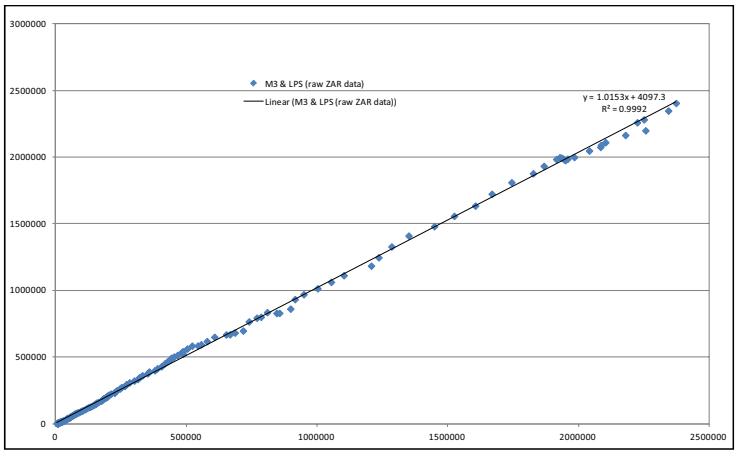

Figure 2: Scatter chart: M3 & LPS (raw ZAR data)

The correlation coefficient and the R^2 of the raw data (ZAR quarterly; 1965–2012) are 0.9995 and 0.9992, respectively.

In the case of *changes* (yoy%), shown in Figures 3–4, the correlation coefficient and the R^2 of the raw data (ZAR quarterly; 1966–2012) are 0.8 and 0.7, respectively.

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It will be evident that if all the BSSoC were included both the correlation coefficient and the R^2 would deliver 1.0.

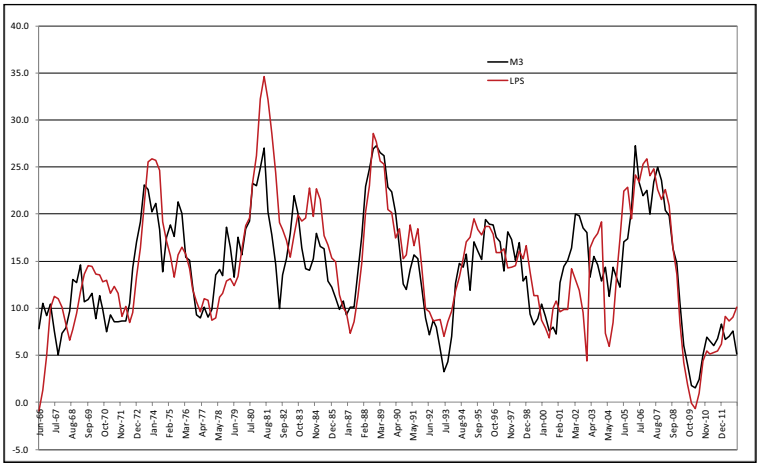

Figure 3: Changes (yoy%): M3 & LPS

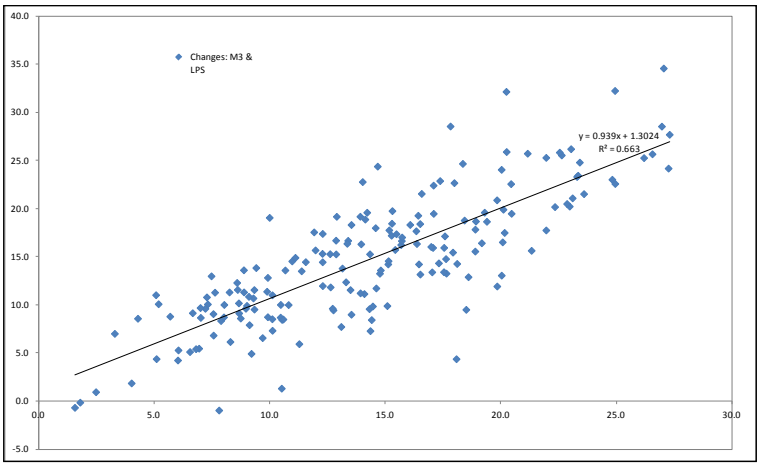

Figure 4: Changes (yoy%): M3 & LPS

New bank loans extended cause new bank deposits to be created, and the causation path is:

> borrower decision to borrow → bank decision (assume positive) → loan granted → new deposit created.

As indicated earlier, to many this is obvious. However, there are many sceptics, many an undergraduate textbook continues to lead students down the wrong path, and there are many other misconceptions relating to money creation.[73] For these reasons I embarked on an empirical venture to prove the above: that new loans create new deposits (= money, if the deposit belongs to a member of the NBPS).

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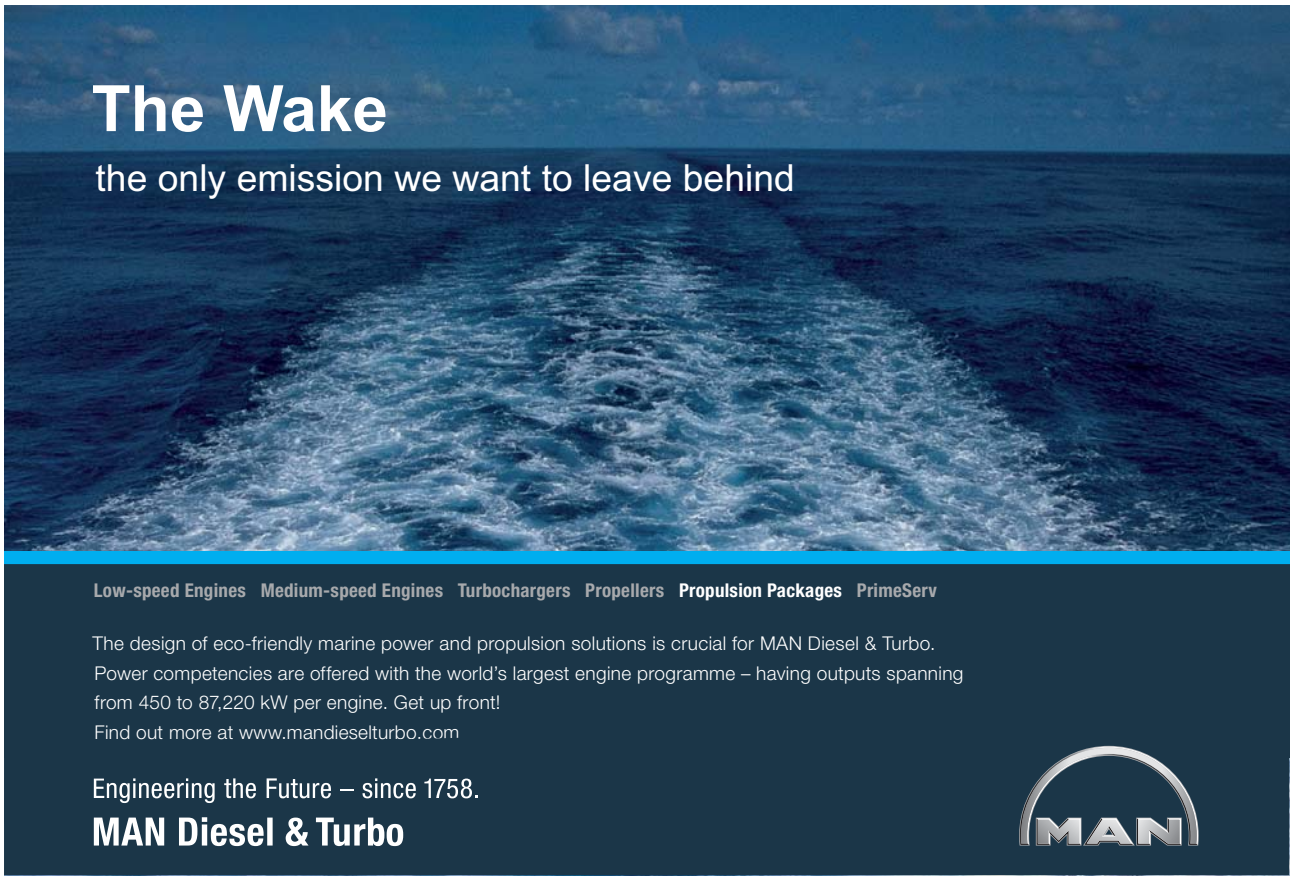
The author (APF) approached a non-executive director and the CEO of a bank in Malawi[74] (CDH Investment Bank – CDH) and enquired whether they would grant APF a loan in Malawian Kwacha (MWK) in the amount of MWK 100 000.00. The amount was not to be paid in bank notes but to be credited to a newly-created current account in APF's name in the bank's books. Thus, the loan was to be "fully cash covered"[75] (= the finest collateral).

They agreed to provide the loan for one month. APF formally applied for the loan (see Appendix 1[76]), and CDH formally granted the loan (see Appendices 2–4). It was granted at a punitive interest rate of 33% per annum, which APF took on the chin in the interests of science. Malawi was experiencing high inflation and high interest rates at the time. The amount was credited to the newly-created non-resident current account in APF's name (see Appendix 5), as requested (see Appendix 1). *CDH did not have to acquire a deposit from elsewhere to execute this.*

The respective balance sheets changed as shown in Balance Sheets 1–2.

BALANCE SHEET 1: APF (MWK)			
Assets		Liabilities	
Deposits at banks (CDH)	+100 000	Loans from banks (CDH)	+100 000
Total	+100 000	Total	+100 000



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BALANCE SHEET 2: CDH INVESTMENT BANK (MWK)			
Assets		Liabilities	
Loans (APF)	+100 000	Deposits of NBPS (APF) (= money)	+100 000
Total	+100 000	Total	+100 000

The accounting entries (provided by CDH) are shown in Box 1. Clearly, when a balance sheet is drawn up, the "Bank" entries cancel out, leaving the loan and the current account entries.

BOX 1: ACCOUNTING ENTRIES / BALANCE SHEET FOR CDH			
GENERAL LEDGER JOURNAL (MALAWI KWACHA)			
Debit		Credit	
Loan to APF	100 000	Bank	100 000
Bank	100 000	Current account APF	100 000
BALANCE SHEET (MALAWI KWACHA)			
Assets		Liabilities	
Loans (APF)	+100 000	Deposits (APF)	+100 000

If this was the only transaction undertaken by CDH in December, its official returns to the central bank for end-December 2012 will show an increase in deposit liabilities of MWK 100 000. As these returns are usually lodged up to a month after the relevant month-end, CDH will be obliged to increase its required reserves (RR), assuming a RR ratio of 10%, by MWK 10 000 at this time (that is, almost two months after the transaction). As banks are not able to create central bank money (CBM), the central bank will loan the funds at its policy or key interest rate (KIR), as indicated in Balance Sheet 3 [assuming CDH had no excess reserves (ER)].

BALANCE SHEET 3: CENTRAL BANK (MWK)			
Assets		Liabilities	
Loans to banks @ KIR (BR)	+10 000	Bank reserves (Total reserves - TR) [ER = 0] [RR = +10 000]	+10 000
Total	+10 000	Total	+10 000

In the real world, a change in RR is just one of many factors which influence the demand for or the release of RR. These factors are found in the balance sheet items of the central bank.[77]

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In normal times, the banks usually do not have ER. Rather they have a borrowed reserves (BR), or liquidity shortage (LS), condition, which is the quintessence of monetary policy: the KIR is made effective by the existence of a BR condition and strongly influences the banks' lending rates (and therefore the demand for loans which, when granted, has money creation as an outcome). In abnormal times central banks create an ER condition (by the purchase of, for example, bonds) in order to force interest rates down (sometimes as low as the cost of banking, aka the intermediation margin).

In terms of the monetary analysis:

ΔM3		= +MWK 100 000
BSSoC	= ΔLPS	= +MWK 100 000.

The actual source of change (ASoC) was twofold: APF's decision to borrow and the CDH's decision to grant the loan.

After a month the transaction was reversed (see Appendices 6–7) and the balance sheet changes were the converse of those indicated above (see Balance Sheets 4–6).

BALANCE SHEET 4: APF (MWK)			
Assets		Liabilities	
Deposits at banks	-100 000	Loans from banks (CDH)	-100 000
Total	-100 000	Total	-100 000

BALANCE SHEET 5: CDH INVESTMENT BANK (MWK)			
Assets		Liabilities	
Loans (APF)	-100 000	Deposits of NBPS (APF) (= money)	-100 000
Total	-100 000	Total	-100 000

BALANCE SHEET 6: CENTRAL BANK (MWK)			
Assets		Liabilities	
Loans to banks @ KIR (BR)	-10 000	Bank reserves (TR) [ER = 0] [RR = -10 000]	-10 000
Total	-10 000	Total	-10 000

Money was destroyed:

ΔM3		= -MWK 100 000
BSSoC	= ΔLPS	= -MWK 100 000.

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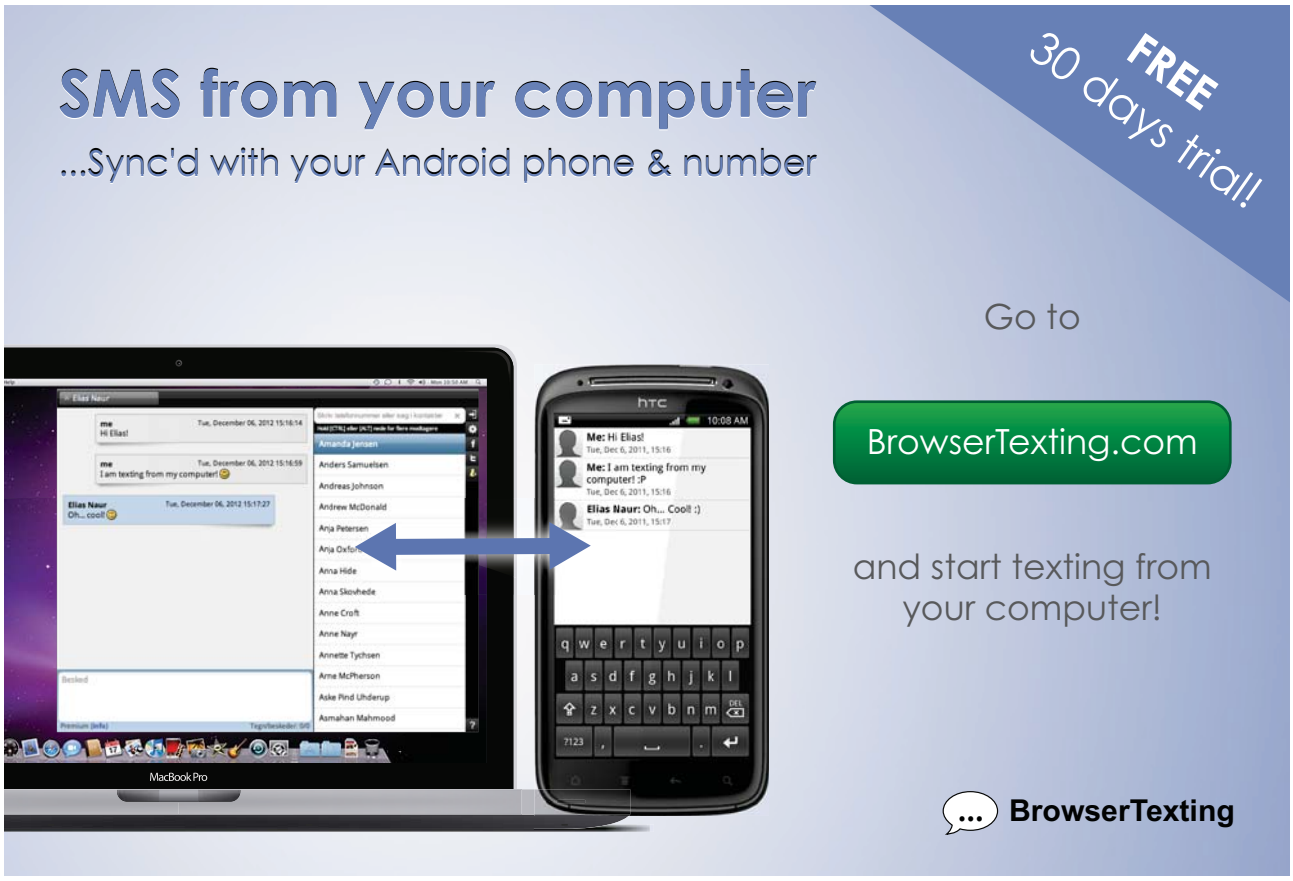
There can be no doubt that a new bank loan creates a new bank deposit (money), even if we make the experiment more "complicated":

1. APF would request an overdraft facility from CDH and utilise it when it suits him.
2. APF would spend the funds on goods.
3. The goods seller would most likely receive the money on deposit at another bank (assume XYZ Bank).

When APF utilises the facility and makes an EFT to the account of Goods Seller at Bank XYZ, changes take place as indicated in Balance Sheets (7–11). It is important to understand that all interbank settlements take place over the banks' accounts with the central bank (TR) (which they are obliged to have).

BALANCE SHEET 7: APF (MWK)			
Assets		Liabilities	
Goods	+100 000	Loans from banks (CDH)	+100 000
Total	+100 000	Total	+100 000



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BALANCE SHEET 8: GOODS SELLER (MWK)			
Assets		Liabilities	
Goods Deposits at banks (XYZ)	-100 000 +100 000		
Total	0	Total	0

BALANCE SHEET 9: CDH INVESTMENT BANK (MWK)			
Assets		Liabilities	
Loans (APF) Reserves (TR) [ER = 0) [RR = -100 000]	+100 000 -100 000		
Total	0	Total	0

BALANCE SHEET 10: XYZ BANK (MWK)			
Assets		Liabilities	
Reserves (TR) [ER = +100 000) [RR = 0]	+100 000	Deposits of NBPS (Goods Seller)	+100 000
Total	+100 000	Total	+100 000

BALANCE SHEET 11: CENTRAL BANK (MWK)			
Assets		Liabilities	
		Bank reserves (Total reserves) [CDH = -100 000] [XYZ Bank = +100 000]	0
Total	0	Total	0

At this stage (at the end of the business day) CDH is short of reserves, and XYZ Bank has ER, to the extent of MWK 100 000. Assuming that both banks are in a BR situation, balance sheet changes will take place as indicated in Balance Sheets 12–14.

BALANCE SHEET 12: CDH INVESTMENT BANK (MWK)			
Assets		Liabilities	
Reserves (TR) [ER = 0) [RR = +100 000]	+100 000	Loan from central bank @ KIR	+100 000
Total	+100 000	Total	+100 000

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BALANCE SHEET 13: XYZ BANK (MWK)			
Assets		Liabilities	
Reserves (TR) [ER = +100 000) [RR = 0]	+100 000	Deposits of NBPS (Goods Seller)	+100 000
Total	+100 000	Total	+100 000

BALANCE SHEET 14: CENTRAL BANK (MWK)			
Assets		Liabilities	
Loans to banks @ KIR (BR) [CDH = +100 000] [XYZ Bank = -100 000]	0	Bank reserves (Total reserves) [CDH = +100 000] [XYZ Bank = -100 000]	0
Total	0	Total	0

As the above may be a little confusing, we present the net situation in Balance Sheets 15–17 (the balance sheets of the NBPS remain as indicated above).

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BALANCE SHEET 15: CDH INVESTMENT BANK (MWK)			
Assets		Liabilities	
Loans (APF)	+100 000	Loans from central bank @ KIR	+100 000
Total	+100 000	Total	+100 000

BALANCE SHEET 16: XYZ BANK (MWK)			
Assets		Liabilities	
		Deposits of NBPS (Goods Seller) Loans from central bank @ KIR	+100 000 -100 000
Total	0	Total	0

BALANCE SHEET 17: CENTRAL BANK (MWK)			
Assets		Liabilities	
Loans to banks @ KIR (BR) [CDH = +100 000] [XYZ Bank = -100 000]	0		
Total	0	Total	0

When we consolidate the balance sheets of the banking sector (CDH, XYZ Bank and the central bank), in which interbank claims are netted out, we are able to produce a consolidated balance sheet of the monetary banking sector (MBS) as shown in Balance Sheet 18.

BALANCE SHEET 18: CONSOLIDATED BALANCE SHEET OF MBS (MWK)			
Assets		Liabilities	
Loans (to APF)	+100 000	Deposits of NBPS (Goods Seller)	+100 000
Total	+100 000	Total	+100 000

Thus, in terms of the monetary analysis:

$$\Delta M3 = +MWK\ 100\ 000$$
$$BSSoC = \Delta LPS = +MWK\ 100\ 000,$$

which is identical to the experiment shown above, that is, the case when APF took the loan and kept the funds on deposit: new bank loans create new bank deposits (money). This exercise also indicates that there is a direct link between the monetary economy and the real economy: new bank loans represent new aggregate demand (real goods are sold and replenished by the seller): [$\Delta(C + I) = \Delta GDE$; $\Delta GDE + \Delta(X - M) = \Delta GDP$ in nominal terms)[78].

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Money creation is the outcome of new bank loans (in the main, as shown). It is endongenously determined, and there is no such thing as exogenous money. The reserves-focused Monetarist approach is a monetary policy *model*, not a process of money creation. In this model (which is a theoretical model) money is also created endogenously.

It is notable that once money is created the new deposit-holders decide on the term of the deposit, that is, to which monetary aggregate it moves: M1, M2, or M3. Therefore, a money-output analysis is better served by the association between ΔLPS and ΔGDP in nominal terms (ΔGDP_N) (see Figure 5; 1966–2011). The correlation coefficient is 0.5 (there are of course many other factors in the money-output association). There is also a robust long-term relationship (see Figure 6; 1966–2011)[79]. Perhaps the money-output analysis should be a two-step one, focused on LPS: (1) LPS-GDP_N; (2) GDP_R-inflation trade-off (GDP_R = real GDP).

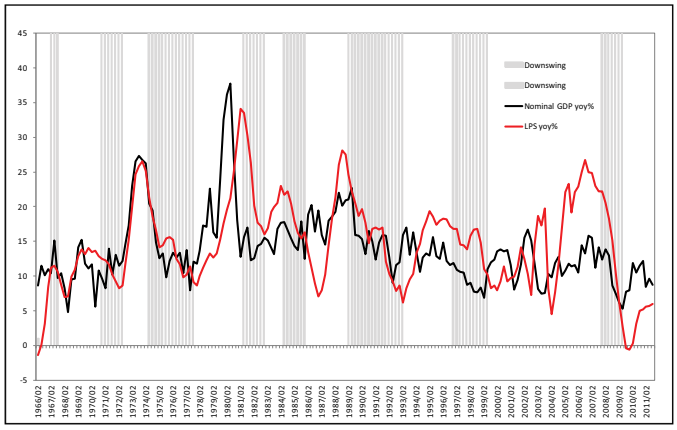

Figure 5: Changes (yoy%): Nominal GDP & LPS

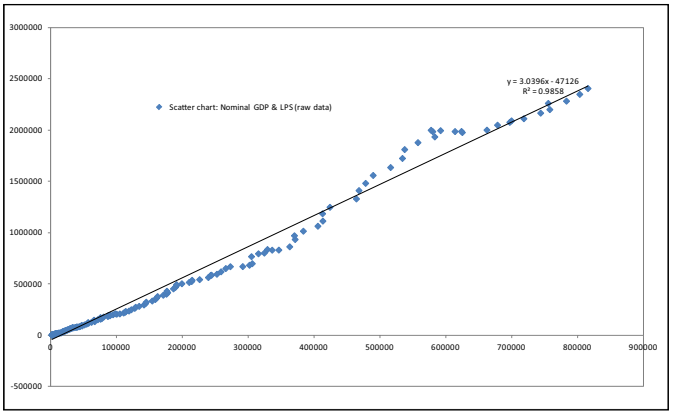

Figure 6: Scatter chart: Nominal GDP & LPS (raw ZAR data)

6.3 References

Faure, AP (2012–2013). Various which can be accessed at http://ssrn.com/author=1786379.

Faure, AP (2013). Various which can be accessed at
http://bookboon.com/en/banking-financial-markets-ebooks

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Appendix 1: Loan application

Memorandum

To : Misheck Esau CEO/MD, CDH Investment Bank

From : AP Faure

Date : 5th December 2012

Subject: Short term loan: K100,000.00

I would like to apply for a loan facility amounting to K100,000 at commercial terms.

Term	:	1 months
Collateral security	:	Cash
Source of repayment	:	
Purpose	:	To buy Malawi-made souvenirs for the family in Capetown

Once approved, please credit the proceeds to my non-resident current account in your books.

I look forward to your favourable consideration.

Regards,

AP Faure

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Appendix 2: Board memorandum

CDHIB

Board Memorandum

To : **Board of Directors**

From : **Management**

Date : **5th December 2012**

Subject: **Short term loan for Prof AP Faure**
K100,000

Borrower	:	Prof AP Faure
Amount	:	K100,000
Interest rate	:	Base rate currently at 33%
Arrangement fee	:	2% payable in advance
Term	:	1 months)
Collateral security	:	Cash
Source of repayment	:	

Commodities Limited, a related entity to CDH Investment Bank.

We confirm that he does not owe CDH Investment Bank anything and the above terms are all at arms' length and are in compliance with our policy with regard to lending to connected persons.

We seek your approval.

Regards,

XXXXXXXXXXXXXXXXXXXX

Misheck Esau

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Appendix 3: Loan approval by board resolution

INVESTMENT BANK

CERTIFIED BOARD RESOLUTION

I **ARTHUR ALICK MSOWOYA**, Company secretary of CDH Investment Bank Limited hereby certify that the following resolution was passed by the Board of Directors of CDH Investment Bank Limited on Wednesday 5th December 2012.

"That a loan facility of K100, 000.00 to be extended to AP Faure payable after one month.

That management of the Bank is authorized to extend the credit facility to AP Faure [redacted] the facility has to be approved by CDHIB Board"

SIGNED: [redacted]

ARTHUR ALICK MSOWOYA
COMPANY SECRETARY
CDH INVESTMENT BANK LIMITED

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Appendix 4: Loan account schedule (current)

INVESTMENT BANK

Blantyre Banking Centre
Loan account schedules

Customer	XXX	Account Number	XXXXXXXX
Name	Alexander Pierre Faure	Currency	MWK
Address	XXXXXXX	Description	Cash cover personal loan
	XXXXXX	Amount Financed	100,000.00
	XXXXXXX	Maturity Date	05-Jan-2013
	South Africa	Value Date	05-Dec-2012
		Interest Rate	33
		Penalty Rate	43
		Total Outstanding	100,000.00
		Status	Active

Schedule Due Date	Component Name		Amount Due	Amount Settled	Outstanding
05-Dec-2012	Arrangement fee		5,000.00	5,000.00	0.00
05-Dec-2012	Arrangement fee		0.00	0.00	0.00
		Total	5,000.00	5,000.00	0.00
05-Jan-2013	Main Interest		2,796.07	0.00	0.00
05-Jan-2013	Principal		100,000.00	0.00	0.00
		Total	102,796.07	0.00	0.00

Loan account summary

Total repayments	:	0.00	Total arrears	:	0.00
Total interest debits	:	0.00	Total penalty interest	:	0.00

End of statement

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Appendix 5: Disdursement of loan (current account credited)

CDH
INVESTMENT BANK

Prof Alexander Pierre
Alexander Pierre Faure
XXXXXXXXXX
XXXXXXXXXX

Account number : XXXXXXXX
Account type : XXXXXXXXXXXXXXXXXX
Currency : Malawi Kwacha

Account summary

Total debits (2)	:	Uncollected balance	:
Total credits (2)	:	Available balance	:
Blocked balance	:		

For the period 01-Feb-2012 to 31-Dec-2012

Txn date	Value date	Description	Reference	Debit	Credit	Balance
		Opening balance				0
5-Dec-12	5-Dec-12	Loan fees	002CCPL123400001	5,000.00		-5,000.00
5-Dec-12	5-Dec-12	Disbursement of loan	002CCPL123400001		100,000.00	95,000.00
		Closing balance				95,000.00

*** End of statement ***

We thank you for banking with us

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Appendix 6: Loan account schedule (after repayment)

INVESTMENT BANK

Blantyre Banking Centre

Loan account schedules

Customer	XXXX	Account Number	XXXXXXXX
Name	Alexander Pierre Faure	Currency	MWK
Address	XXXXXXXX	Description	Cash cover personal loan
	XXXXX	Amount Financed	100,000.00
	XXXXXXX	Maturity Date	05-Jan-2013
	South Africa	Value Date	05-Dec-2012
		Interest Rate	33
		Penalty Rate	43
		Total Outstanding	0.00
		Status	

Schedule Due Date	Component Name	Amount Due	Amount Settled	Outstanding
05-Dec-2012	Arrangement fee	0.00	0.00	0.00
05-Dec-2012	Arrangement fee	0.00	0.00	0.00
	Total	0.00	0.00	0.00
05-Jan-2013	Main Interest	0.00	0.00	0.00
05-Jan-2013	Principal	0.00	0.00	0.00
	Total	0.00	0.00	0.00

Loan account summary

Total repayments	:	0.00	Total arrears	:	0.00
Total interest debits	:	0.00	Total penalty interest	:	0.00

End of statement

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Appendix 7: Current account debited to clear loan

CDH INVESTMENT BANK

Prof Alexander Pierre
Alexander Pierre Faure
[illegible]

Account number : [illegible]
Account type : [illegible]
Currency : Malawi Kwacha

Account summary

Total debits (2)	:	Uncollected balance	:
Total credits (2)	:	Available balance	:
Blocked balance	:		

For the period 01-Feb-2012 to 31-Dec-2012

Txn date	Value date	Description	Reference	Debit	Credit	Balance
		Opening balance				0
5-Dec-12	5-Dec-12	Loan fees	002CCPL123400001	5,000.00		-5,000.00
5-Dec-12	5-Dec-12	Disbursement of loan	002CCPL123400001		100,000.00	95,000.00
5-Dec-12	5-Dec-12	Funds withdrawal	002CCPL123	95,000.00		0.00
		Closing balance				0

*** End of statement ***

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7 Money creation: role of bank liquidity

AP Faure[80]

7.1 Abstract

The state of bank liquidity, measured as the banks' net excess reserves (NER) with the central bank, is a critical element of the successful implementation of monetary policy. Central banks have absolute control over NER and manipulate it to bring about a positive NER (in QE periods) to drive interest rates down, or a negative NER in order to have control over interest rates. The latter condition aims at influencing the exogenous force, the demand for bank loans. Satisfaction of the demand for bank loans has the simultaneous outcome of deposit money creation.

There is no such thing as exogenous money; only endogenous money creation exists. A central bank is able to exactly control the extent of money creation exactly (under the theoretical monetary base-focused monetary policy model – see below), but money creation which takes place under this model is still endogenous: new bank loans create new bank deposits (that is, money). A demand for bank loans must exist for a bank to grant loans, which is an exogenous force.

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The money stock is comprised of two parts: notes and coins (N&C) and bank deposits (BD) held by the domestic non-bank private sector (NBPS):

M = N&C + BD (held by the NBPS).

There are two monetary policy models:

- Monetary base-focused monetary policy.
- Interest rate-focused monetary policy.

The former is a theoretical model, and it rests on the money multiplier ($m = 1 / r$) [r = the reserve requirement (RR) ratio applied to bank deposits]. The growth in BD money is related to r, in that it can only increase up to the extent of excess reserves (ER) created by the central bank (CB) times m:

Money growth = ER x (1 / r).

Thus, if the CB creates ER[81] to the extent of LCC[82] 10 billion (see Balance Sheets (1–2) by purchasing government bonds from the banks, the banks may make loans (assume to the NBPS), which create deposits (money) simultaneously, to the extent of (see Balance Sheets 3–4):

Money growth = ER x (1 / r)
= LCC 10 billion × (1 / 0.1)
= LCC 100 billion.

BALANCE SHEET 1: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Bonds Reserves (total reserves - TR) (ER = +10) (RR = 0)	-10 +10		
Total	0	Total	0

BALANCE SHEET 2: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Bonds	+10	Deposits: Banks (TR) (ER = +10) (RR = 0)	+10
Total	+10	Total	+10

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BALANCE SHEET 3: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to private sector Reserves (TR) (ER = -10) (RR = +10)	+100 0	Deposits: Private sector (M3)	+100
Total	+100	Total	+100

BALANCE SHEET 4: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
		Deposits: Banks (TR) (ER = -10) (RR = +10)	0
Total	0	Total	0

Note the shift from ER to RR in Balance Sheets 3–4, and the fact that the banks now exactly comply with the RR, and can lend no further. Note also that deposit money creation took place endogenously, as a result of an exogenous force: a demand for bank loans (which was assumed above).

As noted earlier, this model is a theoretical monetary policy model. It was applied briefly in the distant past, with dire consequences in terms of volatile interest rates. It was abandoned for this reason – interest rates are a significant input in business decision-making.

The vast majority of countries adopted the *interest rate-focused monetary policy model* many decades ago. In a nutshell, it amounts to control of the banks' prime lending rate (PR) (and other lending rates which are usually benchmarked on PR), which is achieved by the creation (in normal, non-QE-policy times) of a liquidity shortage (LSh) (= borrowed reserves – BR) in order to make the central bank's policy or key interest rate (KIR effective). An effective KIR affords the central bank control over PR and, therefore, the demand for bank loans (as discretion is exercised it is not an exact science). The control a central bank has is demonstrated in the relationship between PR and KIR for a particular country[83] for a period of over 50 years (see Figure 1; the correlation coefficient is 0.98). This country ensures that the banks are in a borrowed reserves condition at all times – to ensure that the KIR remains effective.

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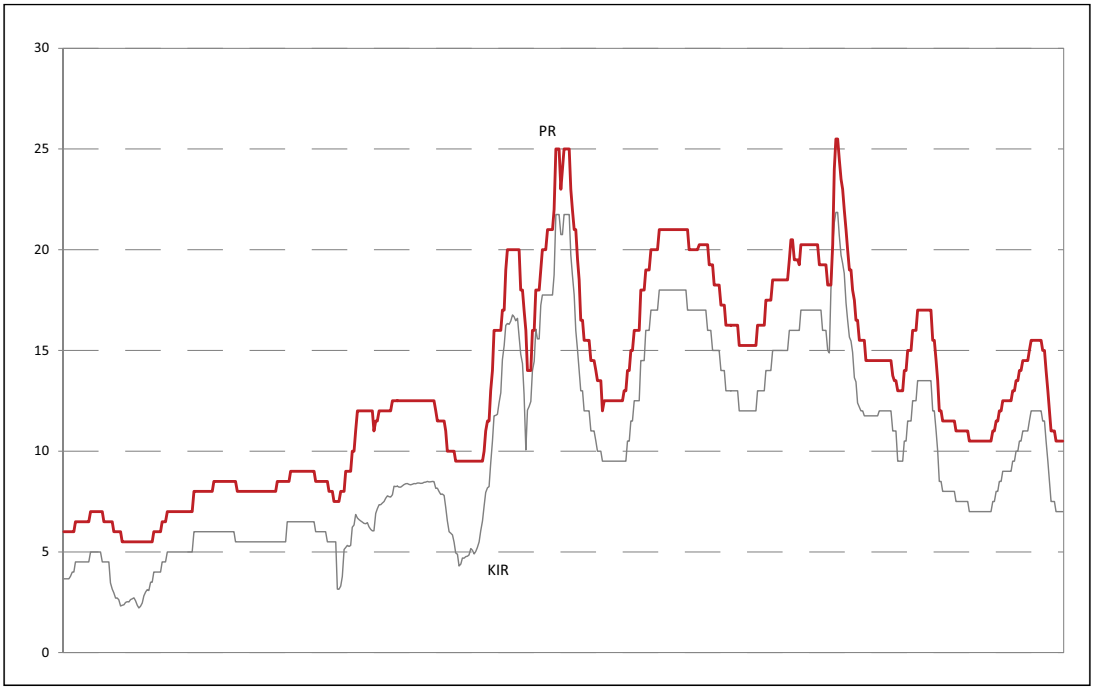

Figure I: KIR & PR (month-ends for over 50 years)

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The reserves required by banks, as they make loans and create deposits, are accommodated by the central bank, as part of its control over the LSh (= BR). An example of central bank accommodation (in the form of on-demand loans – BR – from the central bank, which is the case in the practice in normal times) is presented in Balance Sheets 5–6 (banks make loans of LCC 1 000 billion to the NBPS, which creates LCC 1 000 billion of new deposits; the RR ratio is 10% of deposits):

BALANCE SHEET 5: BANKS (LCC BILLIONS)			
Assets		Liabilities	
Loans to NBPS Reserves at CB (TR) (ER = 0) (RR = +100)	+1 000 +100	Deposits of NBPS (money) Loans from CB (BR) @ KIR	+1 000 +100
Total	+1 100	Total	+1 100

BALANCE SHEET 6: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
Loans to banks (BR) @ KIR	+100	Bank reserves (TR) (ER = 0) (RR = +100)	+100
Total	+100	Total	+100

The central bank is accommodative, that is, supplies the BR on demand, as part of its policy to ensure that the BR condition is on-going.

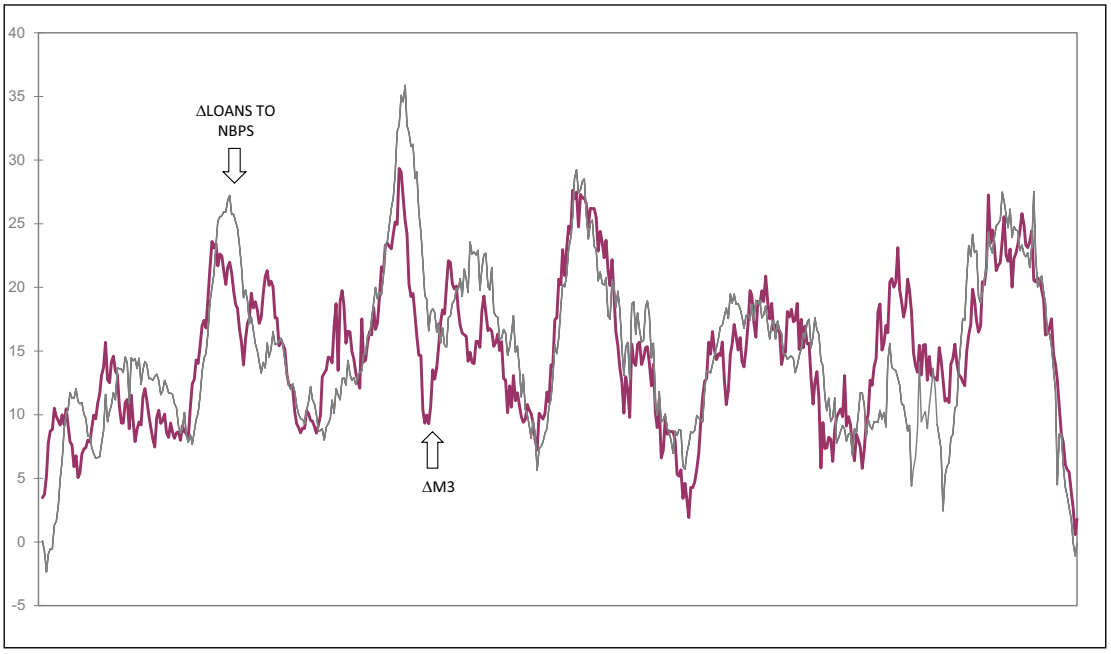

Figure 2: M3 & loans to NBPS (yoy %)

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The above is an example of where bank liquidity is kept "short", that is, when the banks collectively are indebted to the CB (a BR condition exists). However, this policy exists (in slightly different forms in different countries) in normal times – when the money stock is increasing (the outcome of bank lending) and the CB controls PR via its policy rate (KIR), as indicated in Figure 1.Through this mechanism, it influences the exogenous force, the demand for bank loans, and therefore the growth rate in the money stock. The relationship between the growth rates in bank loans to the NBPS and M3 (for a period of over 50 years) is shown in Figure 2.

Conditions do arise when central banks wish to drive interest rates to the lowest levels possible. These periods usually arise at the end of recessions and continue into low-growth periods, and the policy (now known as a QE policy) is designed to encourage bank lending / money creation. By the purchase of bonds the central bank creates ER for the banks. As banks cannot use, create or destroy central bank money (CBM), the only way they can utilise the ER is to make loans (encouraged by the low lending rates), which creates new deposits, which carry a RR. Through this mechanism, the dividing line between ER and RR is shifted in favour of the latter, as shown in Balance Sheets 1–4.

It should be evident that the RR is only one of many factors which influence bank liquidity. In order to elucidate, we present the simplified (we have left out unimportant items such as *other assets*, *other liabilities* and *capital and reserves*) balance sheet of the central bank in Balance Sheet 7.

BALANCE SHEET 7: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA)	1 800	A. Notes & coins (N&C)	2 000
E. Loans to government (LG)[84]	2 100	B. Deposits:	
G. Loans to banks (BR)	100	1. Government sector	1 000
		2. Banks (TR)	500
		(a. ER = 0)	
		(b. RR = 500)	
		C. Loans: Foreign sector	500
Total	4 000	Total	4 000

From this balance sheet we can create what can be called a *bank liquidity analysis* (BLA). On the left of the identity we have the net excess reserves (NER) of the banking sector, an indicator of bank liquidity (as far as CBM is concerned). This is made up of the ER of the banking sector (item B2a) less the extent of loans to the banking sector (at the KIR), that is, the liquidity shortage (LSh = BR = item F):

$$NER = B2a - F.$$

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

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

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

$$\text{NER} = \text{B2a} - \text{F} = (\text{D} - \text{C}) + (\text{E} - \text{B1}) - \text{A} - \text{B2b}.$$

Using the numbers in Balance Sheet 7, we have NER and its counterparts (in LCC billion) as follows:

$$\begin{aligned}\text{NER} &= \text{B2a} - \text{F} &&= (\text{D} - \text{C}) + (\text{E} - \text{B1}) - \text{A} - \text{B2b}\\ &= 0 - 100 &&= (1\,800 - 500) + (2\,100 - 1\,000) - 2\,000 - 500\\ &= -100 &&= 1\,300 + 1\,100 - 2\,000 - 500\\ & &&= -100.\end{aligned}$$

It will also be evident that from one date to another the changes (Δ) as well as the balance sheet sources of changes (BSSoC) can be calculated:

$$\Delta\text{NER} = \Delta(\text{D} - \text{C}) + \Delta(\text{E} - \text{B1}) - \Delta\text{A} - \Delta\text{B2b}.$$

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Thus, a change in the NER of the banking system is *caused* by changes in the remaining balance sheet items (that is, the BSSoCs):

ΔNER =

Δ(D – C)	= net foreign assets (NFA)
+ Δ(E – B1)	= net loans to government (NLG)
– ΔA	= N&C in circulation
– ΔB2b	= required reserves (RR).

The actual sources of changes (ASoC) are the transactions that underlie the BSSoC. It will be evident that the instruments of open market operations (OMO) are NFA (usually forex swaps), NLG (purchases / sales of government securities in the main) and that the RR ratio (*r*) can also be used (rarely so in practice) to also manipulate bank liquidity (NER). For example, the sale of forex to a bank (a forex swap) will decrease NER [(increase the LSh (item F)]. The BSSoC is a decrease in NFA. Similarly, the sale of Treasury bills to the banks will decrease NER (increase the LSh). The BSSoC is a decrease in NLG. Thus, the CB has total control over bank liquidity (assuming efficient markets).

BALANCE SHEET 8: CENTRAL BANK (LCC BILLIONS)			
Assets		Liabilities	
D. Foreign assets (FA)	1 800	A. Notes & coins (N&C)	2 000
E. Loans to government (LG)[85]	2 300	B. Deposits:	
G. Loans to banks (BR)	0	1. Government sector	1 000
		2. Banks (TR)	600
		(a. ER = 100)	
		(b. RR = 500)	
		C. Loans: Foreign sector	500
Total	4 100	Total	4 100

It will also be evident that in a recessionary period (assuming the above numbers to be in place) the CB can change the NER condition of the banking sector at will [to a liquidity surplus (LSu) under a QE policy] by, for example, purchasing LCC 200 billion bonds from the banks (see Balance Sheet 8). This will result in (in LCC billions):

ΔNER		= +200 billion
BSSoC	= ΔNLG	= +200 billion.

The *outstanding* NER condition will be (in LCC billions):

NER = B2a – F
= 100 – 0
= 100.

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Is this a robust analysis? Because a balance sheet balances, one can create an identity for any item. It is robust because it is based on the fact that all interbank settlement takes place over the accounts which banks are required to maintain with the CB. For example, when the central bank sells government bonds (LG in its balance sheet) to the banks, the banks' accounts with the CB will be debited (= a decline in TR). If the banks have no ER, they are obliged to take loans (BR = item F) from the CB at the KIR (assuming the bond sale = LCC 100 million):

NER		= B2a – F
		= 0 – 100
		= – LCC 100 million
BSSoC	= ΔNLG	= – LCC 100 million.

The ASoC is the OMO sale.

The above demonstrates that bank liquidity (NER) is firmly under the control of the CB. Most countries' monetary policy approach (that is, the interest rate-focused monetary policy) rests on creating and maintaining a liquidity shortage (in normal circumstances) in order to make the KIR effective. But, as discussed earlier, in abnormal times, when a QE policy is required, the CB is able to bring about an LSu condition, rendering the KIR irrelevant, thus driving down interest rates to low levels.

7.2 References

Faure, AP (2012–2013). Various which can be accessed at http://ssrn.com/author=1786379.

Faure, AP (2013). Various which can be accessed at
http://bookboon.com/en/banking-financial-markets-ebooks

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8 Money matters: there is no such thing as a money "supply"

AP Faure[86]

8.1 Abstract

Monetary literature remains plagued by references to money "supply" at a time when the endogeneity of money is becoming generally accepted. Money endogeneity is not a hypothesis; it is a fact, and one that has existed since a goldsmith-banker wrote out the first receipt (bank note) and handed it to a borrower (as opposed to a depositor of gold coins). The creation of money has *always* been endogenous, even under the Friedman-Schwartzian Monetarist fixed-money-rule model. Once this is accepted, then it is logical to refer to the *quantity* or *stock* of money, and to the *supply* of bank credit. The household, corporate and government sectors borrow from banks to consume (C) or invest (I), which are the major components of nominal GDP [C + I + net exports (= aggregate demand, AD)]. Domestic credit extension (DCE) thus represents the link between the monetary and real economies. Money creation is the outcome of the change in DCE; the latter, not the change in M, approximates the change in AD (there are other influences). The essence of monetary policy is that the central bank controls the (reference) prime lending rate (PR) of banks via its policy interest rate (PIR), and thereby the demand for bank credit. It controls PR in normal (ie non-QE) times by manipulating the liquidity of banks to a borrowed reserves condition (actual, close to, or threat of), in order to make the PIR effective. The causation path is clear.

8.2 Introduction

It is astonishing that in 2013 many papers on monetary matters continue to refer to the money "supply". There are two sources of money creation (ΔM3): changes in *domestic credit extension* (ΔDCE) and in *net foreign assets* (ΔNFA, which may also be seen as *net foreign credit extension*).

ΔNFA represents the portfolio decisions of the private banks and the central bank in respect of foreign borrowing and lending (and is a small factor in most countries), while ΔDCE represents changes in the extension of bank credit to the private (household and corporate) and government sectors. The private and government sectors borrow (ΔDCE) to consume (C) or invest (I), which, together with net exports (E_N = exports – imports) are the components of nominal GDP ($C + I + E_N = GDP_N$)[87], which is also called aggregate demand, AD). Domestic credit extension (DCE) thus represents the link between the monetary and real economies. Money creation (ΔM) is the outcome of ΔDCE; the latter, not ΔM, represents ΔAD (to a large degree).

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It is notable the R^2 of DCE and M3 is close to 1.0 for most countries (UK = 0.994; US = 0.996; Japan = 0.98). Substantiation is presented in Figure 1 (for the US).

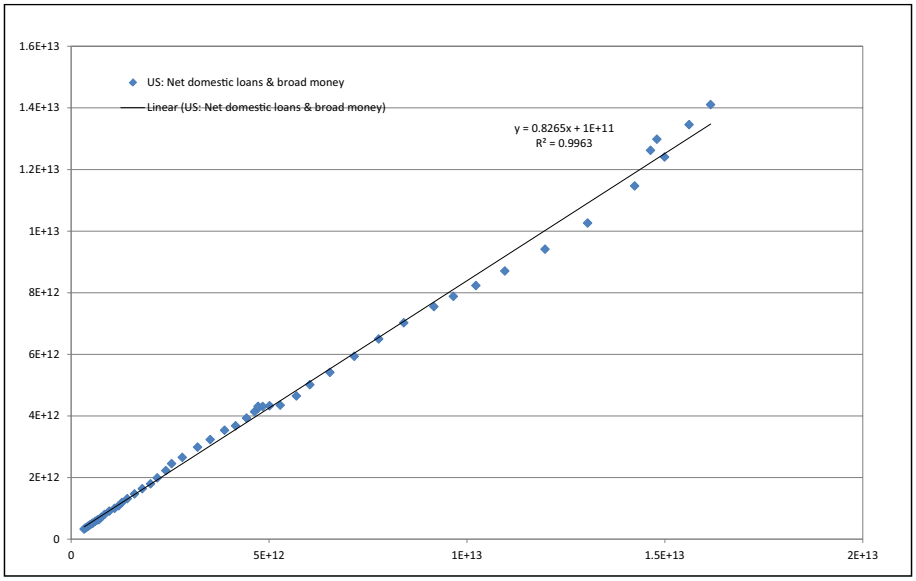

Figure 1: USA: DCE & M3

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The R^2 of ΔDCE and ΔM3 ranges from 0.6 (UK = 0.6; US = 0.7) to 0.9 (Japan: see Figure 2).

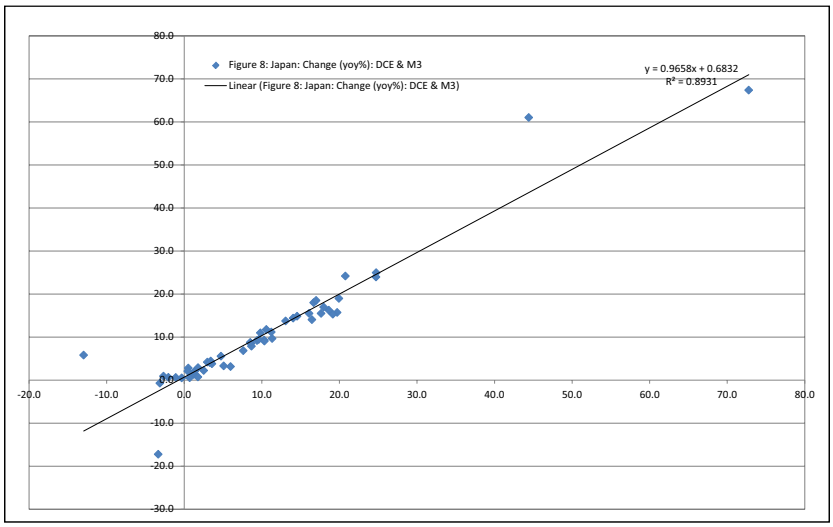

Figure 2: Japan: Change (yoy%): DCE & M3

The causation path is obvious: ΔDCE → ΔM3.

The relationship between DCE and GDP_N (that is, DCE representing, and being the major driver of, GDP_N) in the long-term is also clear, as shown in Figure 3 (raw LCU data for DCE and GDP_N: R^2 = 0.99) and Figure 2 (ΔDCE and ΔGDP_N: R^2 = 0.6). (The latter R^2 is robust but indicates that there are many other shorter term influences.)

The above evidence (World Bank data) is convincing. It is discussed more fully in the Faure literature listed in the references.

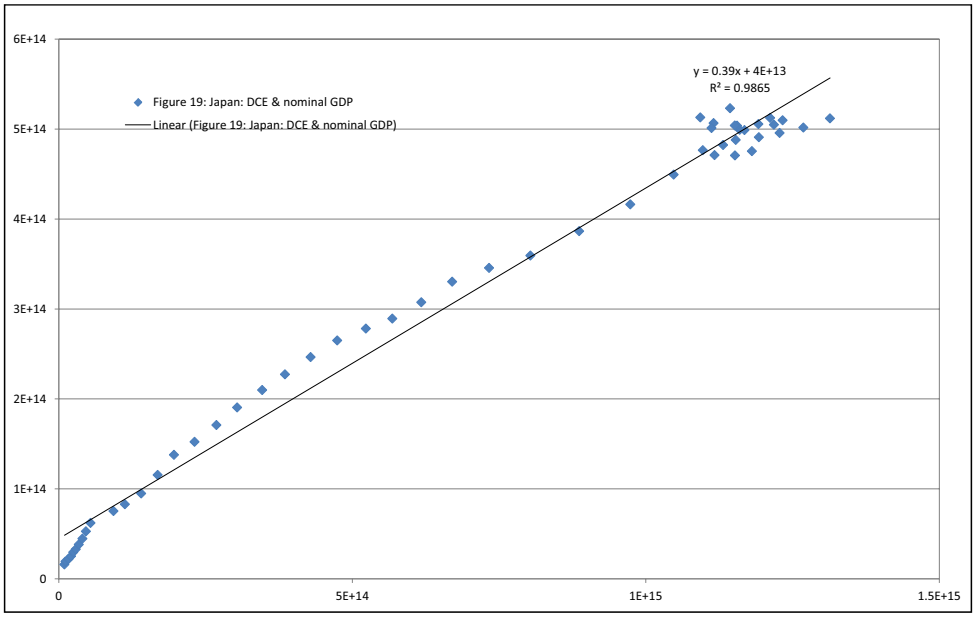

Figure 3: Japan: DCE & nominal GDP

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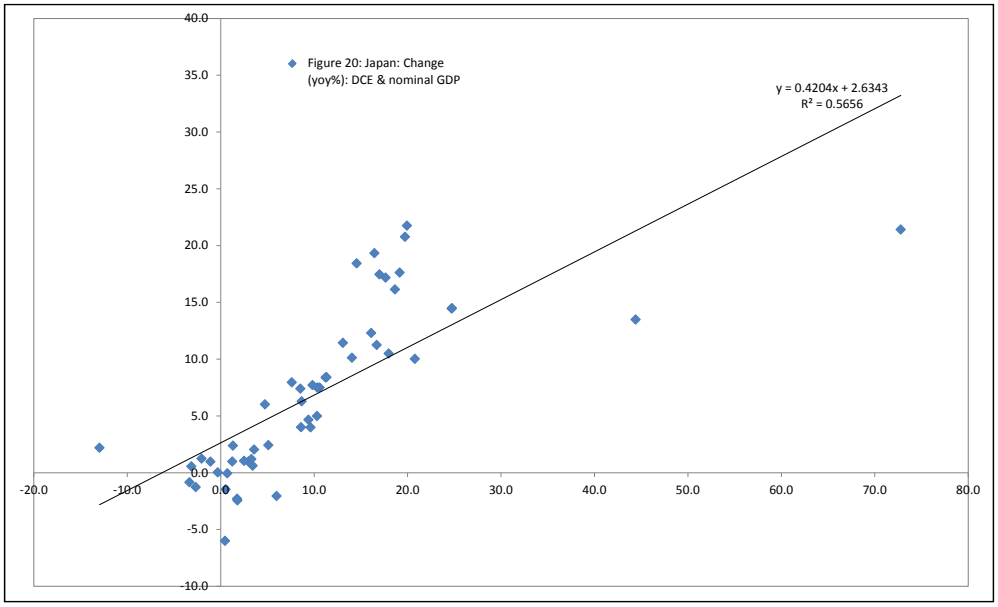

Figure 4: Japan: Change (yoy%): DCE & nominal GDP

The above is presented as a backdrop. This paper is an endeavour to persuade the monetary scholars who have reservations on the reality that there is no such thing as a money "supply". Instead, there is such a thing as a supply of credit, and it is constrained only by credit demand which largely is a function of its price (the banking sector's prime lending rate (PR_N) and rates related to this benchmark rate). This is the principal instrument of the central bank. The other instruments assist in the execution of the principal instrument. These issues are covered in the following sections:

- Literature review.
- Data.
- Money creation in a nutshell.
- Money aggregates.
- Money "supply" does not exist.
- Monetary policy in a nutshell.

8.3 Literature review

It is not necessary to provide a literature review, because almost every piece of monetary literature uses the terminology *money supply*. Many scholars also exhibit a puzzling disconnection between DCE and M3.

8.4 Data

The data used in this paper are from the World Bank (World Bank, 2013) and the South African Reserve Bank (South African Reserve Bank, 2013). In the latter case the data frequency are monthly and the period is 1965–2012. In the former case the data frequency are annual and the period is 1960–2012.

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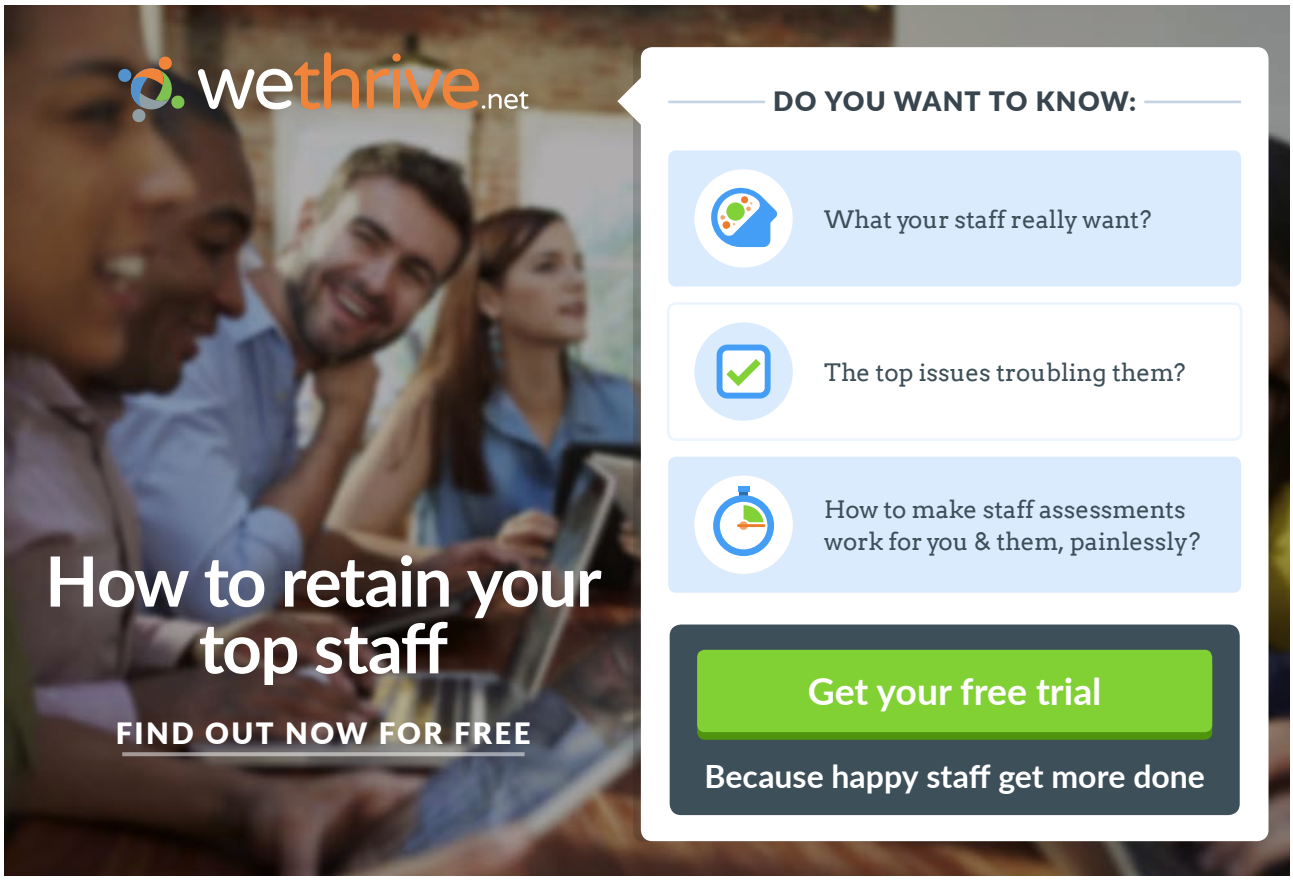
8.5 Money creation in a nutshell

There is no such thing as exogenous money creation, but there is a monetary policy model (MPM) according to which the growth rate in the money stock can be controlled (which we like to term the *reserves-focussed MPM*). This is the Friedman-Schwartzian (Chicago Monetarist School) model which proposed a strict "money rule", that is, the growth rate in the money "supply" can be controlled 100% by the central bank via the monetary base (MB) [total reserves (TR = MB) = required reserves (RR: bank reserves held against deposits) + excess reserves (ER)] over which it has a monopoly. The existence of the money multiplier m [r = RR ratio; assume 10%]:

$$m = 1 / r$$

means that for every LCC[88] 100 billion of reserves[89] held by the private banking system it can hold deposits (BD = M3) to the extent of:

$$\begin{aligned} \text{BD} = \text{M3} &= \text{LCC } 100 \text{ billion} \times 1 / 0.1 \\ &= \text{LCC } 100 \text{ billion} \times 10 \\ &= \text{LCC } 1\,000 \text{ billion.} \end{aligned}$$



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Thus, for every LCC 100 million of excess reserves (ER) created by the central bank (by say buying bonds), the banks can create LCC 1 000 million in new deposits (M3):

$$\begin{aligned} \Delta BD = \Delta M3 &= \Delta ER \times 1 / r \\ &= \text{LCC 100 million} \times 1 / 0.1 \\ &= \text{LCC 100 million} \times 10. \\ &= \text{LCC 1 000 million.} \end{aligned}$$

Through this mechanical relationship, the central bank can control the extent of money "supply" growth. However this MPM says nothing about the *process of money creation*. It still relies on a demand for credit, because the source (ignoring ΔNFA) of ΔM3 is ΔDCE.

The *reserves-focussed MPM* is a model that was flirted with briefly in the US (and elsewhere), and was abandoned due to the volatility of interest rates it was the cause of: *it is a law of economics that when controlling a quantity (money) its price cannot be controlled*. As said, in this model, money is still created by bank credit extension. There is no other way.[90]

The endogenous money creation "hypothesis" is not a hypothesis, but a reality which began when the first English goldsmith-banker discovered in the 17th century that he could make a loan to a client by writing out a goldsmith-banker receipt (they later became bank notes), because the receipts (originally issued for gold deposits) came to be accepted as a means of payments (together with precious metal and other coins). Money was only exogenous when precious metal coins alone were the means of payments[91].

As said, the empirical reality is that money creation can only be endogenous (for detailed discussions see the Faure literature listed in the References). Most central banks (the author is an ex-central banker) have never thought otherwise, because it is an observable fact – as reflected in the monetary analyses (calculation of the money stock and its balance sheets sources) they routinely do on a monthly basis, which is summarised here:

The broad money stock (M3) is comprised of notes and coins (N&C) and bank deposits (BD) held by the domestic non-bank private sector (NBPS):

M3 = N&C + BD (held by NBPS).

The stock of M3, as well as the balance sheet sources of changes (BSSoC) in M3, is calculated by central banks, usually monthly, by consolidating the collective balance sheets of the private sector banks with that of the central bank. It is called the consolidated balance sheet[92] of the monetary banking sector (MBS). A simple example of the MBS balance sheet is presented in Balance Sheet 1.

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BALANCE SHEET 1: CONSOLIDATED BALANCE SHEET OF MBS (LCC BILLION)			
Assets		**Liabilities**	
		A. Notes & coin (M3)	600
		B. Deposits:	
D. Foreign assets (FA)	1 900	1. Government	800
E. Credit to government (CG)	1 900	2. Private sector (M3)	4 000
F. Credit to private sector (CPS)	2 000	a. Call & current a/c's (M1): 1 000	
		b. Other ST + MT deps: 2 000	
		c. LT deposits: 1 000	
		C. Loans: foreign sector	400
Total	**5 800**	**Total**	**5 800**

An identity can now be created:

M3 = A + B2 = 4 600 (600 + 4 000)

= (D – C) = 1 500 (1 900 – 400) Net foreign assets (NFA)
+ (E – B1) = 1 100 (1 900 – 800) Net credit to govt (NCG)
+ F = 2 000 Credit to private sector (CPS)
TOTAL = 4 600.

It also tells us that from a date to another date (in practice month-end to month-end) the BSSoC of changes (Δ) in M3 can be calculated as follows:

ΔM3 = ΔNFA + ΔNCG + ΔCPS.

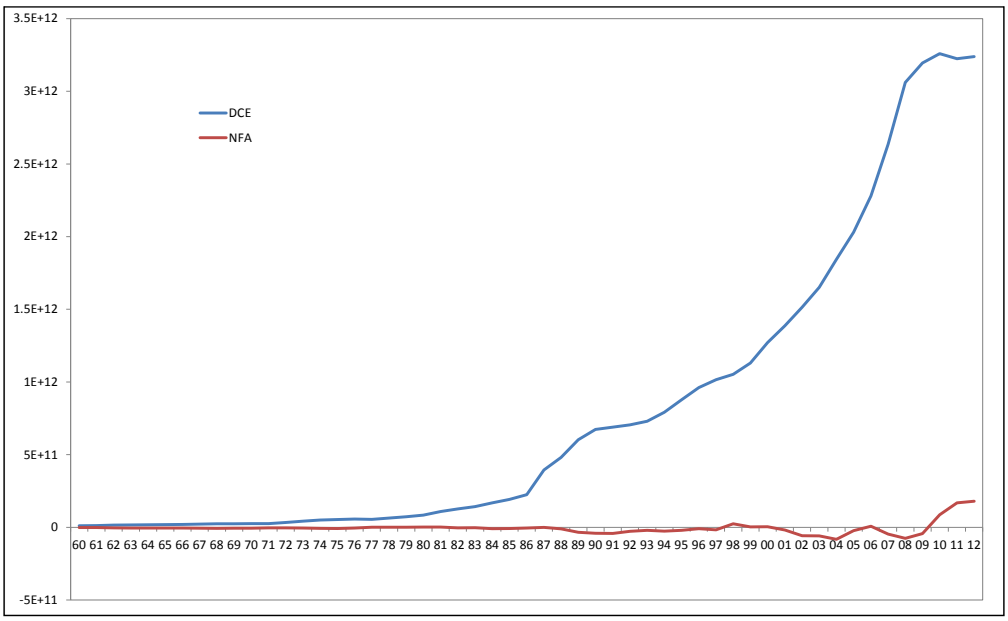

Figure 5: DCE & NFA

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NFA can be seen as net foreign credit extension. If we combine the domestic BSSoC (NCG + CPS) we get domestic credit extension (DCE). Thus:

$$\Delta M3 = \Delta NFA + \Delta DCE.$$

ΔNFA is a minor BSSoC in M3 in most countries. An example is given in Figure 5 (UK: DCE & NFA in LCU[93]). This was also indicated in Figure 1 (in that DCE is the major factor). Another of the latter is presented in Figure 6 (UK: DCE & M3: $R^2 = 0.994$).

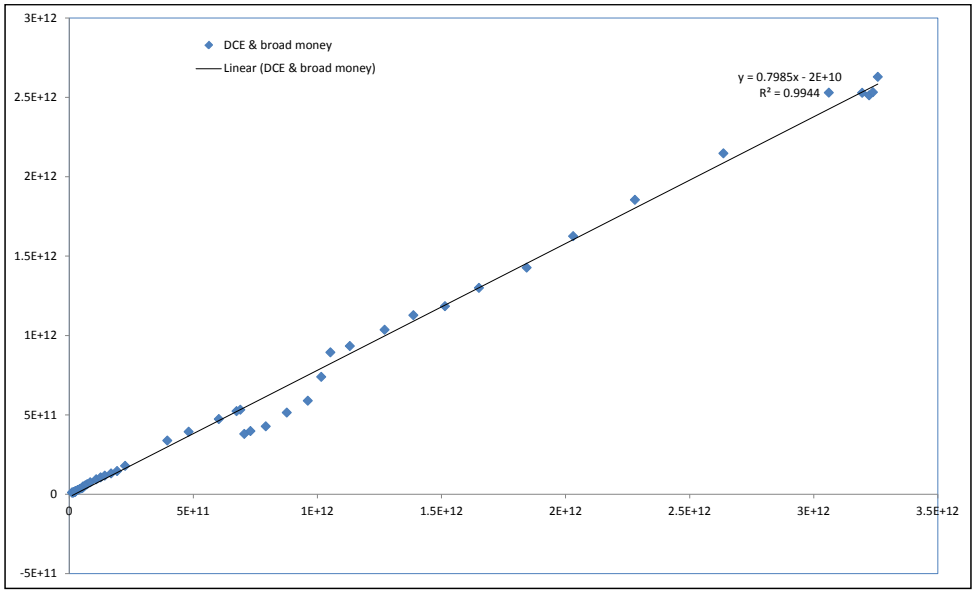

Figure 6: DCE & M3

The *actual* sources are the transactions that underlie the BSSoC, the principle one being the demand for bank credit which is satisfied by the banking sector. The causation path is:

Demand for bank credit → satisfaction by bank (asset = ΔDCE) → simultaneous deposit money creation (bank liability = ΔM3).

In the recent past (and, irrationally, it persists in text books) it was maintained that a bank had to receive a new deposit in order to make a new loan. The question needs to be asked: where did the deposit originate from? It can only be from another deposit in the banking system[94].

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8.6 Money aggregates

There are a number of money aggregates (see Balance Sheet 1). As we are dealing with a principle, we define them simply as follows (all held by NBPS):

- M1 = N&C + deposits immediately available (call & current a/c deposits).
- M2 = M1 + other deposits up to 6 months' maturity.
- M3 = M2 + long-term deposits (LTD).

When money is created they are in the form of deposits immediately available (M1 deposits). Thereafter, the deposit holders can shift them to any deposit maturity desired. For example, a shift from an M1 deposit to a LTD will mean: ΔM1 = -LCC 100 million, with no change in M3. One can create a monetary analysis for M1 as follows:

$$\Delta M1 = \Delta NFA + \Delta DCE - \Delta LTD \text{ (increase -; decrease +).}$$

The analysis for M3 remains unchanged as M3 includes M1 (-) and LTD (+). It is evident that the BSSoC in M1 is technical.

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What is the significance of this? It is that there is no question of a "supply" of M1, M2 or M3. There is a supply of bank credit which, when supplied (as a result of satisfied demand), leads to an increase in M1 deposits. Thereafter the deposit may be shifted to any maturity desired, which is a portfolio decision. A "supply" of M1, M2 or M3 does not exist.

8.7 Money "supply" does not exist

As said, when one accepts that the path of causation is:

New bank credit extension → new bank deposit (money),

and that a demand for new bank credit must exist (an exogenous factor) for this process to take place, then is it obvious that there is no such thing as a money "supply". *Money creation is the outcome of new bank loans*. Thus, there is a supply of bank loans (which is *not* inhibited by the availability of bank reserves), which is constrained only by bank borrower creditworthiness / project viability (in the view of the bank), bank large loan prudential requirements, and so on.

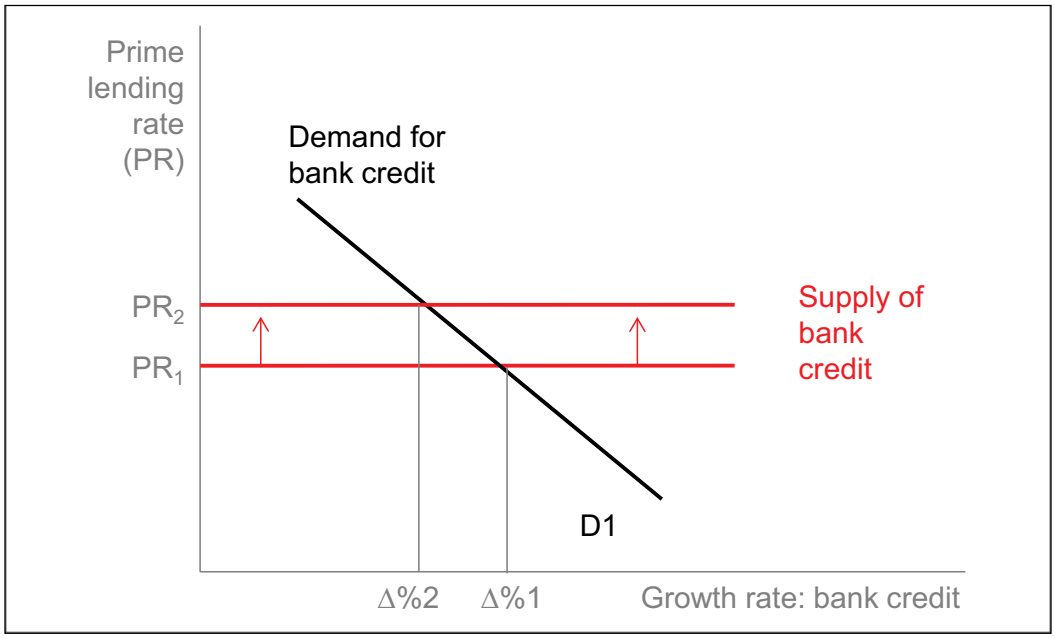

Figure 7: Supply of and demand for bank loans

This may be depicted as in Figure 3. It shows a (infinitely elastic) horizontal credit supply curve which shifts up or down according to the exogenously-determined (that is, by the central bank) PR_N (and therefore PR_R) levels (via the policy interest rate – PIR – see next section). Note that on the horizontal axis we have the *growth rate* in bank credit, as opposed to the quantity of credit. This is because a shift in the horizontal supply curve will bring about a change in the *growth rate* in bank credit. Figure 4 demonstrates that (in South Africa) changes in the growth rate of DCE never become negative and that its *growth rate* responds to PR_R after a lag.

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From the point of view of the borrower, the major restraining factor is the loan interest rate offered by the bank (PR_N and other rates benchmarked on it), and especially so in real terms (PR_R). It is a major input in a project's viability (in the case of a corporate borrower), and the ability to service / repay the debt (in the case of an individual who is, for example, borrowing to purchase a dwelling), which is a function of present income, income expectations, etc.

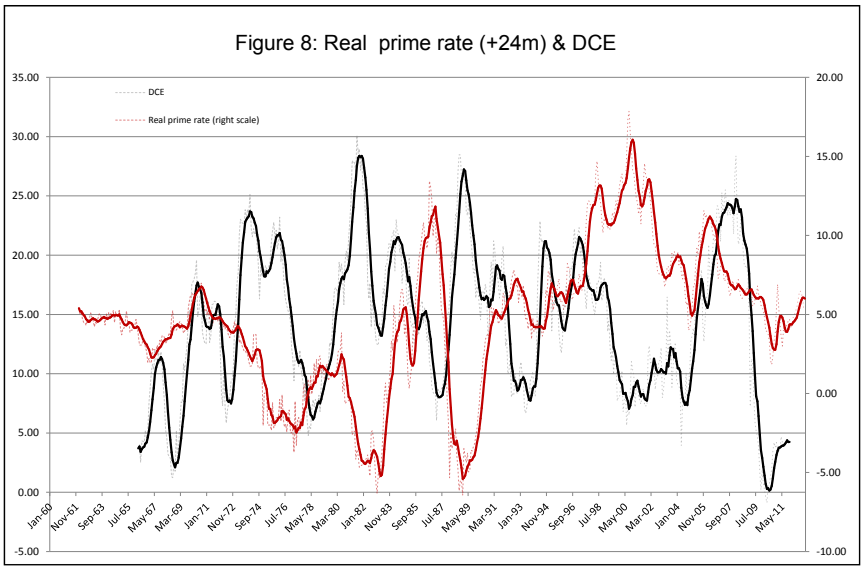

Figure 8: Real prime rate (+24m) & DCE

Thus, there is a *stock* or a *quantity* of money but there is no money *supply*. There is a supply of goods and services, and money is used to purchase them. Money is the medium of exchange, and the existing stock of money is "turned around" slowly or quickly (as registered in the velocity of M1 – V_{M1}). An addition to the money stock is the outcome of an additional demand for bank loans which is satisfied by the banking sector.

There are non-monetary influences on the money stock, such as bank dis- and re-intermediation by customers (for example a company buying bonds from a bank with a bank deposit), securitisation by the banks themselves, etc., but these are minor factors.

In order to concretise this significant economic issue we need to elucidate the core of monetary policy.

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8.8 Monetary policy in a nutshell

Since the abandonment of the *reserves-focussed MPM* (which is now a theoretical model in textbooks), there is one MPM (there are variations but they are small): the *interest rate-focussed MPM*. In summary:

It is evident that in a monetary system where bank liabilities (deposits) are the principal means of payment, and banks are able to create them by simply making loans (depending on demand), there can be no market-determined interest price / rate. If interest rates were unfettered in the *interest rate-focused MPM* many banks, being keen competitors, will get into trouble, as happened often in the age of the goldsmith-bankers, and as we have seen after the sub-prime banking debacle. The consequences for depositors will be profound. Banks will be inherently unstable in such an environment.

In such a system an arbiter is required, and the central bank performs this function. Its primary function is to set the rate of interest on bank credit, because new bank credit extended is the principal source of new bank deposits (money creation). This is done via its PIR, which is made effective by the creation of a permanent liquidity shortage (that is, the existence of a permanent borrowed reserves – BR – condition[95]). The MB plays no role whatsoever; it is an outcome of deposit creation, and the central bank supplies RR on demand. A change in the MB is just one of the many factors which central banks take into account when managing bank liquidity.

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The PIR has a direct impact in the bank-to-bank interbank rate, which in turn impacts on wholesale call deposit rates, and in turn on all deposit rates. As banks maintain a more or less fixed "bank margin" (the margin is "sticky"), the PIR influences the prime lending rate (PR_N and PR_R) of the banks (and marketable asset rates), as shown in Figures 9 and 10 (1960–2012; South African monthly data; $R^2 = 0.98$). The level of bank lending rates (PR) influences the demand for bank credit and its outcome, money creation.

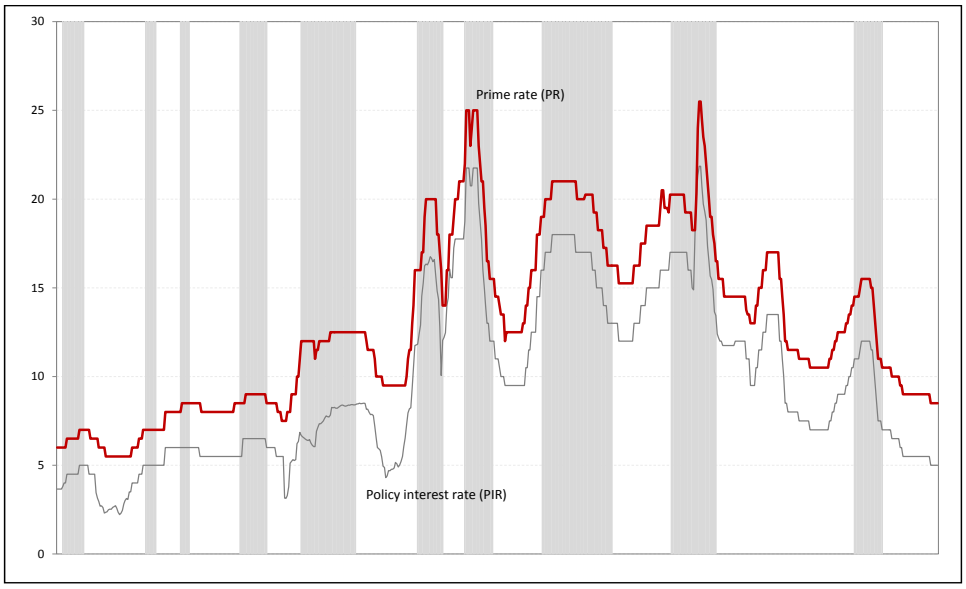

Figure 9: PIR & PR (month-ends: 1960–2012)

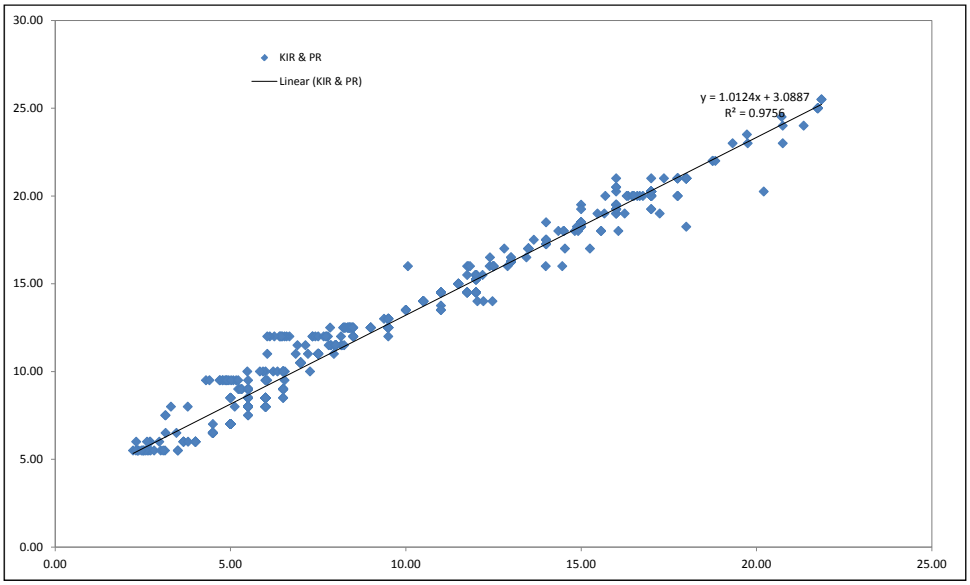

Figure 10: Scatter chart: PIR & PR

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This is the essence of the *interest rate-focused monetary policy model*. Given that money is the liabilities of banks, there is no other way for the system to be managed (however, as said, there are variations on the theme.) The monetary base is the outcome of bank lending / deposit creation, not the driver. This model recognises that the only process of money creation is bank credit extension [and the small BSSoC, net foreign asset (NFA) accumulation]. The causation path is clear:

$$\Delta PIR \rightarrow \Delta PR \rightarrow \Delta \text{demand for credit} \rightarrow \Delta \text{extent of satisfaction by banks (ie } \Delta DCE = \Delta M) \rightarrow \approx \Delta AD.$$

8.9 References

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9 Money matters: money "demand" is meaningless

AP Faure[96]

9.1 Abstract

Much intellectual energy has been devoted over many decades to the concept of money "demand" and its significance for monetary policy. It is obvious that the non-bank private sector (NBPS) does hold non-interest-bearing money (incongruously called money "demand") for specific purposes (in the main, transactions), but in our view the concept is completely meaningless for monetary policy. Supporters of money "demand" significance exhibit a misunderstanding of the process of money creation and its direct link with the real economy: money creation is the direct outcome of domestic credit extension (DCE) (the raw-data R^2 for the countries tested approaches 1.0), and DCE growth represents nominal GDP growth (because the NBPS borrows to spend) (the raw-data R^2 approaches 1.0). The growth in DCE, in turn, is heavily influenced by the bank lending rate (particularly in real terms, with a lag), which is the target of the only instrument the central bank has: the policy interest rate (PIR) (the other instruments assist in making the PIR effective). Thus, interest rates and GDP are principal arguments in monetary matters, but not in the way portrayed in the money "demand" literature.

Keynes (1936) started the ball rolling on money "demand" issues with his liquidity preference function which, he said, together with the quantity of money, determines the rate of interest. Derived from this is $M = L(r)$[97] which he told us "…is where, and how, the quantity of money enters the economic scheme." Keynes also introduced us to the motives for holding money, and stated that liquidity preference "…fixes the quantity of money which the public will hold when the rate of interest is given", implying that the can be a state of excess "supply" of money that no one wishes to hold.

Friedman and Schwartz took the issue to another level stating, inter alia, that the "demand" for money was a stable function of income (positively) and the rate of interest (negatively), and that it is critical for monetary policy. Like Keynes they stated that there can be an excess of money that is not willingly held.

The Keynes-Friedman/Schwartz legacy on money "demand" lives on in the large volume of research that has been conducted over the past decades, despite arguments that money "demand" is nonsensical (Moore, Howells, Palley, Goodhart, etc[98].)

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Money "demand" means that, of the assets held by the corporate and household sectors, a certain amount will be held in the form of non-interest-bearing money [notes and coins, and bank current (and similar) accounts]. The extent is influenced by two main factors:

- Aggregate income (ie GDP), which has a positive influence, because it represents economic transactions. Scholars are divided on whether real GDP or nominal GDP is relevant.
- The interest rate, which has a negative influence, because it represents the opportunity cost of holding money. Thus, when interest rates are positive or rise, there is a major incentive to move out of money and into income-earning assets.

Some scholars have included other factors, such as the exchange rate and foreign interest rates (for open economies), and even advertising spend.

The purpose of the money "demand" research has been to examine the stability of the demand for money function, on the assumption that stability of the function says that there is a predictable relationship between changes in the money "supply" and the function's relatively few "arguments": mainly (1) income (GDP) and (2) interest rates. This makes monetary policy a useful instrument of economic policy.

We present a few views in this regard:

Bahmani-Oskooee, Kutan and Xi (2013)

"Money demand stability is an important issue for policymakers. A stable money demand function indicates that there is a reliable and predictable link between changes in monetary aggregates and changes in variables included in the money demand function. Money demand stability is also critical for selecting monetary policy instruments to target inflation.

Kolluri, Singamsetti & Wahab (2012):

"…we…view money demand and its stability as an important monetary policy issue due to its direct link with money supply, interest rates, and economic growth. Hence, money demand should play an important role directly or indirectly in the conduct of any monetary policy."

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Hossain (2010).

"The implications of a stable money demand function are well-known since Friedman (1959) proposed a fixed money supply growth rule to maintain price stability. The money growth rule follows his famous proposition that 'inflation is always and everywhere a monetary phenomenon'.… This represents the classical view on the monetary source of inflation. When inflation is defined as 'a steady and sustained rise in prices'…a central bank can maintain low and steady inflation by keeping the money supply growth rate low and steady. Underlying this approach to monetary policy is the key assumption that the money demand function is stable and the country under consideration operates under a flexible exchange-rate system so that the central bank acquires the maximum possible control over the money supply. As complete control of the money stock is not possible, the greater the central bank's control over the money supply, the more accurately it can calculate and target the rate of monetary growth necessary for 'price stability' as defined earlier."

Guerron-Quintana (2009).

"The demand for money has been a long-standing puzzle in the monetary economics literature… Understanding the demand for money is critical because of its implications for welfare analysis…the dynamics of exchange rates…and optimal monetary policy…"

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Judd and Scadding (1982):

"What is being sought in a stable demand function is a set of necessary conditions for money to exert a predictable influence on the economy so that the central bank's control of the money supply can be a useful instrument of economic policy. As such, the notion of a stable demand function appears to involve three key elements…. First, the demand for money relation should be highly predictable in a statistical sense as measured by the usual goodness-of-fit statistics, precision of estimated coefficients and (presumably) its ability to forecast accurately out of sample. Second, a stable demand function for money has relatively few arguments; a relationship that requires knowledge about a large number of variables in order to pin it down is, in effect, not predictable. Finally, the variables that appear as arguments in the function should represent significant links to spending and economic activity in the real sector. In sum, a stable demand function for money means that the quantity of money is predictably related to a small set of key variables linking money to the real sector of the economy."

TABLE 1: MONEY AGGREGATES (HELD BY THE DOMESTIC NON-BANK PRIVATE SECTOR)

	Interest-bearing
Notes and coins in circulation	No
+ Cheque and transmission deposits	No
= M1A	
+ Other demand deposits	Yes
= M1	
+ Other short-term and medium-term deposits	Yes
= M2	
+ Long-term deposits	Yes
= M3.	

Note: the aggregates differ from country to country.

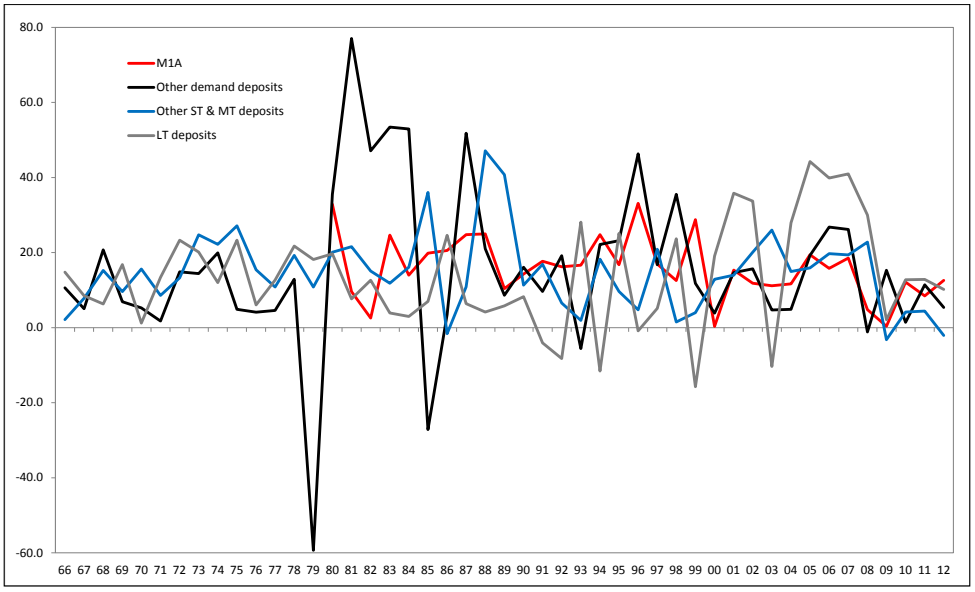

Figure 1: Term-categories of private sector deposites (yoy%)

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We have multiple problems with the "demand" for money theory, including:

- The terminology: "Demand" indicates that there is a "supply" and that some price is an outcome. In the case of money, there is no price outcome because money is the medium of exchange.
- There is no such thing as a money "supply". There is a stock of money, which is the outcome of past bank credit extended. There is a supply of bank credit and it is constrained only by the rate at which it is available. (See further below.)
- The NBPS holds money willingly for transactions purposes only, and they hold such money in non-interest bearing accounts: current and transmission accounts (M1A deposits as shown in Table 1). This is "pure" money.
- There are multiple investment opportunities for money not required for transactions purposes, including opportunities where there is no market risk (about which Keynes made a big issue): demand (call money) deposits, which have a one-day notice period (this is where the largest volatility is found: see Figure 1), and so on.
- There can never be an over-supply of money, and money is willingly held for transactions purposes. When there is money in excess of transaction requirements deficit economic units repay debt, and surplus economic units make investments (1-day for ultra-short-term excesses, and so on). Modern banking practice and technology make such action seamless.
- Stability of the money "demand" function has been elusive, that is, the literature yields conflicting estimates for the coefficients of the money demand equation. As a result scholars have moved from attempting to find the monetary Holy Grail in the M1A aggregate to monetary aggregates which contain deposits which are interest-bearing. This conflicts with the kernel of the theory.

We are not surprised that the monetary Holy Grail is elusive, because it is our opinion that the entire theory is based on a profound misinterpretation of the working of the monetary system. We endeavour to elucidate:

There are two of monetary policy models (MPM) (there are variations but they do not rescind the argument):

- *Reserves-focussed MPM*, founded on the money multiplier (based on the monetary base – MB), which no thoughtful economist any longer takes seriously. It was flirted with in the Friedman "money rule" era, but abandoned because of interest rate volatility (if a quantity is controlled its price cannot be). It is now a theoretical textbook model.
- *Interest rate-focussed MPM*, which is the model followed worldwide (with a few exceptions by die-hard Monetarist central banks).

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It is evident that in a monetary system where bank liabilities (deposits) are the principal means of payment, and banks are able to create them by simply making loans (depending on demand), there can be no market-determined interest price / rate. If interest rates are unfettered many banks, being keen competitors, will get into trouble, as happened often in the age of the goldsmith-bankers, and as we have seen during and after the sub-prime banking debacle. Banks will be inherently unstable in such an environment.

In such a system an arbiter is required, and the central bank performs this function. Its primary function is to set the rate of interest on bank credit, because new bank credit extended is the principal source[99] of new bank deposits (money creation). This is done via its policy interest rate (PIR), which is made effective by the creation of a permanent liquidity shortage (that is, the existence of a permanent borrowed reserves – BR – condition[100]). The MB plays no role whatsoever; it is an outcome of deposit creation, and the central bank supplies required reserves (RR) on demand[101]. A change in the MB is just one of the many factors which central banks take into account when managing bank liquidity.[102]

The PIR has a direct impact in the bank-to-bank interbank rate, which in turn impacts on wholesale call deposit rates, and in turn on all deposit rates. As banks maintain a more or less fixed "bank margin" (the margin is "sticky"), the PIR influences the prime lending rate [nominal (PR_N) and real (PR_R)] of the banks (and marketable asset rates), as shown in Figures 2 and 3 ($R^2 = 0.98$).[103] The level of bank lending rates (PR) influences the *demand* for bank credit and its outcome (when satisfied by the banking sector), money creation[104]. The latter relationship is shown in Figures 4 and 5 ($R^2 = 0.98$ and 0.89, respectively)[105].

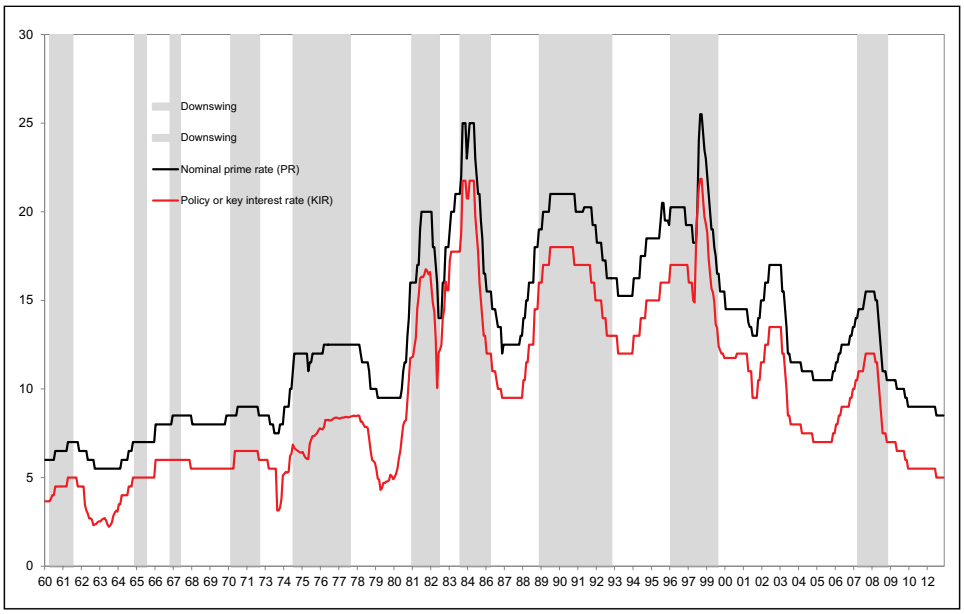

Figure 2: PIR and PR

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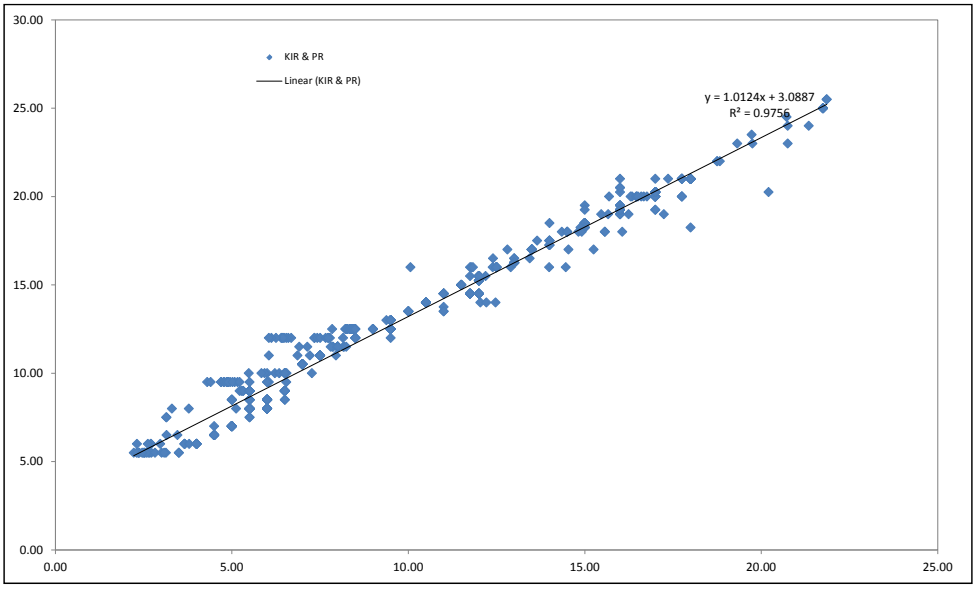

Figure 3: Scatter chart: PIR & PR

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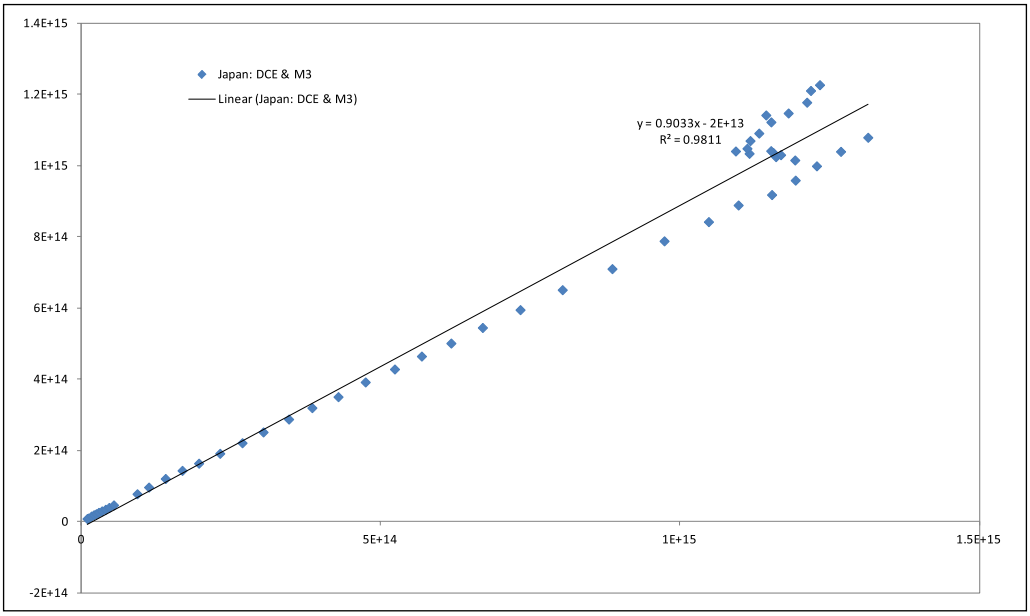

Figure 4: Japan: DCE & M3

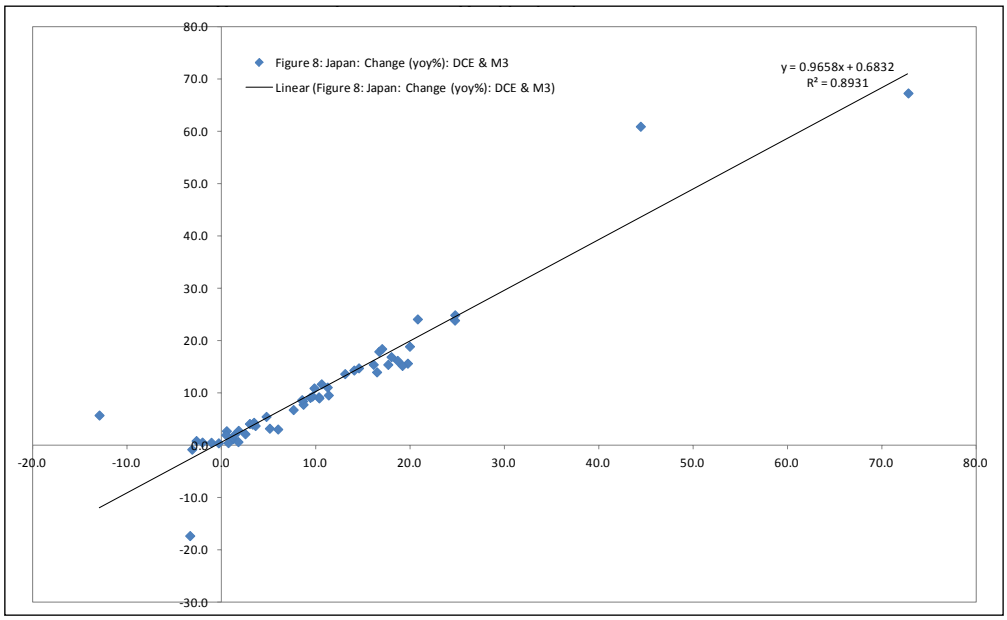

Figure 5: Japan: Change (yoy%): DCE & M3

This is the essence of the *interest rate-focused MPM*. Given that money is the liabilities of banks, there is no other way for the system to be managed (however, as said, there are variations on the theme.) The monetary base is the outcome of bank lending / deposit creation, not the driver. This model recognises that the only process of money creation is bank domestic credit extension (DCE[106]). The causation path is clear:

$$\Delta PIR \rightarrow \Delta PR \rightarrow \Delta demand\ for\ credit \rightarrow \Delta extent\ of\ satisfaction\ by\ banks\ (ie\ \Delta DCE = \Delta M) \rightarrow \approx \Delta AD.$$

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The latter *(ie ΔDCE = ΔM) → ≈ΔAD)* is significant because it represents the link between the monetary economy (ΔDCE = ΔM) and the real economy (aggregate demand – ΔAD). The NBPS borrows to spend (C + I = GDE[107]), which are the major components of AD or nominal GDP (GDP_N). As indicated in Figures 6 and 7, the relationship between DCE and GDP_N is robust (R^2 = 0.99 and 0.6, respectively)[108].

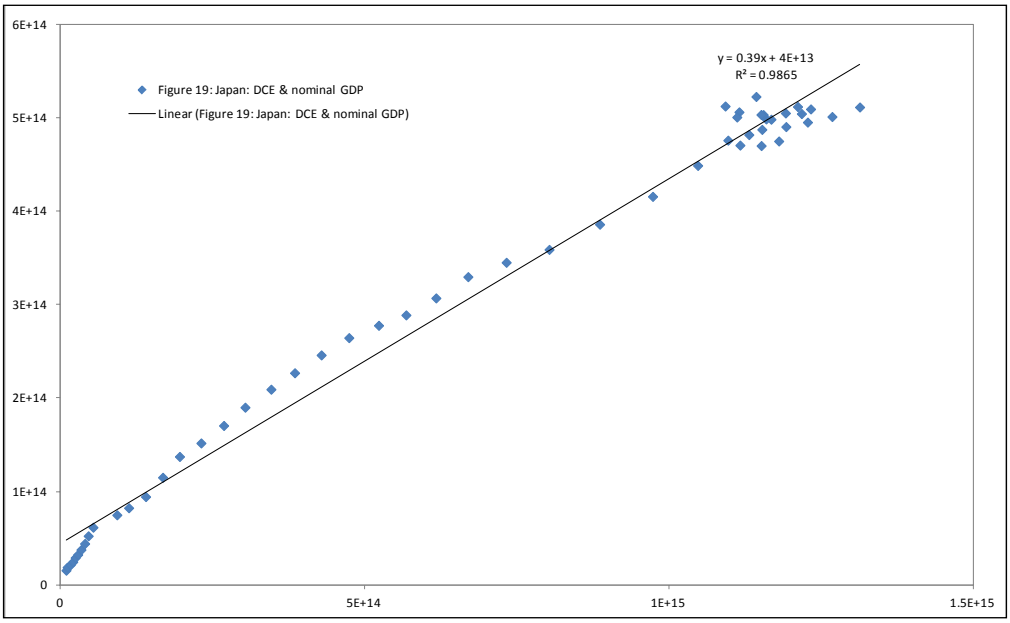

Figure 5: Japan: DCE & nominal GDP

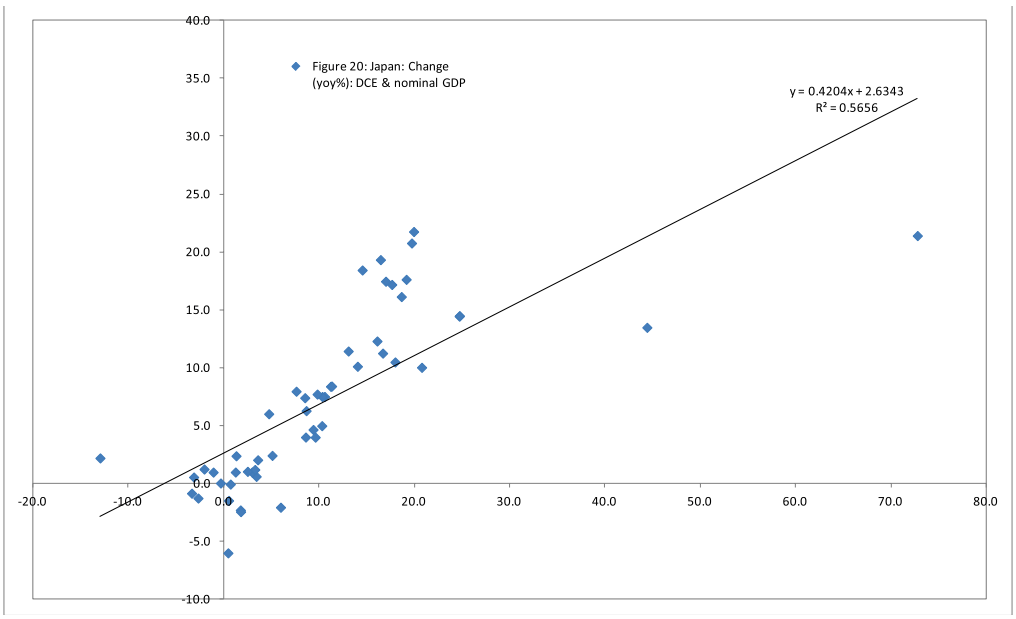

Figure 7: Japan: DCE & nominal GDP (yoy%)

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In summary: The PR_N and PR_R interest rates are under the control of the central bank (via the PIR and a BR condition), and this is so because the NBPS liabilities of banks is money. The levels of PR_N and PR_R influence the extent of DCE (and ΔM1A creation which is then kept as such or shifted to other deposits) and therefore in GDP_N. The division of GDP into its components, prices (P) and GDP_R is a function of the growth rate in AD and the elasticity of supply (and other factors).

9.2 References

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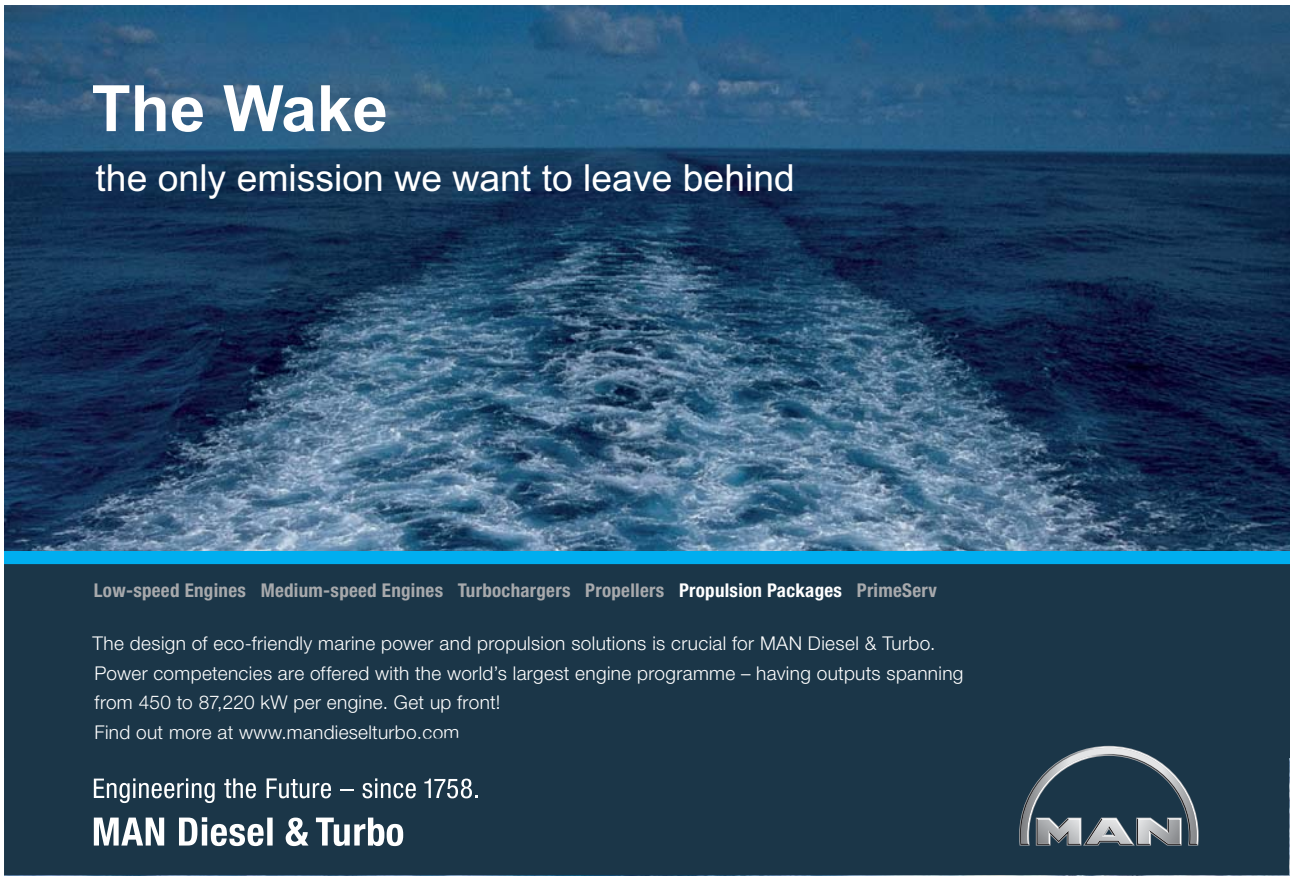
10 Endnotes

1. Foord Chair in Investments: Rhodes University, South Africa.
2. The author has knowledge of the situation in this regard in the UK, South Africa and elsewhere, as expounded in some of the Faure literature mentioned in the References.
3. Chambers Twentieth Century Dictionary.
4. If the new deposits lands up with another bank, it (assuming no other transactions) flows back to the originating banks in the form of an interbank loan.
5. Also excluding the foreign sector.
6. A bank note represents a deposit with the issuer, usually the central bank.
7. Which we do for the sake of elucidation; N&C are a small proportion of the M3 money stock.
8. The currency ("corona") code of a fictitious country: Local Country.
9. This is the widest definition of money used here. The definition of money is discussed again later.
10. South Africa: monthly data; period is over 50 years; correlation coefficient is 0.99.
11. There were some crackpot interpretations of the money creation process, such as money creation begins with a bank receiving a new deposit (BD), placing the RR with the central bank, lending out BD x (1 – *r*), which arrives back in the system as a deposit…and so on. This is nonsense because the "new" deposit comes from somewhere and no bank can create central bank money. This is part of the material for a separate article (soon to be published).



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12. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities).
13. Marketable (for example: commercial paper and corporate bonds) and non-marketable (for example: mortgage and overdraft loans to households and companies).
14. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable paper only, for purposes of open market operations (OMO).
15. Excluding capital and reserves and other assets and liabilities.
16. A similar analysis is done by all central banks. In the case of South Africa, this analysis has been done from March 1965 to the present. An ex-Governor of the South African Reserve Bank first wrote about this analysis in 1964. A later version is: van Staden (1967). The monetary statistics calculated according to this analysis can be found at www.resbank.co.za.
17. NFA is a minor BSSoC.
18. Foord Chair in Investments: Rhodes University, South Africa.
19. M1 is important, but only in terms of velocity (V_{M1}) because spending takes place in this aggregate.
20. It will be evident that when government issues bonds and Treasury bills it receives deposits (GD), which reduces non-bank private sector deposits (M1, M2 and M3). It is therefore a BSSoC and is incorporated in the analysis as a deduction from LG: LG – GD = NLG.
21. http://data.worldbank.org/country
22. LCU = local currency unit.
23. LCC is the currency code for fictitious currency "corona" of fictitious country "Local Country".
24. Includes government consumption and investment expenditure.
25. Foord Chair in Investments: Rhodes University, South Africa.
26. A number of discussions on money and money creation, and related discussions, can be found at: http://ssrn.com/author=1786379.
27. LCC is the currency code for fictitious currency "corona" of fictitious country "Local Country".
28. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities).
29. Marketable (for example: commercial paper and corporate bonds) and non-marketable (for example: mortgage and overdraft loans to households and companies).
30. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable paper only, for purposes of open market operations (OMO).
31. We ignore bank notes and coins which in the big picture, are irrelevant.
32. We assume that N&C do not rank as reserves – to keep the analysis simple. In reality N&C is minuscule in relation to total reserves. There are some countries where N&C do not rank as reserves (South Africa is one of them).
33. Foord Chair in Investments: Rhodes University, South Africa.
34. RR also denotes "required reserves" in this text.
35. The currency ("corona") code of a fictitious country, Local Country.

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36. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities).
37. Marketable (corporate bills and bonds) and non-marketable (for example: mortgage and overdraft loans to household sector and companies).
38. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable only, for purposes of open market operations (OMO).
39. In South Africa, for example, N&C do not rank as reserves.
40. Foord Chair in Investments: Rhodes University, South Africa.
41. Specifically in compiling the monetary statistics and later implementing central bank key interest rate (KIR) and bank liquidity / accommodation policy.
42. Experiencing the receiving end of policy as a dealer on the funding desk.
43. South African Reserve Bank.
44. A bank loan is a debt (liability) of the recipient, an IOU from the borrower to the bank (an asset for the bank).
45. The currency ("corona") code of a fictitious country: Local Country.
46. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities).
47. Marketable (for example: commercial paper and corporate bonds) and non-marketable (for example: mortgage and overdraft loans to households and companies).
48. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable paper only, for purposes of open market operations (OMO).
49. Excluding capital and reserves and other assets and liabilities.
50. A similar analysis is done by all central banks. In the case of South Africa, this analysis has been done from March 1965 to the present. An ex-Governor of the South African Reserve Bank first wrote about this analysis in 1964. A later version is: van Staden (1967). The monetary statistics calculated according to this analysis can be found at www.resbank.co.za.
51. NFA is a minor BSSoC.
52. Some texts in the past (and a few still) tell us that money creation begins with a new bank deposit. This is nonsense: a new bank deposit can only arise from a new bank loan. There is one exception: N&C, but to base a theory on a small part of money is misleading.
53. N&C is a minor component of M3; in most countries 2–3%. It is ignored in the interests of word-economy, but is re-introduced later again.
54. Chambers Twentieth Century Dictionary.
55. By government and/or private sector.
56. Jevons, 1875:201.
57. 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.

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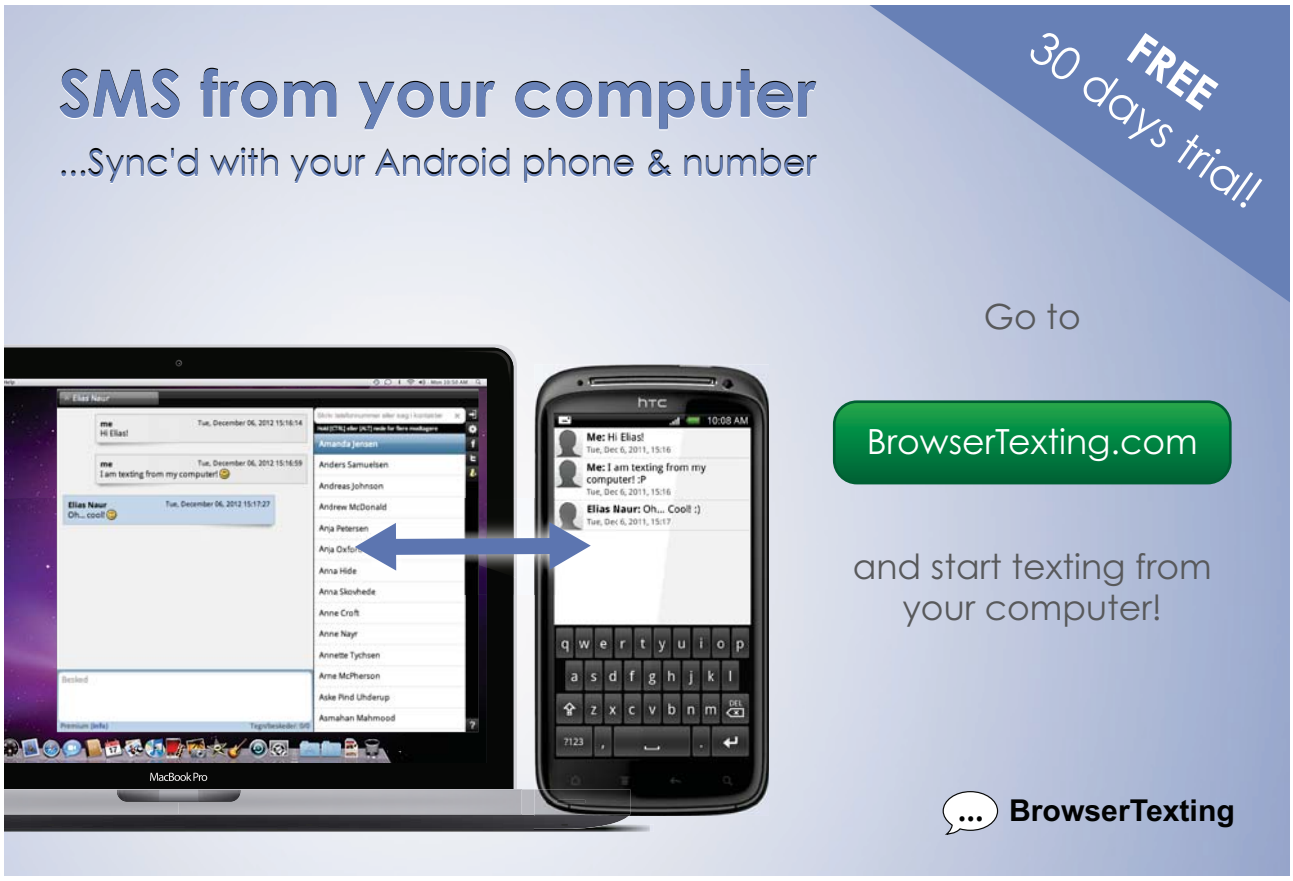
58. The goldsmith-banker is Mr Richard Hoare, the drawer of the cheque is Mr Will[iam] Hale, and the recipient is **Mr Will[iam] Morgan. The "at the golden bottle" notation was the address of the goldsmith**-banker in Cheapside, London (before street numbers were introduced in the 18th century). This goldsmith-banker exists to this day in the form of private banker C Hoare & Co. It is the only remaining goldsmith-banker owned by the same family. See http://www.hoaresbank.co.uk. The museum is well worth a visit.
59. The author was responsible for this analysis at the South African Reserve Bank for a number of years. It is also known as a *money market analysis*. He wrote up the analysis in the Quarterly Bulletin of the bank: see References.
60. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable only, for purposes of implementing open market operations (OMO).
61. This applies in all countries, but the number of days after the month-end differs. It is 21 days in South Africa.
62. Consumption (C) + investment (I) (of public and government) = expenditure on gross domestic product (GDE); GDE + exports (X) – imports M = gross domestic product (GDP).
63. At times banks are able to utilise their reserves, but under normal conditions (non-QE conditions) it is a one-way market for the banks collectively as their deposits usually increase and rarely decline.
64. Banks compete with one another to avoid borrowing from the central bank and are able to reduce their BR.



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65. Monthly data for South Africa for 11 years.
66. Monthly data for South Africa.
67. As shown in Figure 4, the relationship (correlation coefficient) has been 0.99.
68. The monetary base, base money or high powered money.
69. The author has had some exposure to the advice offered by IMF officials to African countries (for example, Uganda and Malawi), based on the money multiplier model. These officials were US citizens, obviously schooled in the US where this model was prevalent.
70. Note: prior to 1874 banks were required to hold reserves (under the National Banking Act) against their deposits and note issue.
71. Foord Chair in Investments: Rhodes University, South Africa.
72. NFA is nothing other than the holding of foreign assets, usually foreign treasury bills and bonds (= marketable foreign loans).
73. For detailed discussions see Faure (2012c, 2012d, 2013a, 2013b).
74. It would be almost impossible execute the experiment with a large bank in a large country: who would one speak with? It had to be conducted on a personal level to avoid being branded a nutcase.
75. I was charged an arrangement fee of MWK 5 000, but we will ignore this for the sake of simplicity and demonstration of the principle.
76. Note that personal details have been blocked out in all the appendices.
77. For a detailed discussion see Faure (2013c).
78. Consumption (C) + investment (I) (government and private sector) = gross domestic expenditure (GDE); GDE + exports (X) – imports (M) = gross domestic product (GDP).
79. As there are a few negative numbers in the LPS time series in the period, we instead used all the BSSoC in M3 (as said earlier, LPS is the major one).
80. Foord Chair in Investments: Rhodes University, South Africa.
81. We ignore the fact that N&C also rank as reserves, in the interests of simplicity. Doing so does not detract from the principle. In some countries this does apply (South Africa in one).
82. The currency ("corona") code of a fictitious country, Local Country.
83. South Africa.
84. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable only, for purposes of open market operations (OMO).
85. Marketable (Treasury bills and bonds) and non-marketable (for example: loans to local authorities), but usually marketable only, for purposes of open market operations (OMO).
86. Foord Chair in Investments: Rhodes University, South Africa.
87. We assume C + I include government consumption and investment spending.
88. LCC is the fictional currency code for the currency, "corona" (C), of fictional Local Country (LC).
89. We ignore notes and coins (N&C) here for the sake of simplicity. In any case, N&C are a minor component of money and will not exist at some stage in the near future. In some countries N&C do not rank as reserves.

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90. It is notable that in "Monetary trends in the United States and United Kingdom: their relation to income, prices, and interest rates, 1867–1975" (Friedman & Schwartz, 1982) never once mentioned the term "money creation".
91. Because the supply was dependent on the discovery and mining of precious metals.
92. Note that in a consolidation interbank claims [required reserves (RR), excess reserves (ER), borrowed reserves (BR) from the CB, and N&C] are netted out.
93. Local currency unit.
94. An exception is N&C, but one cannot base a system on this.
95. It may be actual, close to or threatened.
96. Foord Chair in Investments: Rhodes University, South Africa.
97. M = quantity of money; L = liquidity preference function; r = rate of interest.
98. Apologies to those I have missed.
99. The other factor is changes in the net foreign assets (NFA) of the banking sector, but it is a small factor.
100. It may be actual, close to or threatened.
101. The interbank settlement system is geared to this taking place, and it underlies the integrity of the banking system.
102. An excess reserves condition (under QE) should be seen as unusual – a condition that "forces" interest rates down in order to stimulate the demand for credit.
103. 1960–2012; South African monthly data; R2 = 0.98.
104. It should be evident that when new money is created it is M1A money. The new recipients of the money then make a portfolio decision on there to place it (other deposits or assets).
105. World Bank data for Japan: 1960–2012 and 1961–2012. The data for many other countries yield similar results.
106. And ΔNFA, although it is a small factor.
107. Consumption + investment (including government) = gross domestic expenditure.
108. World Bank data for Japan (1960–2012 and 1961–2012). While the raw data for other countries yield similar results, the change data are not as robust, indicating the presence of other factors, such as velocity of M1A, the role of non-bank financial intermediaries, and so on.

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