Money, Credit and Bank Behaviour: Need for a New Approach

By C. Goodhart
Financial Markets Group, London School of Economics

1. Introduction

The greatest book on Monetary History, Friedman and Schwartz, Monetary History of the United States, was constructed around the analytical framework of the money multiplier, whereby $M$, the money supply, would increase by a large multiple of the change in the high-powered monetary base, $H$.

$$M = H \cdot \frac{(1 + C/D)}{(R/D + C/D)}$$

Yet when the authorities in the major developed countries attempted to use this relationship to expand the money stock (and bank lending) by force-feeding the banks with base money ($H$), in the process of Quantitative Easing, the prior relationships collapsed.
R/D and C/D have looked fairly constant for a decade...

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Standard Deviation</th>
<th>Level in Jun-08*</th>
<th>R/D (as a percentage)</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK (Jun-98 to Jun-08)</td>
<td>0.59</td>
<td>0.71</td>
<td>2.46</td>
<td>4.80</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>US (Jun-98 to Jun-08)</td>
<td>0.84</td>
<td>0.15</td>
<td>0.65</td>
<td>12.02</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Eurozone (Jan-99 to Jun-08)</td>
<td>2.44</td>
<td>0.20</td>
<td>2.71</td>
<td>7.19</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>Japan (Jul-97 to Apr-08)</td>
<td>1.45</td>
<td>1.07</td>
<td>0.68</td>
<td>6.41</td>
<td>0.80</td>
<td></td>
</tr>
</tbody>
</table>

* April 08 for Japan

... So, average multipliers should have been ...

<table>
<thead>
<tr>
<th></th>
<th>Using an average R/D</th>
<th>Using a June 2008 R/D*</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>19.45</td>
<td>14.44</td>
</tr>
<tr>
<td>US</td>
<td>8.71</td>
<td>8.84</td>
</tr>
<tr>
<td>Eurozone</td>
<td>11.14</td>
<td>10.83</td>
</tr>
<tr>
<td>Japan</td>
<td>13.54</td>
<td>15.01</td>
</tr>
</tbody>
</table>
But Tiny multipliers (PNFCs & the Household sector)

<table>
<thead>
<tr>
<th>Change in Bank Reserves Held at Central Bank (%)</th>
<th>Change in Broad Money (%)</th>
<th>Change in Bank Lending to Private Sector (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2008 to June 2009 (For Japan: March 2001 to March 2006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK 372</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>USA 1853</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Eurozone 122</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Japan 103</td>
<td>8</td>
<td>-17</td>
</tr>
</tbody>
</table>


A nice example of Goodhart’s Law in operation. How did such an analytical failure occur (Section 2)? What should we put in its place (Section 3)?
2. The Old Theory

The so-called money multiplier is not derived from a behavioural relationship, but from a manipulation of identities:-

\[ M \equiv D + C \quad (1) \]
\[ H \equiv R + C \quad (2) \]

Divide all by D, and then (1) by (2)

\[ M = H \cdot \frac{(1 + C/D)}{(R/D + C/D)} \quad (3) \]

So, an identity, not a behavioural theory.

Behaviour was actually the reverse of what was assumed.

Central Bank set its official interest rate, io. Given io, the behaviour of the banks and private sector (to be discussed further in Section 3) determines M, C, D and R. This determines level of H consistent with io. It is the job (normally) of CB money market desk to undertake OMO so that \( i_M \approx io \), i.e. to set H consistent with M and iO.
Why do it this way around rather than the other? Effect on gold flows and Balance of Payments, and indeed on economy, clearer. Also volatility, (assuming zero interest rate on R). Consistent with an overdraft, contingent claim system?

(NB: when $i_R$ gets close to $i_o$, and $E_{t+n}$ $\uparrow$, then a liquidity trap can develop.)

Does it matter getting the analysis back to front?
Problems:-
1. Wrong estimate of Reserve Requirements
2. Continuous inconsistency
3. Misinterpretation of QE. Was a vast extension of OMO.

Now a corridor system for interest rates. Interest rate policy and liquidity policy can be separated.
Shifting the corridor up and down.
A New Approach?

Problem with money multiplier was that it got CB’s choice variable back to front. CB chooses i, not H, except in QE, (thereby causing a complete shift in prior statistical relationships).

Having reconsidered CB’s choice variable, need also to reconsider what are the choice variables of commercial banks.

Again these are interest rates, offered on deposits, charged on credit, plus accompanying terms, such as duration, collateral required, etc.

These are generally set as a spread relative to the official rate, with there being some conventionally normal relationship, such that

\[ i_0 - i_D = x^- \]  \hspace{1cm} (4)
\[ i_L - i_0 = y^- \]  \hspace{1cm} (5)

These spreads can be a function of innovation and competition from non-banks (interest-bearing sight deposits), constraints on bank expansion (e.g. capital, profitability, liquidity), and the balance of L and D.
so \[ x - x^- = f (L-D, \text{ Cap, Liq.}) \] (6)

\[ - + + \]

\[ y - y^- = f (L-D, \text{ Cap, Liq.}) \] (7)

\[ + - - \]

Problems

1. \( y \) determines credit lines extended, not usage. Data are only for usage. Lack of data on unused credit lines. So in Q4 2008. Loans granted ↓ Loans used ↑.

2. Because of (1) above, and lack of control over volume of D, banks can never control L-D. How do they adjust?
Adjustment Mechanisms

(a) Liquid (public sector) assets. Banks are price takers, quantity setters.

\[ Q_{ps} = f (reqts, L-D, i_{ps} - y) \] (8)

\[ + \quad - \quad + \]

\[ \text{reqts} \downarrow, L-D \uparrow, i_{ps} - y \downarrow \]

So holdings of public sector, liquid assets declined towards zero.

(b) Wholesale deposits, Liability management

\[ W = f (L-D, \text{Libor} - i_o, \text{innovation}) \] (9)

\[ + \quad - \quad + \]

\[ L-D \uparrow, \text{Libor} - i_o \downarrow, \text{innovation} \uparrow \]
Some implications

Demand for retail money, receiving bank fixed terms,

\[ M_d = f (y, p, i_o, i_n, x) + u \]

so \( x \) is a function of supply factors (equation 6), but otherwise retail deposits primarily demand determined, and so this relationship exists, but is largely superfluous, in neo-Keynesian three equation model (Woodford 2006, ECB Conference Paper, ‘How important is money in the conduct of monetary policy?’).

\[ y_t = E y_{t+1} + \beta_1 (i_t - E \pi_{t+1}) + u_t \quad \text{IS} \]

\[ \pi_t = E \pi_{t+1} + \beta_2 y_t + v_t \quad \text{LM} \]

\[ i_t = f (E \pi_{t+1}, E y_{t+1}) \quad \text{Taylor Reaction Function} \]
But not so with wholesale money; here wholesale money largely determined by supply side considerations, e.g. huge fluctuations in money-holdings of non-bank financial intermediaries, shadow banks, MMFs, etc.

So how do we assess monetary aggregates?

* H or base, No
* M1 very interest elastic, No
* Retail money (Personal sector + Non-financial corporates) √
* Broad money Mixture of Demand and Supply ?
* Credit But non-bank credit, usage not extension ?
Conclusions

Old theory/model must be discarded.

But new realities are more complex, and changing rapidly under pressures of crisis.

Much needs to be done. *Ars longa, vita brevis.*