

File FEA/0000000509, Part D – Monetary Base Control

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PART 4

20/8/1981 – 22/10/1984

Pages 56-71

The results of this exercise suggest that too much weight should not be put on forecasts of M1. Other work undertaken in the Bank of England, however, has shown that for periods of over a quarter the equation-based forecasts of M1 are better than those of naive extrapolative models.

C Testing price homogeneity

Equation 8 of table 1 was restricted to produce an equation (8a) with price homogeneity but not instantaneous adjustment.

A likelihood ratio test was used to test the restriction from equation 8 to 8a. The restriction could not be rejected. The conventional significance level of 5% was used but the result of the test would be the same for a wide range of significance levels. The precise test is shown in the footnote.⁽¹⁾

The equations calculated to test the restriction are shown below. Equation 8 may be written as

$$m_t = \alpha_1 x_{t-1} + \alpha_3 x_{t-3} + \beta_1 p_{t-1} + \beta_2 p_{t-2} + \gamma_0 R_t + \delta_1 m_{t-1} + \delta_2 m_{t-2}$$

Imposing homogeneity requires $\beta_1 + \beta_2 = 1 - \delta_1 - \delta_2$. Thus 8 may be rewritten as 8a as follows

$$m_t - p_{t-1} = \alpha_1 x_{t-1} + \alpha_3 x_{t-3} + \beta_2 (p_{t-2} - p_{t-1}) + \gamma_0 R_t + \delta_1 (m_{t-1} - p_{t-1}) + \delta_2 (m_{t-2} - p_{t-1})$$

The estimated values for these equations⁽²⁾ are as follows

	α_1	α_3	β_1	β_2	γ_0	δ_1	δ_2	RSS
8	0.307 (3.70)	-0.200 (2.53)	0.568 (3.07)	-0.464 (2.33)	-0.660 (8.08)	0.621 (6.17)	0.276 (2.96)	0.010872
8a	0.309 (3.93)	-0.200 (2.55)	0.563 (imposed)	-0.458 (2.35)	-0.658 (8.60)	0.620 (6.27)	0.275 (3.03)	0.010873

(1) The likelihood ratio test (LR) is distributed as χ_r^2 where r is the number of restrictions imposed. The critical value of $\chi_1^2(5\%)$ is 3.84 [and $\chi_1^2(0.5\%)$ is 7.88]. $LR = n \ln \left(\frac{RRSS}{URSS} \right)$ where n = number of observations, RRSS = restricted residual sum of squares and URSS = unrestricted residual sum of squares.

Imposing homogeneity $LR = 69 \ln \left(\frac{0.010873}{0.010872} \right) = 0.006$

0.006 is less than the critical value so the homogeneity restriction cannot be rejected.

(2) Estimation period 1963 Q3 to 1980 Q3.

It is not possible to place a restriction on 8b which imposes instantaneous adjustment as well as price homogeneity. An equation with both restrictions would make current real M1 depend on past real M1 but 8b cannot be so restricted because it excludes p_t . Thus the choice of equation 8 from the general maintained form excludes the possibility of instantaneous adjustment.

The appropriateness of this exclusion can be demonstrated by comparing the general maintained form (equation 1 of table 1) with the same equation with the two restrictions applied. The instantaneous adjustment restriction is rejected (unlike the homogeneity restriction despite the fact that the test on the general maintained form is less powerful than that on the preferred form. The precise test is shown in the footnote*.

Again, similar results are obtained using sa data. The results reported in this section are strong results. Price homogeneity but not instantaneous adjustment is consistent with the dataset used.

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Economics Division

* The general maintained form (equation 1) is:

$$(1) \quad m_t = \sum_{i=0}^6 \alpha_i x_{t-i} + \sum_{i=0}^6 \beta_i p_{t-i} + \sum_{i=0}^6 \gamma_i R_{t-i} + \sum_{i=1}^6 \delta_i m_{t-i} \quad (\text{RSS}=0.0069)$$

Imposing price homogeneity requires the single restriction that

$$\sum_{i=0}^6 \beta_i = 1 - \sum_{i=1}^6 \delta_i \text{ and substituting for } \beta_0 \text{ gives:}$$

$$(1a) \quad m_t - p_t = \sum_{i=0}^6 \alpha_i x_{t-i} + \sum_{i=1}^6 \beta_0 (p_{t-i} - p_t) + \sum_{i=0}^6 \gamma_i R_{t-i} + \sum_{i=1}^6 \delta_i (m_{t-i} - p_t) \quad (\text{RSS}=0.0069)$$

Imposing instantaneous adjustment requires $\beta_i = \delta_i$ for all i (but if homogeneity has already been imposed only $i-1$ further restrictions are required). This gives:

$$(1b) \quad m_t - p_t = \sum_{i=0}^6 \alpha_i x_{t-i} + \sum_{i=0}^6 \gamma_i R_{t-i} + \sum_{i=0}^6 \delta_i (m_{t-i} - p_{t-i}) \quad (\text{RSS}=0.0105)$$

$$(a) \quad \text{Testing homogeneity: } LR = \ln \frac{0.0069}{0.0069} \times 65 = 0$$

The critical value of χ_1^2 (5%) = 3.84 is not exceeded so the restriction is not rejected.

$$(b) \quad \text{Testing instantaneous adjustment: } LR = \ln \frac{0.0105}{0.0069} \times 65 = 27.3$$

27.3 exceeds the critical value of χ_5^2 (5%) = 11.07 so the restriction is rejected.

TABLE 1 continued

(b) Properties of equations in Table 1(a)

Equation number	Long-run elasticities		\bar{R}^2	DWS	F	SEE	RSS
	X	P					
1 (ua)	1.67	1.08	0.999	2.05	1,994	0.0142	0.0069
2 (ua)	1.92	1.28	0.999	2.03	2,951	0.0132	0.0072
3 (ua)	1.85	1.15	0.999	1.95	3,837	0.0130	0.0078
4 (ua)	1.28	0.98	0.999	1.92	4,761	0.0128	0.0080
5 (ua)	1.58	0.97	0.999	1.79	5,844	0.0136	0.0102
6 (ua)	1.83	0.95	0.999	1.81	6,441	0.0135	0.0102
7 (ua)	1.82	1.00	0.999	1.86	7,267	0.0135	0.0106
8 (ua)	1.04	1.01	0.999	1.85	3.4×10^6	0.0136	0.0109
9 (sa)	1.56	0.99	0.999	1.96	9,174	0.0143	0.0125
10 (sa)	1.02	0.99	1.000	1.95	4.3×10^6	0.0143	0.0127

* semi-elasticity [see Appendix 1, page 3, footnote 4].

X = real output

P = prices

R = short interest rates

DWS = Durbin-Watson statistics

F = F statistic

SEE = Standard error of equation

RSS = Residual sum of squares

TABLE 2(a): COEFFICIENTS OF 'BEST' M1 EQUATION OVER SEVERAL DATA PERIODS
(t-statistics in brackets)

Estimation period		1963 Q3 to	1976 Q1	1977 Q1	1978 Q1	1979 Q1	1980 Q1
Coefficients							
α_1	(x_{t-1})	0.484	0.416	0.408	0.388	0.360	
		(4.07)	(3.63)	(3.68)	(3.58)	(3.69)	
α_3	(x_{t-3})	0.360	-0.323	-0.310	-0.285	-0.256	
		(3.05)	(2.75)	(2.82)	(2.64)	(2.65)	
β_1	(P_{t-1})	0.706	0.848	0.799	0.667	0.605	
β_2	(P_{t-2})	-0.583	-0.757	-0.704	-0.566	-0.511	
		(2.08)	(2.83)	(2.98)	(2.68)	(2.66)	
γ_0	(R_t)	-0.739	-0.744	-0.747	-0.692	-0.673	
		(6.01)	(6.28)	(7.18)	(7.10)	(7.93)	
δ_1	(m_{t-1})	0.626	0.702	0.704	0.714	0.712	
		(5.35)	(6.37)	(6.66)	(6.84)	(7.02)	
δ_2	(m_{t-2})	0.252	0.207	0.201	0.185	0.186	
		(2.38)	(2.04)	(2.07)	(1.93)	(2.00)	

Diagnostics

RSS	0.0100	0.0112	0.0115	0.0122	0.0124
SEE	0.0149	0.0151	0.0147	0.0146	0.0142
\bar{R}^2	1.000	1.000	1.000	1.000	1.000
F Stat	3.7×10^6	3.9×10^6	4.4×10^6	4.8×10^6	5.3×10^6
DW Stat	2.03	1.99	2.02	1.98	1.98

Long-run elasticities

⁺ Prices	Price homogeneity is imposed. Thus $\beta_1 = 1 - \delta_1 - \delta_2 - \beta_2$				
Real expenditure	1.02	1.02	1.03	1.02	1.02
Interest rates*	-6.06	-8.18	-7.86	-6.85	-6.60

* Semi-elasticity [See Appendix 1 page 5 footnote 1].

TABLE 2 (b) FORECASTING PERFORMANCE OF M1 EQUATIONS

Residuals assumption (1)				Residuals assumption (2)			
Equation with- out price homogeneity imposed	Predicted	Actual	Difference	Equation with- out price homogeneity imposed	Predicted	Actual	Difference
76/77	13.9	8.9	-5.0	76/77	14.0	8.9	-5.1
77/78	19.4	24.6	5.2	77/78	17.2	24.6	7.4
78/79	6.0	13.3	7.3	78/79	7.4	13.3	5.9
79/80	5.2	6.5	1.3	79/80	6.8	6.5	0.3
80/81	5.1	8.4	<u>3.3</u>	80/81	5.6	8.4	<u>2.8</u>
			Average magnitude				Average magnitude
			4.4% pts				4.3% pts
			Standard deviation				Standard deviation
			4.9% pts				5.0% pts
Equation with price homogeneity imposed	Predicted	Actual	Difference	Equation with price homogeneity imposed	Predicted	Actual	Difference
76/77	18.0	8.9	-9.1	76/77	16.7	8.9	-7.8
77/78	22.7	24.6	-1.9	77/78	20.1	24.6	4.5
78/79	12.5	13.3	0.8	78/79	12.2	13.3	1.1
79/80	6.1	6.5	0.4	79/80	7.5	6.5	-1.0
80/81	4.1	8.4	<u>4.3</u>	80/81	4.8	8.4	<u>3.6</u>
			Average magnitude				Average magnitude
			3.3% pts				3.6% pts
			Standard deviation				Standard deviation
			4.6% pts				4.4% pts

Assumption (1) Forecast levels used (residuals ignored).

APPENDIX 2

THE DEMAND FOR NOTES AND COIN by P V Temperton

Method

The method adopted is essentially the same as that used for the M1 equation. We estimate a general form and then impose restrictions to obtain an equation containing fewer explanatory variables. The equations are estimated in log-linear quarterly form (with the exception of interest rates which are measured linearly) and all data are seasonally adjusted.

Results

The general form of the equation was taken as:

$$\log NC = \alpha + \sum_{i=1}^6 \beta_i (\log NC)_{-i} + \sum_{i=0}^6 \gamma_i (\log PC)_{-i} + \sum_{i=0}^6 \delta_i (\log RPDI)_{-i} + \sum_{i=0}^6 \phi_i r_{-i}$$

where C = the stock of notes and coin in circulation with the public (£m)
 PC = the price index of consumer goods (1975=100)
 RPDI = real personal disposable income (£m, 1975 prices)
 r = the local authority three-month rate (average over the quarter of final Fridays in each month) (% pa).

This was estimated using quarterly data over the period 1965(I) to 1981(I) and the following preferred equation was obtained:

$$C = -1.14 + 0.43PC + 0.36RPDI - 0.21r - 0.29r_{-4} + 0.49C_{-1} + \varepsilon_t$$

(0.36) (0.10) (0.07) (0.09) (0.10) (0.11)

where $\varepsilon_t = U_t + 0.38_{(0.13)} t_{-4}$

The fourth order autoregressive error term was included as the residual correlogram of the preferred equation displayed signs of fourth order autocorrelation. This equation has a long-run price elasticity of rather less than unity (0.84). The interest sensitivity of cash holdings, although significant, is rather low: a one point rise in interest rates will, over the course of a year, reduce cash holdings by only 0.39%. This interest sensitivity is, however, a feature of the recent past only. When the preferred equation was re-estimated over earlier sub-periods the coefficients and long-run elasticities in Table 3 were obtained. The interest sensitivity does appear to have increased over time. It is, of course, possible that these regression results are merely identifying recent association between high interest rates and particularly low cash holdings and that the two series are not causally related. This possibility is made more plausible by the fact that the equations which include interest rate effects have been over-predicting the demand for notes and coin during 1981, when interest rates have generally been falling.

The accuracy of forecasts produced by the preferred specification is reported in the text.

TABLE 3

Estimation period	Constant	PC	RPDI	Γ	Γ ⁻⁴	C	ϵ _{t-4}	SE	R ⁻²	Long-run elasticities with respect to PC RPDI Γ
5.1 - 81.1	-1.14 (.36)	0.43 (0.10)	0.36 (0.07)	-0.21 (.09)	-0.29 (.10)	0.49 (.11)	.38 (.13)	1.51	.999	.84 .71 -.98
5.1 - 80.1	-1.00 (.36)	0.51 (0.10)	0.38 (0.07)	-0.16 (.08)	-0.24 (.10)	0.41 (.11)	.30 (.13)	1.44	.999	.86 .64 -.68
5.1 - 79.1	-0.89 (.37)	0.51 (0.10)	0.37 (0.07)	-0.07 (.09)	-0.22 (.10)	0.42 (.12)	.36 (.13)	1.40	.999	.88 .64 -.50
5.1 - 78.1	-0.85 (.34)	0.56 (0.11)	0.40 (0.07)	-0.08 (.09)	-0.16 (.11)	0.35 (.13)	.32 (.14)	1.38	.999	.86 .62 -.37
5.1 - 77.1	-0.91 (.34)	0.66 (0.11)	0.48 (0.08)	+0.06 (0.11)	-0.16 (.12)	0.21 (.14)	.29 (.14)	1.35	.998	.84 .61 -.13
5.1 - 76.1	-0.98 (.44)	0.59 (0.12)	0.45 (0.10)	+0.08 (0.11)	-0.08 (.13)	0.28 (.15)	.37 (.15)	1.34	.998	.82 .62 0

MR MIDDLETON

1) Mr. Binney
Nothing else. Just
make the print as
you suggest
2) 8m 4/12

81 89/12
cc Mr Monck
Mrs Lomax
Mr Sedgwick
Mr Turnbull

RECENT DEVELOPMENTS IN MONETARY CONTROL IN THE UK

When I was in Champaign-Urbana, I met Geoffrey Wood who mentioned that he had just been to a conference at St Louis where Bill Allen of the Bank of England had presented a paper on monetary control in the UK. He (Geoffrey Wood) was rather surprised I had not seen a copy and agreed to send me one.

2. I was rather disturbed to find that the paper as presented in St Louis claimed to "describe the conclusions drawn by the Bank of England from the debate on monetary base control". I spoke to Bill Allen who told me that all references to the Bank's conclusions had now been removed, and that he now presents the conclusions as his own. He sent me a revised version of the paper, as enclosed.

3. It is well worth reading. We also have to consider whether we are pleased to see all the material in it put into circulation in this unofficial form. As you know, I have always thought some more considered official response, by the Treasury as well as the Bank, was needed to the MBC debate. You might particularly look at:

pages 4, 7 and 8 on the use of £M3 as a target aggregate. The message is that it is not a good predictor, or closely related to nominal income, but we use it because the counterparts are a convenient focus for policy discussion.

page 13 - There is a clear presumption that interest rate stability is to the public advantage, rather than predictable monetary growth.

mandatory base control
page 14 (etc) - A monetary scheme would have to apply to retail deposits only, probably defined as in the new M2 series. Whether we adopt it or not depends on M2 not being either too interest-elastic or too interest-inelastic.

pages 18 etc argue that banks may not hold sufficient excess reserves for non-mandatory MBC to work - and suggests (wrongly I think) that we can judge how well it would work by observing reserve demand under the existing system.

page 21 explains why ^{the} option of dealing in the inter-bank market was rejected.

page 23 explains ^{the} current policy dilemma over £M3, with the balance of argument seeming to point towards abandoning it.

4. I am inclined to write to Charles Goodhart saying it would have been nice to have seen all this before it was presented to a conference. Is there anything else you would like me to say?


A. J. C. BRITTON
2 December 1981

CONFIDENTIAL

MR LAVELLE

FROM: A TURNBULL
11 January 1982

cc Mr Peretz

cc for information:

Mr Middleton ~
Mr Monck
Mr Sedgwick
Mr Willetts

MONETARY CONTROL REVISITED

We are currently discussing with the Bank a number of issues on monetary control. While it seems unlikely that any major reforms will emerge, there may be a few lesser changes to the arrangements. HF have prepared the attached paper as background to the specific proposals being considered. One of the questions raised in it is whether the present arrangements can provide, or are used in a way which does provide, adequate signals about the authorities' interest rate intentions. This is an area where there is likely to be some tension between HF's desire for low noise signalling and OF's preference on occasions for rather louder signals.

2. We would welcome your views on how the present arrangements have operated, and whether you see any circumstances where they do not provide an adequate response.

AT

A TURNBULL

CONFIDENTIAL

3441

From: P E MIDDLETON
20 March 1982

Chancellor of the Exchequer

cc Chief Secretary
Financial Secretary
Economic Secretary
Sir Kenneth Couzens
Mr Ryrie
Mr Burns
Mr Britton
Mr Monck

MONETARY BASE CONTROL

I expect that you will have noticed an intriguing addition to the list of undeclared targets which people believe we have - and are pursuing with considerable success - because we claim that we are in fact pursuing other targets. The most noteworthy of these is of course the exchange rate where a target of 88-92 has been detected by many observers. But now Gordon Pepper, in his generally helpful circular on Improving Practical Monetarism has detected another undeclared objective which has been achieved with remarkable success and precision. He believes that the good behaviour of the monetary base since 1978 is "too much of a coincidence for it to be unplanned". So perhaps we may satisfy the most monetarist monetarists after all.

E. K. Clarke

PP

P E MIDDLETON

Copy to E.G. → sent 31/3

Copy taken also
for A. Walker.



cc: Chief Secretary
Financial Secretary
Economic Secretary
Sir Douglas Wass
Sir Kenneth Couzens
Mr. Burns
Mr. Ryrrie
Mr. Britton
Mr. Monck

MR. MIDDLETON —

MONETARY BASE CONTROL

You had a word with the Chancellor this morning about Gordon Pepper's Greenwells circular no. 129; and he will see tonight your short minute this morning. As you know, his own (overnight) reaction to the circular, and in particular to its last paragraph, was to wonder whether you and the Bank were engaged in some benign/covert/unconscious/inadvertent, and brilliantly successful, plot to control the monetary base. But I am sure that you reassured him by indicating that no plot could be as successful as Gordon Pepper implies!

2. You should know that the Chancellor also saw overnight Tim Congdon's 26 March circular, which was summarised in his Daily Telegraph piece on 29 March; and that he thought it rather important. As you know, he thinks that your study of the range of problems in this area is a rather urgent task - particularly as, in his view, we need to be in a position to act, if action seems appropriate, in this year's Finance Bill. He welcomed your intention to report by mid-May.

A handwritten signature in dark ink, appearing to read 'J.O. Kerr'.

J.O. KERR

30 March 1982

1046/3

From: D B ANDREN
Date: 8 July 1982

84/9
MR A J C BRITTON

cc Mr Dixon
Mr Gordon
Mr Hibberd
Mr Potter

BUSINESS MONITOR MA 3: COMPANY FINANCE

You told me Stanley James had written to you asking whether, in order to save staff, the Treasury had any views on the case for and against continuing publication of the Business Monitor on company finance.

2. Although one can get comparable information for individual industries from privately financed surveys (eg Jordan's), I know of no other analysis of comparable scope. In particular, I think the ability to derive key accounting ratios for individual industries and to analyse figures according to size of company (small, medium, large) could prove useful for the purpose of policy analysis. The usefulness of the figures would be ~~partly~~ enhanced by the introduction of a standard form of CCA since one would then get a much clearer picture of the profitability of individual sectors. I think from the policy point of view currently the most serious omission is that of companies which fall into the category of banking and insurance.

3. The lack of aggregate information about the availability of quantitative information about small firms and companies and their financial structure and well being has been the subject of frequent comment (eg by the Wilson Committee). Similarly, basing sources and uses of funds data solely on national accounts data is not very satisfactory because the figures are frequently derived as residuals. Thus, I should like to see the present series continued.

4. If one was ~~talking~~ to some of the people in Brian Unwin's Information Technology Unit I am sure they would say one should look at the scope for partial or total privatisation. What

occurs to me is that it is just possible Jordan's or the Centre for Inter-firm Comparisons might, with the development of new technologies, be interested in running these surveys on some kind of agency basis.

D. B. Andren

D B ANDREN