EUROPEAN UNIVERSITY INSTITUTE
DEPARTMENT OF ECONOMICS

EUI Working Paper **ECO** No. 2003/10

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Published in Italy in April 2003
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Will the monetary pillar stay? A few lessons from the UK*

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March 28, 2003

Abstract

The ECB formulates its policy relying on two-pillars: the monetary pillar and alternative models of inflation. The two-pillars strategy has been seriously criticized and there is a chance that it will be reconsidered at some point in the future. This paper elaborates on this possibility, concentrating on the monetary pillar and drawing suggestions from the analysis of monetary policy in the UK. The choice of the UK is motivated by the fact that the Bank of England walked all the way from monetary targeting to the informational approach to money (and inflation targeting). As the ECB is currently threading the same path, and finding troubles on the way, the aim of the paper is to work out a map of the risks laying ahead, learning from the experience of someone who has been there before.

Keywords: Monetary Policy, Cointegration, Demand for Money; *JEL*: E58,C32, E41.

*I am grateful to Michael Artis, Marcello de Cecco, Giuseppe Garofalo, Katarina Juselius, Helmut Lütkepohl, Fernando Vianello for their valuable and helpful comments. Comments are very welcome and may be addressed to paolo.paesani@iue.it.

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"*There is no point in wasting time setting up the target if the bows and arrows are weak and inaccurate*" Sargent (1981), p. 106

1 Introduction

The monetary policy strategy of the European Central Bank (ECB) consists of one goal (keeping consumers price inflation below 2% in the medium run) and two "pillars" (monetary analysis and inflation forecasts). Competing paradigms of inflation and model uncertainty are the main justifications offered by the ECB for its strategy. The two pillars should form a solid framework to organize the analysis and the presentation of a broad set of economic information relevant for monetary policy-making.[1] The strategy was formulated as a compromise between the "old" monetary targeting approach and the "new" inflation targeting approach.[2] As such, it has attracted considerable criticism.

With data on the functioning of the euro area (and criticism) accumulating, there is a chance that the two-pillars strategy will be reconsidered at some point in the near future.[3] This paper elaborates on this possibility, concentrating on the monetary pillar and drawing suggestions from the analysis of monetary policy in the United Kingdom. Why the UK?

Between 1971 and 1986, British monetary authorities adopted monetary targeting. Even if the ECB is not a monetary targeter itself many similarities appear between the monetary pillar and monetary targeting in the UK.[4] In 1986 UK monetary targets were abandoned as they were simply too difficult to meet in a competitive and market-oriented banking and financial environment, such as the one emerging from the Thatcher era reforms. As banking and finance in the euro area may be subject to more competition and market-orientedness as a consequence of the monetary union, it is of interest to investigate the impact of such structural considerations on the ECB strategy. In 1997 the Bank of England abolished the remaining "monitoring ranges" for the growth rate of monetary aggregates[5] and yet money and credit retain a significant role in its (successful) inflation targeting strategy.[6] This suggests that there is more than one way to incorporate money in the information set of a central bank entrusted with the task of controlling inflation.

[1] ECB (2000).

[2] Friedman (1959, 1968), Svensson (1999), Rudebusch and Svensson (1999).

[3] ECB (2002c).

[4] Use of broad monetary aggregates, short-term lending rates as policy instruments, detailed monetary and credit analysis as a way to explain policy to the public, large and persistent deviations from target allowed.

[5] See pages 8-9 of the November 1997 *Inflation Report.*

[6] This means that monetary models of inflation and monetary and credit indicators are distinctly monitored as source of information in the Bank of England policy formulation process (see Kohn (2000), Hauser (2001)).

The structure of the paper is as follows. Section 2 briefly discusses the monetary pillar, Section 3 analyzes UK monetary policy. Section 4 goes back to discussing the monetary pillar draws implications for the ECB. Section 5 concludes.

2 The monetary pillar (part 1)

When discussing alternative strategies for the future European central bank, two candidates made it to the end: monetary targeting and inflation targeting.[7] Flexible monetary targeting had been the (successful) strategy of the Bundesbank between 1975 and 1998.[8] The Bundesbank being the largest, most credible and powerful central bank in Europe, the ECB was designed to closely resemble it,[9] with one notable exception, its monetary policy strategy. Instead of a simple replica, a weakened version of it was adopted (the monetary pillar), adding the second pillar (inflation forecasts) to it.

2.1 How the monetary pillar works

> First, money will be assigned a prominent role. This role will be signalled by the announcement of quantitative reference value for the growth of a broad monetary aggregate. The reference value will be derived in a manner which is consistent - and will serve to achieve - price stability. Deviations of current monetary growth from the reference value would, under normal circumstances, signal risks to price stability. (...) However, the concept of a reference value does not imply a commitment on the part of the ESCB to mechanistically correct deviations of monetary growth from the reference value over the short term. (...) (Introductory statement by the President, press conference of 13 October 1998).

The ECB has chosen to take a *broad* monetary aggregate (M3) as reference for policy purposes. M3 broad-basedness is taken as a guarantee of its stability in the face of portfolio substitution effects among different monetary instruments.[10] The mechanism to calculate the reference value for the growth rate of M3 is the same as the one adopted by the Bundesbank and is derived consistently with the assumption

[7] EMI (1997).

[8] Bernanke and Mihov (1997) argue that the conduct of the Bundesbank should best be considered as inflation targeting in disguise. On the Bundesbank conduct see Issing (1997), Schmid (1999).

[9] Independence from government, price stability as a statutory objective, cooperation in achieving other macroeconomic objectives, consultative role on exchange rate matters, consultative role on the supervision of the banking system entrusted to government agencies or national central banks.

[10] The components of M3 are: currency in circulation (7%), overnight deposits (34%), deposits with agree maturity up to two years (19%), deposits redeemable at notice up to three months (24%), repurchase agreements (3%), money market fund shares/units and money market paper (10%), debt securities up to two years (2%). The numbers in brackets refer the end-2000 percentage share of the different components of M3 as reported in ECB (2001) - Chart 2.6.

of a stable relationship between money, real income, prices and velocity: $MV = PY$ where M is equal to M3, V is the velocity of circulation, P is the Harmonized Index of Consumer Prices (HICP) and Y is real income.

The reference value is announced once a year in terms of an annual single rate of change. It is a single number (4,5% from December 1, 1998 to the present day), not to convey the impression that the ECB would automatically react to observed deviations should a range instead of point value be there.[11] It is expressed in terms of a rate of change instead of a level, to avoid problems with the infinite memory of the process.

The ECB compares the reference value with a three-months moving average of the twelve monthly annualized growth rates. A difference between actual money growth and the reference value is interpreted by the ECB and processed alongside other information but does not induce any automatic reaction.[12]

Analysis under the first pillar involves discussing the components and counterparts of M3, with the aim of detecting monetary impulses in the economy, its degree of financial fragility, the possibility of speculative bubbles.[13]

2.2 Defence (and criticism)

Money neutrality, static and dynamic[14] and leading indicator properties of money with respect to prices are the main justifications for the monetary pillar within the price-stability oriented strategy of the ECB.[15] Other justifications include: policy robustness compensating limitations in the knowledge of the functioning of the economy in the euro area, presence of a stable long-run money demand to be used to compute the reference value, data availability.[16]

Members of the so-called EMU-monitor group support the monetary pillar, as a weakened version of the Bundesbank monetary targeting strategy, as way of inheriting the Bundesbank credibility.[17] Espousing this idea, Issing *et al.* (2001) claim, on page 81, that one of the advantages of assigning a central role to money underscores the continuity between the ECB strategy and the strategy of those central banks that have, in the past, successfully used the information coming from monetary aggregates to enact price-stability oriented policy.

[11] Bibow (2002) criticizes the ECB for choosing too low a reference value as a way of having a standing excuse for hiking interest rates.

[12] ECB (2000), p. 41.

[13] (Masuch *et al.* (2001).

[14] Static neutrality implies that if nominal money and prices change in the same proportion, real variables are unaffected. Dynamic neutrality implies that if real output remains the same, changes in money supply lead to prices changing in the same proportion (leading indicator properties of money with respect to prices). The notion of money neutrality is based on the hypothesis that economic agents suffer no money illusion

[15] Issing *et al.* (2001), p. 77. On the long run link between money and prices McCandless and Weber (1995), Rolnick and Weber (1997). Gali (2002) criticizes this point, arguing that long-run equilibrium relationships (e.g. $MV = PY$) will hold independently of the monetary regime.

[16] Trecroci and Vega (2000), Nicoletti Altimari (2001), Coenen and Vega (1999), Brand and Cassola (2000), Masuch *et al.* (2001).

[17] Neumann (1998).

Alesina *et al.* (2001) censure this argument as not effective and unclear. Von Hagen and Brückner (2001) reply that the monetary pillar serves as a commitment device, disciplining the ECB Council against uncontrolled accelerations and decelerations of money growth, and as a signal to the general public that the ECB will watch over monetary developments in this way.

Svensson (1999), building on Estrella and Mishkin (1997), shows how monetary aggregates may be poor indicators of risks to price stability (low correlation between money growth and inflation forecasts).[18]

Gerlach and Svensson (2001) find a role for the real money gap as an inflation indicator, using the P* framework.[19] Issing *et al.* (2001) claim Gerlach and Svensson's findings support the monetary pillar, while the authors themselves suggest that the Eurosystem money growth indicator is an inferior inflation predictor with respect to the real money gap.

Gerlach (2003) finds a potential role for the monetary pillar as an indicator of shifts in the low-frequency component of inflation but argues that, under current circumstances, the estimated relationship is rather of reverse causality from prices to money. Thus, movements in money appear to largely reflect shifts in money demand that do not indicate risks to price stability.

3 Monetary policy in the UK

3.1 Why the UK ?

Issing *et al.* (2001), define the monetary pillar a compromise between 'enlightened' monetary targeting (the Bundesbank approach) and the informational approach (*i.e.* the idea that looking at money is a way to learn about inflation). Implementing this definition requires (i) discussing what the informational approach and monetary targeting require, and (ii) what it means to strike a compromise between the two. This will be done in Section 4.

But before that, this will be devoted to the analysis of monetary policy in the UK. The choice of the UK is motivated by the fact that the Bank of England walked all the way from monetary targeting to the informational approach (and inflation targeting). As the ECB is currently threading the same path, and finding troubles on the way, the aim of the following pages is to work out a map of risks laying ahead, learning from the experience of someone who has been there before.

[18] Stabilizing monetary aggregates around a reference value would in any case not be advisable as it might induce higher inflation and output variability in the short run, if compared with inflation (forecast) targeting. Baltensperger (2000) criticizes this conclusion for completely overlooking model and monetary transmission uncertainty.

[19] Price level p^* makes the money stock m compatible with money demand $m = p + ay - bi$ once real income and interest rates are at their long run or trend levels (y^*, i^*). *Cet. par.*, a positive real money gap $(m - p) - (m - p^*) = (p^* - p) > 0$ signals risks to price stability.

3.2 The facts

British interest in the monetary aggregates began under the stimulus of an agreement reached with the IMF in 1967, in the wake of a balance of payments crisis leading to a huge devaluation. The announcement of domestic credit expansion (DCE) targets, later supplemented with a statement of the expected increase in M3, was the policy followed until 1971.

Between 1971 and 1973, the removal of controls[20] and an expansionary monetary climate led to a huge increase in M4. Money velocity fell considerably.[21] The Heath cabinet responded to rising unemployment with budget deficits and monetary expansion. Inflationary pressures started to build up.

In 1972 the pound started floating against other currencies. The break-down of Bretton Woods called for a new monetary policy strategy. Velocity was claimed to be stable enough for monetary targets to be employed. Concerns over which aggregates to choose and the possibility of short-run instability were dismissed as second order problems.[22]

In December 1973 controls on the banking system were reintroduced (the 'corset') to face repeated monetary overshooting. The purpose of the corset, which was finally phased out in 1980 after circumventing innovation had made it largely ineffective, was to restrain the growth of monetary aggregates by limiting the involvement of banks in the wholesale deposits market.[23]

The corset, fiscal moderation, increased debt sales and current account deficit restrained money growth. Money velocity started to rise back towards its previous (trend) level[24] Renewed concern about the behavior of the monetary aggregates and the sterling crisis led the Chancellor of the Exchequer to declare publicly in July 1976 an M3 target. Targets for DCE and target ranges for the money supply (now £ M3) were set for 1977-78 and 1978-79.[25] Monetary control was to be achieved through the 'counterparts methodology'.[26]

[20] In 1971 the Bank of England published *Competition and Credit Control* which can be seen as the inauguration of a 'new course' in the British monetary policy. The new course was to rely on three qualifying aspects: prudential controls in the banking sectors, greater market freedom and new techniques of monetary control (Collins (1988)).

[21] The initial fall in velocity can be explained in terms of a money supply shock, induced by deregulation, which pushed the money stock away from a stable money demand (Artis and Lewis (1981), Reid (1982)).

[22] Batten *et al.* (1990), Goodhart (1992).

[23] The corset worked as a system of rising reserve requirements on the increase of 'interest bearing eligible liabilities', in excess of a pre-specified base, with corset reserves paying no interest. The corset was introduced for the first time in December 1973 until February 1975, once again between November 1976 and August 1977 and finally between June 1978 and June 1980. On Competition and Credit Control and the Corset see Zawadzki (1981).

[24] According to Artis and Lewis (1981), the rising velocity was not only due to re-regulation but also to agents absorbing the effect of the previous supply shock.

[25] Artis and Lewis (1991), page 124. Details on monetary policy between 1974 and 1979 can be found in Artis and Cobham (1991).

[26] These were the credit counterparts (government deficit, borrowing of the public sector net of debt sales, current account) to the change in broad money. The methodology enabled the authorities to relate monetary growth to particular policy instruments: the PSBR was related to fiscal policy, debt sales to interest rates, bank lending to direct and indirect controls, and the

In 1979 the Labour party lost the general elections to the Conservatives. The Thatcher cabinet made it clear that monetary targeting would remain on the agenda and would be pursued, with renewed strength, within the horizon of medium-term financial strategies (MTFS).[27]

In 1980-81, the fiscal and monetary climate remained very tight, with the exchange rate appreciating and narrow and broad monetary aggregates falling. The economy entered a deep recession, largely blamed on the government. A change was called for, which took the form of fiscal tightness (in 1982 taxes were increased even if the recession was still going on) coupled with monetary loosening. The Public Sector Borrowing Requirement (budget deficit minus privatization proceeds) declined, moving to surplus in 1987 and yet the ratio of sales of government debt to non-bank residents to PSBR grew, leading to the practice of 'overfunding'.[28]

The Conservative Government promoted intense banking liberalization. The 1979 *Banking Act* aimed at breaking up the segmented and club-like banking sector and at unifying the authorization and supervision regime under the Bank of England, a principle later to be reaffirmed in 1987. In 1981, the reserve requirements regime was made less stringent and new procedures were inaugurated for money-market operations. In 1986 liberalization was extended to the Stock Exchange, to building societies and to the entire financial system. Banking and financial liberalization has continued into the 1990s.[29]

Repeated overshooting of targets and doubts on what aggregate to choose, led to the gradual discontinuation of monetary targeting. Exchange rate targeting was adopted, at first informally pegging sterling to the German Mark. In 1990 Britain joined the Exchange Rate Mechanism (ERM) of the European Monetary System. In October 1992, following sterling's departure from ERM, Britain adopted a new framework for monetary policy, consisting of an explicit inflation target and of institutional changes designed to enhance transparency of the policy process.[30]

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external counterparts to foreign exchange market interventions. It also enabled the authorities to believe and to claim that they were acting on money from the supply side rather than from the demand side (Cobham (1991), p.43).

[27]Several advisers of the new Government favored the adoption of some form of monetary base control. This being incompatible with its long-standing practices, the Bank of England opposed it, receiving the support of the City, fearing excessive interest rates fluctuations, and of the academic world (Goodhart (1995)).

[28]The aim of overfunding, selling more public debt to the non-bank private sector than necessary to finance the PSBR, was to retain controllability of the money stock by 'mopping up' bank deposits, which appeared to be interest rates inelastic while reducing bank lending to the public sector (Goodhart 1989).

[29]Morison (1994), Revell (1994).

[30]Publication of regular Inflation Reports (since October 1992), establishment of regular monthly monetary policy meetings, publication of minutes (since April 1994), Bank discretion over timing of rate changes from November 1993 until May 1997 when full operational indepence was granted (King (1997), Bernanke *et al.* (1999)).

3.3 Methodology and data description

The analysis of UK monetary policy will be carried out by applying the cointegrated VAR methodology, a useful tool to investigate monetary policy and monetary transmission,[31] The statistical model in error correction form which will be applied to the data is

$$\Delta z_t = {}_{i=1}^{n} \Gamma_i \Delta z_{t-i} + \Pi z_{t-1} + \Phi D_t + \epsilon_t \qquad \epsilon_t N(0, \Sigma)$$

The vector z is an n dimensional vector containing the variables of interest, Γ_i are $n \times n$ matrices capturing the short-run dynamics, D_t the vector of deterministic components, and ϵ_t the white noise process describing residuals with zero mean and constant variance-covariance matrix Σ. The hypothesis $z_t I(1)$ is formulated as the usual reduced rank hypothesis $\Pi = \alpha\beta'$ with α a $(p \times r)$ matrix, β' a $(r \times p)$ matrix and $\alpha_{\perp}^{'}\beta_{\perp}$ with full rank equal to $(p-r)$. Reformulating the model in moving average form we obtain.

$$z_t = C_{i=1}^{t}(\epsilon_t + \Phi D_t) + C_1(L)(\epsilon_t + \Phi D_t) + A$$

Vector A depends on initial values such that $\beta' A = 0$, $C = \beta_{\perp}(\alpha_{\perp}^{'}\Gamma\beta_{\perp})^{-1}\alpha_{\perp}^{'}$, $\Gamma = I - \Gamma_i$. The C matrix captures the long-run impact of cumulated shocks on the level of variables.

The data consist of quarterly observations from 1971:2 to 1998:4. The period is chosen to The initial date coincides with the adoption of Competition and Credit Control, which inaugurated liberalization in the banking system together with the idea that money growth could be restrained using short term interest rates. The final date coincides with the end of the second phase of EMU, and it is chosen to rule out from the analysis any indirect effects of the euro on monetary policy in Britain.

The data consist of unadjusted log real M4 (m), log real GDP (y), Consumer price index-based inflation rate (π, with CPI normalized at 100 in 1995), short-term interest rate (s, Treasury Bill rate) and long-term interest rate (l, 10 years government bond rate).[32] This five-dimensional system is a standard choice in the literature on cointegration and monetary policy. Long-run price homogeneity (same stochastic trend driving nominal money and prices) is assumed. M4 and GDP are deflated using the CPI.[33]

The sample (1971:1 - 1998:4) is divided into two periods. The idea is to start from a long sample, identify a significant break in the series (cut-off date), and analyze the properties of the model before and after the break.

[31] Johansen (1995), Johansen and Juselius (1990), Juselius (1998).

[32] Data on income, prices and interest rates come from the IMF International Statistics Yearbook - CD Rom version (March 2000). Data on money come from the OECD Main Economic Indicators - CD Rom version (1998). All calculations have been performed using the computer packages PC FIML 9.0 and CATS in RATS.

[33] For up-to-date references on empirical studies on UK monetary data see Lewis and Mizen (2000), Dhar *et al.* (2000), Nelson and Nikolov (2002).

This is the same methodology as applied by Juselius (1996) to analyze monetary policy in Germany. UK monetary targeting was officially discontinued in March 1987 but it had ceased being credible long before then. Instead of imposing 1987:1 as the cut-off date, different alternatives were considered and tested. Stability of parameters and residuals suggests choosing 1985: 4.

3.4 Model selection and evaluation

The model is a five-dimensional cointegrated VAR model, with a constant term, centered seasonal dummies, linear trend (restricted to lie in the cointegrating space) and impulse dummies, introduced to account for outliers.[34] Information criteria (e.g. Akaike test) suggest choosing one lag for both periods.

Each equation of Model 1 (1971:2 - 1985:4; 59 quarterly observations) is fitted with 13 parameters, leaving $45 = 58 - 13$ degrees of freedom for the variance. Each equation of Model 2 (1986:1 -1998:4; 52 quarterly observations) is fitted with 11 parameters, leaving $40 = 51 - 11$ degrees of freedom for the variance. Normality of estimated residuals for period 1 is impaired by the presence of outliers (see Table 1).[35] Tests on single equations are not included and are available upon request.

Table 1. Misspecification tests

Period 1: 1971:2 - 1985:4		
Residual autocorrelation order 1 $\chi^2(25)$	20.4	[0.73]
Residual autocorrelation order 4 $\chi^2(25)$	33.2	[0.13]
Vector normality χ^2 (10)	30.7	[0.00]
Period 2: 1986:1 - 1998:4		
Residual autocorrelation order 1 $\chi^2(25)$	35.1	[0.09]
Residual autocorrelation order 4 $\chi^2(25)$	23.6	[0.54]
Vector normality χ^2 (10)	18.1	[0.05]

Following Juselius and Toro (1999), it is possible to tests whether the models estimated for period 1 and 2 are significantly different from one another.[36] The hypothesis of constant parameters is strongly rejected by the data.

Table 2. Testing for a regime shift

$-log \mid \hat{\Sigma} \mid \times T_i$	$-log \mid \hat{\Sigma} \mid \times T_i$	$-log \mid \hat{\Sigma} \mid \times T_i$	$\chi^2(v)$	
First period	*Second period*	*Full sample*	*Statistic*	95% *CI*
52.977×58	60.263×51	54.486×110	153 (70)	49-95

[34]Three impulse dummies $(0, 1, -1, 0...)$ were introduced in period 1: 1974:1, 1979:2, 1979:3). One impulse dummy in 1990:2 was required in period 2. The deterministic component takes up 8 degrees of freedom in Model 1 and 6 degrees of freedom in Model 2.

[35]Non-normality can be due to excess Kurtosis, as in this case, or excess skewness. If excess skewness is limited or absent, non-normality does not significantly impair the reliability of estimates.

[36]The test is an *LR* test, approximately distributed as a $\chi^2(v)$, with v equal to the total number of estimated parameters in the cointegrated VAR model under the null hypothesis of constant parameters.

3.5 Cointegration rank

The null hypothesis that there are at most r cointegrating vectors, and $5 - r$ unit roots, is tested using the Johansen methodology. The tests indicate cointegration rank equal to 2 in period 1 and to 3 in period 2.

Table 3. Tests for cointegration rank

Period $1:1971:2-1985:4$						
Eigen	H_o: r_1	$p-r_1$	Max	90%	Trace	90%
0.82	0	5	99.4	23.7	156.1	82.7
0.48	1	4	37.4	19.9	56.7	58.9
0.17	2	3	10.8	16.1	19.2	39.1
0.10	3	2	6.6	12.4	8.4	22.9
0.03	4	1	1.8	10.6	1.8	10.6
Period $2:1986:1-1998:4$						
Eigen	H_o: r_1	$p-r_1$	Max	90%	Trace	90%
0.84	0	5	93.2	23.7	202.7	82.7
0.69	1	4	59.3	19.9	109.6	58.9
0.44	2	3	29.8	16.1	50.3	39.1
0.28	3	2	17.1	12.4	20.5	22.9
0.06	4	1	3.4	10.6	3.4	10.6

The kind of relationships which cointegration aims at detecting (money demand, interest rate and exchange rate parities, IS effect) are usually obtained in general equilibrium models with no restrictions to market adjustment. This being the case, the cointegration rank can be seen as an indication of how well such adjustment takes place. *Cet. par.* a larger number of cointegrating vectors is to be expected the less regulated the economic environment is.[37]

3.6 Testable propositions

3.6.1 Stationarity, weak exogeneity, long-run exclusion

1. Testing stationarity (STA) requires imposing zero restrictions on all the coefficients of the first cointegrating vector but one at the time. Stationarity is the null hypothesis. Test statistic is distributed as $\chi^2(p-r)$. A stationary variable identifies one of the cointegrating vectors.

2. Testing long run exclusion (LRE) requires imposing zero restrictions on the coefficients of one variable at a time in all the r cointegrating vectors, leaving all the other coefficients unrestricted. The test statistic is distributed as $\chi^2(r)$.

3. Testing weak exogeneity (WEX) requires imposing zero restrictions on the α coefficients of the Π matrix, one row at the time. The test statistic is distributed as a $\chi^2(r)$. Weak exogeneity specifies one of the common trends.

[37] Juselius and Toro (1999), p. 15.

3.6.2 Economic propositions

1. Money demand: $cv = m - \beta_1 y - \beta_2 s - \beta_3 l - \beta_4 \pi - \beta_5 Trend \sim I(0)$, $\beta_1 > 0, \beta_3 \leq 0, \beta_4 \leq 0$ and Δm adjusting to cv. Possible constraints on money demand to be tested independently or jointly include: velocity constraint ($\beta_1 = 1$), no impact of inflation ($\beta_4 = 0$), s as a proxy of the return on deposits ($\beta_2 \geq 0$), s the main opportunity cost of holding money ($\beta_2 \leq 0, \beta_3, \beta_4 = 0$), l as the main opportunity cost of holding money ($\beta_2, \beta_4 = 0, \beta_3 \leq 0$), $(l - s)$ as a measure of the opportunity cost of holding money ($\beta_2 = -\beta_3, \beta_3 \leq 0$).[38] Failure of money demand may be due to distorting regulation of the banking system.[39]

2. Fisher parity: $cv_1 = l - \pi \sim I(0), \Delta l$ adjusting to cv_1. Failure of Fisher parity may be due to tax effects, systematic overprediction of inflation by market participants, time-varying risk premium dependent on the level and variability of inflation.[40]

3. Expectation hypothesis: $cv = l - s \sim I(0)$, Δl adjusting to cv. Failure of expectation hypothesis may be due to financial markets imperfections.

4. GDP equation: $cv = y - \beta_1 l - \beta_2 \pi - \beta_3 Trend, \beta_1 \leq 0, \beta_2 \geq 0, \Delta y$ adjusting to cv. Possible constraints to be tested separately or jointly are: trend stationarity ($\beta_1 = 0, \beta_2 = 0$), IS effect ($\beta_1 = -\beta_2, \beta_1 \leq 0$). Failure of IS effect indicates weakness of monetary transmission through the interest rate channel.

5. Short term rate equation: $cv = s - \beta_1 y - \beta_2 \pi - \beta_3 l \sim I(0), \Delta s$ adjusting to cv, $\beta_1 \geq 0$ (demand effect on short term rates), $0 \leq \beta_2 \leq 1$ (partial adjustment to inflation), $\beta_2 \geq 1$ (over-adjustment to inflation).[41]

3.7 Time series and cointegration properties in Period 1

The hypothesis of stationarity is rejected for all the variables (All lines in Table 4 report p-values of the tests). For real money, real income and inflation trend stationarity is rejected as well. Results are robust to the choice of the number of cointegrating vectors. The short term rate appears to be excludable from the cointegrating space, while the long term interest rate, being borderline weakly exogenous, could be one of the three common trends driving the system.

[38] Inflation can be treated as a proxy of the return on real assets.

[39] When the central bank exerts a strong control of the banking system it can force its own choice of money supply (text-book case) with money demand passively adjusting to it. In this case money is expected to be weakly exogenous and significant in the cointegrating space. Gennari and Juselius (1998) discuss this case analyzing Italian data.

[40] Brand and Cassola (2000), page 16.

[41] If the long term rate is weakly exogenous and the short term rate is not, the possibility that the former affects the latter can be tested. No prior assumptions can be imposed on the sign of β_3, as it depends on the substitution effects within the financial system.

Both the velocity constraint and the hypothesis that the interest rate differential measures the opportunity cost of holding money are (weakly) not rejected by the data. Inflation cannot be tested out of money demand. The best specification of money demand (p-value 80%) contains velocity constraint, long term interest rate, inflation and trend. The coefficients on long term rate and inflation have both the appropriate sign, indicating substitutability between money, bonds and real assets.[42] The trend coefficient in the money demand equation indicates declining velocity.

Both the Fisher parity and the Expectation hypothesis are rejected by the data (financial market imperfections). Real GDP is explained by trend (positive growth) and real long term interest rate (negative IS effect). In line with tests on long-run excludability, coefficients on the short term interest rate in the cointegrating space are tested to be jointly equal to zero.

Table 4. Single hypotheses: $1971:2-1985:4$

1. $STA:\ p_m=0.00, p_y=0.00, p_\pi=0.00, p_s=0.00, p_l=0.00$	
2. $LRE: p_m=0.01, p_y=0.00, p_\pi=0.00, p_s=0.96, p_l=0.00, p_T=0.00$	
3. $WEX: p_m=0.01, p_y=0.01, p_\pi=0.00, p_s=0.11, p_l=0.07$	
4. $Money\ demand: m-\beta_1 y-\beta_2 s-\beta_3 l-\beta_4\pi-\beta_5 T\sim I(0)$	
$\beta_1=1, \beta_5=0$	$LR-test, r=2: \chi^2(1)=2.86$ [0.09]
$\beta_2=-\beta_3, \beta_5=0$	$LR-test, r=2: \chi^2(1)=3.35$ [0.07]
$\beta_4=0, \beta_5=0$	$LR-test, r=2: \chi^2(1)=12.5$ [0.00]
$\beta_1=-1, \beta_2=-\beta_3, \beta_5=0$	$LR-test, r=2: \chi^2(2)=13.1$ [0.00]
$\beta_1=1, \beta_2=0, \beta_3<0, \beta_4<0$	$LR-test, r=2: \chi^2(2)=0.06$ [0.80]
5. $Fisher\ Parity: l-\beta_1\pi\sim I(0)$	
$\beta_1=1$	$LR-test, r=2: \chi^2(4)=29.7$ [0.00]
$\beta_1\neq 1$	$LR-test, r=2: \chi^2(3)=12.2$ [0.00]
6. $Expectation\ Hypothesis: l-\beta_1 s\sim I(0)$	
$\beta_1=1$	$LR-test, r=2: \chi^2(4)=29.7$ [0.00]
$\beta_1\neq 1$	$LR-test, r=2: \chi^2(3)=20.5$ [0.00]
7. $Real\ income: y-\beta_1 l-\beta_2\pi-\beta_3 Trend\sim I(0)$	
$\beta_1=0, \beta_2=0;$	$LR-test, r=2: \chi^2(3)=16.5$ [0.00]
$\beta_1=-\beta_2$	$LR-test, r=2: \chi^2(2)=0.93$ [0.63]

A joint test of money demand (Table 4, line 9, $cv_1: m-y+31.4\pi+18.2l+0.007Trend$), real income (Table 4, line 18, $cv_2: y+5.3(l-\pi)-0.006Trend$), exclusion of short term rate, is not rejected with a p-value of 0.45. Money significantly adjusts to cv_1 ($\alpha_{11}=-0.06, t-value=-7.8$), compatibly with the hypothesis of a stable long-run money demand. Real income significantly adjusts to cv_2 ($\alpha_{22}=-0.16, t-value=-3.4$), compatibly with the identification of cv_2 as an income equation. The coefficient measuring the reaction of $\Delta\pi$ to cv_1 ($\alpha_{31}=0.017, t-value=4.6$) could indicate that positive shocks to nominal money (or negative shocks to the price level) may lead to higher inflation.

[42] Brand and Cassola (2000) (pages 12-13) discuss why the long term bond rate could be an effective proxy for the opportunity costs of holding money when broad monetary aggregates are modelled in the system.

The coefficient measuring the reaction of $\Delta\pi$ to cv_2 ($\alpha_{32} = 0.21, s.e = 6.9$) indicates that positive shocks to real income tend to lead to higher inflation (demand driven inflation).

3.8 Time series and cointegration properties in Period 2

The hypothesis of stationarity is rejected for all the variables (Table 5, line 1). Inflation is tested to be trend stationary (negative trend, p-value 0.25). This identifies one cointegrating vector. Results are robust to the choice of the number of cointegrating vectors. The long term rate, unlike the other four variables, appears to be borderline excludable from the cointegrating space and, as in period 1, weakly exogenous.

Table 5. Single hypotheses: $1986:1 - 1998:4$

1. $STA:\ p_m = 0.00, p_y = 0.00, p_\pi = 0.00, p_s = 0.00, p_l = 0.00$	
2. $LRE: p_m = 0.01, p_y = 0.00, p_s = 0.00, p_l = 0.03$	
3. $WEX: p_m = 0.00, p_y = 0.00, p_\pi = 0.00, p_s = 0.00, p_l = 0.41$	
2. $Money\ demand: (m-p) - \beta_1 y - \beta_2 s - \beta_3 l - \beta_4 \pi - \beta_5 T \sim I(0)$	
$\beta_1 = 1, \beta_2 = 0, \beta_3 < 0, \beta_4 < 0$	$LR - test, r = 2: \chi^2(3) = 11.5$ [0.00]
$\beta_1 = 1, \beta_2 = -\beta_3$	$LR - test, r = 3: \chi^2(3) = 13.7$ [0.00]
$\beta_1 > 0, \beta_2 \leq 0, \beta_3 = 0, \beta_4 = 0,$	$LR - test, r = 3: \chi^2(3) = 2.80$ [0.24]
3. $Fisher\ Parity: l - \beta_1 \pi \sim I(0)$	
$\beta_1 = 1$	$LR - test, r = 3: \chi^2(5) = 22.4$ [0.00]
$\beta_1 \neq 1$	$LR - test, r = 3: \chi^2(4) = 22.4$ [0.00]
4. $Expectation\ Hypothesis: l - \beta_1 s \sim I(0)$	
$\beta_1 = 1$	$LR - test, r = 3: \chi^2(5) = 21.3$ [0.00]
$\beta_1 \neq 1$	$LR - test, r = 3: \chi^2(4) = 21.3$ [0.00]
5. $Real\ income: y - \beta_1 l - \beta_2 \pi - \beta_3 trend \sim I(0)$	
$\beta_1 = 0, \beta_2 = 0$	$LR - test, r = 3: \chi^2(4) = 16.4$ [0.00]
$\beta_1 = -\beta_2$	$LR - test, r = 3: \chi^2(3) = 7.45$ [0.05]
6. $Short\ rate: s - \beta_1 y - \beta_2 \pi - \beta_3 l \sim I(0)$	
$\beta_1 > 0, \beta_2 > 0$	$LR - test, r = 3: \chi^2(3) = 3.32$ [0.36]

Both the money demand specification obtained in period 1 and the hypothesis that the interest rate differential measures the opportunity cost of holding money are rejected by the data. The best specification of money demand for period 2 (p-value 24%) leaves the coefficient on income unconstrained ($\beta_1 = 5.8$), the Treasury bill rate as a measure of the opportunity cost of holding money ($\beta_2 = -12.8, \beta_3 = 0$), no distinct impact of inflation ($\beta_4 = 0$) and trend.

The high income elasticity of money demand suggests the presence of wealth effects. Liberalization and increasing competition in the banking and financial sector, inducing higher substitutability between Treasury bills and deposits, and the structural change in the inflation process explain the changing nature of the opportunity cost of holding money.

As in period 1, both the Fisher parity and the Expectation hypothesis are rejected by the data (financial market imperfections). Trend stationarity of real income and IS effect are equally rejected.

A joint test of inflation and trend ($cv_1 : \pi + 0.0002Trend$), money demand ($cv_2 : m - 5.8y + 12.4s + 0.002Trend$), short-term interest rate equation ($cv_3 : s - 0.1y - 4.3\pi + 0.4l$),[43] is not rejected with a p-value of 0.26. Money significantly adjusts to cv_2 ($\alpha_{12} = -0.13, t - value = -5.2$), compatibly with the hypothesis of a stable long-run money demand with the Treasury bill rate measuring the opportunity cost of holding money (foregone returns). The short term rate adjusts to cv_3, but the α coefficient is borderline significant.

3.9 The Π matrix

The $\Pi = \alpha\beta'$ matrix, corresponding to the restrictions described above for the two periods, is reported in Table 6 below. The upper section of the table refers to period 1, the lower section to period 2. Significant coefficients (t-value larger than 2.5 in absolute value) are indicated in bold print.

Table 6. The Π matrix

Period 1 : 1971 : 2 − 1985 : 4					
	m	y	π	s	l
Δm	**−0.06**	**−0.18**	**−0.55**	0.00	**−2.21**
Δy	**−0.02**	**−0.14**	0.17	0.00	**−1.35**
$\Delta\pi$	**0.02**	**0.17**	**−0.59**	0.00	**1.41**
Δs	0.00	0.03	−0.16	0.00	0.21
Δl	0.00	0.01	−0.04	0.00	0.10
Period 2 : 1986 : 1 − 1998 : 4					
	m	y	π	s	l
Δm	**−0.13**	**0.46**	**−0.98**	0.37	**0.74**
Δy	0.02	0.00	−0.30	**−0.97**	**−0.48**
$\Delta\pi$	**−0.03**	**0.10**	**−0.53**	0.33	0.28
Δs	−0.01	0.02	**0.44**	**−0.18**	−0.06
Δl	0.00	0.00	0.00	0.00	0.00

In period 1, the impact of π and l on Δm and Δy is compatible with the assumptions of money demand and IS effect. The link between l and $\Delta\pi$ could be explained in terms of the (current) bond rate level anticipating (future) higher inflation. The impact of y on Δm and of m on Δy requires further investigation and may be due to substitution effects between money and real assets.[44]

[43] Interpreting cv_3 as an equation for the Treasury Bill rate $s = 0.1y + ...$, the vector indicates a positive impact of income and inflation on the short term rate (demand effect) and a negative impact of bond rates (substitution effect between Treasury Bills and Bonds).

[44] Higher real GDP leading to higher asset prices (stock exchange boom) and lower money demand (substitution effect between money and real assets). Moreover, a positive shock to real income has two effects on money demand: a positive effect (transaction purposes), and a negative effect (higher real income leading to higher inflation and lower money demand). To find a negative impact of real income on real money could indicate that the second effect is stronger than the first one.

In period 2, the impact of y and π on Δm is compatible with the assumptions of money demand.[45] The impact of l on Δy is the same IS effect identified in period 1. $\Delta\pi$ is negatively affected by the level of m[46] and π (adjustment mechanism), and positively affected by y (demand effect). Δs positively reacts to inflation (Treasury Bill rates set in a competitive financial environment) and negatively to itself (adjustment mechanism). Δl is weakly exogenous.

3.10 The C matrix

Having imposed a series of identifying restrictions on the r cointegrating vectors, the dual representation of the cointegration space allows for the identification of the $p-r$ common trends driving the system. The key element of the MA representation is the C matrix capturing the impact of cumulated shocks on the levels of variables.

In period 1, choosing 2 cointegrating vectors implies 3 common trends. The C matrix for the two periods and corresponding to the restrictions described above is reported in Table 7 below, with statistically significant coefficients (t-values larger than 2.5) reported in bold print.

Table 7. The C matrix

Period 1 : 1971 : 2 − 1985 : 4					
	$\Sigma\hat{\varepsilon}_m$	$\Sigma\hat{\varepsilon}_y$	$\Sigma\hat{\varepsilon}_\pi$	$\Sigma\hat{\varepsilon}_s$	$\Sigma\hat{\varepsilon}_l$
m	**0.62**	**−1.98**	0.59	**−0.00**	**−19.6**
y	**−0.10**	**0.41**	**0.58**	**−0.00**	**−5.39**
π	**−0.02**	**0.08**	0.04	0.08	−0.00
s	−0.01	−0.03	−0.16	**1.00**	−0.42
l	−0.03	−0.00	−0.07	0.00	**0.92**
Period 2 : 1986 : 1 − 1998 : 4					
	$\Sigma\hat{\varepsilon}_m$	$\Sigma\hat{\varepsilon}_y$	$\Sigma\hat{\varepsilon}_\pi$	$\Sigma\hat{\varepsilon}_s$	$\Sigma\hat{\varepsilon}_l$
m	**1.06**	0.30	−2.86	−4.01	−1.60
y	0.24	0.007	−0.56	−0.77	**−1.50**
π	**−0.00**	−0.00	0.05	0.00	0.00
s	**0.03**	0.01	−0.11	−0.06	**−0.51**
l	0.00	−0.00	−0.09	−0.15	**0.92**

Weak exogeneity tests indicate the bond rate as one of the common trends. This interpretation is supported by the MA representation of the data. Cumulated shocks to the bond rate negatively affect m (money demand effect), y (IS effect) and positively l, with a coefficient almost equal to one.

[45] The positive impact of l on Δm is compatible with l negatively affecting s (substitution effect between treasury bills and bonds) and s negatively affecting Δm (substitution effect between Treasury bills and money).

[46] This change in the monetary transmission mechanism contributes to explaining why monetary targeting was abandoned in period 2.

The bond rate is not affected by any cumulated shocks but those on the bond rate itself. The interpretation of the other two trend is less secure. Cumulated shocks to real income (real common trend) have a positive and significant impact on y itself and π (demand effect) and a negative impact on money demand (substitution between money and real assets). Cumulated shocks to s only affect the Treasury bill rate itself.

In period 2, choosing 3 cointegrating vectors implies 2 common trends. The C matrix corresponding to the restrictions described in Section 3.7 is presented in Table 9 below, with statistically significant coefficients (t-values larger than 2.5) reported in bold print. Weak exogeneity tests indicate the bond rate as one of the common trends. This interpretation is supported by the MA representation of the data. The coefficient measuring the impact of $\Sigma\hat{\varepsilon}_l$ on m has the correct (negative) sign but is statistically insignificant, contrary to period 1. This could depend on the weakening of the (direct) substitution effect between money and bonds with Treasury bills (and their market determined return) emerging as an intermediate step. The negative impact of $\Sigma\hat{\varepsilon}_l$ on y is compatible with the IS effect, observed in period 1. In this case, the effect is still statistically significant but weaker, consistently with the hypothesis of a changing transmission mechanism. Finally the negative impact of $\Sigma\hat{\varepsilon}_l$ on s is in line with a substitution effect between Treasury bills and bonds, absent in period 1 because of barriers in the capital market due to regulation. The second common trend could be generically labelled domestic monetary trend. Cumulated shock to m have a positive impact on m itself and on s and a very weak negative impact on π.

3.11 Comments on empirical analysis

A cointegrating relation compatible with the money demand hypothesis (see above Section 3.5.2) is found in both periods with Δm equation adjusting to it. In period 1 (High and non-stationary inflation, high nominal bond rates, strongly regulated short term rates, barriers to international capital flows) the chosen formulation includes both inflation and the bond rate as measures of returns on alternatives to holding money (real assets and bonds).

In period 2 (Low and trend stationary inflation, low nominal bond rates, market-determined short term rates, no barriers to international capital flows) the chosen formulation only includes the short term interest rate as a measure of the opportunity cost of holding money.

Links between money and inflation appear to be "correct" in both periods. Inflation negatively affects Δm equations (Table 5 and 7), compatible with the hypothesis of the opportunity cost of holding money raising with inflation. The effect is stronger and direct in period 1 (when inflation was higher), weaker and indirect (through s) in period 2. In period 1, higher m induces higher π (leading indicator properties of money with respect to prices). In period 2 this effect disappears, possibly due to the structural change in the inflation process.

But if money demand was stable, and the link between money and prices correct, why did monetary targeting fail in the UK?

My conclusion is that it failed because monetary policy instruments were either inappropriate or incompatible with a market-oriented and competitive banking and financial environment.

Monetary authorities tried to achieve targets by manoeuvering short-term rates. No attempt was made to control other variables such as bank reserves, contrary to the advice of Milton Friedman,[47] or bond rates.[48] The fact that the bond rate was the main determinant of period 1 money demand, the absence of stationary links short and long-term rates, and the bond rate weak exogeneity explain why this strategy was doomed to fail. Regulation (the corset) helped for a while in the task of achieving targets. Circumventing innovation, the risk of disintermediation, and market-oriented reforms monetary targeting nullified this possibility and monetary targeting had to give way.

The pulling down of barriers obstructing international capital movements and increasing competition in the banking and financial sector, both within the country and between UK and foreign institutions, might explain the changing status of the bond rate, with external (exchange rate and international parity) and structural (financial market deregulation) considerations exerting a stronger influence on its determination than before in period 2 rather than in period 1. For the same reasons, the short term rate appears to have become a better hedge against inflation. Substitution between Treasury bills and bonds appear in period 2 as a consequence of eliminating barriers in the capital market. Notwithstanding this, the spread is not stationary.

4 The monetary pillar (part 2)

4.1 A simple scheme

In order to better understand the monetary pillar a simple scheme of the M3 money market may be useful. This consists of money demand, money supply and equilibrium condition. Adopting the same notation as above, a general (deterministic) money demand is of the following kind

$$(1)\ m^d = p + a_1 y + a_2 s + a_3 l + a_4 \pi$$

with $a_1 > 0$ and the magnitude and sign of a_2, a_3 and a_4 depending on the prevailing structural and substitution effects between money, short term bonds, long term bonds and real assets.

[47] Friedman (1980).

[48] As to bond rates, public debt management considerations were always given pre-eminence with respect to their management.Only the fiscal scenario improved and with adoption of overfunding (see above note 24), bond rates started being directly influenced for monetary control purposes.

Money supply depends on monetary base b, monetary policy (summarized by the short term rate s), reserve requirements r, the propensity to lend of the banking system, deposit and loan rates d and n,[49] and the cash/deposit ratio c. Indicating with $m(s, r, x, c)$ the logarithm of the money multiplier[50] and with b the logarithm of monetary base, the logarithm of money supply is equal to

$$(2)\ m^s = m(s, r, d, n, c) + b$$

Imposing the equilibrium condition $m^d = m^s$ and differentiating with respect to time, under the assumption that the velocity constraint holds ($a_1 = 1$), that the money multiplier is constant, and that the effect of interest rates and inflation on money demand is captured by the opposite of velocity $v = -(a_2 s + a_3 l + a_4 \pi)$, the following expression holds

$$(3)\ \frac{\dot{b}}{b} = \frac{\dot{m}}{m} = \pi + \frac{\dot{y}}{y} - \frac{\dot{v}}{v} = \mu$$

Equation (3) is exactly of the kind used by the ECB to determine the reference value for the growth rate of M3 under the monetary pillar. Once hypothesis on $\frac{\dot{y}}{y}$ and $\frac{\dot{v}}{v}$ are formulated, the definition of price stability (π below 2%) yields the required reference value μ^*.

Deviations of μ from μ^* may be due either to demand, or to supply (monetary policy shocks, changing propensity to lend of the banking system, current account imbalances affecting the size of b through the foreign reserves channel, government deficit monetization[51]) The purpose of the monetary and credit analysis conducted under the monetary pillar is to investigate the source of such deviations, *i.e.* to explain $(\mu - \mu^*)$.

4.2 Making the monetary pillar work

The informational approach to the use of money in a price-stability oriented monetary policy strategy rests on the notion of monetary neutrality and on the quantity theory of money. The key implication of this theory is that a given change in the rate of change of the quantity of money induces an equal change in the rate of price inflation.[52]

What is required for the informational approach to work is to empirically prove that money contains information on inflation, to be used by the central bank in its policy formulation process.[53]

[49] This is a complex function of loan rates, rates on alternative assets (bonds, commercial paper), rates on deposits (bank liabilities) and the risk propensity of the banking system.

[50] Walsh (1999).

[51] Forbidden under the Growth and Stability Pact (ECB (2001)).

[52] Lucas (1980), p. 1.

[53] For a critical perspective on the usefulness of monetary aggregates as information variables, Estrella and Mishkin (1997) and Gali (2000). Nelson (2003) discusses cases in which monetary aggregates can be useful indicators of inflationary aggregate demand pressures.

As to the euro area, Tre Croci and Vega (2000) find a significant positive association between the real money gap (see above footnote 19) and future inflation. The analysis of Gerlach and Svensson (2001) is in line with these results. Nicoletti Altimari (2001) supports the idea that monetary and credit aggregates provide significant and independent information for future price developments in the euro area, especially in the medium term horizon. Gerdesmeier and Roffia (2003) suggest this information might be useful in predicting the ECB reaction function.

So much for the usefulness of money as an information variable, but the monetary pillar is more than this. It is a compromise between the informational approach and monetary targeting, according to Issing *et al.* (2001). Its purpose is to give money a 'prominent' role in the ECB strategy, where the dictionary definition of, 'prominent' is "standing out, projecting, most easily seen, catching the attention and the eye of the public".

Monetary targeting is a monetary policy strategy based on the notion that "inflation is always and everywhere a monetary phenomenon"[54]. Under this strategy, the central bank computes a target for the growth rate of one (or more) monetary aggregates, compatible with its notion of price stability, communicates it officially to the public and commits itself to meet it, at least in the medium run.[55] Monetary targeting should be viewed as the informational approach plus three additional attributes, listed below. Their purpose is to improve the coordination of agents' expectations around the target, with the aim of making monetary policy more effective.[56]

1. Once the monetary target μ^* is defined in a clear and open way consistent with the central bank goals, the analysis of $(\mu - \mu^*)$ must be the primary framework for monetary policy communication to the markets (policy communication through monetary and credit analysis).

2. The central bank must behave in a consistent way, making it possible to understand when and how it will react to deviations from target $(\mu - \mu^*)$ (consistent monetary conduct).

3. The central bank must be capable of controlling μ through its policy instruments (*e.g.* short term interest rates) so that $\mu = \mu(s)$ and, at least on average, $\mu = \mu^*$ (monetary control)

Matching this taxonomy with the 'compromise' definition of the monetary pillar, this definition is implementable if the ECB renounces *at least one* of above attributes (otherwise it would be a money targeter, which it is not) *but not all of them* (otherwise the monetary pillar would be undistinguished from the informational approach and the ECB strategy would be made more intelligible by doing away with it).

[54] Friedman (1963), p.17.

[55] Griffiths and Wood (1981), Friedman (1990), Mahadeva and Sterne (2000).

[56] The coordination of agents' (especially wage bargainers') expectations through the announcement of quantified policy objectives was one of the essential features of monetary targeting in Germany (Posen (2000), p.395).

The existence of two distinct pillars and the refusal to attach any relative weight to them[57] are contrary to the notion that monetary and credit analysis is the key communication tool of the ECB, even if a lot of time and analysis is devoted to explaining $(\mu - \mu^*)$. Preserving the two-pillars framework implies renouncing the first of the three attributes distinguishing monetary targeting from the informational approach. But what about the other two?

The ECB has repeatedly claimed that the announcement of a reference value for the growth rate of M3 does not entail any form of monetary control. The first lesson which can be drawn from the analysis of monetary policy in the UK, is this may have been a very wise choice and one the ECB should stand firm on.

To have a stable money demand does not imply that the problems of monetary control are automatically solved. Whenever μ is different from μ^* , monetary control is possible if and only if $\mu = \mu(s)$ and the value of s which is required to attain μ^*, is within the reach of the central bank.

Potentially the central bank can affect μ both through demand and supply (money multiplier, monetary base). Even in the most favorable of cases, with a stable money demand, a constant money multiplier and monetary base fully under the control of the central bank, the possibility of having $\mu = \mu(s)$ depends on the stationarity of the link between s (central bank instrument) and returns measuring the opportunity cost of holding money (e.g. long term rates l, or π as a proxy of the return on real assets q), i.e. on the stationarity of $(l - as)$ and $(s - b\pi)$, with a and b possibly equal to one, and on causality running in the 'right' direction $(s \rightarrow l, \pi)$.[58]

The key point is that once l and π are set in a competitive market, open to the rest of the world, by global financial institutions, these institutions are free to decide what part of changes in s pass on to the rest of the system, leaving the relevant differentials unaffected or changing them according to *their* perception of risk not the central bank's.[59] Obviously, the two may coincide. But if they do not the central bank may be unable to do much about it, therefore loosing monetary control, unless it chooses to adopt extreme measures of a destabilizing nature.[60] Following this line of reasoning, this paper blames the failure of monetary control in the UK not on money demand instability but rather on the absence of a stationary link *from* s (central bank instrument) *to* l and π (money demand determinants).

This finding should could confirm the ECB in its decision to rule monetary control out even with a stable money demand for the euro area. As to this, Coenen and Vega (1999) find $m^d = p + 1.14y - 0.82(l - s) - 1.4\pi$. Brand and Cassola (2000) find $m^d = p + 1.3y - 1.6l$ and $(l - s) \sim I(0)$.

[57] Issing *et al.* (2001), p.106.

[58] In Germany, where monetary targeting was successful, Lütkepohl and Wolters (2003) find both a stationary money demand and a link between (the exogenous) s and m *via* l : $(\Delta m = ... - 0.349l_{t-1}), (\Delta l_t = ... + 0.237s_t - 0.227s_{t-1})$.

[59] Goodhart (1984), Augar (2000).

[60] Under these circumstances, there will still be an effect of s on μ, through y and π *via* money demand at the end of the transmission process, but the strength of the link and the chances of running an effective monetary control of the $\mu = \mu(s)$ may be greatly diminished.

In both cases, though, it is open to question (and to future research) whether the ECB could be capable of affecting l and $(l - s)$ through s and whether this capability and a stable money demand would survive the eventual adoption of more stringent monetary control (Goodhart's law).

But if policy communication of the monetary targeting kind is incompatible with the two-pillars framework and if the ECB rules monetary control out (and rightly so, judging from past UK experience), the only possibility for the monetary pillar to work as a compromise between monetary targeting and the informational approach depends on the ECB conduct with respect to the reference value.

Once the ECB officially announces a reference value for the growth rate of M3, either it shows that deviations from it influence its policy in a consistent way or it does not. If it does not, there is a serious risk that the markets will perceive the monetary pillar and the strategy as a whole, as faulty.[61]

Developing a consistent conduct with respect to the reference value is a different thing from monetary control. Large deviations from the reference value may still be allowed, provided it is understood *when and how* the ECB will react to them. This should make it easier for the markets to understand monetary policy, focusing on the reference value, while leaving the ECB enough room of maneuver to face unforeseen circumstances. Such an argument is all the more relevant within the two-pillars framework, given that the reference value for the growth rate of M3 is the only front page quantitative indicator against which evaluation of its conduct is possible apart from inflation.[62]

To be fair, it may be too early to expect the ECB conduct with respect to deviations form the reference value to be fully consistent. After all, the ECB is a new institution operating in a new environment. To develop a consistent monetary conduct is a complex exercise, requiring judgment and caution. The links between money and other macroeconomic variables can be influenced by a multiplicity of factors, from the nature of the policy regime to the technology of the payment systems, from financial innovation to the tax system, in a way which makes consistent monetary management even more difficult.[63]

Given an adequate amount of time and a *reasonably stable* financial and economic environment, it is possible that a consistent conduct with respect to the reference value will emerge out of the analysis run under the monetary pillar. For this to happen, the ECB must choose to be less hesitant in letting the markets understand, in a coherent and consistent way, *when and how* it will react to deviations from the reference value and when this will not be the case. If the ECB chooses to do so the monetary pillar will be probably safe as a compromise between monetary targeting and the informational approach. And yet, what happened in the UK suggests that even this may be a difficult task to achieve.

[61] Bibow (2001).

[62] The publication of staff projections of inflation based on the assumption of no policy changes was inaugurated in the Monthly Bulletin of December 2000 and its still in its infancy.

[63] Issing *et al.* (2001), p.81

British monetary authorities failed to exert monetary control. They also failed to develop a consistent conduct with respect to deviations from target. From time to time, such deviations were met by short-term interest rates rises, regulation (corset), overfunding, accommodation or target manipulation, without any coherent and consistent pattern emerging.[64]

This shifting conduct was probably the only feasible alternative in an open, competitive and market-oriented financial system, housing a world-level financial center (London). And this is probably why, in the end, British monetary authorities chose to abandon monetary targeting and simply to go for the informational approach, without striking any compromise between the two, such as the one the ECB is trying to achieve through the monetary pillar.

Competition in banking and finance encourage innovation. Reserve margins are narrowed to a minimum to be profitably invested or lent out. The links between banks and markets multiply both within and between nations. Global financial conglomerates emerge. New risks (derivatives, international finance) are tried out. Impulses of a destabilizing nature (international financial crises, speculative bubbles) propagate more easily the less segmented and market-oriented the system is. The central bank may be called in more and more often to act as lender of last resort.

The main lesson the ECB should learn from what happened in the UK is that, not only monetary control, but also the possibility of developing a consistent conduct with respect to the reference value is *inversely proportional* to the level of competitiveness and market-orientedness of the banking and financial system and is *in contrast with* the choice of developing a world-level financial center (or more of them) within the euro area, capable of rivalling with London (and New York).

Many changes will have to take place if the euro is to gain status as an international reserve currency. Many of them will affect banks.[65] Cost/income pressure, changes in risk and risk management and the growing importance of consumer issues are the three main trends driving the evolution of European banks.[66] Recent figures on branches and subsidiaries point to a continuing integration in the banking industry.[67]

If integration brings about more competition, this will encourage securitization, off balance-sheet operations and internationalization. Capital markets will grow and become more competitive, with national stock exchanges likely to merge.[68] European households and firms could react to all this by adopting less conservative financial habits.

[64] In Germany, where monetary targeting was successful, the Bundesbank allowed overshooting of target if accompanied by signs of economic weakness or by a strong appreciation of the Deutsch mark (see Von Hagen and Neumann (1993)).

[65] Kregel (2000) lists: Increase in the corporate loan origination and credit risk evaluation services supplied by banks to be matched by a reduction of their loan books, the spreading of loan securitization, collateralised loan obligations and other liquidity guarantees by banks.

[66] ECB (2002b)

[67] ECB (2002b), page 19.

[68] ECB (2002a).

All this could make it difficult for the ECB to develop a consistent conduct around the reference value for the growth rate of M3, exactly as it made it difficult for UK monetary authorities to develop a similar conduct. Should this prove to be the case, the only alternative to the monetary pillar will be to "Do as the Bank of England does" or as Svensson (2003) puts it to "Incorporate the first pillar into the second, and adopt flexible inflation targeting". The role of money in the (successful) Bank of England inflation targeting strategy responds to the basic requirement of informational approach (money containing empirically relevant information with respect to inflation) but does away with all of the three attributes of monetary targeting, requiring no compromise between the two.

5 Will the monetary pillar stay?

In a democratic society, transparency and accountability in pursuing clear objectives are essential counterweights of central bank independence.[69] The ECB has been often criticized for adopting and communicating its policy in an inconsistent way, with the two pillars being a part of the problem instead of the solution.[70] It is possible that at some point in the future the two-pillar strategy will be reconsidered. The ECB itself has recognized that this strategy has led to 'occasional misunderstanding of the ECB policy framework'.[71]

Flexible monetary targeting is compatible with a wide range of variables (wages, exchange rates, asset prices) being looked at and reacted upon.[72] Inflation targeting is compatible with detailed monetary and credit analysis. Abandoning the two-pillars in favor of a unified approach, then, is not be a problem of what *variables* to include in the information set of the ECB, but rather of what *variable* to keep on the front page, for the markets to look at.

The main conclusion of the paper is that for the monetary pillar to work as originally conceived, within the two-pillars strategy, the ECB should commit itself to explaining, in a consistent and coherent way, when and how it will react deviations form the reference value. This is what I call a consistent monetary conduct.. Developing such a conduct is a different thing from monetary control. Large deviations from the reference value may still be allowed provided they pose no dangers to price stability or provided such dangers can be offset by the effects of monetary policy on other variables (wages, exchange rate, asset prices, investment decisions).

Thus far the ECB has refused any commitment of this kind, applying a principle of caution in the face of the many unknowns it had to face. And yet, as data on the working of the euro area accumulate, it could probably become a bit less cautious and start committing itself to a consistent monetary conduct, be it only through *ex post* explanations as the Bundesbank did.

[69] Issing *et al.* (2001), p. 128.
[70] Arestis *et al (*2002), Artis (2002), Bibow (2002), Forder (2002).
[71] ECB (2000), November, p.37.
[72] Von Hagen (1995), Issing (1997), Bernanke and Mihov (1997).

It is only for to the ECB to decide whether this is a feasible option. It is certainly the only way to preserve the monetary pillar and the 'prominent' role of money as something distinct from the informational approach. This would have the additional advantage of robustness, for those who believe, as many macroeconomists do, that money and prices are always linked in the long-run.

If the way the banking and financial sector in the euro area evolves, turns out to make developing a consistent conduct with respect to the reference value and to deviations from it too difficult a task, the monetary pillar will slowly fade from view, *de facto* if not formally, leaving the informational approach *à la* Svensson as the only way to credibly include money in the information set of the ECB.

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