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**A case for money in the ECB
monetary policy strategy**

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Abstract

One major outcome of the review of the ECB's "two pillar monetary policy strategy", which was published on 8 May 2003, has been the de facto downgrading of the hitherto prominent role assigned to the stock of money. According to the authors' judgement, however, there is a strong theoretical and empirical rationale for the ECB monetary policy to pay close attention to the information content of money in the form of M3. However, the authors argue the ECB should make use of the so-called "price gap" or "real money gap" concept rather than the reference value as the latter runs the risk of giving misleading policy recommendations and compromising the indicator quality of the stock of money. Making use of M3 seems all the more rational as currently no better inflation indicator appears to exist in providing inflation forecasts in the euro area.

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"The gold and silver money which circulates in any country may very properly be compared to a highway, which, while it circulates and carries to market all the grass and corn of the country, produces itself not a single pile of either"

A. Smith, Wealth of Nations, 1776, p. 321.

1. Introduction

Numerous studies have shown that inflation has negative consequences for investment, growth and employment. As a result, a monetary policy pursuing price stability can be considered as conducive to economic well being. Experience has shown that an overly expansionary monetary policy might yield output and employment gains in the short-run but is followed by growth and employment losses in the longer term. To avoid that (small) short-term benefits are traded off against (substantial) long-term costs, monetary policy requires an institutional framework conducive to maintaining price stability. Successful central banks are supported by a constitution, which explicitly states price stability as the (primary) objective of monetary policy, and grants political, financial and personnel independence to the central bank. In addition, an explicitly announced monetary policy strategy – that is the framework governing the actual interest rate setting policy – can be seen as being highly important for communicating and delivering a price stability oriented monetary policy.

On 8 May 2003, the ECB Governing Council announced the results of the review of the “two pillar monetary policy strategy”.¹ One major decision of the ECB was that the economic analysis (represented by the former “second strategy pillar”) shall now be used to identify short- to medium-term risks to price stability. The monetary analysis (the former “first strategy pillar”) will then follow to assess the medium- to long-term inflation trends. By doing so, ECB has *de facto* downgraded the monetary analysis to second rank: The “prominent role” formerly assigned to money has been substituted for a “control variable” function of money. The focus of this article is to analyse the rationale for money to play a leading role in the ECB’s strategy. The article has been structured as follows. First, the elements and the rationale of the former ECB strategy will be briefly outlined. Second, a critical look will be taken at the implementation of the reference value concept and arguments are provided for substituting it with the so-called “price gap” or “real money gap”. Third, a brief look will be taken at the “rivaling” concepts of monetary and inflation targeting. Lastly, we summarize the findings.

¹ For background studies on the ECB monetary policy strategy review see www.ecb.int.

2. ECB strategy – design and performance

The ECB monetary policy strategy was chosen by explicitly adhering to a number of normative principles such as, for instance, “effectiveness”, “accountability”, “transparency” etc, which were set up by the European Monetary Institute (EMI) in 1997 to assess the appropriateness of the alternative strategy candidates. Moreover, in formulating the strategy, the special situation prevailing at the start of Stage Three had to be taken into account. In autumn 1998, the ECB made public the elements of a so called stability-oriented monetary policy strategy, which rested on two pillars:

- The first pillar assigned a prominent role for money in the definition of M3, based on the notion of the monetary origins of inflation. In indication of the prominent role it attached to money in the formulation of its monetary policy, the ECB has announced a quantitative reference value for monetary growth in December, which has been set at 4½ percent since the start of Stage Three of EMU.
- The second pillar consisted of a broad-based assessment both of the outlook regarding price developments and of the risks to price stability in the euro area as a whole. This assessment comprised analyses of information on the economic and financial situation, ensuring that the ECB is as well informed as possible when making its monetary policy decisions.
- Moreover, the ex ante public announcement of a quantified definition of the final objective of price stability has been considered as an indispensable part of any ECB strategy candidate in order to enhance the transparency and credibility of the strategy.² Since the beginning of EMU, the ECB has defined price stability as an annual increase of the Harmonized Index of Consumer Prices (HICP) of below 2.0%. As from 8 May 2003, the bank aims to maintain inflation rates of close to 2% – “coming from below” – over the medium term.

Forward-looking inflation targeting central banks tend to place the inflation forecast at the centre of their analytical and communication frameworks, and use such a forecast ideally as if it was an intermediate policy target. The ECB has received a level of criticism for not always having changed rates systematically in line with the inflation forecast signals provided by the two strategy pillars.³ However, the use of considerable discretion in interpreting the signals of its strategy has obviously not been detrimental to delivering price stability.

² See European Monetary Institute (1997), p. 14.

³ For an analysis of the ECB rate setting behaviour see, for instance, Kösters, W., Leschke, M., Polleit, T. (2003), How do central banks react? – A comparison between the European Central Bank and the US Federal Reserve, forthcoming.

The explanation for this may be found in the fact that the ECB policy has nevertheless met a number of requirements, which are to be considered conducive to maintaining price stability, namely:⁴

- the bank has made the stability mandate operational and transparent;
- it has legitimised the price stability mandate by making the public aware of the costs of inflation;
- the bank made extensive effort in explaining the elements and rationale of its strategy to the wide public;
- it analysed and commented target deviations and empirically reviewing the properties of the strategy variables used; and
- it analysed the framework within which monetary policy is conducted (such as, for instance, reform processes in the product and factor markets, fiscal policy etc.).

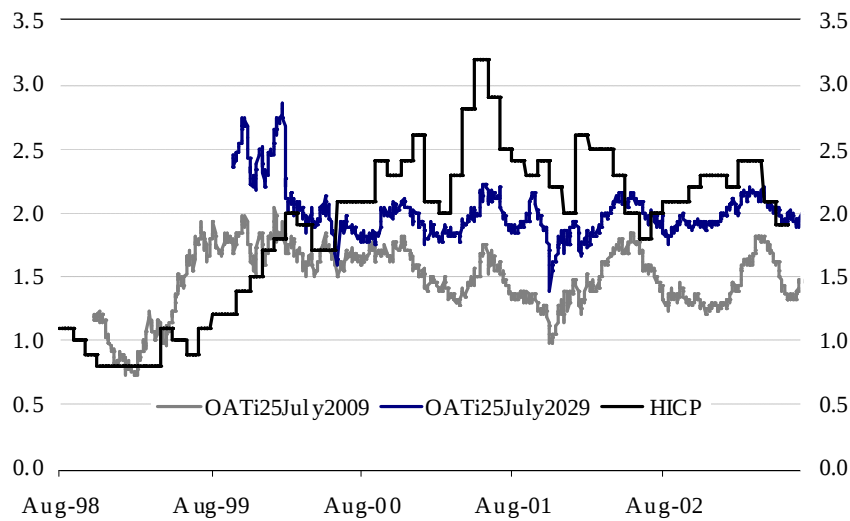
Since the beginning of 1999, average inflation in the euro area has remained close to the ECB's upper inflation ceiling of 2.0 percent.⁵ Moreover, inflation expectations, approximated by the so-called "break-even" inflation of inflation-index bonds, seem to have remained closely linked to the ECB's price stability promise since the beginning of Stage Three (see Figure 1). This finding can be interpreted as financial markets having considered the ECB's price stability mandate as credible even in periods when actual inflation exceeded the bank's 2.0 percent ceiling. Regardless of the favourable performance, the prominent role of money in the ECB strategy, in particular, has continued to attract criticism, both for conceptual and communication reasons. In some cases, it has been argued that the first pillar should be integrated with the second⁶, or that the policy focus on M3 be dropped altogether. In the following section, we outline and critically assess the merits and the conceptual idea governing the former first pillar.

⁴ See ECB OBSERVER, Die EZB-Strategie auf dem Prüfstand, Press Statement, 17. März 2003, pp. 4.

⁵ In the period January 1999 to February 2003, the annual increase in the Harmonized Index of Consumer Prices (HICP) averaged 1.99%. The maximum rate was 3.2% in May 2001, the minimum was 0.8% at the beginning of 1999.

⁶ See, for instance, Sachverständigenrat, Jahresgutachten 2002/03, p. 303 and pp. 305.

Figure 1: Actual inflation and “break-even” inflation in percent, August 1998 to Mai 2003



Data source: Bloomberg; own calculations. – Actual inflation measured as annual changes in the HICP; last data point: February 2003; monthly data. – “Break-even”-inflation (BEI) calculated from the French inflation-linked OATs; daily data. – For further explanation of the BEI see, for instance, Sack, B. (2000), Deriving inflation expectations from nominal and inflation-indexed Treasury yields, Board of Governors of the Federal Reserve System, Working Papers, 16 May 2000, www.federalreserve.gov/pubs/feds/2000/200033/200033pap.pdf.

3. Discussion about the role of money

3.1 The use of M3 and the reference value concept

From a stability-oriented monetary policy, the pre-announcement of an envisaged M3 growth rate serves a number of purposes. Firstly, it contributes to the stabilisation of market agents' expectations as the central bank's reaction function in terms of forthcoming interest rate changes should become more transparent. Secondly, the central bank can signal to wage negotiation partners the amount of money it is willing to provide, thereby setting a strict limit for the funding of nominal wage increases through monetary policy. Thirdly, the pre-announcement of money growth enhances the accountability of monetary policy. And fourthly, the pre-announcement of M3 growth provides the ECB with a shield against political pressure to trade off price stability against growth.

As a rule, the rationale of focusing on the stock of money as an important inflation indicator of monetary policy hinges on the aggregate's statistical properties:⁷

- first, the demand function for M3 has been found to be stable over time: there is a stable long-term relation between money, income and interest rates in the long term;⁸
- second, the central bank seems to be able to control the intermediate variable by using its instruments in a predictable manner; and
- third, changes in the monetary aggregate have to be followed by predictable changes in the final objective of monetary policy.

The validity of the stock of money to function as a reliable inflation indicator depends essentially on the trend stability of the demand for the money aggregate M3. Of course, there is a risk that money demand could become unstable in the future (for instance, through the introduction of financial innovations, changes in banks' refinancing behaviour etc.).⁹ At the same time, however, there are a number of arguments lending comfort that the stock of M3 will retain its information content for the foreseeable future:¹⁰

- First of all, the ECB monetary policy objective of keeping inflation stable should actually prevent “monetary policy induced” shocks to money demand. This must be seen as an important factor: it is not too far-fetched to assume that the breakdown between the relation between prices and money, which has been observed in various countries, is to a large extent a consequence of a misguided monetary policy.
- Second, a broadly defined money aggregate can be expected to “absorb” most of the changes in banks' and non-banks' portfolio behavior.

⁷ For the demand for euro area M3 see, for instance, Coenen, G., Vega, J. L. (1999), The Demand for M3 in the Euro Area; also Brand, C., Cassola, N. (2000), A money demand system for euro area M3. Supporting the findings of the analyses, the ECB Council wrote in December 2002: “there are at present no signs of structural breaks or changes in the long-run fundamental relationship between money and prices in the euro area which underlies the derivation of the reference value.” For a contrary view see Sachverständigenrat 2001/02, pp. 279. Here the long-term stability of money demand is questioned and, moreover, the null-hypothesis of weak exogeneity of the short-term interest rate for the demand for money – which is the precondition for super-exogeneity – is rejected at the 1% significance level. For the latest findings see also Bruggeman, A., Donati, P., Warne, A. (2003), Is the demand for euro area M3 stable?, <http://www.ecb.int/pub/strategy/BruggemannDonatiWarne-money-demand.pdf>. Also Calza, A., Sousa, J. (2003), Why has money demand been more stable in the euro area than in other economies? A literature review, <http://www.ecb.int/pub/strategy/CalzaSousa.pdf>.

⁸ It should be noted that the demand for money represents nothing else than the reciprocal of the velocity of money. If, for instance, a money unit is used 100 times for turnover purposes in a given period of time, it is held for 1/100 of the time in the portfolios of money holders.

⁹ It should be noted that the risk of a hitherto stable relation between an indicator variable and prices becoming unstable is not confined to the use of money but essentially inherent to any monetary policy strategy which aims to influence the price level by making use of an intermediate target or forecasting variable.

¹⁰ See ECB OBSERVER, Can the ECB do more for growth? p. 38.

- And third, as long as there is no full harmonization of savings patterns, business cycles and taxes and regulations across the countries participating in the euro area, a broadly defined monetary aggregate can be expected to remain fairly robust. From this point of view, the enlargement of the euro area should function as a kind of stabilizer, supporting the validity of a broadly defined monetary aggregate such as M3.

From a theoretical point of view, the monetary analysis rests on the transaction equation, which can be written as follows:¹¹

$$(1) \quad M \cdot V = Y \cdot P,$$

where M = is the stock of money, V = the velocity of money, Y = real output and P = price level. Equation (1) simply says that the stock of money, multiplied by the number of times a money unit is used for financing purposes, equals the real output valued with its price level. Taking logarithms and first differences of the variables (Δ), equation (1) can be easily rearranged as follows:

$$(2) \quad \Delta m + \Delta v = \Delta y + \Delta p.$$

When using long-term values of the variables, namely 2.0 to 2.5% for potential growth, 0.5 to 1.0% for the decline in velocity and an envisaged inflation of around 1.5%, the adequate money supply growth is:

$$(3) \quad \Delta m^T = \Delta y^* + \Delta p^* - \Delta v^* \approx 2.25\% + 1.5\% + 0.75\% \approx 4.5\%,$$

where asterisks mark long-term values. To use the informational content of M3, the ECB compares actual M3 growth rates with the reference value on a monthly, e.g. 3-month moving average, basis. Persistent deviations in M3 growth from the reference value shall signal to the ECB, under normal circumstances, danger to the future price stability and, consequently, a need for policy action.

However, analysing the information content of M3 by making use of the reference value concept suffers from two shortcomings. First, the demand for M3 seems to be stable over the long rather than the short term. This finding is largely due to the fact that in the short-term non-banks' portfolio shifts, which are not necessarily related to inflation relevant transactions, might well distort the indicator function of money aggregates, whereas in the long term, the demand for money bears a relatively close relation to income and interest rates. As a result, a focus on short-term comparisons of actual M3 growth with the 4½% reference value run the risk of resulting in frequent (target) deviations, providing misleading policy recommendations. In addition, there might be a much more fundamental problem with the reference value concept: in terms of its actual implementation, the question arises whether the concept will actually succeed in delivering price stability.

¹¹ The ECB's monetary analysis includes M3, its components and counterparts, notably credit, and various measures of excess liquidity.

3.2 Modifications to the reference value concept

In principle, the ECB's concept implies that the current year's stock of M3 shall be expanded at a constant rate. However, keeping the reference value for the next year constant is only viable if the actual M3 expansion is measured against the envisaged M3 growth starting from a "once and for all" fixed base period. If, however, the actual M3 expansion is simply measured against a reference value that is held constant each year without taking into account excess M3 growth built up in former periods, inflation target deviations could be the consequence: even M3 growth rates close to the reference value could be accompanied by an unwanted rise in the overall price level as M3 overhangs (defined as past deviations of actual M3 expansion less the reference value) start feeding through into a higher price level.

So far, the ECB's implementation of the reference value concept systematically disregards the effects of real M3 overhangs built up in former periods, which, however, will subsequently feed through into the price level. If the reference value is kept constant each year even though M3 deviations have occurred in past periods, comparisons between actual M3 and the reference value become meaningless in terms of anticipating forthcoming ECB reactions, as the central bank may have to act even though M3 expansion complies with the reference value. If the central bank decides to set the reference value each year anew, an approach for determining the reference value for the coming period could – under certain assumptions – look as follows:¹²

$$\begin{aligned}
 \text{next period's envisaged M3 expansion} = & \quad \text{GDP potential growth} \\
 & + \text{declining growth of the velocity trend} \\
 & - (+) \text{positive (negative) former M3} \\
 & \quad \text{overhangs (positive/negative price gap)} \\
 & + \text{inflation forecast} \\
 & + \text{normative inflation} \\
 & (- \text{ other variables influencing future inflation})
 \end{aligned}$$

According to this reference value calculation (which can be characterized as some form of "formula flexibility"), the dynamics of money supply implications on future prices are systematically taken into account. The time-lags are to be determined by an empirical analysis of the relationship between inflation and current and past M3 overhangs. In the following, we take a closer look at the so-called "price gap" or "real money gap", which can be considered as an "enlightened" way of using the information content of money.

¹² See Leschke, M., Polleit, T. (2001), Monetary Targeting – antiquated strategy of robust stabiliser?, in: INFER, Frankfurt, May.

3.3 A case for the “price gap” or “real money gap”

The ECB has addressed the deficiency of the reference value concept outlined above by publishing the so-called “real money gap”. This concept is closely affiliated with the so-called P-star model.¹³ To start with, the actual price level is:

$$(4) \quad p = m + v - y.$$

The long-term price level can be formalised as:

$$(5) \quad p^* = m + v^* - y^*.$$

The difference between equations (5) and (4) is the so-called price gap:

$$(6a) \quad p^* - p = (v^* - v) + (y - y^*).$$

The price gap ($p^* - p$) consists of (i) the liquidity gap ($v^* - v$) and (ii) the output gap ($y - y^*$). Equation (6a) suggests that if, for instance, actual output exceeds potential ($y > y^*$) and actual velocity equals the long-term equilibrium ($v = v^*$), the actual price level can be expected to rise (in the future).

However, when analysing the “forces driving inflation” in the P-star concept, it is important to note that, for instance, an increase in real output above potential will not cause a change of the price gap as equation (6a) suggests: This is because v will rise as y increases, so that any increase in the output gap is compensated by a decline in the liquidity gap. It is therefore recommendable to use a representation which shows that the price gap is actually independent from the output gap: that the price gap is simply the difference between real money (adjusted by the trend velocity) and real potential output:

$$(6b) \quad p^* - p = (m + v^* - p) - y^*$$

That said, inflation – a persistent rise in the price level – can only occur when “too much money chasing too few goods” or, to put it differently, money is always and everywhere a monetary phenomenon in the P-star concept.¹⁴

¹³ This concept is actually based on the influential work of Hallman, J. J., Porter, R. D., Small, D. H. (1991), Is the price level tied to the M2 monetary aggregate in the long run?, in: American Economic Review, Vol. 81, No. 4, pp. 841 – 858. See also Svensson, L. E. O. (2000), “Does the P* Model Provide Any Rationale for Monetary Targeting?” German Economic Review 1, pp. 69 – 81.

¹⁴ An empirically testable inflation forecasting model using the price gap as inflation indicator could look as follows: $p_{t+1} = b_0 + b_1(p_t^* - p_t) + \sum_{i=1}^n b_i p_{t-i} + N_t + e_t$ where p_{t+1} is future inflation. If the actual price level is lower (higher) than the equilibrium level, future inflation will accelerate (slow down) to close the “gap”. As a result, one would expect the parameter b_1 to be positive. Given the “stickiness” of inflation, one

Alternatively, the so-called “real money gap” is defined as actual money supply less actual price level:

$$(7) \quad m_{real} = m - p.$$

The real equilibrium real money holding is:

$$(8) \quad m_{real}^* = m - p^*.$$

The difference between equation (7) und (8) is the real money gap, which represents nothing other than the price gap with a negative sign:

$$(9) \quad m_{real} - m_{real}^* = (m - p) - (m - p^*) = -p + p^* = -(p - p^*).$$

Figure 2 on the following page shows the nominal and real money gap in the euro area from the period December 1998 to April 2003.

Against the background of these findings, it is easily shown that a simple comparison between actual money growth and the reference value might lead to misleading policy signals as monetary expansions, which occurred in the past and will have a bearing on future prices, are systematically neglected. Using a more formal approach, the equilibrium price level is:

$$(10) \quad p^* = m^T + v^* - y^*,$$

where m^T is the envisaged money supply growth as determined by the reference value concept. The deviation between the equilibrium and actual price level is:

$$(11) \quad p^* - p = (m^T + v^* - y^*) - (m + v - y) = (m^T - m) + (p^* - p).$$

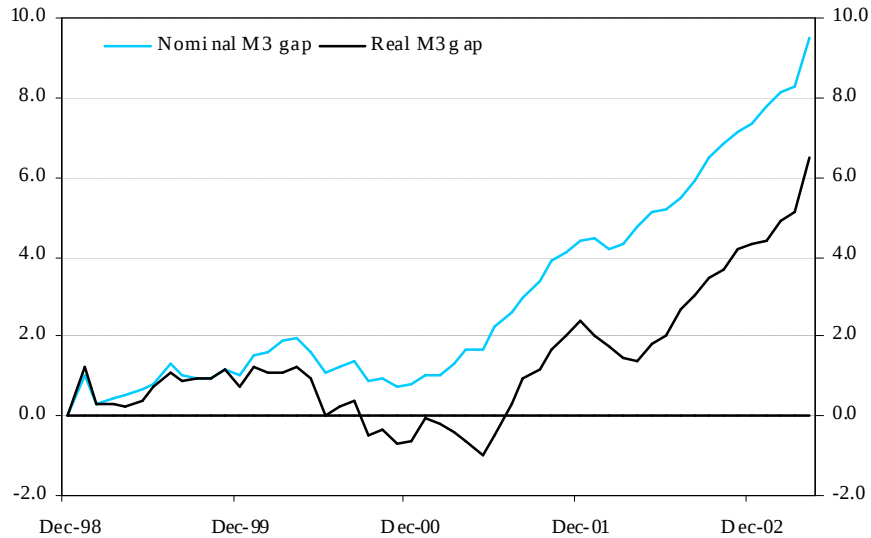
The deviation of the envisaged from the actual price level can be explained by the deviation of the envisaged from actual the stock of money and the price gap (or, alternatively, the negative real money gap). And only if the price gap is zero, it makes sense to base monetary policy decisions on the reference value concept.¹⁵

may also take into account past inflation as shown by $\sum_{i=1}^n b_i p_{t-i}$. N_t represents a vector of non-monetary

“cost push” variables (oil, wages, exchange rate, unemployment etc.).

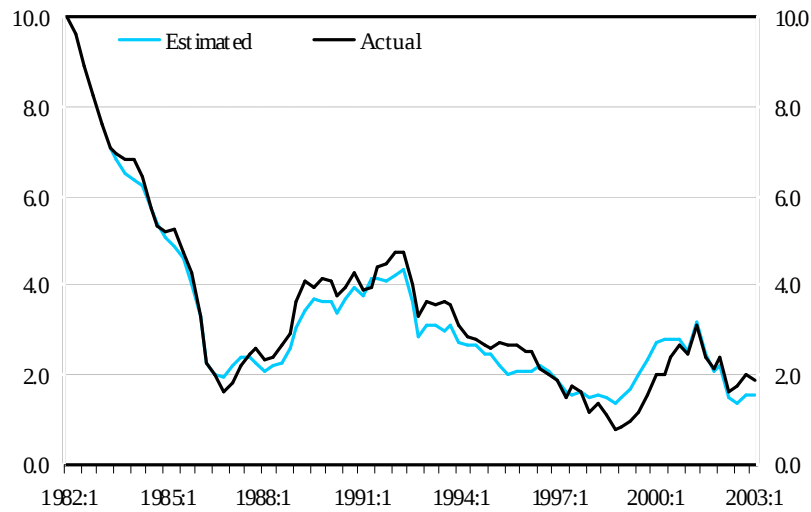
¹⁵ See Görgens, E., Ruckriegel, K., Seitz, F. (2001), Europäische Geldpolitik, p. 124.

Figure 2: Nominal and real money gap in the euro area on the basis of M3 (in percent of the stock of money), December 1998 to April 2003



Data source: ECB; Bloomberg; own calculations. – The nominal money gap is the difference between the actual stock of M3 and a stability-conforming stock of M3 in percent of the stability-conforming stock of M3. The latter has been calculated as the stock of M3 prevailing in December 1998, expanding it in line with the reference value of 4½%. – The real money gap is defined as the nominal money gap minus the deviation of actual inflation from the envisaged inflation assumed to be 1.5% in percent of the stability-conforming stock of M3.

Figure 3: Actual and estimated inflation in the euro area for the period 1982-Q1 to 2003-Q1



For further explanations of the structure of the model see www.ecb-observer.com.

Figure 3 shows actual and estimated inflation in the euro area in percent for the period 1982-Q1 to 2003-Q1.¹⁶ The estimation is based on the M3 price gap, the output gap, the exchange rate and the oil price. The analysis shows that money plays a highly important role in determining inflation in the euro area. For instance, simulation analyses show that changes in the output gap, exchange rate and oil price exert only temporary fluctuations in the consumer price inflation whereas excess money has a lasting and persistent impact on euro area inflation.

4. Monetary targeting versus inflation targeting

As was noted earlier, recommendations have been put forward to integrate the first into the second pillar or drop the use of a monetary aggregate altogether, adopting a direct “inflation targeting”.¹⁷ An inflation targeting framework is usually defined as one in which the central bank aims to directly steer the final target variable, the inflation rate, without the use of a

¹⁶ For inflation estimates on the basis of the real money gap see, for instance, Gerlach, S., Svensson, L. E. O. (2001), Money and inflation in the euro area: a case for monetary policy, Bank for International Settlements, Working Papers No 98.

¹⁷ Beginning in the early 1990s, price stability became an increasingly important goal of the monetary authorities in many countries. But some central banks found the traditional approaches – that is influencing inflation and economic activity by controlling intermediate variables like monetary aggregates or an exchange rate – not very successful. To address this problem, several industrialized countries – New Zealand (1990), Canada (1991), the UK (1992), and Sweden (1993) – adopted “inflation target” regimes.

separate intermediate target variable (such as, for instance, money, credit, exchange rates etc.). These regimes are said to be transparent and therefore credible to the public, because the central bank makes an explicit commitment to conduct monetary policy to meet a specified numerical inflation rate target within a specified time frame. The explicit target provides an anchor for monetary authorities, and it also serves as an anchor for private market expectations.

A closer look at a monetary policy assigning a prominent role to money as a main information variable – usually referred to as “monetary targeting” – and a direct inflation targeting reveals a number of common characteristics. Both concepts are based on achieving the same final objective, price stability. In addition, both strategies are forward-looking and in practice a wide range of indicators is employed to determine the need for monetary policy action. As in practice a forward-looking inflation targeting has to make use of inflation indicators in order to be effective, the remaining factor distinguishing the strategies is the ongoing (theoretical) question about the adequacy of money serving as an inflation forecasting variable.

A forward-looking monetary policy has to rely on forward-looking indicators (or intermediate variable) due to the well-known time-lag problem of monetary policy; this holds true for both inflation targeting and monetary targeting. An intermediate variable has to meet at least three requirements: the variable must (i) exhibit a close and reliable relation to the final policy objective, that is price stability; (ii) be influenced through monetary policy action; and (iii) reflect first and foremost monetary policy action rather than any other influences. That said, a monetary variable meeting these properties naturally qualifies as a indicator variable *par excellence* and deserves special attention by monetary policy makers. So long as there is no alternative (set of) variable(s) that forecast inflation more adequately than the stock of M3 (measured by the price gap or real money gap), the ECB should have a strong rationale to continue to pay close attention to monetary developments in forming policy decisions.

Viewed in this way, inflation targeting can be characterised as an “umbrella strategy” under which a policy based on the information function of money is a special case. So the question about the appropriateness of assigning a prominent role to a monetary aggregate boils down to an empirical answer: if a monetary aggregate contains considerable and reliable value for predicting future inflation, it is rational that monetary policy makers pay special attention to it. Such a decision seems all the more rational when monetary aggregates’ inflation predicting quality outperforms alternative (real or financial economic) indicators within a timeframe that appears relevant from the point of view of monetary policy effectiveness.¹⁸

¹⁸ See Trecroci, C., Vega, J. L. (2000), The information content of M3 for future inflation; also Altimari, N. (2001), Does money lead inflation in the euro area?, ECB Working Paper, No. 63.

5. Conclusions

From a conceptual point of view, the ECB two pillar monetary policy strategy is generally suitable to deliver and maintain the bank's price stability promise in the euro area. Under the latest ECB strategy review, the role of money has, de facto, been downgraded to second rank status. However, a strong theoretical and empirical rationale exists for continuing to assign a prominent role to money. Empirical evidence points to the stability and controllability of money demand, and a number of arguments lend some comfort to the view that the demand for M3 might prove to be stable going forward. One may argue, however, that the ECB should make use of the information content of the stock of money M3 by applying the so-called "price gap" or "real money gap" rather than the reference value concept as the latter runs the risk of giving misleading policy recommendations. This is because the implementation of the reference value concept systematically disregards monetary overhangs or deficits that have occurred in the past and will affect price level movements in the future. Monetary policy following the signals provided by the reference value concept rather than the price gap is unlikely to be in a position to achieve its price stability objective and, moreover, runs the risk of compromising the indicator quality of the stock of money in the form of M3.

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