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The ECB's Money Pillar: An Assessment

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The ECB's Money Pillar: An Assessment

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Abstract

This paper discusses the case for a money pillar in the European Central Bank's (ECB) monetary policy strategy. Time-series evidence for industrial countries based on frequency-domain and unobserved-components analysis suggests that money can play a useful role in gauging and constraining long-run risks to price stability. Moreover, the specter of asset price bubbles and some of the area's institutional features, which may impart considerable persistence to area-wide inflation, caution against shifting to conventional inflation targeting. But the time series evidence also seems to point to a relatively loose connection between variations in nominal money growth and inflation in the short to medium run. As a consequence, effective communication of the ECB's monetary policy decisions from the point of view of the present money pillar is likely to remain a challenging task.

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I. Overview

In October 1998, the Governing Council of the European Central Bank (ECB) announced its strategy for conducting monetary policy in the euro area, opting for an unorthodox mix of elements of monetary and inflation targeting traditions:

- First, in a move that echoed the Bundesbank's monetary targeting approach, the ECB assigned money a prominent role as the "first pillar" of its strategy, noting that money represents a "natural, firm, and reliable nominal anchor for monetary policy."[2]
- Second, introducing an element closely associated with the inflation targeting approach, the ECB's strategy includes a "second pillar" that gauges inflation trends based on "a variety of factors that normally affect price developments in the shorter term."[3]
- As the third element of its monetary strategy, the ECB defined price stability as "a year-on-year increase in the HICP for the euro area of below 2 percent," a goal that is to be achieved "over the medium term."

After more than four years of policy operations, the ECB's hybrid monetary strategy remains controversial. The mixed perceptions of the strategy are illustrated by three broad assessments that appear to be shared by many outside observers: (1) The role of the money pillar in guiding analysis and policy decisions within the two-pillar architecture has remained opaque.[4] (2) At times, it was difficult to square policy decisions with the ECB's communication of its two-pillar strategy.[5] (3) At the same time, the ECB's policy decisions are seen to have generally been on the mark, and the ECB has established its credibility notwithstanding its status as a young central bank and a difficult macroeconomic environment characterized by a plethora of difficult-to-disentangle demand and supply shocks. For example, while the CEPR report by Begg and others (2002) is highly critical of the ECB's policy strategy, the report at the same time concludes that the ECB's policy stance responded well to a challenging macroeconomic environment.

[2] ECB (1999, p. 47). In December 1998, the Governing Council set a reference value for M3 growth at 4½ percent, reflecting assumptions of 2–2½ percent growth of real potential output and a trend decline in M3 velocity of ½–1 percent. The specified ranges for output and velocity growth in combination with the 4½ percent reference value are consistent with a commitment to aim at a long-run inflation range of 1–2 percent.

[3] Under the second pillar, ECB staff started publishing macroeconomic projections in December 2000, providing a range forecast for inflation according to the Harmonized Index of Consumer Prices (HICP) assuming constant policy interest rates.

[4] Blinder and others (2001) called the two-pillar setup "confusing"; on an even more abrasive tone, a CEPR report by Begg and others (2002) called the first pillar the "poison pillar."

[5] De Grauwe (2002) refers to a gap between the ECB's "words and deeds."

Against this background, the purpose of this paper is twofold: (1) to discuss rationales for a monetary pillar in the ECB's strategy; and (2) to assess whether the ECB's communication has been consistent with what the paper considers sensible rationales for a monetary pillar.

The rest of the paper consists of the following:

- Section II reviews the ECB's actual communication of the two-pillar strategy's role in policy analysis and decision making during the last four years. The review concludes that the ECB's communication of the role of the money pillar has evolved and that there may indeed have been gaps between the ECB's "words" and "deeds."

- Section III discusses the policy challenge of putting in place a credible nominal anchor for price stability. In particular, using a stylized example for the inflation process, the section discusses the constraints on inflation implied by conventional inflation targeting as a benchmark for evaluating the ECB's strategy.

- Section IV argues that the two-pillar strategy could be viewed as an eclectic version of inflation targeting,[6] where the central bank, on the one hand, avoids announcing a precise medium-term inflation point or range target, but, on the other hand, uses an explicit long-run nominal anchor (the reference value for M3) for pinning down long-run inflation expectations. This section discusses several rationales for adopting this twist on more full-fledged inflation targeting strategies: (1) Past experience with asset price bubbles suggests that the buildup phase of a bubble can be consistent with a low and stable medium-term inflation outlook while the buildup of imbalances is accompanied by rapid money and credit growth—the ECB strategy's allowance for an explicit role for monitoring money (and credit) may provide some insurance against the buildup of area-wide asset bubbles. (2) Uncertainties about the size and persistence of inflation shocks in the euro area could argue against a conventional inflation targeting strategy because keeping inflation in a narrow range could come at the cost of increased variability of output. And (3) there are strong convictions among euro-area policymakers that money can indeed provide a reliable nominal anchor for long-run price stability, convictions that appear to be rooted in member countries' collective postwar experiences with money and inflation.

- Section V examines the credentials of money as a long-run anchor by studying the (frequency-domain) coherence between inflation and money growth in selected industrial countries over the last 40 years. The link between inflation and nominal money growth at the lower (or long-run) frequencies (defined as longer-run cycles in money and inflation taking more than 8 years to complete) is found to be strong—consistent with the longstanding idea of money as an effective "low-frequency anchor." The link between inflation and money at the higher (or medium-run) frequencies (cycles that last less than 8 years) appears, however, to be much weaker,

[6] Carare and Stone (2003) classify inflation targeting regimes into "full-fledged," "eclectic," and "lite" depending on the clarity and transparency of the central bank's inflation target.

suggesting that money serves best as a long-run anchor of inflation and complements (rather than competes with) the medium-run inflation outlook provided by the second pillar's analysis. For relatively moderate inflation environments, these empirical results echo and seem consistent with similar empirical results for the long-run versus shorter-run coherences between inflation on the one hand and exchange and interest rates on the other hand.

- Section VI considers euro-area member countries' formative experiences with inflation and money growth during 1960–98. It suggests, on the one hand, that monetary developments for the area as a whole provided clear and early signals of the dismal inflation trends of the 1970s and early 1980s. Moreover, estimates of selected member countries' central bank credibility using long-term bond yields suggests that the use of money as a long-run anchor may have provided the Bundesbank with an unusually high degree of credibility—in fact, estimates based on an unobserved components model seem to suggest that bond yields in Germany during the last 40 years were generally consistent with long-term inflation expectations of about 2 percent, although observed German inflation exceeded 2 percent much of that time.

- Section VII summarizes and concludes.

II. The ECB's Communication of Its Two-Pillar Strategy

Effective communication requires that senders and recipients of messages share a common framework for decoding messages and have a mutual understanding of what the focus of communication should be. In an early attempt to account for the ECB's communication gap, one of the ECB's Executive Board members (Issing, 2000) put the onus for closing the gap squarely on the recipients of the ECB's messages, citing inter alia journalists' unwarranted focus on peripheral issues such as the vicissitudes of the euro exchange rate (instead of focusing on internal price stability), academic critics' proclivity to reduce monetary policy strategies into simple stylized decision rules (instead of seeing strategies as disciplining devices for conducting analysis and making policy decisions), market participants' ingrained preference for predictable policy actions (instead of recognizing the pervasive uncertainty faced by the Governing Council).

While there can be little doubt that effective communication of a monetary policy strategy requires some measure of "cooperation" from recipients, communication of the two-pillar strategy could also have suffered from problems on the sender's side, such as confusing signals about the relative role and importance of the various elements of the strategy. This section reviews a small but influential portion of the ECB's public communication of its two-pillar strategy, drawing mainly on the ECB's regular press conferences after Governing Council meetings and focusing on four interrelated issues: (1) the relative importance or status of the two pillars in policy decisions; (2) the relevant time horizons for gauging risks to price stability under the two pillars; (3) the assessment of what constitutes "significant deviations" from the M3 reference value; and (4) the role and status of output fluctuations in the two-pillar strategy.

As background, Figure 1 provides some basic facts regarding the ECB's policy decisions and key macroeconomic developments during the last four years. The upper-left panel shows the path for the main refinancing rate and (the three-month centered average) for M3 growth relative to the 4½ percent reference value. The upper-right panel plots the main refinancing rate against an estimate of the real money gap (which was arbitrarily normalized at zero in January 1999). The lower-left panel shows HICP inflation for headline and core rates and the main refinancing rate. Finally, the lower-right panel juxtaposes an indicator of slack in the real economy (capacity utilization in industry) with the path for the main refinancing rate.

Communication of relative importance of the two pillars

Initial ECB comments on its strategy suggested that the first pillar would not only be prominent but provide the dominant input into policy decisions. At the presentation of the ECB's policy strategy in October 1998, the introductory statement noted that the two-pillar includes a "prominent role for money" and that "deviations of current monetary growth from the reference value would, under normal circumstances, signal risks to price stability." When ECB President Duisenberg was asked on the relative importance of the two pillars, he noted that "... it is not a coincidence that I have used the words that money will play a prominent role. So if you call it the two pillars, one pillar is thicker than the other is, or stronger than the other, but how much I couldn't tell you.".

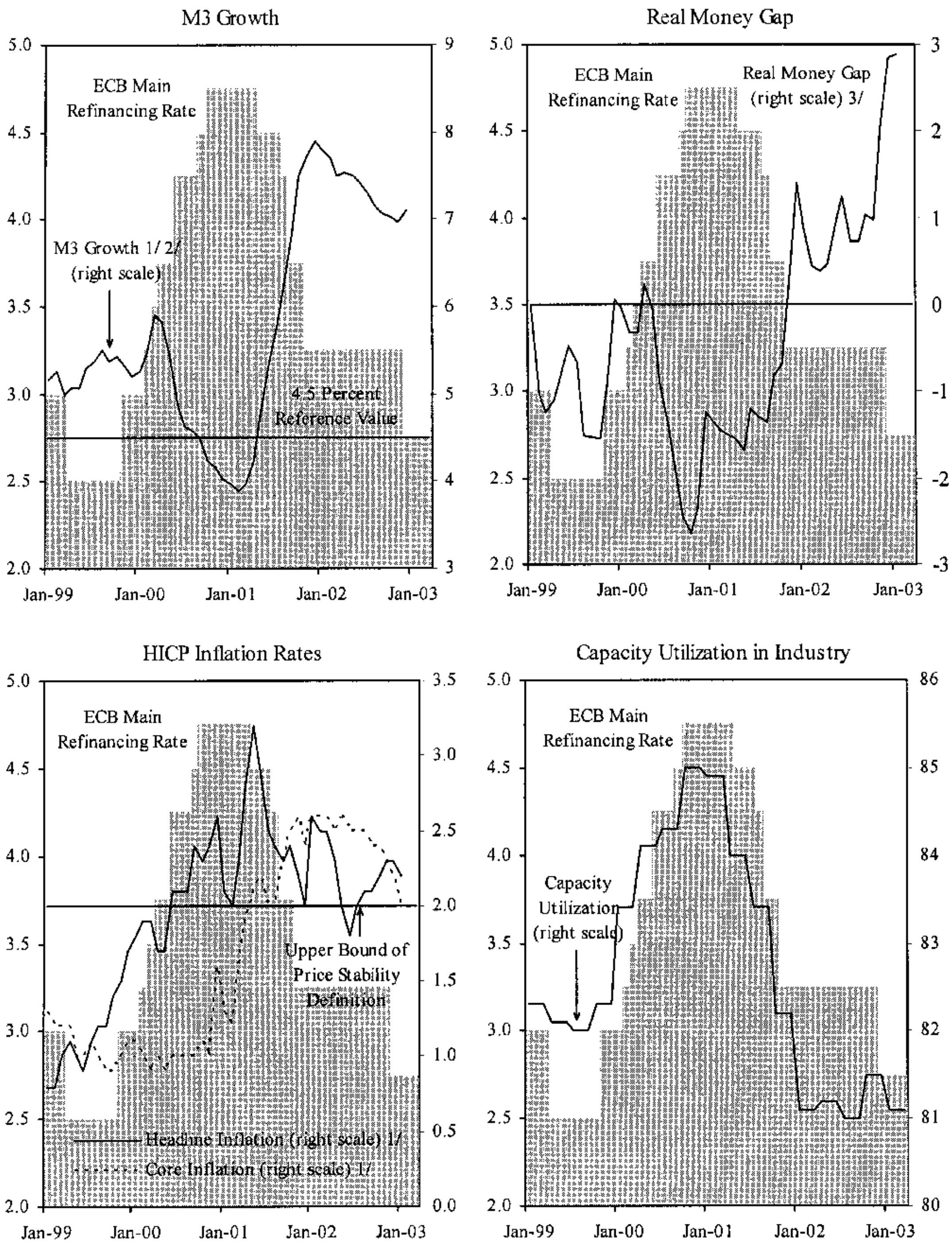
However, with M3 growth persistently exceeding its reference value and a rising real money gap (Figure 1), ECB statements on the relative roles of the two pillars tended to water down previous more unequivocal statements. In particular, increasing stress was put on the need to undertake a "comprehensive monetary analysis" that goes beyond "a comparison between M3 growth and the reference value"; moreover, "M3 growth may undershoot or overshoot the reference value temporarily without this necessarily being a cause for concern"; and "monetary data may be, on occasions, subject to special influences which temporarily impair the information content on future price developments."[7] Issing (2001) appeared to go a step further in re-stating the role of the first pillar relative to initial pronouncements by noting that "the prominent role assigned to money implies that the ECB is committed not to disregard the information content of monetary and credit aggregates, as this information can be expected to prove useful in forward-looking monetary policy decisions."

Communication of relevant time horizons of the two pillars

It is convenient to use frequency-domain terminology to distinguish between three separate time horizons for the analysis of inflation pressures. In this paper, the "long run" or the "lower frequencies" will refer to cycles in inflation that take more than 8 years to complete. The "medium run" or the "business-cycle frequencies" refer to cycles in inflation that take 2-8 years to complete. Finally, the "short run" or the "higher frequencies" refer to cycles taking less than 2 years to complete. The cut-off point at 8 years is loosely motivated by

[7] All quotes are taken from ECB (2001.

Figure 1. Euro Area: ECB Main Refinancing Rate and Monetary Policy Indicators
(In percent)



Sources: Eurostat; European Central Bank; Bloomberg; IFS, IMF; and author's estimates.
1/ Year-on-year percent change.
2/ Three-month centered moving average.
3/ Deviation of the actual real stock of M3 from an estimate of the long-run real stock of M3 consistent with long-run inflation of 1.5 percent per year and assuming that the real money gap is zero in January 1999.

traditions in business-cycle analysis, including the finding that the average U.S. postwar cycle lasted 7-8 years and that the widely used Hodrick-Prescott filter assumes a similar demarcation point between longer-run cycles and business cycles.[8] Against this background, what are the relative time horizons for inflation analysis under the two pillars?

Some of the ECB's communications on this issue appear to point to a "division of labor" between the two pillars, where the second pillar covers the higher and business cycle frequencies of the inflation process, while the first pillar acts as a "low-frequency crosscheck" on the second pillar analysis. For example, Issing and others (2001, p. 9) build their case for a prominent first pillar in part on what they suggest is "the one-to-one relationship between money and prices in the long run." A similar division of labor is suggested by Issing (2000) who notes that "one could think of both pillars as representing different, yet complementary, views (or models) of the structure of the economy as well as relating to different horizons of analysis. " Finally, in his most recent introductory statement to the Committee on Economic and Monetary Affairs of the European Parliament (February 2003), President Duisenberg stressed that "when comparing current (M3) developments with the reference value, it is important to bear in mind that the assessment of monetary developments is essential for long-term trends in inflation."

However, other ECB communication efforts have suggested that the first pillar acts as a competitor for second-pillar analysis of inflation trends at the business-cycle frequencies, if not at the very short-term frequencies. This interpretation is suggested inter alia by: (1) the use of deviations of (three-months centered) M3 growth from a constant reference value (which, by design, is a high-frequency indicator of monetary developments) to signal first-pillar information on future price pressures; (2) references to the two-pillar strategy as a cross-checking device, where the concept of cross-checking appears to refer to the inflation outlook at similar time horizons; and (3) some of the ECB's research work endeavors to show that money and credit aggregates contain independent predictive power at the higher and business-cycle frequencies. For example, the results and arguments in Altimari (2001) appear to suggest that money and credit has been a powerful predictor for (synthetic) quarterly euro-area inflation rates for horizons up to 3 years and that predictive power at these time horizons is a key requirement for the first pillar's legitimacy.

Interpretation of deviations of M3 growth from reference value

At the beginning of stage 3 of EMU, monthly M3 growth was quite close to the reference value (Figure 1), and the ECB's communication seemed to treat relatively small deviations as a matter of serious concern. For example, in the introductory statement to the press conference on December 22, 1998, it was noted that the latest "annual growth rate of M3 stood at around 4.5 percent" and that this was "exactly in line with the reference value set by the Governing Council." In the introductory statement on March 4, 1999, the latest M3 growth rate stood at 4.9 percent, and while the Governing Council did not view this deviation

[8] See, for example, the unobserved components analysis of the U.S. business cycle in Harvey and Jaeger (1993).

as a signal for future inflationary pressures, it was noted that a "close monitoring of monetary developments in the coming months remains necessary to give more conclusive evidence of the underlying causes and the permanent or temporary nature of the rise in M3 growth."

However, as the monthly deviations of M3 growth from the reference value became larger and more persistent, and notwithstanding two significant downward revisions of M3 statistics to exclude nonresident holdings of negotiable instruments, communication of first-pillar developments began to put more and more stress on the need to interpret deviations from the reference value as only one element of a comprehensive monetary analysis.

Communication of the role of output fluctuations under the two pillars

The EU Treaty clearly mandates the pursuit of price stability as the ECB's primary objective, but it also states that the ECB, without prejudice to the objective of price stability, should support the general economic policies in the community including the achievement of sustainable growth and a high level of employment. The ECB's communication has generally downplayed "output stabilization" as a separate concern of policy, and output developments are discussed under the second pillar in their role as signals of future inflation pressures. Issing and others (2001, p. 67) note that "the (Treaty's) clear and precise statement on price stability as a primary objective corresponds to the widely agreed-upon robustness of the relationship between money and prices in the medium term. The uncertainties on the effectiveness of monetary policy as a means to stabilize output fluctuations are mirrored, instead, by the unwillingness to take a specific stance in this respect."

At the same time, the ECB's apparent reluctance to admit to concerns about economic outcomes other than medium-term price stability appears not to be mirrored by actual policy decisions. At a theoretical level, Begg and others (2002) have argued that the perhaps implicit view that stabilizing inflation is the best contribution monetary policy can make to stabilizing output may not be a good approximation for a low-inflation environment. In such a setting, inflation becomes a less reliable information variable on the state of the economy, and real indicators of the business cycle including measures of output slack will gain in signaling value for a central bank concerned about overall macroeconomic stability. In fact, the close association between policy rate changes and measures of output slack in the euro area (see lower-right panel in Figure 1) has suggested to many that either output slack has been viewed by policymakers as being very closely correlated with inflation (a view not strongly supported by the lower-left hand panel in Figure 1) or it has been viewed as providing independent but relevant information on the state of the economy. Moreover, with reference to the ECB's April 1999 cut in interest rates, De Grauwe (2002) and others have noted that that particular cut appeared to be of a largely precautionary nature, reflecting concerns about future output trends, which, in the event, turned out to be benign (see Figure 1).

III. Nominal Anchors and Price Stability

The need for monetary policy to provide a "nominal anchor" that ties down current and expected inflation rates is hardly controversial. A nominal anchor can be interpreted as a commitment by the central bank to impose strict limits on the process generating the economy's inflation rate. A simple time-series model for the inflation rate (π_t) can illustrate the key issues involved:

(1) $\pi_t = (1-\phi)\pi^* + \phi\pi_{t-1} + \eta_t,$

where, assuming $|\phi|<1$, π^* is the inflation rate in the long run (which can also be interpreted as the central bank's long-run inflation target), the parameter ϕ captures the persistence of shocks to inflation, and the error term η_t represents uncorrelated inflation shocks, which are assumed to be distributed with mean zero and standard deviation σ_η. In this stylized model, the level and variability of inflation will depend on long-run inflation (π^*), the persistence of inflation (ϕ), and the variability of shocks (σ_η). In particular, and again assuming $|\phi|<1$, the level of inflation in the long run will average to π^*, and the variability of inflation (σ_π) is given by:

(2) $\sigma_\pi = \sigma_\eta/(1 - \phi^2).$

For annual data spanning 1961–98, the simple model (1) provides a good fit for euro-area member countries' inflation histories (Table 1).[9] The results illustrate the large variety of historical inflation experiences across the area. Inflation rates range from a low of 3.1 percent for Germany to a high of 11.5 percent for Portugal, while the standard deviation of inflation shocks varied from a low of 1.1 percent for Germany to a high of 3.8 percent for Greece. At the same time, inflation processes in all countries were highly persistent, with estimated ϕ parameters in the range 0.75–0.91. Against this historical background, the ECB's longer-run inflation objective to keep π^* in the middle of a 1-2 percent range (as signaled by the assumptions underlying the M3 reference value) and the quantitative definition of price stability (year-on-year HICP increases below 2 percent in the medium run) clearly suggest that the ECB's inflation objectives amount to a major regime break relative to the area's past inflation experience.

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[9] Inflation rates are based on the price deflator for private consumption expenditure. The reference to "good fit" is relative to more general ARMA models of inflation, with the degree of fit measured by conventional information criteria. There is, however, evidence that modeling π^* as a time-varying inflation objective (e.g., as a random walk) would improve the fit of the equations for most countries, but without affecting the substance of the conclusions.

Table 1. Euro Area: Persistence and Variability of Consumer Price Inflation, 1961–98

Estimated equation: $\pi_t = (1-\phi)\pi^* + \phi\pi_{t-1} + \eta_t$, 1/

Country	Parameters			Memo item
	π^*	ϕ	σ_η	σ_π
Germany	3.08	0.81	1.09	1.75
France	5.07	0.91	1.63	3.59
Italy	8.04	0.87	2.52	5.19
Spain	8.38	0.85	2.52	4.91
Austria	3.50	0.80	1.26	1.97
Belgium	4.40	0.75	1.96	2.90
Finland	6.00	0.82	2.42	4.11
Greece	11.19	0.84	3.78	7.15
Ireland	6.00	0.88	2.56	5.37
Luxembourg	4.20	0.84	1.46	2.69
Netherlands	4.10	0.81	1.51	2.57
Portugal	11.46	0.87	3.54	7.16
Euro area	5.79	0.92	1.49	3.53

1/ Regression is based on annual data for 1961–98; π^* denotes estimated average inflation; ϕ is the autoregressive coefficient; σ_η denotes standard deviation of inflation shocks; and σ_π is the standard deviation of inflation.

Turning back to equation (1), a nominal anchor strategy can be interpreted as putting constraints on π^*, ϕ, and σ_η. While a central bank clearly needs to put some constraint on π^*, an announcement on the objective for π^* per se does not amount to a credible nominal anchor. The central bank must also signal a credible commitment of how it is going to keep inflation close to the objective. Traditionally, constraints on nominal variables such as the nominal exchange rate or the nominal stock of money have served as anchors, the anchoring premise being that putting constraints on changes in these variables also puts constraints on inflation.

The emergence (and widespread adoption) of full-fledged inflation targeting as a monetary policy strategy since the early 1990s has established a new benchmark for anchoring price stability. In its full-fledged version, this strategy can be interpreted as anchoring price stability via a commitment to set policy in such a way that expected inflation n periods ahead (π^e_{t+n}) stays within a (usually symmetric) range given by $\pm\varepsilon$, where ε is typically 1 percent in industrial countries and n (the "medium run") may or may not be specified explicitly.[10] In terms of the simple equation (1), inflation targeting amounts to a commitment of policy to put constraints on the parameters ϕ and σ_η such that deviations of actual inflation from π^* will be subject to verifiable limits.

A central bank's commitment to ensure a low-inflation environment is likely to act as a dampener on the size of inflation shocks (η), but even the most credible commitment to a low-inflation environment will not be able to reduce σ_η to zero. The persistence of inflation shocks (ϕ) can be directly lowered (or even come out negative) by setting monetary policy in a way that responds to future inflation pressures in a forward-looking manner, but the persistence of the inflation process may also be influenced by factors outside the control of monetary policy (for example, rigidities in the labor market) or involve tradeoffs (for example, if aiming at lower inflation volatility implies higher output volatility).

To illustrate the range of "admissible values" for ϕ and σ_η, to prevent excessive over- or undershooting of a conventional target range, Table 2 reports the frequency of inflation over- or undershoots of a symmetric 1 percent range for different combinations of ϕ and σ_η. The inflation shocks are assumed to be normally distributed, and the results are, by design, independent of the assumed value for π^*. Taking a frequency of over- or undershoots of 0.10 as a (rather arbitrary) cutoff for differentiating between credible and less credible inflation targeting efforts, the results in the table suggest that only combinations of relatively low inflation persistence and low variability of inflation shocks are consistent with keeping inflation in a conventional target range—in this model example, ($\phi + \sigma_\eta$) needs to be smaller than 1.

Table 2. Euro Area: Frequency of Over- or Undershooting of Symmetric Inflation Target Range for Different Combinations of ϕ and σ_η[1]

	σ_η			
ϕ	1.00	0.75	0.50	0.25
0.90	0.66	0.56	0.38	0.08
0.75	0.51	0.38	0.19	0.01
0.50	0.38	0.25	0.08	0.00
0.25	0.33	0.20	0.05	0.00
0.00	0.32	0.18	0.05	0.00

Source: Author's estimates.

[1]Assumes a symmetric inflation target range of 1 percent and normally-distributed inflation shocks.

[10] This is a stylized characterization of actual practices as regards point targets, target ranges, and target horizons. See Schaechter, Stone, and Zelmer (2000, pp. 6-14) for descriptions of inflation targeting practices.

For a given variability of inflation shocks, the stylized example in this section suggests that full-fledged inflation targeting requires policy to aim at "squeezing" the persistence of inflation shocks to allow the condition $\pi^{e}_{t+n} = \pi^*$ to be met.[11] In frequency-domain jargon, this requirement amounts to "flattening the spectrum" of the inflation rate. Intuitively, to signal a credible commitment to keep inflation at π^*, a full-fledged inflation targeting regime must aim at setting policy rates in such a way as to keep expected inflation close to π^* at the business cycle frequencies.

IV. The ECB's Approach to Anchoring Price Stability

To what extent does the ECB's anchoring strategy deviate from the full-fledged inflation targeting benchmark laid out in the previous section? The ECB's monetary policy strategy clearly echoes key elements of the inflation targeting framework. At the same time, the strategy's quantitative definition of price stability does not provide a point target for π^* or π^{e}_{t+n}, and neither does it specify a conventional inflation target range. Couched in terms of equation (1), the ECB's implicit medium-term inflation target could be interpreted as being consistent with higher persistence and/or variability of inflation shocks than required by full-fledged inflation targeting. At the same time, and again viewed in the context of equation (1), the first pillar, as embodied in the specific reference value for M3 growth, could be interpreted as signaling a commitment "to peg" the long-run inflation rate π^* at 1½ percent (with the assumptions on long-run output and velocity growth underlying the calculation of the reference value seemingly pointing to a range for π^* of 1–2 percent).

In terms of a stylized inflation fan chart, the two-pillar strategy could be visualized as seeking to constrain uncertainty about the inflation rate in the long run, at a horizon well beyond the typical fan chart "inflation cone" that usually reaches only 8–12 quarters into the future. In fact, if both real output and velocity growth were difference-stationary time series processes,[12] a monetary policy that constrained nominal M3 growth to 4½ percent in the long run would remove *all* uncertainty about the level of the long-run inflation rate (although uncertainties about the long-run price level would persist owing to the possibility of permanent shocks to the level of real output and velocity). The range-assumptions for real output and velocity growth underlying the M3 reference value suggest, however, that there is at least some uncertainty whether real output and velocity growth rates are indeed stationary around constant means. At the same time, the annual reviews of the M3 reference value calculation have the purpose to detect permanent shocks to real output and velocity growth early on, putting an effective constraint on any remaining long-run inflation rate uncertainty.

[11] Low persistence of the inflation process appears indeed to be the hallmark of the (very) short-time series on inflation generated by the inflation targeting regimes in New Zealand, Canada, the United Kingdom, and Sweden since 1993: estimates of AR(1) processes for these countries' annual CPI data suggest that σ_η was generally in the range 0.75–1.00 while ϕ was close to zero (if not negative in some countries) during 1993-2001.

[12] Shocks to difference-stationary time series processes have permanent effects only on the level of the series, but their growth rates are stationary around a constant mean.

Nevertheless, why adopt an eclectic and seemingly complex (relative to full-fledged inflation targeting with clearly specified inflation targets) anchoring strategy? One clue appears to be provided by the empirical finding reported in Carare and Stone (2003) that eclectic inflation targeting regimes—which, in the authors' classification, includes the regimes adopted by the ECB and the U.S. Federal Reserve—tend to be underpinned by higher levels of credibility than inflation targeting regimes based on full-fledged inflation targeting. A possible explanation seems to be that monetary policymakers with higher levels of credibility want to take advantage of their "credibility bonus" to pursue other important policy objectives, such as financial stability or output stabilization, without being unduly constrained by keeping inflation in the narrow ranges implied by full-fledged inflation targeting.

Against this background, a first consideration in favor of the two-pillar approach could be that a long-run money anchor may provide some insurance against the occurrence of asset bubbles.[13] The "bubble argument" for the first pillar seems to be based on two stylized facts:

- Sustained run-ups in asset prices usually coincide with rapid growth in money and credit aggregates, as brought out by the relative experiences of the euro area, the United States, Japan, and the United Kingdom over the last 20 years (Figure 2).

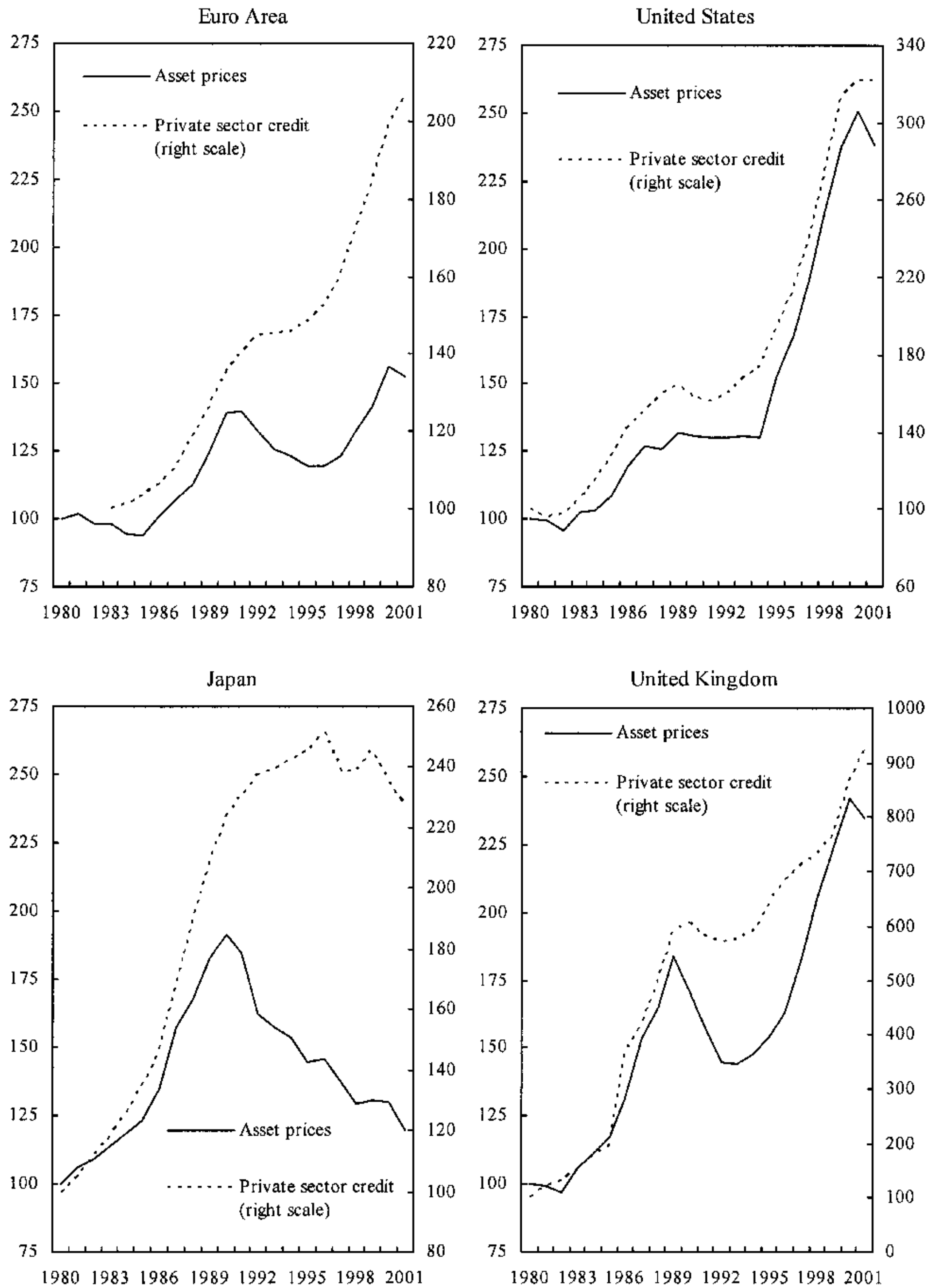
- And the buildup phase of asset prices bubbles can be consistent with low- and stable inflation rates, perhaps because the asset price bubble is accompanied by an investment boom that boosts labor productivity (and with real wages catching up slowly to higher productivity slows unit labor cost) or because the exchange rate appreciates (crimping import price inflation) as increases in asset prices attract capital inflows. The boom periods preceding the Great Depression in the United States and the protracted slow-growth era of the 1990s in Japan illustrate that rapid and unsustainable asset price increases can take place in stable inflation environments. In the case of the buildup phase of the Great Depression, the level of the U.S. GNP deflator actually fell during 1925–29 while U.S. real GNP expanded at an average pace of close to 4 percent per annum. Japan's inflation rate based on the GDP deflator during the second half of the 1980s averaged 1¼ percent while real GDP growth averaged 4½ percent per annum.

More broadly, a low-frequency money anchor combined with a thorough analysis of financial sector balance sheets may provide early warning signals suggesting that the underlying monetary stance is pitched at an inappropriate level, signals that may not be easily picked up by a policy strategy that focuses attention on inflation forecasts that look 8–12 quarters ahead.[14]

[13] See CEPS (2000) and Borio and Lowe (2002).

[14] Christiano and Rostagno (2001) study several analytical examples illustrating that monitoring money growth can be a good insurance practice for monetary policy; in their examples, following an inflation targeting (Taylor) rule can leave the economy without a long-run anchor.

Figure 2. Real Asset Prices and Real Private Credit (1980=100) 1/



Sources: Bank for International Settlements (BIS); IFS, IMF; and author's calculations.
1/ Assets include equities, residential real estate, and commercial real estate (inflation-weighted index 1980=100); euro-area data are based on BIS data for Germany, France, Italy, Spain, the Netherlands, Belgium, and Finland.

A second consideration in favor of the two-pillar approach would be that, owing to the unprecedented nature of the EMU project, there are pervasive uncertainties about the euro area's economic structure regarding the typical shocks hitting the area, the propagation of these shocks, and the monetary transmission mechanism. These uncertainties may only be resolved gradually, with EU enlargement likely to add fresh uncertainties. Quite apart from uncertainties about the euro area's economic structure, there may also be discernable features of the euro area that could lead to persistent overshoots of narrow inflation target ranges:

- The euro area is a large currency area. The exchange rate will therefore play less of a role in the determination of domestic inflation and the monetary transmission mechanism than in a small open economy. But this feature of the area also suggests that potentially large and persistent under- or overshooting episodes of the euro exchange rate relative to its underlying equilibrium cannot be ruled out—exchange rate gyrations that are likely to leave persistent traces in the area's inflation process.[15]

- As another example, history suggests that labor market institutions in key member countries are prone to lead to persistent over- and undershootings of unit labor cost relative to (full-employment) requirements, an institutional feature often associated with an unstable underlying (natural) rate of unemployment, which in turn renders the control of medium-term inflation outcomes more difficult.

A further EMU-specific consideration could be that first-pillar analysis is by definition concerned with area-wide developments and may therefore help ensure that the Governing Council (where 12 out of 18 members are NCB representatives) keeps a watchful eye on area-wide long-run inflation trends. Moreover, von Hagen and Brueckner (2001) argue that the first pillar allows the ECB's chief economist to use monetary trend arguments strategically in his opening presentations during Governing Council policy meetings.

Finally, to the extent that history matters in shaping institutions, the two-pillar strategy may reflect a strong conviction among continental European policymakers that money should have a special role in any anchoring strategy. Issing and others (2001, pp. 9–10) point to "the one-to-one relationship between money and prices in the long run (as) one of the few results that have remained undisputed over time and across economists." More recently, this view has been questioned by Begg and others (2002). While the claim of a tight "one-to-one relationship" may indeed be too strong for typical low-inflation environments, the next section provides some reassuring evidence on the effectiveness of a low-frequency money-anchor strategy.

The collective historical experiences of the area members provided strong backing for a prominent role of money. In the case of Germany, the Bundesbank's monetary targeting strategy proved successful as a credible signaling device for pinning down long-run inflation expectations. And other member countries were increasingly inclined to piggyback on

[15] In fact, Calvo and Reinhart (2002) suggest that "fear of (exchange rate) floating" tends to be associated with low credibility, high pass-through to prices, and inflation targeting.

Germany's money anchor strategy (albeit different countries at different speeds), a meeting of minds that paved the road to EMU. Section VI reviews these historical experiences.

Have other central banks made similar choices as the ECB? Perhaps most interestingly, the Swiss National Bank (SNB)—a central bank with a long-standing money targeting tradition—also opted for the ECB-type definition of price stability. Rich (2000) argued that in Switzerland's case it would not have been advisable to precommit to keep the inflation rate within a narrow range at all times as inflation is subject to number of large shocks beyond the control of the SNB: "Of course, the SNB could endeavor to quell short-run movements in the inflation rate by adjusting monetary policy, if necessary, drastically. However, if it were to use heavy artillery for keeping the inflation rate within a narrow range, it would likely do more harm than good because such actions would exacerbate unnecessarily fluctuations in real output and employment."

V. Money Growth and Inflation: Evidence from the Frequency Domain

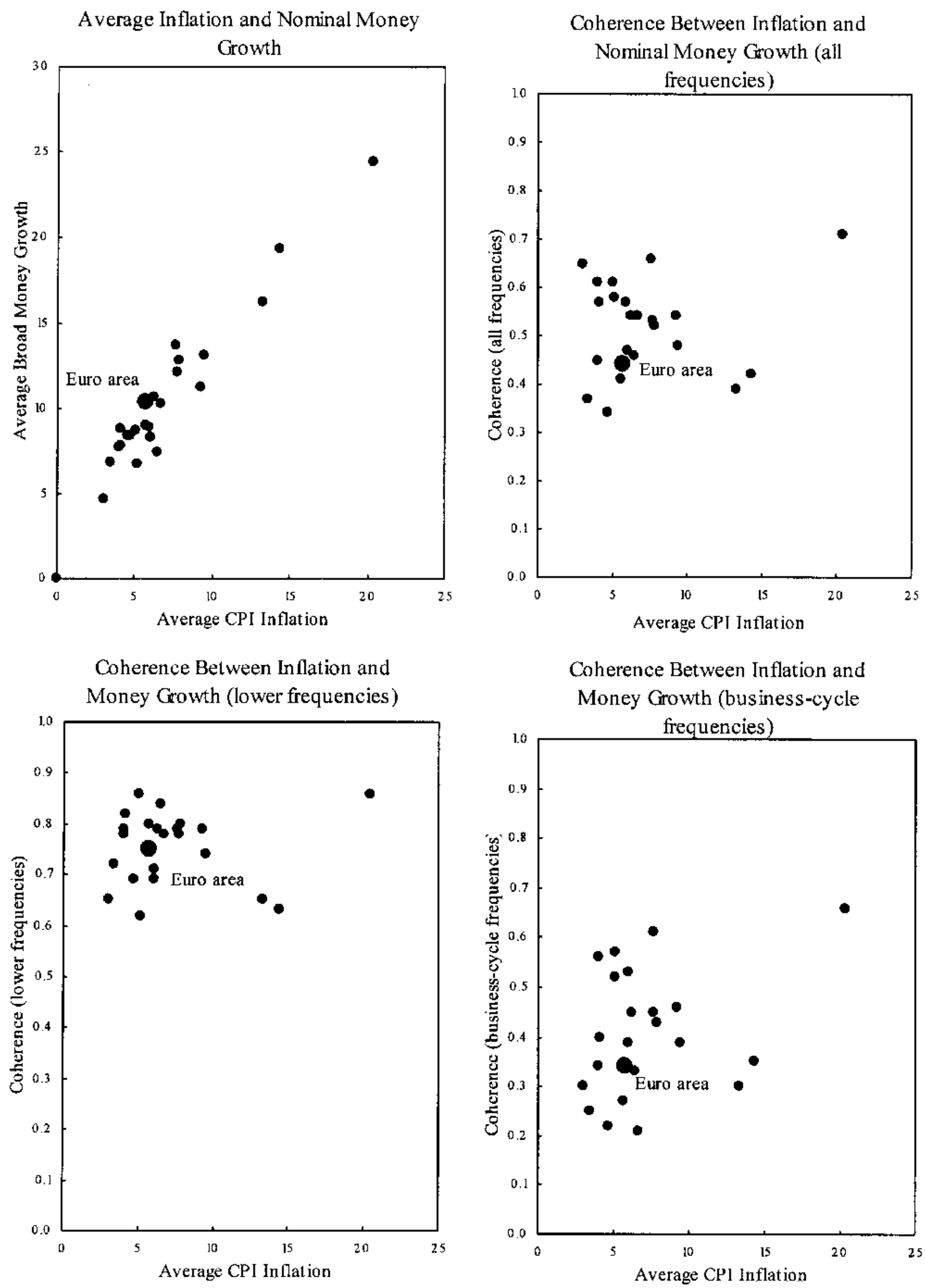
The viability of the ECB's first pillar is premised on the assumption of some empirical link between money growth and inflation. The nature and interpretation of this link remains, however, controversial. While most economists subscribe to the notion that "inflation is a monetary phenomenon in the long run," this phrase leaves open what is meant by the "long run" and "monetary phenomenon." More recently, Begg and others (2002), building on work by De Grauwe and Polan (2001), have argued that even the long-run link between nominal money growth and inflation in countries that have operated in moderate inflation environments may be much looser than commonly assumed.

This section presents some cross-country evidence based on frequency domain analysis.[16] For the industrial country group, the upper-left panel of Figure 3 replicates the well-known close relationship between average CPI inflation rates and average broad money growth (averages were taken over the period 1961–2000, except in the case of the euro-area countries, where averages are for 1961–1998; for a few countries, annual money growth data were available only from 1965 onward).

Frequency domain analysis can be used to decompose the overall movements in a time series in cycles at different frequencies. The lower frequencies capture the cycles with longer durations and the higher frequencies capture the cycles with shorter durations. Applying frequency domain analysis to the link between nominal money growth and inflation is attractive because it helps address directly the issue of medium vs. long run. As the analysis uses annual data, the shortest possible cycle spans two years. For the purpose of this analysis, low-frequency cycles are defined as cycles taking more than eight years to complete, while

[16] Lucas (1980) used frequency domain techniques to study the long-run link between money and inflation. Gerlach (2003) adopts a "frequency domain approach" to derive estimates of a "two-pillar" Phillips curve for the euro area, with inflation linked to money in the long run but to the output gap in the shorter run.

Figure 3. Money and Inflation in Industrial Countries, 1961-2000 1/



Sources: European Commission; WEO, IMF; IFS, IMF; and author's calculations.
1/ Data for the euro-area countries end in 1998.

the remaining part of the frequency domain captures all cycles that takes two to eight years to complete. The coherence between two time series in the frequency domain can be interpreted as the degree of linear association (at all leads and lags), or, loosely speaking, as the R^2 of regressing inflation on all leads and lags of nominal money at a particular frequency.

For the period 1961–98, Figure 4 shows the coherence between nominal money growth and inflation for the euro area (weighted average of coherences of the twelve member countries) plus the coherences for the member country with the lowest inflation record (Germany) and the member country with highest inflation record (Greece). The plots suggest that the long-run link between inflation and nominal money growth is quite close at the lower frequencies but falls off drastically in the range of the business-cycle frequencies.

The top-right panel of Figure 3 provides a cross-country perspective of the coherence measures averaged across all data frequencies, while the two bottom panels show separate results for the lower and business-cycle frequencies. The plots consistently suggest that the coherence is much stronger at the lower compared with the business-cycle frequencies, suggesting that the long-run link between inflation and nominal money growth is quite strong.[17]

To provide some intuition for these results, consider two alternative identities for decomposing the growth rate of nominal money (Δm_t):

(3) $\Delta m_t \equiv \pi_t + \Delta(m_t/p_t)$

(4) $\Delta m_t \equiv \pi_t + \Delta y_t - \Delta v_t,$

where the first identity rewrites nominal money growth as the sum of inflation and real money growth $\Delta(m_t/p_t)$ and the second identity uses the quantity equation to rewrite nominal money growth as the sum of inflation, real output growth (Δy_t), and the growth rate of the velocity of money (Δv_t). In terms of equation (3), the frequency domain results suggest that changes in nominal money are mainly reflected in variability in real money at the business-cycle frequencies, but, if sustained, ultimately lead to changes in prices in the long run. In terms of equation (4), and assuming that nominal money and output growth are unrelated in the long run, the apparent "disconnect" between money growth and inflation at the business-cycle frequencies should reflect mostly the medium-run variability of velocity growth. But as long as velocity growth itself does not undergo permanent (as opposed to temporary) shifts, a close link between inflation and nominal money growth should obtain in the long run.

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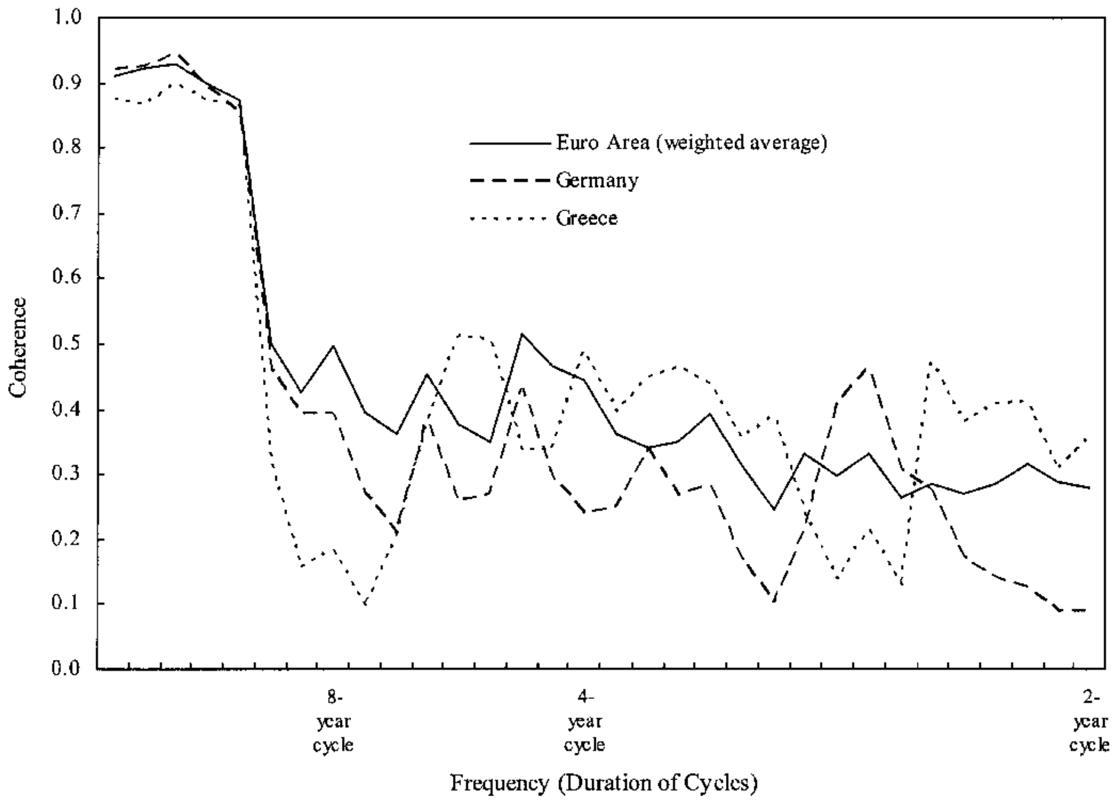
[17] The results of frequency domain analysis based on small sample sizes can be quite sensitive to prefiltering ("prewhitening") of the data and the "spectral window" used for calculating the crossspectrum. Robustness analysis suggested that the lower-frequency results shown in Figures 3-4 are quite sturdy, but the coherence estimates at the business-cycle frequency can be sensitive to prefiltering without affecting the overall conclusions.

Figure 4. Coherence Between Money Growth and Inflation, 1961-98



Sources: European Commission; WEO, IMF; IFS, IMF; and author's calculations.

The results of the frequency-domain analysis are consistent with the "Swiss argument" that monetary policy strategies that use money as an anchor are likely to face difficult communication problems.[18] The Swiss National Bank decided at end-1999 to abandon the explicit monetary targeting elements of its strategy, partly on the grounds that there can be considerable variability in nominal (and real) money growth at the business cycle frequencies, variability that may not, however, signal threats to long-run price stability. But high variability of (nominal and real) money growth at the business-cycle frequencies means that a monetary policy strategy that relies in part on communicating the meaning of monthly deviations of money growth from a reference value is likely to face a difficult task.

VI. Pre-EMU Experiences with Money and Inflation

This section looks at area member countries' combined (synthetic) inflation experience against the background of monetary developments since 1960. The three main themes

[18] See Jordan, Peytrignet, and Rich (2000).

emerging from this (historical) analysis are: (1) the area's overall inflation rate was left largely unanchored by member countries' (synthetic) monetary policy during the last four decades; (2) monetary developments during the 1960s and early 1970s provided clear, early warning signals that price stability was endangered; and (3) the Bundesbank's monetary targeting approach successfully signaled a precommitment to maintain low long-run inflation rates at about 2 percent, notwithstanding persistent overshooting of actual inflation rates (relative to 2 percent).

The first part of the analysis centers on a "money market version" of the Phillips curve of the form:

$$(5) \qquad \pi_t = \pi_{t,t-1}^e + \alpha MGAP_{t-1} + \delta Z_t + \eta_t,$$

where π_t is the annual consumer price inflation rate, $\pi_{t,t-1}^e$ is the expectation of annual inflation in year t formed at t-1, $MGAP_t$ represents the real money gap, Z_t is a variable proxying supply shocks (in the empirical analysis below proxied by the terms of trade), and η_t is a regression error term. Gerlach and Svensson (2002) define the real money gap as the (logarithmic) difference between the actual real money stock (M_t/P_t) and the long-run equilibrium real money stock $(M_t/P_t)^*$:

$$(6) \qquad MGAP_t = \ln(M_t/P_t) - \ln(M_t/P_t)^* \equiv \ln(M_t/P_t) + \ln(V_t^*) - \ln(Y_t^*).$$

As shown in equation (6), the long-run equilibrium money stock can be rewritten as the difference between the (logarithms) of long-run velocity of money (V_t^*) and real potential output (Y_t^*).

To estimate equation (5) based on time-series data, it is necessary to specify how inflation expectations evolve over time and derive an estimate of the money gap. As regards formation of inflation expectations, this note uses the following process for annual data:

$$(7) \qquad \pi_{t,t-1}^e = (1-\phi)\pi^* + \phi\pi_{t-1},$$

where π^* denotes an implicit inflation target (assumed to be constant) and ϕ captures the degree of credibility of the implicit inflation target (also assumed to be constant).[19] The long-run real money stock was constructed by Hodrick-Prescott (HP) filtering of the logarithms of velocity and real output.[20]

[19] The part of this section on the Bundesbank's monetary targeting experience considers an approach to modeling inflation expectations and credibility that allows time-variation in ϕ.

[20] Because the analysis uses annual data, the HP-filter smoothing constant was fixed at 100. A more subtle approach would base the long-run estimates of velocity and potential output on explicit unobserved components modeling—but the gains in insights relative to using the paper's simple HP-filtering approach appear to be modest.

The top two panels of Figure 5 show the evolution of the area's (synthetic) consumer price inflation during 1961-2001 relative to nominal (broad) money growth and the real money gap.[21] Consumer price inflation seemingly got out of control during the 1960s and 1970s, reaching double-digit levels by the second half of the 1970s, and was brought under control during the disinflation era of the second half of the 1980s and the 1990s. The level of nominal money growth and the real money gap appear to have provided clear early warning signals on the future flare-up in inflation, and money growth and the gap contract well ahead of the steep disinflation path that took hold at the beginning of the 1980s.

Short-term interest rate developments mirrored monetary trends closely: the bottom-right panel shows the level of the real short-term interest rate (defined as the nominal short-term rate minus consumer price inflation) and suggests that the area's (synthetic) monetary stance was pitched at an unsustainably loose level well into the mid-1970s—real short-term interest rates were negative—before disinflation was brought about by a sharp sustained tightening of the monetary stance that was only relaxed during the 1990s.

The history of the real short-term interest rate suggests that the "neutral or equilibrium real interest rate" may provide an additional useful low-frequency anchor for judging the long-run appropriateness of the monetary stance, particularly in case of large or persistent shocks to velocity growth. While the measurement of the "neutral real interest rate" is clearly a challenging task, analysts have not been deterred by similar challenges with regard to potential output or other unobservable economic variables.

Finally, the bottom-right panel highlights the unusual past variability of the area's levels of real unit labor cost (normalized at 100 in 1960) and of the unemployment rate—and both series suggest that the area's labor market environment provided a challenging backdrop for the conduct of monetary policy as the area's underlying (natural) unemployment rate failed to provide a "real anchor" for the economy.

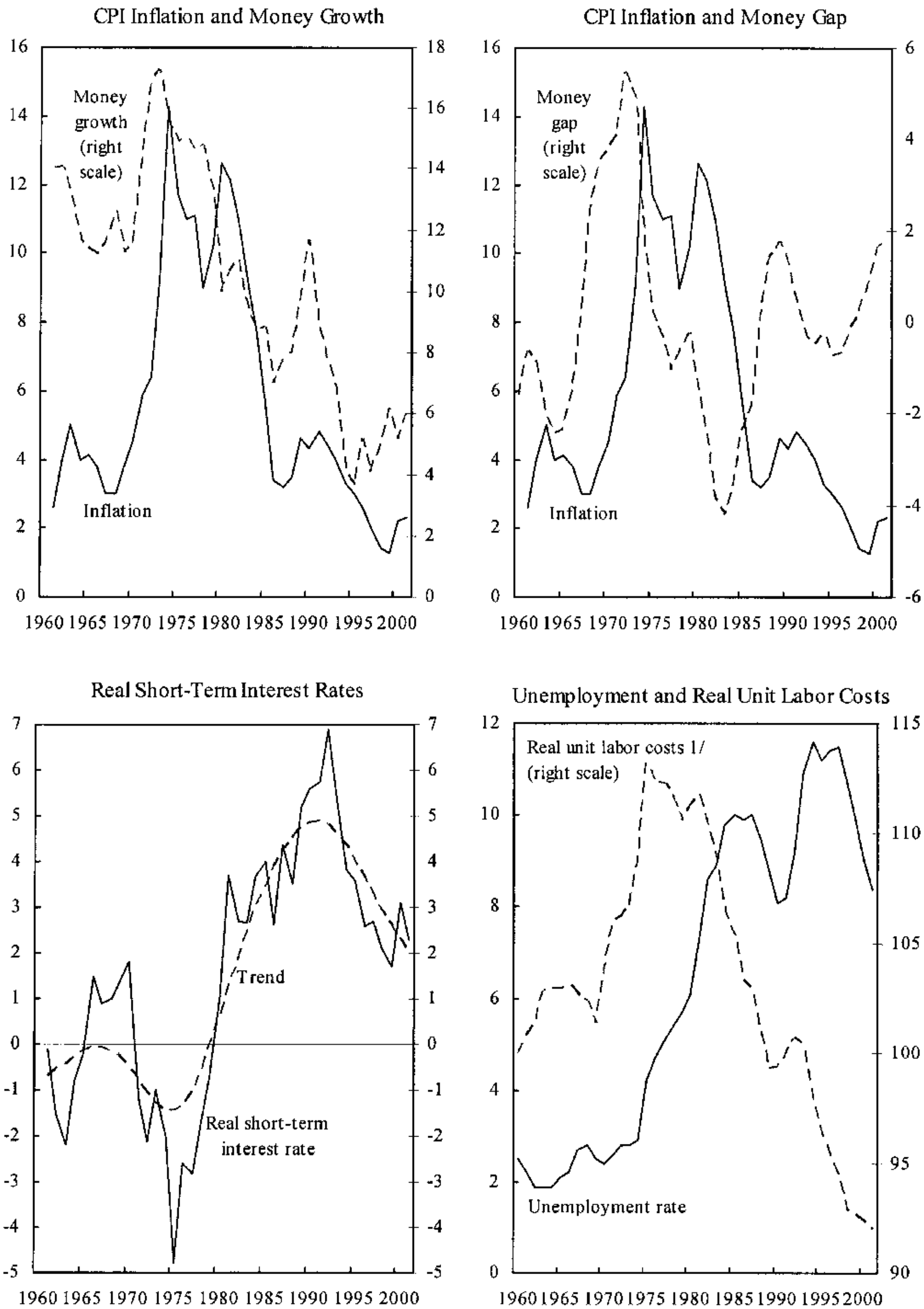
Turning to the evidence on the predictive power of money for inflation developments, the following regression was implemented:

(8) $$\pi_t = (1-\phi)\pi^* + \phi\pi_{t-1} + \alpha MGAP_{t-1} + \beta MGAP_{t-2} + \delta Z_t + \gamma Z_{t-1} + \eta_t.$$

Two comments on this particular specification. First, the constant "credibility coefficient" ϕ measures the persistence of shocks to inflation—an estimate close to one indicates that shocks were (on average) highly persistent and, at the extreme ϕ=1, inflation would have had a unit root and would not have been anchored to an underlying target. Second, the inclusion of once- and twice-lagged money gaps allows testing how "hysteretic" inflation was in

[21] All data series are taken from the European Commission's database. The change in the terms of trade is the difference between export and import price inflation for goods and services.

Figure 5. The Euro Area's Monetary and Inflation Experience, 1960-2001
(In percent)



Sources: European Commission; and author's estimates.
1/ Index, 1960=100.

response to movements in the money gap. If $\alpha + \beta = 0$, the level of the real money gap did not matter for the evolution of future inflation. Applying OLS to equation (8), the estimation results (with standard errors in parenthesis) are:

$$\text{(9)}\quad \underset{}{\pi_t} = \underset{(0.279)}{0.319} + \underset{(0.042)}{0.930}\pi_{t-1} + \underset{(0.128)}{0.525}MGAP_{t-1} - \underset{(0.124)}{0.360}MGAP_{t-2} - \underset{(0.036)}{0.314}Z_t + \underset{(0.037)}{0.345}Z_{t-1}$$

Time range 1961–98 $\quad R^2 = 0.971 \quad DW = 1.619$

The results suggest that the inflation process was highly persistent (the null hypothesis that ϕ=1 cannot be rejected using standard unit root tests) and that the money gap was a useful predictor of inflation. An F-test of the restriction $\alpha + \beta = 0$ suggests that both the change and the level of the real money gap matter for predicting future inflation (the marginal significance level for the test is 0.01). Including the output gap in the regression yields:

$$\text{(10)}\quad \pi_t = \underset{(0.279)}{0.227} + \underset{(0.042)}{0.947}\pi_{t-1} + \underset{(0.140)}{0.516}MGAP_{t-1} - \underset{(0.154)}{0.435}MGAP_{t-2} - \underset{(0.031)}{0.33}Z_t + \underset{(0.034)}{0.300}Z_{t-1}$$

$$+ \underset{(0.098)}{0.310}YGAP_{t-1} - \underset{(0.102)}{0.155}YGAP_{t-2}$$

Time range 1961–98 $\quad R^2 = 0.976 \quad DW = 1.918$

The results of regression (10) suggest that the money gap and the output gap are both powerful predictors of future inflation, in line with the results in Gerlach and Svensson (2002) for quarterly euro-area data for the period 1980-2001.

To provide some intuition for these results, note that the real money gap is, by construction, equal to the difference between the output gap and the velocity gap, that is, $MGAP_t = YGAP_t - VELGAP_t$, and that a regression on the money gap alone is therefore equivalent to a restricted regression on the output and velocity gaps. In fact, the implied restrictions are rejected by an F-test at very low significance levels. Moreover, the unrestricted regression suggests that most of the predictive power of the money gap reflects the predictive power of the output gap.

For the period considered in this paper, and contrary to Gerlach's and Svensson's (2002) results, adding lagged nominal money growth (DM_{t-1}) to equation (8) adds significant power to predicting inflation:

$$\text{(11)}\quad \pi_t = \underset{(0.363)}{1.293} + \underset{(0.059)}{0.763}\pi_{t-1} + \underset{(0.113)}{0.425}MGAP_{t-1} - \underset{(0.111)}{0.239}MGAP_{t-2} - \underset{(0.031)}{0.33}Z_t + \underset{(0.034)}{0.30}Z_{t-1} + \underset{(0.051)}{0.177}DM_{t-1}$$

Time range 1961–98 $\quad R^2 = 0.978 \quad DW = 1.964$

The last result is robust to including the output gap as well and suggests that the main predictive power of nominal money growth is likely to be found at the lower data frequencies, as also suggested by the frequency domain evidence in the previous section.

Achieving high credibility—defined as the degree to which the public's inflation expectations are anchored to the central bank's price stability objective—is a key objective of monetary policy. There is some empirical evidence suggesting that high credibility is associated with a more favorable short-run unemployment-inflation tradeoff—for example, a positive aggregate demand shock in a high-credibility environment is followed by a much more subdued inflation response than in a low-credibility environment.[22] As regards institutional practices, central bank independence and the explicit use of nominal anchors for signaling a commitment to price stability have proven valuable tools for gaining and maintaining credibility.

The remainder of this section asks two questions relevant to understanding the euro area's past inflation experience and the role of the monetary anchor in the ECB's policy strategy: To what extent did the Bundesbank's monetary targeting approach succeed in pinning down long-run (low-frequency) expectations of inflation? And how has central bank credibility evolved in other key euro area countries?

The following analysis uses the time-series information in nominal long-term bond yields and actual inflation rates to infer the extent to which a central bank has established its credibility. As the starting point, the annual 10-year nominal long-term interest rate can be approximated (via the Fisher equation) by the sum of the unobservable annual real interest rate component (r_t) and the unobservable inflation expectations over a 10-year horizon ($\pi_{t,10}^e$):

$$(12) \qquad R_t = r_t + \pi_{t,10}^e$$

Assume that annual inflation (π_t) evolves according to a univariate autoregressive process of order one with the autoregressive coefficient (ϕ_t) varying (drifting) in time:

$$(13) \qquad \pi_t = (1-\phi_t)\pi^* + \phi_t\pi_{t-1} + \varepsilon_t$$

where π^* is the underlying inflation target and ϕ_t evolves as a random walk driven by white-noise shocks (η_t):

$$(14) \qquad \phi_t = \phi_{t-1} + \eta_t.$$

For illustration, it is worthwhile to use equation (13) to construct explicitly the average expected inflation rate over a 2-year horizon at time t-1:

$$(15) \qquad \pi_{t,2}^e = [\pi^*(1-\phi_{t-1})(1+\phi_{t-1}) + \phi_{t-1}(\phi_{t-1}\pi_{t-1})]/2.$$

Equation (15), which can be generalized to 10-year inflation expectations, illustrates that as ϕ_t approaches 1, inflation expectations are increasingly conditioned on the actual realization

[22] See Laxton and N'Diaye (2002) for empirical evidence supporting this statement.

of inflation in period t-1. At the other extreme, if ϕ_t approaches 0, inflation expectations are closely tethered to the inflation target π^*.

Estimates of ϕ_t can be used to derive the following standardized measure of central bank credibility (c_t):

(16) $c_t = [(1-\phi_t)\pi^*]^2/\{[(1-\phi_t)\pi^*]^2 + [\phi_t(\pi^* - \pi_{t-1})]^2\}$,

which constrains credibility c_t in the interval $0 \leq c_t \leq 1$:

- High credibility (c_t close to 1) means that 10-year inflation expectations are anchored to the long-run inflation target rate (π^*), independently of the deviation of current inflation from this target rate. In other words, in a high-credibility regime, observed inflation is expected to revert to π^*, and actual inflation developments therefore leave little trace in ten-year expectations of inflation.

- Low credibility (c_t close to 0), by contrast, means that 10-year inflation expectations are mainly based on observed annual inflation developments, and deviations of observed inflation from the target rate tend to be quickly incorporated into 10-year expectations of inflation.

To estimate the model, the unobserved real interest rate component is assumed to follow a random walk:

(17) $r_t = r_{t-1} + \xi_t$,

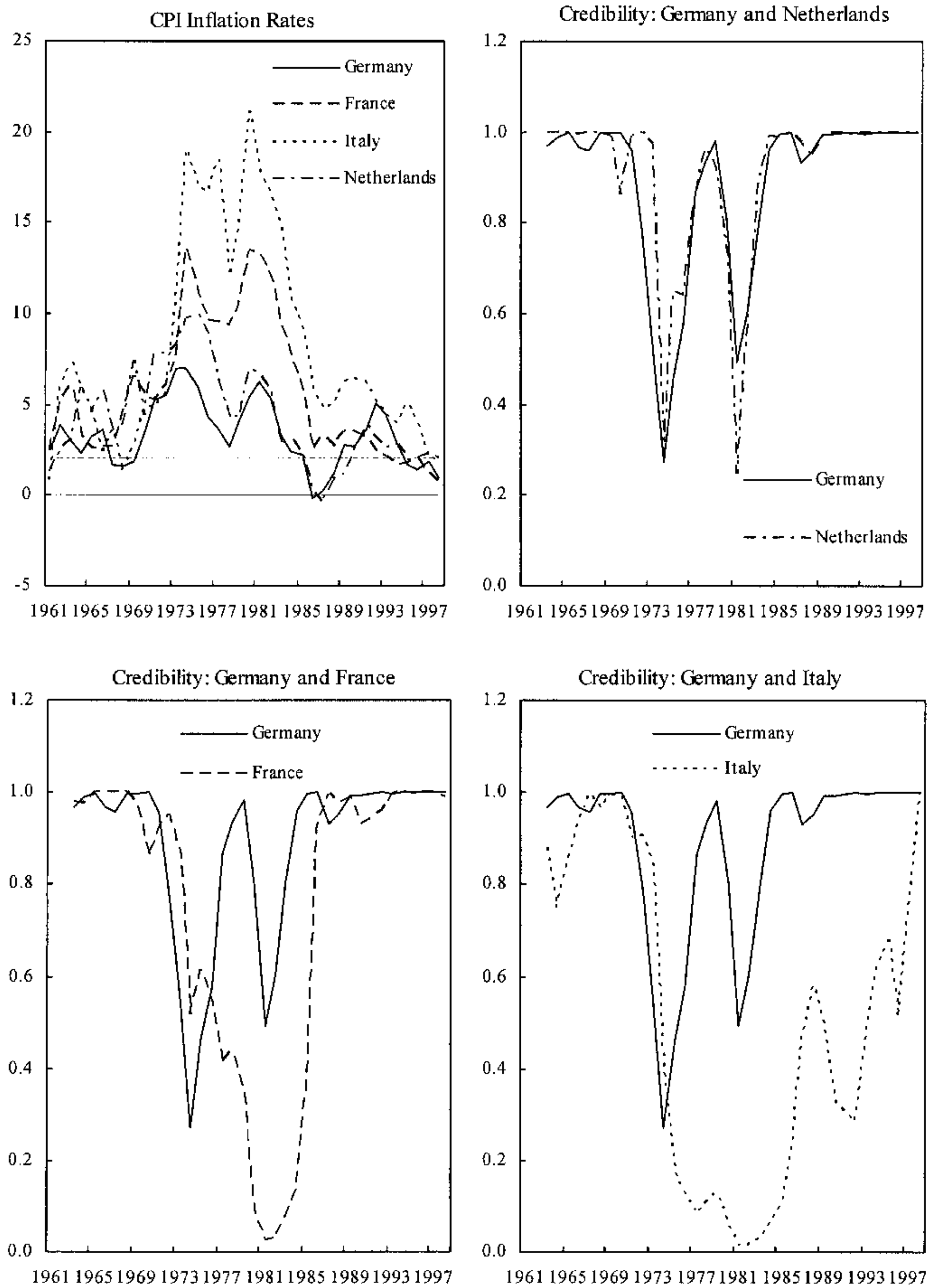
where ξ_t is a white noise term, and π^* was fixed at 2 percent. To estimate the model, the equations were put in state-space form and the model's likelihood was maximized using the Kalman filter.

Figure 6 presents the estimates for the credibility parameter graphically, plotting the credibility measure for Germany against the results for three euro-area countries: the Netherlands, France, and Italy. The plots seem to support three statements:

- While the Bundesbank's inflation-fighting credibility was bruised temporarily by the oil price shocks of the 1970s, credibility recovered quickly after these short episodes notwithstanding the persistent overshooting of the (assumed) 2 percent underlying inflation target.[23] It is difficult not to attribute this outcome to the Bundesbank's

[23] Germany's year-on-year inflation targets implicit in the money growth targets (base money during 1974-87 and M3 during 1988-98) during this period were at times above 2 percent.

Figure 6. Central Bank Credibility, 1961-98



Sources: European Commission; and author's estimates.

distinct monetary targeting strategy that sought to establish a long-run anchor for price stability and inflation expectations.[24]

- By pegging the guilder to the deutsche mark, the Netherlands, early on, piggybacked onto the credibility-enhancing effects of Germany's monetary policy strategy, mirroring after pegging almost one-for-one Germany's credibility performance.

- France and Italy literally touched (credibility) bottom before shifting gears and converging to Germany's high credibility regime—in the case of France this occurred in the mid-1980s while in the case of Italy the regime change was delayed almost to the onset of stage 3 of EMU.

VII. Summary and Conclusions

From the perspective of historical continuity, the ECB's adoption of a monetary pillar based on a reference value for M3 growth may well have reflected the need to strike a compromise between monetary and inflation targeting traditions. As put provocatively by Marshall (1999, p. 278): "A 'reference value' (for money growth) was vague enough to soothe those who believed money was no longer reliable enough to justify being a target, but explicit enough to mollify the monetarists. Everyone could read what they wished into the word."

Notwithstanding its genesis as a compromise between rival monetary strategy traditions, however, the ECB's two-pillar strategy meshes with a number of substantive considerations:

- First, as a stylized fact, asset price bubbles tend to be accompanied by rapid money and credit growth. At the same time, low-inflation environments appear to do little to thwart the emergence of bubbles. In such a setting, a money pillar may be able to provide valuable early warning signals, suggesting that the underlying monetary stance is pitched at an inappropriate level to maintain macroeconomic stability in the longer run, signals that may not be picked up by an 8-12-quarters-ahead inflation forecast. And to the extent that the fallout from asset price bubbles can spill over to other economies, one could argue that central banks in the largest currency areas have special responsibility to be vigilant regarding the buildup of bubbles.

- Second, while the ECB's strategy does not include a precise point or range target for the medium-term inflation rate, the first pillar's reference value for M3 growth establishes an implicit range for long-run inflation of 1-2 percent. Several institutional features of the euro-area economy—particularly the existence of labor market institutions in key member countries that are prone to generate persistent over- or undershooting of real wage claims relative to full-employment requirements and the possibility of large, persistent real exchange rate swings—suggest that keeping too

[24] The opposite view, namely that the Bundesbank's monetary policy strategy succeeded despite its monetary targeting approach, has, however, many adherents.

tight a lid on medium-term movements of the area's inflation rate could prove costly in terms of additional variability in output and employment.

- Third, the first-pillar analysis is by definition concerned with area-wide developments, ensuring that the Governing Council (where 12 out of 18 members are national central bank representatives) keeps an eye on area-wide long-run inflation trends.

- Finally, the idea that money can provide a reliable long-run anchor for long-run price stability appears to be deeply rooted in the euro area's collective postwar experience with money and inflation.

However, the specific two-pillar strategy chosen by the ECB has also proven a taxing framework for communicating policy decisions. Some of the communication difficulties may be rooted in the design of any policy strategy that incorporates money in view of the apparently loose link between money and inflation at all but the long-run data frequencies. But some of the difficulties may also reflect the largely operational decision to organize the monetary pillar around a fixed reference value for M3 growth as well as the ECB's own changing communication efforts: for example, the first pillar was, at times, described as being the "primary or thicker pillar," when its actual role should probably be to serve as a "long-run cross-check" on the second pillar, medium-run inflation outlook; the first pillar was presented as providing a competing (rather than a complementing) perspective on medium-term inflation pressures; and relatively small deviations of monthly M3 growth from its reference value were, at times, treated as having grave importance for the medium-run inflation outlook when the empirical evidence appears to suggest that money has moderate predictive power for inflation at business-cycle frequencies.

As a final cautionary note, it can take a considerable time span for assessments of monetary policy strategies to settle around a widely shared view, particularly when the strategy in question has new and unorthodox elements. The inclusion of a monetary pillar in the ECB's strategy has been an unorthodox step, particularly given that more recently, money has largely disappeared from popular macroeconomic models. Nevertheless, a monetary policy strategy that keeps money firmly on stage could prove prudent, albeit maybe only in the longer run.

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