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Is the ECB's monetary benchmark still alive?

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Abstract

We develop a simple test to show that the ECB's monetary benchmark serves as an anchor for financial markets. This result is more pronounced for the financial crisis 2007-2009 and when looking at longer-term forecasts. However, for non-EMU forecasters we do not find an anchoring effect.

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1 Introduction

To ensure its primary objective of price stability, the ECB's monetary policy officially uses a two-pillar strategy (ECB, 2003). The first pillar concerns short-term threads to price stability which originate from the interplay of supply and demand. Under the second pillar, the ECB reviews and monitors numerous factors such as developments of goods, labor and financial markets which are linked to the medium-term development of money growth. Since "inflation is always and everywhere a monetary phenomenon" (Friedman, 1963), the assessment of monetary factors is of utmost importance. To understand how monetary policy can manage expectations it is important to analyze how expectations concerning the money growth rate are formed.

Shortly after the ECB's monetary policy strategy was introduced in October 1998, the importance of the first pillar was underlined by the announcement of a reference value for money growth of 4.5% per annum which was supposed to be in line with price stability. The reference value serves as a benchmark in the overall process of evaluating price stability rather than as an explicit money growth target. However, since May 2003 the annual review was discontinued because of the medium-term orientation of the assumptions underlying the reference value. This paper tests whether the ECB's monetary benchmark still serves as an anchor for private-sector forecaster.

2 Testing the role of the ECB's monetary benchmark

The intuition motivating the test can be best elucidated by considering a private-sector forecaster who forms an efficient private forecast that, under the null hypothesis, is not influenced by the ECB's monetary benchmark. Assuming that the forecaster will submit the median of his posterior, the forecast will be unbiased and the probability that it overshoots or under-

shoots the future money growth rate should be 0.5. However, if the ECB's benchmark anchors a private forecast, the eventually published forecast is closer to the ECB's benchmark than his private forecast. If a private forecast exceeds (falls short of) the ECB's benchmark, the probability that the published forecast overshoots (undershoots) the subsequently realized money growth rate is, thus, smaller than 0.5. In contrast, if the private sector forecaster differentiates his forecast from the ECB's benchmark, he will publish a forecast that is tilted farther away from the benchmark. If the private forecast exceeds (is below) the ECB's benchmark, the published forecast is larger (smaller) than the private forecast, implying that the probability that the published forecast overshoots (undershoots) the subsequently realized money growth rate is larger than 0.5.

We compute the probabilities of over- and undershooting as follows. We define $m_{i,t+k}$ as a forecast formed by forecaster i in period t for the money growth rate, m, in period $t+k$, and m^{ECB} as the ECB's reference value. Furthermore, we define the conditioning events $\gamma^+ = I(m_{i,t+k} > m^{ECB})$ and $\gamma^- = I(m_{i,t+k} < m^{ECB})$, where $I(.)$ is an indicator function. If $\gamma^+ = 1$ ($\gamma^- = 1$), a forecaster publishes a forecast that exceeds (falls short of) the ECB's benchmark, and $\gamma^+ = 0$ ($\gamma^- = 0$) otherwise. Similarly, we define $\delta^+ = I(\gamma^+ = 1 \wedge m_{t+k} < m_{i,t+k})$ and $\delta^- = I(\gamma^- = 1 \wedge m_{t+k} > m_{i,t+k})$ as indicator functions, where m_{t+k} denotes the realized money growth rate in period $t+k$. The conditional probability of overshooting, given that a forecaster publishes a forecast that exceeds the money growth rate, can then be calculated as $P_o = \sum \delta^+ / \sum \gamma^+$, where the sum is computed over all forecasting cycles. The conditional probability of undershooting can be calculated as $P_u = \sum \delta^- / \sum \gamma^-$.

Averaging the conditional probabilities of over- and undershooting yields the test statistic, $S = (P_u + P_o)/2$. Under the null hypothesis that the target neither anchors nor repels private forecasts, we have $S = 0.5$. Anchoring of private forecasts implies $P_u < 0.5$ and $P_o < 0.5$ and, thus, $S < 0.5$.

Finally, we have $P_u > 0.5$ and $P_o > 0.5$, resulting in $S > 0.5$, in case the target repels private forecasts. Bernhardt et al. (2006) show that the test statistic, S, has an asymptotically normal sampling distribution and is robust to various sources of misspecification like market-wide shocks, different forecast horizons, and optimism or pessimism among forecasters. The reason is that the test statistic, S, is defined as the average of P_u and P_o and, for instance, macroeconomic shocks move P_o and P_u in opposite directions, but leave the test statistic, S, unaffected.

3 The data set and empirical results

We use money growth forecasts for the euro area published in the monthly survey conducted by Consensus Economics for the time period between December 2002 and December 2011. The survey participants work with financial institutions which present a group that should have a good idea of the ECB's monetary policy. Using private-sector forecasts is also of advantage compared to the forecasts of international institutions like the IMF or OECD (Frenkel et al., 2013). While the latter might have an incentive to report strategic forecasts consistent with their macroeconomic policy (Dreher et al., 2008), the private sector should have an incentive to provide an accurate forecast rather than a strategic forecast (Batchelor, 2001). Moreover, the individual forecasts are published along with the names of the forecaster and his affiliation. Given that this allows everybody to evaluate the performance of the individual participants, the accuracy of the forecasts can be expected to have an effect on the reputation of the forecasters. Furthermore, we are able to split the data set with respect to the location of the forecasters. In total, we have $3,281$ money growth forecasts available submitted by 38 private-sector forecasters.

Consensus Economics publishes the forecasts for two different time horizons, namely the current and the next year. This allows us to analyze two

different forecast horizons. Table 1 provides some descriptive statistics differentiating between the EMU and non-EMU forecasters. A t-test indicates that the forecasts between both groups are not systematically different from each other. The null hypothesis of the Shapiro-Wilk test (H_0: The forecasted money growth rates are normally distributed) can soundly be rejected for both groups and both forecast horizons. This means that the forecasts are not normally distributed indicating that there is a systematic component in the forecast heterogeneity. One source of this outcome might be that the forecasts are based on an asymmetric loss function. Elliott et al. (2005) report that macroeconomic forecasts are subject to different weights attached to over- and underprojections stipulating a rational forecast bias. Such a behavior could potentially explain the asymmetric distribution of forecasts of the ECB's money growth rate. Yet, another source of such a forecast bias might be that forecasters place their forecast towards the ECB's monetary benchmark. This research question is analyzed in this study in more detail.

Table 1: Descriptive Statistics

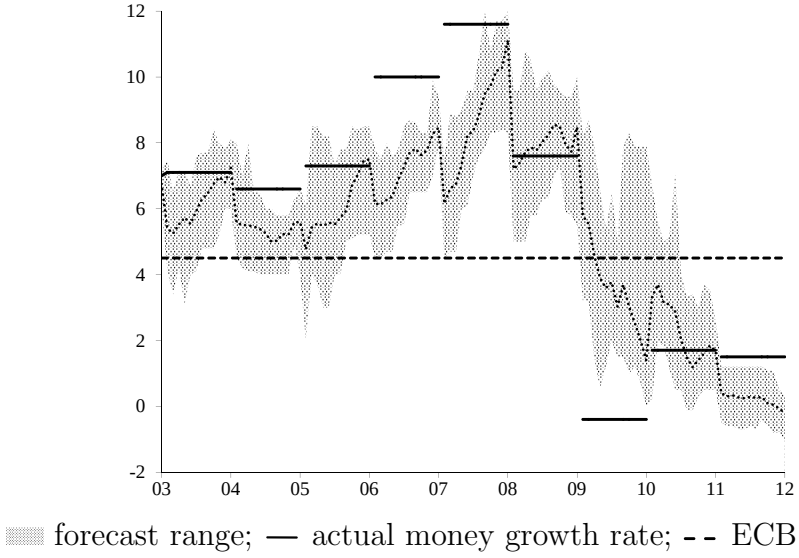
Sample	year	Mean	Stand. Error	Min	Max	Obs.	Forecaster
EMU	current	5.14*	0.09	-0.5	12.0	1,001	21
	next	5.70*	0.04	1.5	9.2	772	21
Non-EMU	current	5.40*	0.10	-1.0	12.0	850	17
	next	5.73*	0.04	1.5	12.1	658	17

Note: Table 1 reports the descriptive statistics for EMU and non-EMU forecasters. * indicates that the null hypotheses of the Shapiro-Wilk test (H_0: series is normally distributed) can be rejected on a one percent level. A t-test on the means between both groups show significance levels of .03 and .36 for both forecast horizons, respectively.

Figure 1 shows the consensus (fine line) as well as the range (shaded area) of the current-year money growth forecasts, the actual money growth rate (solid line), and the ECB's benchmark (dotted line). Despite the fact that the actual and the expected money growth rate move in line, Figure 1 also

reports a substantial dispersion of money growth forecasts in the euro area. Such a dispersion might be affected by the ECB's benchmark if it repels or attracts private-sector forecasts. Figure 1 provides some anecdotic evidence that the ECB's benchmark serves as an anchor for private-sector forecasters. For instance, in 2006 and 2007 the forecasters placed their projections closer to the ECB's target compared to the actual money growth rate, while in 2009 the forecasts were higher than the actual money growth rate and fluctuated around the benchmark. The peak of the ECB's money growth rate in 2007 reflects that the ECB's expansionary monetary measures were not expected by the financial market participants.

Figure 1: ECB's Target, Expected and Actual Money Growth



Note: Figure 1 shows the forecast range (shaded area), the actual money growth rate (solid line) and the ECB's target (dotted line).

The vertical distance between the individual forecasts and the realized value can be regarded as the forecast error. To analyze whether the geography of forecasters matters for the forecast error, we follow Berger et al. (2009) and decompose the forecast error $e_{i,t}$ of forecaster i at time t into a forecaster-specific component α_i, a systematic EMU component $\text{EMU}_{i,t}$, and a random

component $\epsilon_{i,t}$:

$$e_{i,t} = \alpha_i + \beta EMU_{i,t} + \epsilon_{i,t}. \quad (1)$$

Here, $\text{EMU}_{i,t}$ is a dummy variable indicating whether the forecaster is located in the EMU. Table 2 reports the results of Equation (1) and shows that the forecaster-specific component is significant, while the EMU-related component is statistically not different from zero for both forecast horizons. This indicates that the forecast error is not systematically different between EMU and non-EMU forecasters. This indicates that other forecaster characteristics, such as age, reputation and experience, influence the forecast error. Lamont (2002) shows that more established forecaster tend to submit extreme forecasts which yields a lower forecast accuracy. He uses data from the Business Week between 1971 and 1992 and reports that older forecasters perform worse since they make more radical forecasts.

Table 2: Decomposition of the Forecast Error

year	α	β	R^2	Obs./Forecasters
current	.9083*	.1140	.0007	1,851/38
	(.1011)	(.1313)		
next	1.0850*	-.2155	.0007	1,430/38
	(.2188)	(.2916)		

Note: Table 2 reports the estimation results of Equation (1): $e_{i,t} = \alpha_i + \beta EMU_{i,t} + \epsilon_{i,t}$ based on the Newey-West panel estimator; autocorrelation and heteroscedasticity robust standard errors in parentheses; * indicates that the coefficient is statistically different from zero on a one percent level.

Table 3 summarizes the results for the S statistic and reports that the ECB's benchmark anchored private-sector forecasts when looking at the full sample period. Concerning the current-year forecasts the test statistic of 0.47 significantly falls short of the unbiased value of 0.50. This indicates that the forecasters use the ECB's benchmark as a yardstick and place their forecasts closer to it than they would have done otherwise. The anchoring device of

the ECB's benchmark is even more pronounced for next-year forecasts with a test statistic of 0.42.

Table 3: Empirical Results

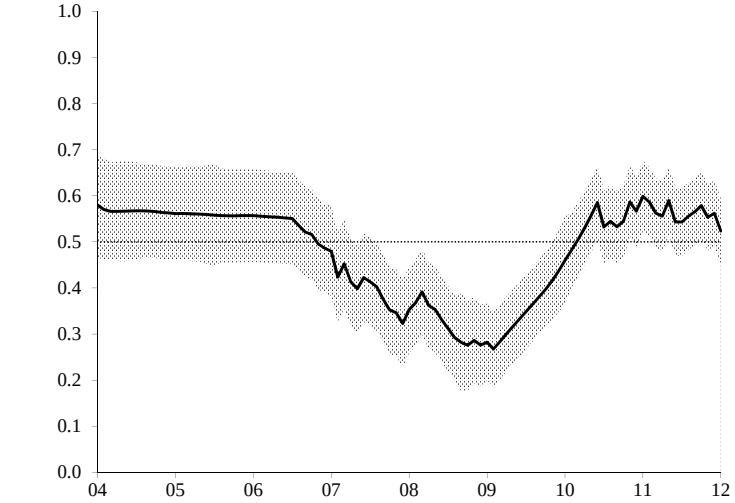
Sample	year	S-stat	Stand. Error	Lower 99 %	Upper 99 %	Obs.	Forecaster
Full	current	0.474*	0.013	0.449	0.499	1,851	38
sample	next	0.416*	0.020	0.375	0.456	1,430	38
EMU	current	0.462*	0.017	0.429	0.496	1,001	21
	next	0.278*	0.031	0.216	0.340	772	21
Non-EMU	current	0.489	0.019	0.451	0.527	850	17
	next	0.519	0.027	0.465	0.573	658	17

Note: Table 3 reports the herding statistic, S, the upper/lower 99% confidence bounds, the number of observations, and the number of forecasters. * indicates whether the S statistic is significantly different from 0.5 at the one percent significance level.

Because the money growth rate experienced large swings during our sample period, Figure 2 shows the results estimating the time-varying S_t statistic based on a one-year rolling window. Figure 2 shows three distinct periods: (a) The period 2004-2007 is characterized by an unbiased value of 0.5 indicating that the ECB's target has never repelled nor anchored private-sector forecasts. One reason might be that the ECB's inflation target was perceived to be more important from a financial market's point of view. (b) For the period 2007-2010, the S_t statistic is lower than 0.5 reflecting that the financial forecasters tend to place their money growth forecasts towards the monetary target of the ECB. One reason might be that the financial market did not expect the ECB to increase the money growth rate by means of their expansionary monetary measures in 2007 by 11.6% and would decrease it in 2009 by 0.4% but rather the financial market used the monetary target as a benchmark. This supports the findings reported in Figure 1 showing that the financial market underestimated the large increase in the 2007 money growth and overestimated the money growth rate in 2009. (c) The period 2010-2012

is characterized by an unbiased value of 0.5. For the whole sample period, the test statistic never exceeded the unbiased value of 0.5 in a statistically significant way indicating that the monetary target never repelled private-sector forecasters.

Figure 2: Time-varying S_t Statistic



99% confidence interval; — time-varying S_t Statistic; --- unbiased value of 0.5

Note: Figure 2 shows the time-varying S_t statistic based on a one-year rolling window and the corresponding 99% confidence interval.

As a robustness test, we split our sample with respect to the forecaster's location. Berger et al. (2009) analyze interest rate forecaster in Europe and find that forecasters located in the EMU produce lower forecast errors compared to colleagues located outside the EMU. Specifically, we estimate the S statistic for EMU and non-EMU forecasters which splits the sample in two roughly equally weighted groups. Table 3 reports that the test statistic is significantly lower than 0.5 for forecaster located in the EMU indicating that those forecasters use the ECB benchmark as an anchor for their money growth expectations. Compared to this, forecasters working outside the EMU show an S statistic not different from 0.5 indicating that those forecasters do

not take the ECB's benchmark into account. This result holds for current-year as well as next-year forecasts. This supports the results provided by Berger et al. (2009) who emphasize that the differences of inflation histories, policy strategies and economic environments in Europe contributed to the heterogeneity among EMU and non-EMU forecasters.

4 Concluding remarks

Using more than 3,000 private-sector forecasts of the money growth rate, we find that the ECB's monetary benchmark still serves as an anchor for private-sector forecasters. This result holds especially during the financial crisis 2007-2009 and in general for longer-term forecasts. Interestingly, forecasters located outside the EMU do not respond to the ECB's benchmark which fits into the discussion on the geography of forecasters (Berger et al. 2009).

Our results have interesting policy implications. The announcement of the ECB's benchmark yields a lower dispersion of private-sector forecasts which fits into studies reporting that monetary policy transparency reduces disagreement among forecasters (Ehrmann et al. 2012). The results also indicate that there is some disagreement concerning the ECB's policy within and outside the EMU and reflects that the understanding of the ECB's monetary conduct is perceived to be different in Europe. The results also emphasize that analyzing how private-sector forecasters form expectations concerning monetary variables is crucial if the ECB desires to manage expectations in Europe.

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