Does Money Matter in the ECB Strategy?

New Evidence Based on ECB Communication

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Abstract

We examine the role of money in the policies of the ECB, using introductory statements of the ECB President at the monthly press conferences during 1999-2004. Over time, the relative amount of words devoted to the monetary analysis has decreased. Our analysis of indicators of the monetary policy stance suggests that developments in the monetary sector, while somewhat more important in the later half of the sample, only played a minor role most of the time. Our estimates of ECB interest rate decisions suggest that the ECB's words (monetary-sector based policy intensions) are not an important determinant of its actions.

Key words: ECB, communication, monetary policy

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1. Introduction

Ever since its inception, the European Central Bank (ECB) has been criticized for its monetary policy strategy (see De Haan *et al.*, 2005 for a discussion). A particular controversial element in the ECB strategy is the role of money.[1] In addition to a broad assessment of the risks to price stability (the so-called "economic analysis", previously called the "second pillar"), the ECB uses a quantitative reference value for the annual growth rate of a broad monetary aggregate (M3) to assess whether monetary developments pose a risk to price stability ("monetary analysis", previously called the "first pillar"). According to Jaeger (2003), initial ECB comments on its strategy suggested that money would be a dominant input into policy decisions.[2] After an evaluation of its monetary policy strategy, the ECB Governing Council decided in May 2003 that the introductory statement of the ECB President after a Governing Council meeting will henceforth start with the economic analysis to identify short to medium-term risks to price stability. The monetary analysis will then follow to assess medium to long-term trends in inflation in view of the close relationship between money and prices over extended horizons.[3] This decision was widely interpreted as implying that money has become less important in the ECB monetary strategy. For instance, according to De Grauwe (2003): "the ECB is downgrading the importance of the money stock (M3) in its monetary policy strategy, and rightly so. It just did not make sense anymore to pretend that the money stock is the most important variable to watch. This variable is so much polluted by noise that it rarely gave the right warning signal of future inflation."[4] However, on various occasions, the ECB has stressed that, as in the past, the monetary analysis still plays a role in its monetary strategy. Still, according to Gerlach (2004), most econometric estimates of reaction functions for the euro area fail to find that money growth plays a role in the ECB's interest rate decisions.[5]

In this paper we examine the role of money in the ECB monetary policy strategy using the ECB's most important communication device, i.e. the President's introductory statement at the monthly press conference in which he reports on the decisions taken by the ECB's Governing Council. The statement is understood to reflect the position and

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[1] Summarizing the critique, Gerlach (2004) argues that the ECB would be ill advised to disregard monetary factors, but that taking proper account of these does neither necessarily entail monitoring the growth rate of M3, nor does it require a separate monetary pillar.

[2] When, for instance, ECB President Duisenberg was asked during the press conference on 13 October 1998 on the relative importance of money 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".

[3] Duisenberg explained these changes at the beginning of the press conference on May 8th, 2003: "The introductory statement will henceforth present first economic analysis, followed by monetary analysis. It concludes by cross-checking the analyses conducted under these two pillars."

[4] Similarly, Svensson (2003) summarizes the Governing Council decision as follows: "Keeping the two-pillar strategy but reducing the prominence of the first pillar by putting it second and discussing the monetary pillar (relabeled "monetary analysis") after the "broadly-based assessment" (relabeled "economic analysis"), seeing it mainly as a means of "cross-checking" the "economic analysis". This is a change in the right direction, but it is not enough."

[5] Recently, Carstensen and Colavecchio (2004) estimated several Taylor-type reaction functions for the ECB and conducted a structural change analysis using both recursive parameter estimates and structural change tests. They do not find clear-cut evidence in favour of a break after the revision.

views of the Council, agreed upon on a word-by-word basis by its members, and—other than, for instance, the editorial included in the Monthly Report—focuses almost exclusively on matters of monetary policy. More specifically, we quantify and analyze the policy implication contained in the introductory statement: we extract the ECB's *overall policy intention* stemming from its aggregated view of the economy, and the ECB's views on certain disaggregated economic developments and their policy implications, in particular *monetary indicators*, *price stability*, and *developments in the real economy*.

Since monetary policy is increasingly becoming the art of managing expectations, communication has developed into a key instrument in the central bankers' toolbox in recent years. It is therefore no surprise that recently various papers on central bank communication have been published. Broadly speaking, this research can be distinguished in two (not mutually exclusive) groups of studies. The first group consists of studies examining communication strategies of central banks (e.g. Blinder *et al.*, 2001 and Ehrmann and Fratzscher, 2005), while the second group consists of studies in which the effect of communication on financial markets is analysed (e.g. Fratzscher, 2004 and Jansen and De Haan, 2005a).

Two papers on ECB communication come close to ours. Like the present paper, Rosa and Verga (2005) transform the qualitative information of the ECB press conferences into an ordered scale, verifying empirically to what extent market expectations react to the information released by the ECB. They find that the public not only understands but also believes the signals sent by the European monetary authority. Heinemann and Ullrich (2005) also use the introductory statements by the ECB President at the monthly press conference to construct a wording indicator reflecting the "hawkishness" of monetary rhetorics, integrating this indicator into a standard Taylor type model for the interest rate. They find that the wording indicator can improve the model's fit when added to the standard explanatory variables. Our paper differs from these studies in two ways. First, we use the introductory statements of the ECB president for a different purpose, i.e. to examine whether the ECB's monetary policy strategy has changed. Second, we use a different method to transform qualitative information into quantitative information. Not only do we come up with an indicator of the ECB's overall policy intention stemming from its aggregated view of the economy, we also have indicators of the ECB's views on certain disaggregated economic developments coinciding with the "economic analysis" and the "monetary analysis".

Our main finding is that developments in the monetary sector did not play a significant role most of the time when explaining the overall policy stance as communicated by the introductory statements of the ECB president. Also when it comes to actual policy, our estimates of ECB interest rate decisions suggest that money never did significantly matter. There are indications that the role of money has slightly changed, but most likely this change occurred before May 2003.

The remainder of the paper is structured as follows. Section 2 outlines communication of the ECB on its monetary policy strategy in some detail and explains our methodology. Section 3 presents the outcomes of our analysis based on simply counting words, while sections 4 and 5 shows the results for our indicators of the monetary policy stance. The final section offers some concluding comments.

2. Quantifying communication by the ECB on its monetary policy strategy

Researchers have highlighted three reasons why communication may prove useful for central banks. First and foremost, communication may be a very direct and effective tool to influence expectations. Therefore, it plays a seminal role in improving the effectiveness of policy and, consequently, the economy's overall performance (e.g. Blinder, 1998 and Bernanke, 2004). In some instances and under some circumstances—such as when nominal interest rates are close to the zero lower bound—communication may even function as the sole tool to anchor and guide market expectations. Second, communication may be used to reduce noise in financial markets (e.g. Posen, 2003). Greater disclosure and clarity over policy may lead to greater predictability of central bank actions, which, in turn, reduces the uncertainty in financial markets. Finally, communication is indispensable from the perspective of central bank accountability. As central banks have become more independent over time, they have to pay closer attention to explaining what they do and what underlies their decisions. The increased use of communication is partly a logical consequence of this development (Issing, 2005 and De Haan and Eijffinger, 2000).

A number of factors make communication particularly difficult for the ECB. First, it is a relatively young international organization with a Council and staff reflecting the cultural heterogeneity of the euro area. Talking with "one voice" might be difficult under these circumstances. Indeed, Jansen and De Haan (2005b) show that statements by ECB officials are often contradictory. Second, the message of the ECB may not be easy to convey. As pointed out in the Introduction, the monetary policy strategy of the ECB differs from those of other central banks, containing elements of monetary and inflation targeting. As a result, surveys suggest that professional economists often feel that they do not have a good understanding of the ECB's policy (De Haan *et al.*, 2005).[6] Third, the ECB has to deal with a large number of different media coming from various countries and having different traditions. As Hämäläinen (2001)—at the time member of the Executive Board of the ECB—puts it: "communication is not easy in a pan-European context in which differing cultures, languages, traditions and motives affect how messages are interpreted by the different counterparties involved."

Central bank communication may use various channels: press conferences, minutes of the meetings of the decision-making council, monthly bulletins, speeches and interviews. One important communication device of the ECB is the introductory statement by the ECB President for the press after the meetings of the Governing Council. In the morning of its meeting days, the Governing Council decides whether or not to modify its key interest rates. In his introductory statement the President explains the reasons for such decisions and gives the ECB's opinions on the risks for price stability and growth. In its Monthly Bulletin of November 2002 (p.64), the ECB stated that "The President's introductory statement at the press conference provides a

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[6] Even by its own accord, the European Central Bank (ECB) faces a communication gap. As Issing (2001) writes, "[o]n the one hand, few observers contest the success and credibility of the ECB in delivering on its primary objective and on the appropriateness of most of its policy actions in this regard... On the other hand, however, the overall perception of the ECB by the public, academics, financial analysts, market participants, and not least, journalists continues to remain—at best—rather mixed." Indeed, in an article in the Wall Street Journal the ECB is considered a central bank "that cannot master communication" (Sims and Wessel, 2000).

comprehensive summary of the policy-relevant assessment of economic developments. It is structured along the lines of the ECB's monetary policy strategy and agreed by the Governing Council."

Thus, the information provided in the introductory statement allows answering a number of questions. For instance, what is the relative importance of the "monetary analysis" for ECB communication compared to the "economic analysis"? Or, more pointedly, does the ECB pay more than lip-service to the monetary analysis? Moreover, has the relative importance of the monetary analysis changed over time? In particular, did the ECB indeed downgrade the former "first pillar" of it policy-making framework in May 2003? As discussed above, in May 2003 the ECB changed the structure of the introductory statement, highlighting the importance of non-monetary (or economic) issues. The Council stressed that the "new structure of the introductory statement will better illustrate that these two perspectives [i.e. the economic and the monetary analysis] offer complementary analytical frameworks to support the Governing Council's overall assessment of risks to price stability", and it argued that, as in the past, monetary analysis will take into account developments in a wide range of monetary indicators including M3, its components and counterparts, notably credit, and various measures of excess liquidity. However, a number of academic observers (like De Grauwe, 2003 and Svensson, 2003) have interpreted these changes as an important step away from Bundesbank-style monetary targeting.

Our data set consists of a total of 68 introductory statements of press conferences held after the meetings of the Governing Council. Our first observation is on January 7th, 1999;[7] the last one is on December 2nd, 2004. We proceed in two steps. As a first step we will simply *count words* to analyse whether—and if so, when—the monetary analysis has become less important. The next step is to quantify the informational content of the introductory statement. The statement generally starts with a brief summary of the decision taken and the reasons underlying this decision, sometimes combined with an outlook on the future monetary policy stance endorsed by the Governing Council. Mainly based on this first section and the concluding section often added toward the end of the statement, we compute an indicator for the *overall monetary policy stance* communicated by the Governing Council. The indicator categorizes the overall monetary policy stance on a scale from −3 (strong inclination to lower rates); −2; −1; 0 (neutral); +1; +2; and +3 (strong inclination to increase rates).[8] Furthermore, in line with the contents of the introductory statement we distinguish the implied policy stance for three *subcategories* based on the communicated information on: (1) *price stability*, (2) the *real economy*, and (3) *monetary indicators*. In all three cases, we compute the indexes exclusively based on the information contained in the dedicated sections of the introductory statements, excluding the introductory and concluding sections. Table 1 provides some examples for the three subcategories. As with the overall stance, these statements have been categorized on a scale running from −3 to +3.

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[7] Hence, we neglect the seven press conferences held by the ECB before the introduction of the euro, i.e. before January 1st, 1999.
[8] This is similar to Rosa and Verga (2005); Heinemann and Ullrich (2005) only distinguish between easing, neutral and tightening.

[Insert Table 1 here]

As pointed out Rosa and Verga (2005), the task of categorizing is helped to some extent by the fact that the language employed in the introductory statements is—to a degree—standardized, with a number of key words or strings reappearing with some regularity. Examples of (strings of) such key words are: "appropriate", "in line with", "for the time being", "carefully monitor", "vigilant", "upward/downward risks", "more/less favourable", "uncertainties", "tilted to the up/downside", "inflationary pressures", and "above/below potential growth". However, the introductory statement is not a short document (the average statement in our sample has more than 1,300 words) and the standardization of the language used is far from perfect (the use of key words changes over time and standardization is not necessarily applied consistently to all sections). As a consequence, the coding of policy intentions is based on our reading of the full statement.

An important advantage of extracting from the introductory statements not only the ECB's aggregate policy intentions but also its intentions based on its disaggregated analyses of developments regarding price stability, the real economy, and the monetary sector is that it highlights potential tensions between subcategories and allows exploring the ECB's (possibly changing) way of dealing with these tensions. Take, for instance, the press conference of February 4th, 1999. While the Governing Council states that there are no "significant upward or downward pressures on prices in the short term", the information concerning the real economy suggests "downward risks for output growth", while the growth of credit causes some concern and therefore has to be "carefully monitored". So by comparing the information on the various subcategories with the overall monetary policy stance—based on the overall index and actual interest rate decisions taken—we are able to examine the role of money in the way the ECB communicates its policy intentions. Table 2 (upper panel) shows the correlation amongst the various indexes. An interesting message is that the correlation of the average monetary indicator with the other subindicators and the indicator of the overall policy stance is relatively low as compared to the subindexes based on the ECB's comments on price stability and the real sector.

[Insert Table 2 here]

Communication is not a one-way street, and the empirical analysis has to control for differences in perception. To limit the influence of individual idiosyncrasies in this regard, the scaling of the overall and disaggregated policy stances communicated by the ECB was done by three different teams that operated independently from one another. Examples for the scores of the teams are shown behind the statements in Table 1. The average (or consensus) score of the teams is used in the empirical analyses.[9] Table 2, in addition to showing the correlation amongst the various average indexes, also shows the correlation of the coding of the various teams with these averages (lower panel). The first notable finding here is that, in general, the team-based indicators move more or less in

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[9] We have also experimented with other ways of aggregating the team scores, like the first principal component, the median, an average of standardized series, etc. The qualitative results are by no means affected by this.

sync with the averages. Interestingly, however, the correlation of the monetary indicators for each of the teams and the final average monetary indicator are relatively low. Apparently, the monetary part in the introductory statements leads to the greatest variation in the assessment among the teams. Apparently, the message send by the Governing Council regarding its policy stance is somewhat less precise when it comes to the monetary sector.

3. The importance of money: word count

In a first attempt to capture some of the information contained in the introductory statements, we conducted a simple word count. In particular, we identified, grouped, and counted words in full sentences occurring at any point in the introductory statement addressing a number of key issues. The first group contains statements referring to *price developments*, the second group of statements refers to the state of the *real economy*, the third to the *monetary sector*, and the fourth to a variety of *other topics* with some relevance to monetary policy, including exchange rate developments, the financial sector, or issues related to fiscal policy.[10] A residual group, which we will ignore from now onwards, consists of words related to organizational issues. Figure 1 presents the distribution of words among our four groups for all 68 introductory statements during the 1999-2004 period and Table 3 provides a number of summary statistics.

[Insert Figure 1 and Table 3 here]

It follows from Figure 1 and Table 3 that the weight allocated to the subjects of *price stability*, *real economy*, and *other topics* in the introductory statements is roughly equal, about 22-23 percent each. The *monetary sector* was given somewhat broader coverage in the range of 33 percent. However, this does not imply that the monetary analysis is more important than the economic analysis, as the latter relies on information on price developments and developments in the real economy. A second observation is that the proportion of words allocated to the monetary sector has decreased over time.

It has recently been argued in the literature that a central bank analyzes the economy in an asymmetric way over the business cycle, i.e. during periods of monetary tightening particular elements—like price stability or the real economy—might be given a different weight than during periods of monetary loosening. For instance, Cukierman (2000) argues that central bankers are not completely insensitive to social and political pressure and therefore more inclined to offsetting positive output gaps than negative ones for a given level of inflation.[11] Goodhart (1998) argues that central banks that need to build up reputation (like the ECB) might show a precautionary demand for low inflation, i.e. would rather have inflation below than above target, everything else being equal.[12]

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[10] As these other topics are not discussed on a continuous basis, it is not possible to construct policy stance measures on these (as we did with price developments, the real economy, and the monetary sector).

[11] See also Gerlach (2003) for a formal analysis.

[12] See Aguiar and Martins (2005), Ruge-Murcia (2003a,b) and Cukierman and Gerlach (2003) for empirical tests. Cukierman and Muscatelli (2002) build a model that gives a theoretical foundation for both a larger weight on inflation and a larger weight on output: If the central bank has to build up reputation, they put more weight on price stability to keep inflation expectations low. If the central bank has already built up enough reputation, the precautionary demand for economic expansions rises.

Therefore, we split the sample in two parts. In the first half of the sample, i.e. up to April 2001, the interest rates as set by the ECB were on the rise, whereas in the second half they were falling. Splitting the sample in April/May 2001, we note that monetary issues dominated before 2001 (at about 38 percent of the word count for the four groups selected) but fell to significantly lower levels (about 31 percent) thereafter. The associated gains occurred mostly in the *other topics* category.[13] With respect to the *monetary sector* and *other topics* we cannot reject that there is a break between April and May 2001.

It is interesting to more precisely pinpoint structural changes in the ECB's communication, in particular with respect to the role of monetary analysis. To that end we perform the Andrews and Ploberger (1994) structural break tests for a linear regression, with p-values using Hansen's (1997) approximations.[14] The optimal threshold date for the *monetary sector* is only shortly after May 2001, i.e. in December. The optimal break for the *other topics* category is July 2001 and hence occurs almost around the same time. For the other two components we do not find a significant threshold anywhere in our data. However, the threshold tests contained in Figure 2 suggest that the significance of the decrease in the weight monetary issues received is fairly independent of the precise date chosen.

[Insert Figure 2 here]

While these results are interesting, fewer words do not necessarily imply less importance when it comes to influencing the ECB's policy intentions as communicated through the introductory statements. For instance, the statements might include fewer words allocated to the *monetary sector* during the post-2001 period because the policy implications of the analysis stemming from the monetary sector became clearer. In the following section we will therefore analyse the role of money in the ECB monetary policy strategy using the indicators as outlined in Section 2.

4. The importance of money: analysis of our indicators

The stance-indicators we constructed on the basis of the press conferences can each take on values between -3 (strong inclination to lower interest rates) and +3 (strong inclination to increase interest rates). Three topics return in each statement: developments in the monetary sector, price developments, and developments in the real economy. Besides looking at the overall policy intention, we will also look at these three underlying components.

[Insert Figure 3 about here]

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[13] Within the group of *other topics* there have been some clear shifts across time. Whereas comments on the *financial sector* almost completely disappeared and *exchange rate* issues also got less attention, *other policy* and especially *fiscal policy* issues more than compensated for this after May 2001.
[14] A series of LM statistics are generated for breaks at each of the points in the middle range of the data set. The break generating the highest LM statistic is the most likely candidate. To approximate p-values, it uses an exponentially weighted average of these LM statistics.

As Figure 3 shows, the three sub indicators and our overall measure of policy intention coincide pretty much up until the summer of 2001 (July 5th, 2001), the time at which all indicators took a more or less neutral position. After that our indicator for the monetary sector departs from the other indicators, to maintain a high and relatively stable value ever since. Even when putting the monetary sector aside, price developments and developments of the real economy as described in the press statements are clearly more out of line after the summer of 2001 than before. What the data in Figure 3 furthermore suggest is that the overall policy stance leaned more on the assessment of price developments in the early half and at the very end of our sample, whereas the real economy appeared to set the tone during the second half of 2002 up until the end of 2003.

As the overall policy indicator has not been directly derived from the three underlying components, it is possible to test what the implicit weights are that the ECB assigns to these sub indicators. Given that all indicators are defined over the interval (-3, 3) where the value zero represents the neutral position for all, the regressions do not contain a constant. Hence, we assume that the average overall policy position is neutral once we have corrected for the underlying three sectors.[15]

[Insert Table 4 about here]

Column (1) of Table 4 reveals that over the entire period, price developments as well as developments in the real economy were given the largest weights in judging the overall situation. Monetary developments were clearly given a much smaller weight. The Durbin-Watson statistic shows that there is positive autocorrelation in the residuals of this first equation. A potential reason might be that previous press statements echo on to the subsequent one. To test for this policy inertia effect we include the lagged dependent variable in the Column (2) of Table 4. The estimated coefficient is significant; however, the estimated size of this effect is far less than for both the coefficients of price stability and the real economy.[16] Note furthermore, that the general LM test of Godfrey (1978) and Breusch (1978) is highly significant, still indicating problems with respect to the residuals and therefore the specification.

As Figure 3 suggests that the implicit weights given by the central bank might have changed over time, we allow the econometric model to differentiate the coefficients of interest across sub periods. A likely candidate is the turning point in the interest rate cycle in May 2001, but none of the following results depend on the precise timing of the break. Columns (3) and (4) of Table 4 redo the previous two specifications, taking this break into account. The estimated changes in coefficients in the second part of the sample along with their test statistics are reported in the lower half of the table.

A first result is that the problems associated with the residuals presented in columns (1) and (2) of Table 4 seem indeed to be related to a structural break in the

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[15] The only plausible reason for having a constant in the regressions would be if there would a fourth component relevant for the ECB which on average does not have a neutral stance. Hence, we assume here that all other determinants of the overall policy stance have on average a value of zero and are therefore part of the residual. We have also run the regressions including a constant; it turned out that it is in most situations insignificant and does not alter our qualitative conclusions.

[16] Including lagged values of the three sub indicators instead results in insignificant estimate for all additional coefficients. Hence, once contemporaneous values of the three sectors are included, their previous values do not add aditional information.

underlying data. Both the Durbin-Watson in Column (3) and the LM statistic in Column (4) become insignificant once we allow for a structural break between April and May 2001. The Chow test indicates that the changes in the coefficients after the break are jointly highly significant. Before the break, price developments were clearly the most important determinant of the ECB's policy stance, whereas after the break that role was taken over by developments in the real economy. As there does not appear to be a significant change in the policy inertia parameter over the two periods, we presume that this kind of inertia is not sample dependent in Column (5) of Table 4. Interestingly, developments in the monetary sector did not play a significant role before the break, while after the break its impact is significant, albeit at relatively modest levels. Our preferred specification is shown in Column (6) of Table 4 in which the weight on the monetary sector in the first half of the sample is set equal to zero. This merely strengthens the previous findings.

The evidence suggests that, in contrast to what many observers argue, the role of the monetary analysis—as represented in the ECB President's introductory statement at the monthly press conference—has not been reduced in importance in the second half of our sample period. The opposite appears to be more likely. Still, money only plays a relatively minor role in determining the ECB's policy stance. Even post May 2001, in our preferred specification, the coefficient measuring the importance of the monetary sector in determining the ECB's overall monetary policy stance is only somewhat more than a third of the coefficient for the real sector and little more than two-thirds of the coefficient for the price sector.[17]

So far, the threshold of April 2001 has been selected on theoretical grounds—but does this also coincide with what the data tell us? Figure 4 shows the results when testing for the date of a threshold break in our regression shown in Column (2) of Table 4 using the Andrews and Ploberger (1994) approach. The highest test statistic prevails for July 4th, 2002. However, the figure also clearly shows that during the period October 2000 and October 2002, the test statistic takes on high values (which are always significant on a 1 percent level). Hence, it is difficult for the data to assess the exact threshold point. However, there clearly is a break in the weights the empirical model allocates to the three sectoral indicators and the most likely time window for this break includes the turning point in the ECB's interest rate cycle, that is, May 2001. In contrast, a break in May 2003—the date at which the ECB Governing Council announced some changes in their way of communicating the two pillars—appears to be less likely.

[Insert Figure 4 here]

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[17] See column (6) in Table 4. As mentioned above, the coefficient for the monetary sector is zero before May 2001. To compare coefficients in the second period, the estimated coefficients in the middle and lower panels of Table 4 have to be added. The quantitative-economic impact of the monetary indicator is even smaller than what the relative size of the coefficient suggests, as the monetary indicator is less volatile than the price and real indicator during this part of the sample period.

5. Are the Deeds Following the Words?

Our analysis of the previous section suggests that the monetary pillar has played a minor role in determining the overall monetary policy stance according to our overall policy indicator. One may, of course, argue that despite the theoretical arguments put forward in section 2, it is not words but deeds that count. Did the ECB follow up its communication by action? To answer this question, we have first to decide whether to look at all ECB policy decisions over the sample period under consideration, i.e. 108 meetings of the General Council, or to focus only on the 68 meetings that were followed by a press conference with an introductory statement of the President agreed upon by the Governing Council. Because the decision to hold a press conference and/or prepare an introductory statement is in itself part of the ECB's communication strategy, using the full 108 meeting data set seems to be called for. However, the results reported below do not change substantially if we constrain the analysis to the 68 observations for which introductory statements are available.

In Table 5 we regress the ECB's main refinancing rate (MRR) on our three measures of communicated monetary policy, i.e. *price developments*, *real economy* and *monetary sector*. In the left part of that table, where we explain the actual level of the MRR, we also include a constant, the policy rate as it is shortly before the Governing Council meeting, and its change as made in the previous meeting.[18] In this way our Taylor-rule type of equation allows for the usual policy inertia. As it might be argued that the policy rate resembles a non-stationary process, we also show—in the middle part of the table—the results using the first-difference of the main refinancing rate as our dependent variable. Interest rate decisions do have a rather discrete character; in practice the MRR only changes by steps of 25 basis points or 50 basis points. To econometrically cope with this, the right part of Table 5 reports results using an ordered probit estimator.[19] Note that overall the results do not depend upon these three distinct ways in which we set up our model.

It is generally agreed that communication not only serves to justify actions taken, but also to prepare markets for upcoming changes. Hence, communication is likely to be forward-looking. For that reason, we include besides the contemporaneous values of our press release indicators also their lagged ones.

Furthermore, given the results in the previous sections, we expect a significant break during our sample. As before, we start by assuming this break to potentially take place in May 2001. We will subsequently test for this.

[Insert Table 5 here]

All together this results in a rather comprehensive first model which is presented in Columns (1), (4) and (7) of Table 5. The lower part of the table reports the change in the coefficients as they have been estimated for the post-May 2001 period; the upper part shows the results for the period until our break date. Except for the ordered probit model, the Chow tests report clear evidence of a significant break in May 2001. However, it is

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[18] The latter we include to remove remaining negative autocorrelation from the regression. The qualitative results are not affected by this in any way. We, therefore, will not comment on this variable.

[19] Note in this case, the coefficients cannot be interpreted in the usual way; they depend upon the scale of the cut-off points.

also clear that a number of estimated coefficients hardly differ from zero. Dropping insignificant variables other than our main variables of interest, i.e. indicators related to the monetary sector, we arrive at the specifications in Columns (2), (5) and (8). This improves the overall fit and makes the break even more pronounced (including in the ordered probit model) without affecting the qualitative results.

A first finding from Table 5 is that the contemporaneous version of our real economy measure is highly significant in explaining developments in the main refinancing rate. This coefficient is stable across the periods and its lagged version has no significant impact. A possible interpretation is that the ECB is using developments in the real economy to explain why the main refinancing rate has been set at its present level. Its role in preparing the markets for upcoming changes appears all but negligible.

This does not hold for price developments in the first part of our sample. Up until April 2001, a higher value in the previous press release increases the likelihood of having a subsequent policy rate increase. As the sum of the contemporaneous and lagged coefficients almost equals zero, this effect disappears at the next meeting. Hence, a communicated increase in the ECB's propensity to raise interest rates due to price increases is more likely to be followed by an increase in the ECB's main refinancing rate one meeting ahead than during the meeting after which it is communicated. In other words, communication with respect to price developments seems to be forward-looking. Note, however, that in the later part of the sample the importance of the contemporaneous coefficient increases substantially. The reverse holds for the lagged variable. In other words, after 2001 the ECB seems to have been more inclined to use communication with respect to price developments to explain current interest rate decisions than preparing markets for upcoming ones.

What role did money play in the ECB interest rate decisions? All our results hardly show any role for money in actual interest rate decisions. At best one could argue (using a 20 percent significance level) that—as with price developments—in the pre-May-2001 period it was used in a forward-looking manner, i.e. to prepare markets for upcoming increases in the main refinancing rate. From then onwards, however, both contemporaneous and lagged coefficients for our monetary sector indicator become indistinguishable from zero at any plausible significance level. Columns (3), (6) and (9) report the results in case variables that are insignificant at the 10 percent level are one at a time removed from the specification.[20] This leads to the removal of all monetary sector indicators. In other words, when it comes to interest rate decisions our results suggest that money does not matter.

[Insert Figure 5 here]

As before, the threshold of May 2001 has been selected on theoretical grounds. Figure 5 reports the results when testing for the date of a threshold break in our regression shown in Column (5) of Table 5. This time, the highest test statistic prevails for November 2nd, 2000. Clearer than before, the figure shows that a break is most likely to have occurred between October/November 2000 and April/May 2001. On the other

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[20] For ease of comparison we have left the previous change in the main refinancing rate in the ordered probit specification. As noted in footnote 18, this does not affect our conclusions.

hand, a break in April/May 2003—the time where the ECB Governing Council changed their way of communicated the two pillar strategy—appears to be rather unlikely.

6. Concluding Remarks

This paper examines the role of money in the monetary policy strategy of the ECB based on its policy intentions as communicated in the introductory statement of the ECB President at the press conference following Governing Council meetings. We construct an indicator of the ECB's overall policy intention stemming from its aggregated view of the economy. In addition, we measure the policy implications of the ECB's views on certain disaggregated economic developments coinciding with the "economic analysis" (including the real sector and price developments) and the "monetary analysis". Our data set includes a total of 68 introductory statements extending from January 1999 to December 2004.

In a first step we perform a simple word count which yields two main results. First, the relative share of words devoted to the subjects of price developments, real economy, and other topics in the introductory statements is about 22-23 percent each, while the monetary sector was given somewhat broader coverage in the range of 33 percent. Second, over time, the relative amount of words devoted to the monetary analysis in the introductory statement decreases. The question is whether this also suggests a decrease in relative importance when it comes to the communicated ECB policy intentions.

Our analysis of indicators of the ECB's overall policy stance suggests that developments in the monetary sector did not play a significant role most of the time. There are, however, indications for a change that contrasts with the simple word-count exercise and with the view of many observers: while monetary analysis was never quite as important in determining the ECB's overall policy intentions as price developments or the real sector, our results suggest that the ECB has come to rely somewhat more on monetary developments over time. In particular, we find evidence for a structural break (after which monetary analysis gained in importance) in early 2001, at the upper turning point of the interest cycle. There is little indication of a break in May 2003 when the ECB presented the outcomes of its evaluations of its monetary policy strategy and changed the presentation of the introductory statement.

Moving from words to deeds, the monetary sector seems to play an even smaller role. We show that ECB interest rate decisions are barely influenced by its monetary-sector based policy intentions. Policy intentions based on developments in the real economy and, to a smaller degree, on price developments, are the main factors explaining actual policy changes. This holds throughout the sample. To the extent that there is evidence of an influence of monetary-sector based policy intentions at all, it is limited to the first part of the sample.

A final result is that, before early 2001, the communicated policy intentions were predominantly linked to future interest rate decisions, while, thereafter, they appear mainly related to contemporaneous policy decisions. This suggests a declining degree of forward-lookingness of communication.

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Table 1: The introductory statement of the ECB President: some examples

Date:	Prices:	Team 1 2 3	Real economy:	Team 1 2 3	Money:	Team 1 2 3
4-Feb-99	confirmed its earlier assessment that the outlook for price stability remains favourable; there are no significant upward or downward pressures on prices in the short term	0 0 0	confirm our earlier assessment that there are downside risks for output growth	-1 -1 -1	M3 growth remained very close to the reference value; particular the developments in credit growth will need to be carefully monitored in the coming months	0 0 0
9-Sep-99	we remain vigilant taking into account the upward risks to price stability; expectations for inflation …. tend to indicate that markets still expect an evolution of consumer prices, which will remain compatible with price stability	1 1 1	upturn in economic growth in the course of this year	0 0 2	recent monetary developments merit close attention; shorter-term monetary developments need to be interpreted with caution	2 1 3
5-Jan-00	consumer price developments are expected to remain subject to further upward pressure; stability-oriented behaviour is urgently required	2 2 2	confirmed the widely expected upturn in growth	1 1 3	no…need to extend the current situation of abundant liquidity; liquidity conditions…continue to be generous	2 3 3
14-Dec-00	Governing Council judges the risks to price stability still to be on the upside	2 2 3	growth continues to prevail	0 1 2	caution continues to be warranted with regard to the upside risks to price stability stemming from the monetary side	1 1 2
10-May-01	upward risks to price stability over the medium term have diminished somewhat	1 0 0	actual economic growth will nevertheless be broadly in line with trend potential growth	0 0 1	monetary developments no longer pose a risk to price stability	0 0 0
11-Oct-01	interest rates at the current juncture is therefore seen as consistent with maintaining price stability over the medium term	0 0 0	continue to monitor downside risks to the current situation	-1 0 0	we do not judge that monetary developments signal risks to price stability … the developments of M3 will have to be monitored carefully in the coming months	1 0 2
2-May-02	prospects for price stability appear to be somewhat less favourable than they were towards the end of last year	1 1 2	GDP growth rates in the euro area should again be in line with potential growth later this year; still a number of uncertainties surrounding the strength of the current upswing	0 0 1	some normalisation in the development of M3	1 0 2
7-Nov-02	further increase in the annual rates of inflation around the turn of the year and a delay in the return to inflation rates below 2% cannot be ruled out; this further increase should only be temporary	1 -1 1	Governing Council has discussed extensively the arguments for and against a cut in the key ECB interest rates. The view has prevailed to keep interest rates unchanged. However, the Governing Council will monitor closely the downside risks to economic growth in the euro area	-3 -1 -1	more liquidity is available than would be needed to finance sustainable, non-inflationary growth. However, given the current economic environment, we do not see the risk of this translating into inflationary pressure in the near future	1 0 3
8-May-03	current monetary policy stance remains consistent with the preservation of price stability over the medium term	0 0 1	important downside risks to the economic recovery have diminished; nevertheless, there continue to be downside risks	-1 -2 -1	euro area economy continued to accumulate liquidity significantly above the amount needed to sustain non-inflationary growth	2 1 3
4-Nov-04	there are upside risks to price stability over the medium term; strong vigilance is therefore warranted with regard to all developments which could increase such risks	3 1 1	basic determinants of economic activity remain consistent with continuing economic growth in 2005; outlook is surrounded by continuing uncertainty	0 0 1	remains substantially more liquidity in the euro area than is needed to finance non-inflationary growth; this could pose inflationary risks in the future if the excess liquidity is not progressively reduced	2 1 2

Note: These quotes are selective and do not exhaust the information used to compute the policy intention indicators. See the main text for an explanation of the scores listed under the header of "Team".

Table 2: Summary statistics of our indicators

| | Correlation matrix of averages: | | | |
	Overall policy stance	Price stability stance	Real sector stance	Monetary sector stance
Overall policy stance	1.00	0.92	0.95	0.58
Price stability stance		1.00	0.86	0.60
Real sector stance			1.00	0.55
Monetary sector stance				1.00

| | Correlation matrix of teams: | | | |
| | Averages | | | |
	Overall policy stance	Price stability stance	Real sector stance	Monetary sector stance
Team 1	0.92	0.86	0.92	0.89
Team 2	0.95	0.92	0.93	0.75
Team 3	0.94	0.85	0.97	0.84

Note: The upper panel reports results for the "average" indicators as used in the remainder of the paper. The term average means that each of these indicators is computed as the mean of three independently generated indicators. The latter are based on the work of three research teams ("Team 1", "Team 2", and "Team 3"). The lower panel shows the correlation of the "average" indicators with the team-based indicators.

Table 3: Word count analysis

Share of words on:	Sample averages			Equal mean p-value	Threshold test	
	Full sample	<May-01	≥May-01		Opt.date	p-value
price stability	21.6%	20.7%	22.3%	42.3%	2-Dec-99	40.3%
real economy	22.4%	23.1%	21.9%	52.8%	8-Jan-04	27.5%
monetary sector	33.4%	37.5%	30.7%	2.9%	6-Dec-01	0.0%
other topics	22.6%	18.7%	25.1%	0.5%	5-Jul-01	0.0%
# Obs.	68	27	41			

Note: p-values are reported for the Andrew and Ploberger (1994) test using Hansen's (1997) approximations.

Table 4: Regression results explaining overall policy intention by underlying components

	(1)	(2)	(3)	(4)	(5)	(6)
adj. R^2	0.932	0.942	0.953	0.957	0.957	0.957
Durbin-Watson	1.09		1.71			
LM-test		10.23		1.13	1.10	1.49
Significance LM-test		0.00		0.29	0.29	0.22
# Obs	68	67	68	67	67	67
Chow-test (sign.level)			0.00	0.00	0.00	0.00
coefficients up to April 2001						
price stability	0.55	0.45	0.74	0.67	0.65	0.70
	(7.45)	(6.03)	(7.72)	(6.69)	(6.77)	(10.38)
real economy	0.49	0.40	0.27	0.26	0.24	0.24
	(10.35)	(7.35)	(4.26)	(3.71)	(3.68)	(3.68)
monetary sector	0.12	0.10	0.08	0.06	0.06	
	(2.52)	(2.18)	(1.02)	(0.77)	(0.70)	
Lagged overall policy intention		0.20		0.11	0.14	0.14
		(3.05)		(1.42)	(2.41)	(2.55)
Δcoefficients from May 2001 onwards						
inflationary pressures			-0.34	-0.34	-0.31	-0.36
			(-2.62)	(-2.53)	(-2.48)	(-3.55)
real economy			0.47	0.37	0.41	0.40
			(5.35)	(3.42)	(4.63)	(4.63)
monetary sector			0.19	0.17	0.19	0.24
			(1.99)	(1.79)	(2.04)	(4.77)
Lagged overall policy intention				0.07		
				(0.65)		

Notes: t-statistics are in parentheses. The Chow test is checking joint significance of the coefficients in the bottom part of the table, i.e. testing whether we can reject the null hypothesis of having no break.

Table 5: Regression results explaining which components used in the press statements drive actual interest rate decisions

	MRR (OLS)			ΔMRR (OLS)			ΔMRR (ordered probit)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
adj./pseudo R^2	0.984	0.985	0.985	0.290	0.311	0.309	0.615	0.599	0.538
Durbin-Watson	2.18	2.21	2.16	2.11	2.12	2.10			
LM-test	4.14	4.81	3.22	1.77	1.86	1.39			
Sign. LM-test	0.04	0.03	0.07	0.18	0.17	0.24			
# Obs	107	107	107	107	107	107	107	107	107
Chow-test (sign.)	0.03	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.00
				coefficients up to April 2001					
Constant	0.19	0.19	0.09						
	(1.65)	(2.59)	(1.77)						
MMR before meeting	0.96	0.95	0.97						
	(35.38)	(55.18)	(68.58)						
Previous ΔMRR	-0.25	-0.25	-0.22	-0.26	-0.24	-0.21	-8.85	-8.63	-5.82
	(-1.88)	(-2.83)	(-2.48)	(-1.99)	(-2.63)	(-2.34)	(-0.68)	(-0.64)	(-1.13)
Price stability	-0.12	-0.12	-0.13	-0.15	-0.14	-0.14	-2.23	-1.87	-2.04
	(-2.09)	(-2.59)	(-3.14)	(-2.68)	(-3.07)	(-3.74)	(-0.84)	(-1.35)	(-2.17)
Lagged price stability	0.11	0.13	0.14	0.11	0.10	0.13	3.99	2.62	3.12
	(2.00)	(3.02)	(3.85)	(2.08)	(2.24)	(3.36)	(1.29)	(2.10)	(3.55)
Real economy	0.07	0.07	0.07	0.09	0.07	0.08	2.42	1.29	1.23
	(1.03)	(2.95)	(2.93)	(1.28)	(3.55)	(4.83)	(0.90)	(1.94)	(2.08)
Lagged real economy	0.01			-0.03			-1.60		
	(0.15)			(-0.47)			(-0.59)		
Monetary sector	-0.09	-0.09		-0.05	-0.04		-0.68	-0.83	
	(-1.45)	(-1.64)		(-0.92)	(-0.84)		(-0.36)	(-0.34)	
Lagged monetary sector	0.06	0.07		0.08	0.08		2.04	2.24	
	(1.10)	(1.31)		(1.49)	(1.45)		(0.98)	(0.81)	
				Δcoefficients from May 2001 onwards					
Constant	0.02								
	(0.09)								
MMR before meeting	-0.01								
	(-0.33)								
Previous ΔMRR	-0.01			0.06			-2.06		
	(-0.04)			(0.31)			(-0.00)		
Price stability	0.22	0.21	0.22	0.26	0.26	0.25	7.35	6.56	5.52
	(2.74)	(3.33)	(3.82)	(3.42)	(4.10)	(4.23)	(1.56)	(2.47)	(2.82)
Lagged price stability	-0.19	-0.21	-0.25	-0.22	-0.21	-0.26	-7.35	-5.74	-5.82
	(-2.41)	(-3.41)	(-4.29)	(-2.92)	(-3.25)	(-4.28)	(-1.78)	(-3.12)	(-3.99)
Real economy	0.01			0.02			-0.95		
	(0.08)			(0.22)			(-0.28)		
Lagged real economy	-0.02			0.00			1.85		
	(-0.28)			(-0.00)			(0.56)		
Monetary sector	0.06	0.06		0.03	0.03		0.57	0.36	
	(0.72)	(0.84)		(0.41)	(0.35)		(0.16)	(0.12)	
Lagged monetary sector	-0.10	-0.11		-0.09	-0.09		-1.19	-1.62	
	(-1.20)	(-1.40)		(-1.08)	(-1.14)		(-0.29)	(-0.50)	

Notes: t-statistics are in parentheses. The Chow test is checking whether the coefficients in the bottom part of the table are jointly significant. The cut-off points for the order probit regression in Column (9) are -3.03 (between -0.5/-0.25), -2.62 (between -0.25/0), 5.25 (between 0/0.25), and 6.63 (between 0.25/0.5).

Figure 1: Relative number of words per topic

Price stability   Real economy   Monetary sector   Other topics
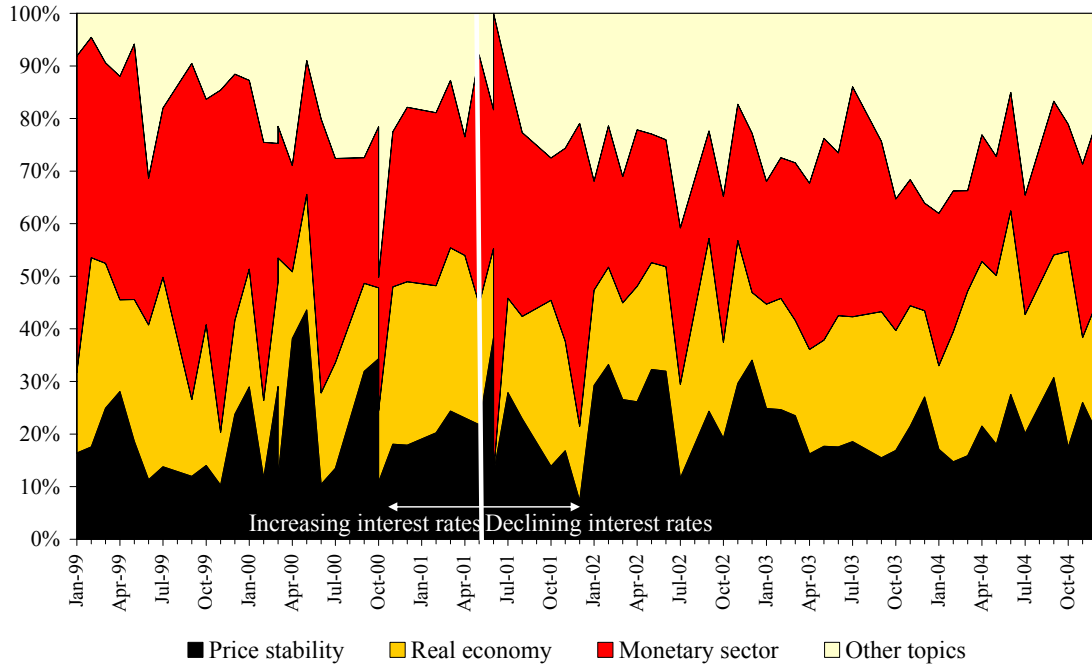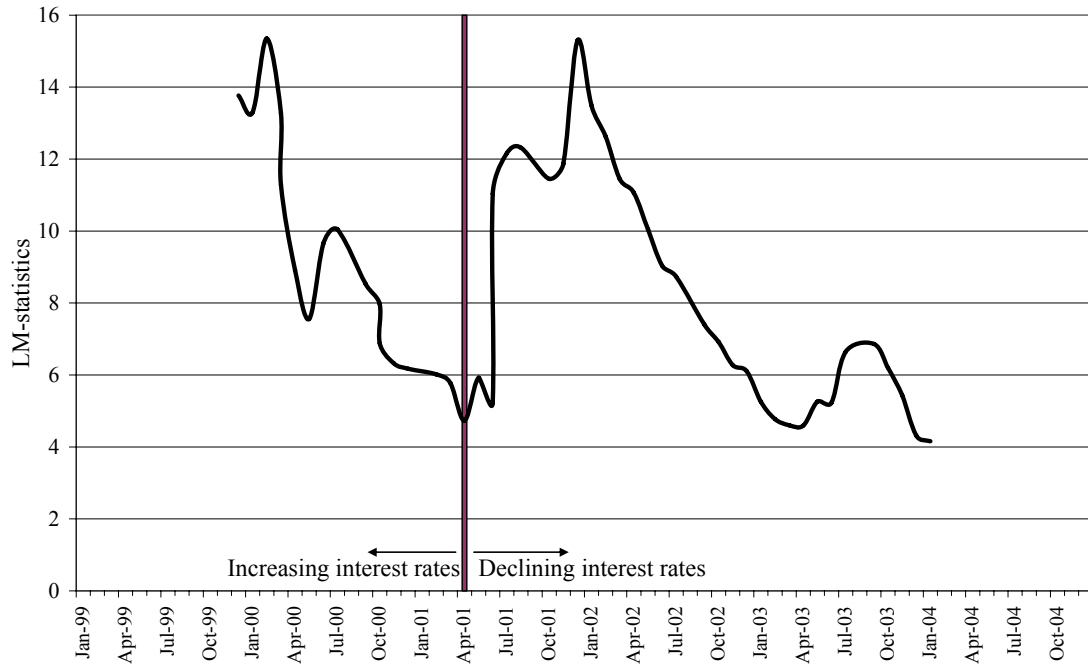
Figure 2: Threshold break test result for the monetary sector using words count data

Note: Approximately every test statistic above 6 rejects the null hypothesis of no break at that particular date.

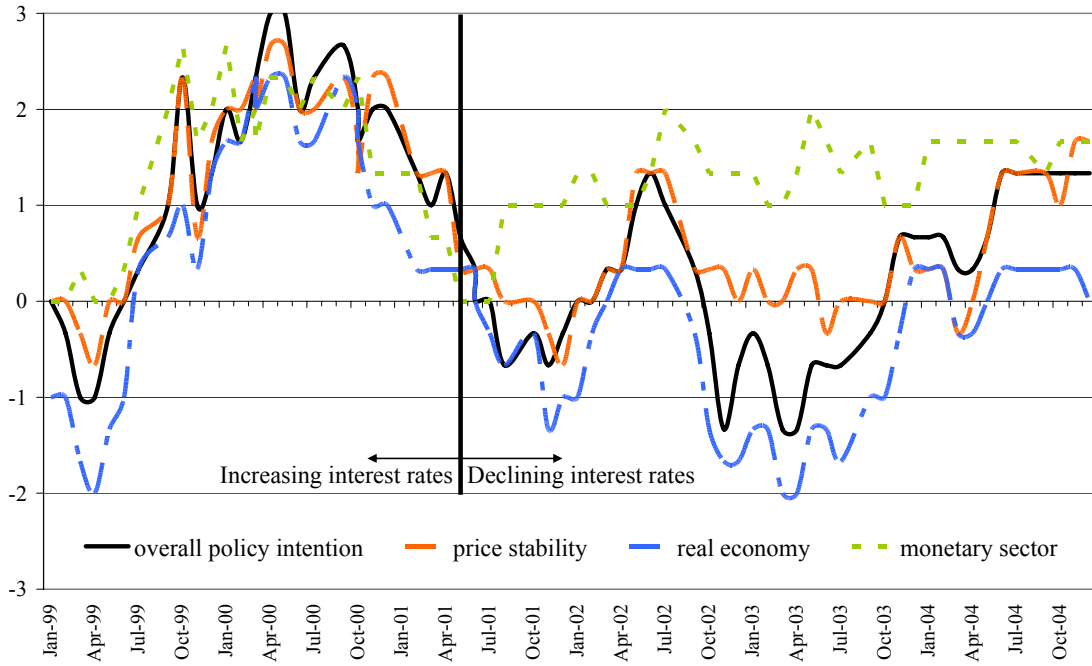**Figure 3: Indexes on monetary policy stance/inclination/leaning**

Increasing interest rates | Declining interest rates

— overall policy intention — price stability — real economy - - monetary sector

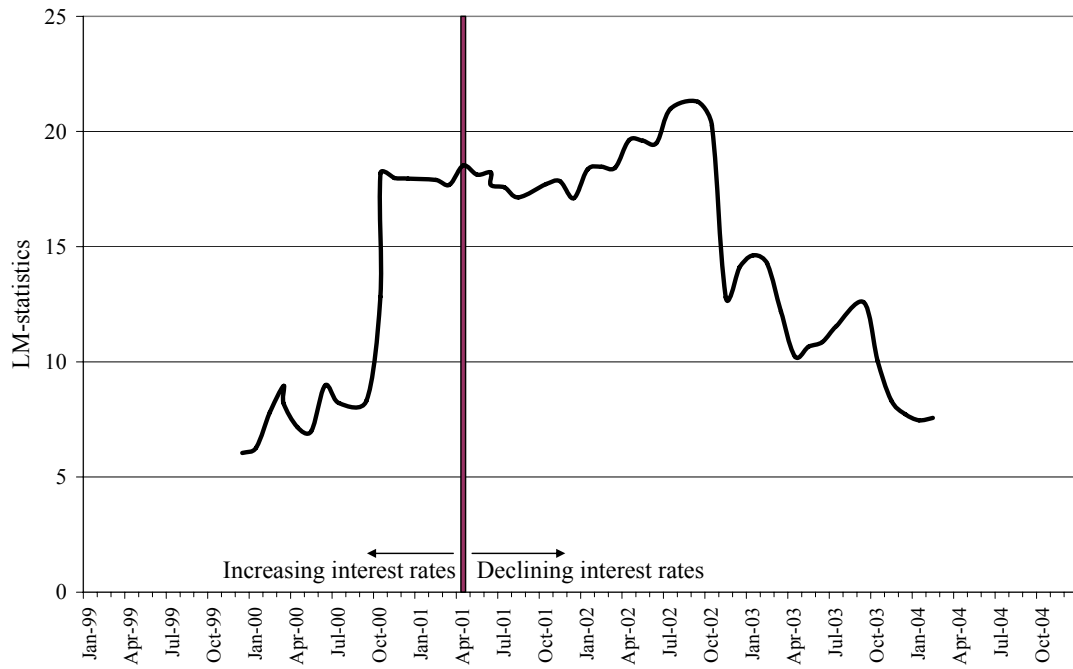**Figure 4: Threshold break test results explaining overall policy intention**

Figure 5: Threshold break test results explaining interest rate decisions