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# Perception is Always Right: The CNB's Monetary Policy in the Media

Jiří Böhmer, Petr Král and Branislav Saxa\*

## Abstract

In this paper we analyze the favorableness and extent of the media coverage of the CNB's monetary policy decisions in the period of 2002–2007. We identify the factors explaining the variance in these two dimensions using an extensive set of articles published in the four most relevant Czech daily broadsheets immediately after monetary policy meetings. We take account of parameters of the CNB's actual monetary policy decisions and related communication as well as variables characterizing the general economic environment that prevailed at the times of the individual meetings. The most appealing results are that those CNB's decisions that surprise financial markets are – if needed – not negatively perceived by the media and that the media welcomes interest rate changes. Therefore, from the media coverage point of view, there is no need for too much smoothing. Simultaneously, our analyses shed some light on how the media tends to report on (economic) events in general.

**JEL Codes:** E52, E58.

**Keywords:** Communication, media, monetary policy, newspapers.

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## **Nontechnical Summary**

Transparency and communication are particularly important for those central banks that conduct their monetary policies within the inflation targeting framework. Since 1998, the Czech National Bank (CNB) has become one of the most progressive institutions concerning the openness of monetary policy among inflation-targeting central banks. All steps taken to increase the CNB transparency have been primarily oriented toward the financial markets and analysts, who are naturally the main target group of the CNB's communication on monetary policy decisions. A credible, accountable and transparent central bank should, however, also take account of the general public's perception of its monetary policy decisions and the CNB does so.

Unlike the sophisticated audience (markets, analysts), which is directly influenced by announcements made by the central bank (available, for example, on its web site), the general public is indirectly reached by the bank primarily through the media. In this paper, we find it appropriate and useful to take a look back at the media's perception of the CNB's monetary policy decisions in the period of 2002–2007.

In our paper, we find that some parameters of the CNB's actual decisions and their communication, as well as several variables characterizing the contemporary economic environment, are significant (while some are not) in explaining the variability of the media's coverage.

Our major results are the following. First, the media is in general qualitatively indifferent to the fact that the CNB surprises the market from time to time with its interest rate decisions. Simultaneously, such surprising decisions, i.e. those which are not priced in market interest rates yet before the meeting, attract the attention of the media, which manifests itself in more/longer articles. Second, the media welcomes when the CNB moves interest rates and pays special attention to such decisions. Third, the media does not like rising inflation but welcomes accelerating GDP growth, and vice versa. Fourth, the new quarterly macroeconomic forecast attracts the attention of the media. Finally, movements of the exchange rate are a good reason to write about the CNB's monetary policy meetings with appreciation of the koruna exchange rate being negatively perceived in the media.

To sum up, the factors that turned out to be significant for the coverage of the CNB's decisions suggest that the media seems to understand in principle (not in all aspects however) what the CNB usually does in the field of monetary policy, and why it does it, and pays proper attention to its decisions where appropriate.

## 1. Introduction

Transparency and communication are particularly important for those central banks that conduct their monetary policies within the inflation targeting framework. The Czech National Bank (CNB) has been applying this regime since 1998 and since then it has become one of the most progressive institutions concerning the openness of monetary policy among its peers. The CNB's efforts to become more and more transparent in terms of monetary policy decisions and their background have intensified recently, with some changes having been introduced to the existing set of communication tools. Filáček et al. (2007) present the reasons underlying the CNB's decision to start publishing interest rate forecasts in 2008. Moreover, the CNB has been publishing the votes cast by individual board members on interest rate decisions by name starting in 2008. And very recently, the CNB has decided to disclose the exchange rate trajectory consistent with its quarterly macroeconomic forecast as well.<sup>1</sup>

All these steps taken have been primarily oriented toward the financial markets and analysts, who are naturally the main target group of the CNB's communication on monetary policy decisions. As a matter of fact, inflation-targeting central banks are in general particularly highly dependent on the market perception of their policy decisions and communication.<sup>2</sup> A credible, accountable and transparent central bank should, however, also take account of the general public's perception of its monetary policy decisions. This can be backed not only by the aim of a typical inflation-targeting central bank to affect the formation of people's inflation expectations, wage-bargaining and other price-setting processes. Another reason is that many central banks deal with challenges stemming from the fact that over time they have become almost fully independent of governments (even being sometimes accused of getting out of democratic control) and some form of accountability to the public is perceived as necessary.

Unlike the sophisticated audience (markets, analysts), which is directly influenced by announcements made by the central bank (available, for example, on its web site), the general public is indirectly reached by the bank primarily through the media. The media's perception of monetary policy decisions and communication is thus important for the extent and quality of the central bank's influence on the general public and people's view of the credibility of the bank's monetary policy. Inversely, from the general public's point of view, monetary policy reflection in the media is undoubtedly crucial for assessing the role the central bank plays in the country's macroeconomic and monetary developments.

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<sup>1</sup> See the press release at:

[http://www.cnb.cz/en/public/media\\_service/press\\_releases\\_cnb/2008/081106\\_nom\\_exchange\\_rate.html](http://www.cnb.cz/en/public/media_service/press_releases_cnb/2008/081106_nom_exchange_rate.html)

or the box in Inflation Report I/2009, pp. 6–7, available at:

[http://www.cnb.cz/en/monetary\\_policy/inflation\\_reports/2009/2009\\_I/index.html](http://www.cnb.cz/en/monetary_policy/inflation_reports/2009/2009_I/index.html)

<sup>2</sup> This is the case because longer-term interest rates, determined, inter alia, by market expectations of future monetary policy, play a key role in the actual decision-making of economic agents. And, accordingly, these longer-term rates (rather than the short-term ones under the direct control of a central bank) co-determine the ultimate macroeconomic outcomes the central bank aims to influence.

In this respect, it looks obvious to us that the media's perception of a central bank monetary policy decision is always right, as it is so "by definition," just like anyone else's authentic perception or impression of whatever event, whoever's action, etc. In other words, no one can blame anyone else but him- or herself that someone else's perception of his or her action is bad, false, inadequate and wrong or biased. And as a result, he or she should then reconsider his or her own way of doing and/or communicating things to get a better perception or response, rather than looking for weak spots of the counterpart.

Taking the aforementioned into account, we find it appropriate and useful to take a look back at the media's perception of the CNB's monetary policy decisions in the period of 2002–2007. In doing so, we closely follow the methodological approach suggested by Berger, Ehrmann and Fratzscher (2006), which can be considered pioneering work in this research area (see part 3 of our paper, containing a literature review). In other words, our study is a national application of their novel multi-country oriented research and both their approach and their results serve as an obvious benchmark for us.

The above-mentioned time period seems very convenient for the purposes of our research, its results and their interpretation for two reasons. First, this time span preceded big changes recently made in the CNB's communication, and these changes – despite being oriented toward a rather sophisticated audience – could have somehow modified the pattern of the CNB's reflection in the media. And second, that period of time was characterized by quite smooth economic developments in which the perception of the CNB's decisions might have primarily been affected by ordinary domestic monetary and economic phenomena and the CNB's own track record in terms of its decisions and their justifications. From this point of view, it will be interesting to see how the results of potential future research on the same topic will be influenced the global financial and economic crisis and related negative tone currently prevailing in the media's reporting of economic events.

In our analysis, we find that some parameters of the CNB's actual decisions and their communication, as well as several variables characterizing the contemporary economic environment, are significant (while some are not) in explaining the variability of the media's coverage. On top of that, we attach our interpretation of the results obtained. Simultaneously, our results shed some light on how the media tends to report on (economic) events in general.

To unwrap our major results in brief, we can list the following. First, the media does not perceive negatively the fact that the CNB from time to time surprises financial markets with its interest rate decisions. And in turn, such decisions attract the attention of the media, which leads to more/longer articles. Second, the media welcomes interest rates changes regardless of their direction and pays special attention to such decisions. Third, the media does not like surging inflation while on the other hand it welcomes GDP growth gaining momentum, and vice versa. Fourth, the intensity of inter-meeting communication of the CNB's board members, proxied by the number of their statements, proved to have a significant bearing on both the favorableness and the extent of the media's coverage only if special circumstances, such as a surprising decision being made or increased uncertainty prevailing, are in place. Fifth, a release of the CNB's new



quarterly macroeconomic forecast increases the media's coverage of the bank board meetings. Finally, exchange rate movements are a good reason for the media to report on the CNB's monetary policy meetings. As a matter of fact, inter-meeting appreciation of the koruna exchange rate seems to be negatively perceived in the media with no regard to the level of the exchange rate vis-à-vis its trend with the inverse being true for appreciation of the domestic currency. All in all, the media seems to understand in principle what the CNB usually does in the field of monetary policy, and why it does it, and pays proper attention to its decisions where appropriate.

The remainder of the paper is organized as follows. The second section provides an overview of literature relevant to the topic of our research. The third section describes the data used and defines the variables we employ to characterize the media's coverage of the CNB Board's decisions on interest rate settings. The fourth section displays the results of our estimations and interprets them. The fifth section discusses robustness issues concerning the results we obtained, while the last section summarizes and concludes.

## **2. Literature Review**

The growing importance of communication in monetary policy has initiated a substantial amount of research in this area over the last decade. In their survey, Blinder et al. (2008) suggest dividing the available literature into two main strands. The first strand analyzes the impact of communication on the financial markets, while the second one links the differences in monetary policy communication strategies across countries to differences in inflation performance in these countries. The following paragraphs summarize the available literature linking communication and its effect on the financial markets as well as the relatively scarce literature on the effects of communication on the general public.

Research on the impact of central bank communication on the financial markets has received relatively strong attention over the last decade. Typically, empirical studies examine how central bank statements move the financial markets. Guthrie and Wright (2000) show how the monetary conditions index moves in the expected direction after a surprising announcement in the case of New Zealand. Kohn and Sack (2003) quantify the effects of Federal Reserve statements on the volatility of interest rates. Reeves and Sawicki (2007) find that while the Bank of England Minutes and Inflation Reports affect the financial markets significantly, the effect of testimonies to parliament and speeches is limited or insignificant. Ehrmann and Fratzscher (2007) investigate how the different communication strategies of the Federal Reserve, the Bank of England and the European Central Bank enable markets to anticipate monetary policy decisions. Their empirical findings support their hypothesis that the predictability of policy decisions is higher and the reaction of the financial markets is stronger in the cases of the Federal Reserve and the European Central Bank, which practice a more collegial approach to decision-making and communication. Another notable contribution is the work of Fracasso et al. (2003), who assess the quality of inflation reports of different central banks and search for a link

between the assessed quality of inflation reports and a measure of monetary policy surprise across countries.

More relevantly to our research, the impact of central bank communication on the general public through the media is investigated in a couple of papers. Amtenbrink and De Hahn (2002) assess the transparency of the ECB and, as part of their research, analyze the monetary policy decision coverage in the *Financial Times* and *Frankfurter Allgemeine Zeitung* (the results are also discussed in De Hahn et al., 2004). They find that while the UK-based *Financial Times* tends to be more focused on the inflation targeting pillar of ECB decision-making, the Germany-based *Frankfurter Allgemeine Zeitung* follows monetary and credit growth more. Berger, Ehrmann and Fratzscher (2006) use data on the favorableness and extent of the press coverage of ECB monetary policy decisions in national and international newspapers. Coverage is found to be less favorable if a decision is surprising or if the recent inflation figure is high. On the other hand, positive effects on the favorableness of coverage are identified in the case of the quarterly staff projection release and in the case of a good explanation of a surprising decision at the press conference. Given the novelty of this approach, the authors argue that comparable research on the communication of other central banks might shed light on the efficiency of different communication channels. Also, Blinder et al. (2008) in their survey call for research oriented on communication with the general public. Our study is one of the contributions to this strand of literature.

Finally, four studies focus particularly on the communication of the CNB. Navrátil and Kotlán (2005) assess the predictability of the CNB's decisions through market pricing. Bulíř et al. (2007) analyze the CNB's major communication tools to assess the clarity of its communication as whole. By comparing the messages sent by inflation forecasts, the verbal assessment of inflation risks in inflation reports and the voting within the CNB Board, the authors found that the CNB's communication is highly clear. Together with their finding that it is also open and timely, the authors conclude that the CNB's monetary policy is transparent. Bulíř et al. (2009) using their novel methodology assess whether the communication of selected central banks around the world (including the CNB) corresponds to the true state of the world. Specifically, the authors compare the inflation factors authentically reported in the inflation (or similar) reports published by the banks under scrutiny with those factors identified ex post by the authors using their new-Keynesian calibrated country-specific models. The study finds that central banks with more sophisticated forecasting frameworks (among which the CNB ranks) generally reported the same factors as those identified by the authors. In the fourth study focused on the communication of the CNB, Fišer and Horváth (2009) investigate the effect of central bank communication on the volatility of the exchange rate. Using daily data on the exchange rate, the authors use GARCH analysis to find how communication through two particular channels – the comments of board members and the minutes of monetary policy meetings – influence exchange rate volatility. Their results suggest that CNB communication lowers the volatility of the exchange rate.

### **3. Data Description and Stylized Facts**

#### **3.1 Data on Press Coverage**

Similarly to Berger, Ehrmann and Fratzscher (2006), the analysis presented in this paper is based on a dataset that measures the favorableness and quantity of the press coverage of central bank monetary policy decisions received after press conferences. In this case, we focus on the CNB, which holds its monetary policy meetings typically on Thursdays. The decisions of the board are usually announced shortly after the decision has been taken and explained during press conferences later in the afternoon. The analysis in this paper is based on articles published in selected dailies within the following two days (the following Fridays and Saturdays).

The time period examined runs from January 2002 to September 2007 inclusive. Focusing on the reactions of the public to CNB monetary policy decisions during a relatively long period inevitably calls for some simplification aimed at avoiding excessive costs. Therefore, we took advantage of the Newton I.T. service, which facilitates the collection of the relevant press articles using pre-defined key words.

Since the analysis covers the monetary policy decisions of the CNB, the selected broadsheets are only those published in the Czech Republic, namely *Mladá fronta Dnes*, *Právo*, *Hospodářské noviny* and *Lidové noviny*. The selection of the data sources, however, is a kind of trade-off between their relevance to the examined topic and the volume of readers they address. The result is a marked preference for the relevance factor, because the aggregate share of the selected dailies in the total volume of newspaper copies sold daily is less than 40 per cent. Nevertheless, we are convinced that this approach does not result in the loss of any important information. Firstly, the group of readers targeted by the tabloids is in general not interested in economic topics. Secondly, the tabloids mostly do not assess the CNB's monetary policy decisions; at most they only carry information about them. Thirdly, as we are interested in the instant media's reaction to the CNB's latest decisions we focus on dailies only, as weekly and monthly newspapers and magazines usually provide their readers with monetary policy commentaries and assessments taking account of the CNB's longer-term track record.<sup>3</sup>

Unlike Berger, Ehrmann and Fratzscher (2006), we do not use the assessments of specialized in-house media experts in the CNB, in order to avoid any staff-related bias. As a result we were forced to turn to external assessors – three university students from different departments who did not know each other. Nevertheless, this approach has one substantial advantage – neither the authors nor anyone else affiliated with the CNB could influence the assessment procedure. The alternative solution would have been an automated assessment process, for example by using a set of pre-defined meaning-rated key words. The reason for preferring human assessment – as we were looking for the reader's impression or perception – is that language is manifold and so there is a risk of

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<sup>3</sup> Simultaneously and accordingly, we would not have had a sufficiently long sample of articles published in weekly and monthly magazines dedicated solely to the previous CNB monetary policy meeting (twelve meetings a year) to do our analyses.

omitting some assessments and in turn of losing part of the information. Besides, the mere balancing of a number of positive and negative opinions without the application of (“subjective”) judgment seems to be rather misleading. It may easily happen that a larger number of insignificant arguments outweigh a smaller number of high-calibrated counter-arguments and thereby change the true tone of the article in question.

Much like in the aforementioned paper, the coverage of each newspaper is measured in a subjective qualitative and an exact quantitative way. The qualitative assessment (favorableness) is based on the external assessors’ opinions. It shows how well the media understands and judges monetary policy decisions. It thus indicates the perceived quality of the monetary policy decision itself, the communication of that decision and more generally its track-record and the related economic environment. This is very important because maintaining a transparent and appreciated monetary policy is a crucial precondition for enhancing its credibility and subsequently its effectiveness, particularly within the inflation targeting regime.

The favorableness with which the CNB’s monetary policy decisions are discussed is measured, as in the case of Berger, Ehrmann and Fratzscher (2006), on a scale ranging from very negative (-2), via negative (-1), neutral (0) and favorable (1), to very favorable (2). The key principle is that the favorableness assessment is linked solely to press reactions to a given particular monetary policy decision and to the explanation of that decision at the press conference, whereas any opinions on CNB monetary policy in general and/or on the CNB as an institution itself are ignored. Although the articles often contain contradictory arguments of the journalist and/or quoted analysts, the favorableness (perception or impression) of the whole article is assessed. Surprising monetary policy decisions are a clear example of assessment ambiguity. On the one hand, such surprises are often considered to be negative. On the other hand, some analysts admit that such surprises belong in the central bank’s monetary policy arsenal, thereby turning the tone of their assessment somewhat in the opposite direction.

The quantitative assessment shows how much attention the media paid to the monetary policy decision in question. The basic measure used is simply the length of the article, as expressed by the number of words. All the measures of favorableness and quantity of coverage are defined in detail in the next two sub-sections.

Table A1 in the appendix provides an overview of the descriptive statistics of the monetary policy meeting coverage in the four newspapers. *Hospodářské noviny* covered 66 out of 70 monetary policy meetings, i.e. substantially more than any of the other newspapers (32–35 each). While the average favorableness is comparable across newspapers, the average absolute value of favorableness and the average length of the articles suggest slight differences in coverage across newspapers. Looking at the average absolute favorableness, *Lidové noviny* seems to be most extreme in its perception, being often either markedly positive or markedly negative, while *Mladá fronta Dnes* is on average closest to a neutral assessment of monetary policy decisions. The economic daily *Hospodářské noviny* covers monetary policy meetings most extensively, in terms of both the number of articles and the average length of coverage per meeting.

### 3.2 Favorableness of Coverage

Our database covers 263 articles published in 4 newspapers over the period of January 2002 to September 2007. Since favorableness, one of our explained variables, is constructed using the assessment of three independent evaluators, we first check for consistency and reliability of these evaluations. The means and standard deviations of the evaluations provided by the three evaluators are shown in Table A2 in the appendix.<sup>4</sup> Table A3 in the appendix illustrates the differences in the evaluations provided by the three evaluators. The vast majority of the articles have either the same evaluation or evaluations differing by one notch. Two evaluators assigned evaluations differing by three notches to the same article in the case of one article.<sup>5</sup> Overall, the evaluations provide a reasonably consistent assessment and our favorableness indicator for each article is thus constructed as the average of the evaluations supplied by the three evaluators.

In the next step, we compare how positively or negatively the individual meetings were covered by the four different newspapers. For this purpose, the favorableness indicator for each meeting and each newspaper is constructed as the average of the favorableness for all articles published in that newspaper after that meeting.

For the purposes of the main econometric analysis of monetary policy coverage in the print media, three favorableness indicators are constructed at the level of meetings. While we use only one indicator throughout most of the paper, two alternative indicators are used to check the robustness of the results. We follow Berger, Ehrmann and Fratzscher (2006) and our preferred indicator is based on the simple average of the favorableness indicators for all articles published after a monetary policy meeting in the four newspapers:

$$favorableness_m^1 = \frac{1}{n} \cdot \sum_{i=1}^{n_m} \left( \frac{1}{k_{m,i}} \sum_{j=1}^{k_{m,i}} favorableness\ of\ article_{m,i,j} \right) \quad (1)$$

where  $n_m$  is the number of newspapers covering meeting  $m$ ,  $favorableness\ of\ article_{m,i,j}$  is the favorableness of the  $j$ -th article published in newspaper  $i$  following meeting  $m$ , and  $k_{m,i}$  denotes the number of articles published in newspaper  $i$  after meeting  $m$ . Not to put higher weight on a newspaper with many short articles compared to a newspaper with a smaller number of longer articles, favorableness is averaged across articles in each newspaper first.

While our preferred indicator treats all articles in all four newspapers as equally important, our second and third indicators assign higher importance to articles with a

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<sup>4</sup> The pairwise correlations of the evaluations given by the three evaluators are 0.43, 0.46 and 0.68.

<sup>5</sup> An article published in MF Dnes on January 31, 2003. It covers a very surprising decision of the central bank to cut the key interest rate, coinciding with the Czech Statistical Office admitting a substantial mistake in the foreign trade data. At the same time, the author of the article emphasizes the expected positive effect of the interest rate cut on mortgage interest rates.

higher impact on the general public. The second indicator puts greater emphasis on articles published in newspapers read by more readers. It is defined as a weighted average of the favorableness of articles weighted by the circulation of each newspaper:

$$favorableness_m^2 = \frac{\sum_{i=1}^{n_m} \left( \frac{1}{k_{m,i}} \sum_{j=1}^{k_{m,i}} favorableness\ of\ article_{m,i,j} \right) \cdot circulation_{m,i}}{\sum_{i=1}^{n_m} circulation_{m,i}} \quad (2)$$

where  $circulation_{m,i}$  is the circulation of newspaper  $i$  at the time of monetary policy meeting  $m$ , recorded on a monthly basis.

Finally the third measure adds information about the position of the article in the newspaper. An article on the title page is expected to have a greater impact than articles positioned elsewhere. In addition, some newspapers publish articles covering monetary policy meetings on the title page quite often, while others do so only from time to time. In our third measure, the assumption is that a title page article published in the latter group of newspapers has a greater impact on readers than a title page article from the former group, given that the circulation of the two newspapers is the same.

$$favorableness_m^3 = \frac{\sum_{i=1}^{n_m} \left( \frac{1}{k_{m,i}} \sum_{j=1}^{k_{m,i}} favorableness\ of\ article_{m,i,j} \cdot title\ page\ coef_{m,i,j} \right) \cdot circulation_{m,i}}{\sum_{i=1}^{n_m} circulation_{m,i}} \quad (3)$$

$$title\ page\ coef_{m,i,j} = \begin{cases} \frac{a_i^{all}}{a_i^{title\ page}} & \text{if the article appears on the title page} \\ 1 & \text{otherwise} \end{cases} \quad (4)$$

where  $a_i^{all}$  is the total number of articles covering monetary policy meetings published in newspaper  $i$  over the sample period and  $a_i^{title\ page}$  is the number of title page articles covering monetary policy meetings published in newspaper  $i$  over the sample period.

The favorableness described above does not exhibit any trend over time, although lower-than-average favorableness can be observed at the beginning of the sample (see Figure A1 in the appendix).

We extend the methodology of Berger, Ehrmann and Fratzscher (2006) and, unlike them, we also examine the determinants of the heterogeneity of favorableness of coverage. In order to judge how heterogeneous the favorableness of coverage of the four newspapers is after every meeting, a measure of dispersion – defined as the sample standard deviation of the favorableness of all articles published after each meeting – is constructed.

$$\begin{aligned} \text{dispersion of favorableness}_m &= \\ &= \sqrt{\frac{1}{\left(\sum_{i=1}^{n_m} k_{m,i}\right) - 1} \sum_{i=1}^{n_m} \sum_{j=1}^{k_{m,i}} \left( \text{favorableness of article}_{m,i,j} - \overline{\text{favorableness of article}_{m,i,j}} \right)^2} } \quad (5) \end{aligned}$$

where

$$\overline{\text{favorableness of article}_{m,i,j}} = \frac{1}{\sum_{i=1}^{n_m} k_{m,i}} \left( \sum_{i=1}^{n_m} \sum_{j=1}^{k_{m,i}} \text{favorableness of article}_{m,i,j} \right) \quad (6)$$

In order to exploit as much of the variance in favorableness across articles as possible, favorableness is not averaged across articles for each newspaper as in the case of the *favorableness*<sup>1</sup> construction. Instead, the dispersion is the simple sample standard deviation of the favorableness of all articles. In cases where only one article covers a monetary policy meeting, the dispersion is deliberately set to be not defined. The reason for not using cases with only one article is that a dispersion equal to zero would indicate two possible situations – either no heterogeneity in favorableness or a lack of media interest.

A very simple way of looking at the heterogeneity of coverage is to examine the pairwise correlations of *favorableness*<sup>1</sup> between pairs of newspapers. While the favorableness of the major economic daily, *Hospodářské noviny*, is fairly well correlated with the stance of *Mladá fronta Dnes* and *Lidové noviny* (0.61 and 0.43, respectively), the remaining pairwise correlations are lower, as shown in Table A4 in the appendix. One possible explanation for the differences in the favorableness of coverage of monetary policy meetings across newspapers is that monetary policy actions are poorly explained and public opinion is thus fragmented and confused. We focus on this issue by examining the determinants of the dispersion of favorableness in Section 4.3.

### 3.3 Extent of Coverage

Besides favorableness, we also focus on the extent of coverage of monetary policy meetings. To construct indicators of the extent of coverage for each meeting, three variables are recorded for each article. First, the *length* of each article is defined as the number of words in the article. Second, a dummy indicating whether the article appears on the title page is recorded. Third, the monthly circulation data for each daily are used to reflect the impact of particular newspapers.

Four distinct measures of the extent of coverage are constructed. As in the case of the favorableness indicators, only one is used throughout most of the analysis. The three remaining indicators are employed for robustness checks. The first indicator – the sum of the lengths of all articles – is a simple sum of the lengths of all articles covering the

monetary policy meeting in the four dailies after each meeting.<sup>6</sup> The evolution of  $extent_m^1$  (length) is shown in Figure A2 in the appendix.

$$extent_m^1 = \sum_{i=1}^{n_m} \left( \sum_{j=1}^{k_{m,i}} \text{length of article}_{m,i,j} \right) \quad (7)$$

The second measure assigns greater importance to newspapers with higher circulation. It is a weighted sum of the lengths of coverage, as defined below:

$$extent_m^2 = \frac{\sum_{i=1}^{n_m} \left( \sum_{j=1}^{k_{m,i}} \text{length of article}_{m,i,j} \right) \cdot \text{circulation}_{m,i}}{\sum_{i=1}^{n_m} \text{circulation}_{m,i}} \quad (8)$$

where  $n$  is the number of newspapers covering meeting  $m$  and  $\text{length of coverage in newspaper}_{i,m}$  is the sum of the lengths of all articles published in newspaper  $i$  following meeting  $m$ . The third measure adds the information about the positioning of articles.

$$extent_m^3 = \frac{\sum_{i=1}^{n_m} \left( \sum_{j=1}^{k_{m,i}} \text{length of article}_{m,i,j} \cdot \text{title page coef}_i \right) \cdot \text{circulation}_{m,i}}{\sum_{i=1}^{n_m} \text{circulation}_{m,i}} \quad (9)$$

Finally, we construct a simple measure of the number of title page articles covering the monetary policy meeting. This variable, denoted as  $extent_m^4$ , takes values in the range 0 to 4, where 0 means no coverage on the title page of any of the four newspapers. The evolution of  $extent_m^4$  is plotted in Figure A3 in the appendix.

<sup>6</sup> In the pioneering paper of Berger, Ehrmann and Fratzscher (2006), a five-step ranking is used to assess the extent of coverage.



**Table 1: Baseline Definitions of Dependant Variables**

<b>Concept</b>	<b>Variable</b>	<b>Definition</b>
Favorableness	Favorableness	Favorableness of monetary policy meeting press coverage. Aggregated across three evaluators, four newspapers and adhoc number of articles in each newspapers.
Extent	Extent	Extent of monetary policy meeting press coverage. Defined as a sum of lengths of all articles covering the monetary policy meeting in four newspapers after each meeting.
	Extent <sup>4</sup> (the number of title page articles)	The number of title page articles covering monetary policy meeting in four newspaper.
Dispersion	Dispersion	Sample standard deviation of favorableness of all articles published after each meeting. Not defined if less than two articles were published.

### **3.4 Relationship between Favorableness, its Dispersion and the Length of Coverage**

Before searching for a broader set of determinants of favorableness, its dispersion and the length of coverage, we inspect the relationship between these three variables. Our motivation stems from the expectation that the amount of coverage can be influenced by favorableness and by controversy proxied by the dispersion of favorableness. Also, it is possible that controversy is associated more often with more negative, more positive or simply more extreme coverage. Graphically, the pairwise relationships between the three variables are depicted in Figure A5 in the appendix.

Tables 2 and 3 illustrate the possible general pattern of how newspapers tend to report on events. Table 2 shows how the length of coverage is related to the level and dispersion of favorableness. The results from our core dataset do not provide any evidence of more extensive coverage being associated with more extreme, positive or negative, favorableness (Models 1–3 in Table 2). However, in less aggregated settings, when we aggregate favorableness and extent across articles in each newspaper but not across newspapers, the results differ. In such settings, absolute favorableness is positively and significantly correlated with the extent of coverage (Table 3). The relationship thus exhibits a U-curve, i.e. very positive and very negative articles tend to be longer than neutral ones. A similar relationship is observed in Berger, Ehrmann and Fratzscher (2006). When looking at the relationship between the length and the dispersion of favorableness, Models 4–7 in Table 2 indicate that more dispersed favorableness across articles is associated with more extensive coverage.

**Table 2: Relationship between the Length of Coverage, Favorableness and its Dispersion (length is the dependent variable)**

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Favorableness	-372.5 (463.0)				-214.7 (417.7)		
Favorableness (abs)		878.4 (644.5)	745.9 (651.0)			-741.0 (696.9)	-736.8 (705.1)
Negative favorableness dummy			390.1 (317.5)				-24.7 (285.6)
Dispersion of favorableness				2689.7 *** (493.4)	2697.5 *** (497.0)	3021.3 *** (583.2)	3029.5 *** (596.3)
Constant	1167.1 *** (140.2)	938.2 *** (195.2)	877.2 *** (200.7)	444.7 ** (205.7)	457.0 ** (208.5)	496.5 ** (211.2)	499.4 ** (215.9)
Adjusted R-squared	-0.01	0.01	0.02	0.34	0.33	0.34	0.33
Number of observations	69	69	69	56	56	56	56

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table 3: Relationship between the Length of Coverage and Favorableness, Data Aggregated across Articles in Each Newspapers but not across Newspapers (length is the dependent variable)**

	Model 1	Model 2	Model 3
Favorableness	18.0 (64.9)		
Favorableness (abs)		234.6 *** (79.5)	251.5 *** (86.7)
Negative favorableness dummy			-37.2 (75.2)
Constant	468.0 *** (28.7)	393.1 *** (37.8)	395.1 *** (38.1)
Adjusted R-squared	-0.01	0.04	0.04
Number of observation:	168	168	168

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

### 3.5 Possible Determinants

By determinants we mean variables whose level, change or distance from another variable or constant may be important for how the media perceives the “appropriateness” of the CNB’s monetary policy decisions (favorableness of coverage), how it assesses “importance” to inform its readers about bank board meetings (extent of coverage) and how it differs in the tone of articles devoted to interest rate decisions (dispersion of favorableness).

Two groups of possible determinants of favorableness, its dispersion and the extent of coverage are considered. The first group involves determinants that can be influenced to large extent by the central bank directly prior to the meeting or during the meeting day. These include the decision about interest rates, surprise proxied by the market reaction, and the intensity of inter-meeting communication (and possibly also the publication of press conference slides, the “interest rate sentence”, the ratio of the votes cast at the monetary policy meeting, the concord between the decision and the interest rate sentence, etc.).

The determinants in the second group describe the state of the economic environment at the time of the monetary policy meeting. Here, the variables are linked, for example, to CPI inflation, GDP growth and the exchange rate of the Czech currency vis-à-vis euro.

The variables used in the baseline models explaining the variation in favorableness, its dispersion and the extent of coverage are defined in Table 4. Alternative definitions that were also considered are mentioned either later in the text where we comment on particular regressions or in the part devoted to additional regressions.

**Table 4: Definitions of Determinants**

<b>Concept</b>	<b>Variable</b>	<b>Definition</b>
Surprise	Surprise - Market Interest Rate Reaction (abs)	A day-on-day change of one month market interest rates recorded after each monetary policy meeting.
Interest Rate	Monetary Policy Interest Rate Change (abs)	A change of the key policy interest rate.
	Interest Rate Level	A level of the key policy interest rate before the monetary policy meeting.
Inflation	Recent CPI Inflation Change	Month-on-month difference of headline year-on-year CPI inflation.
GDP	Recent GDP Growth Change	Indicator equal to the quarter-on-quarter change of year-on-year GDP growth for the first meeting after the release of quarterly GDP figures. Equal to zero for the second and third meeting after each release.
Communication	Communication Intensity	A number of monetary policy related statements provided by the members of the board in the inter-meeting period.
	Communication Intensity - Governor	A number of monetary policy related statements provided by the governor in the inter-meeting period.
	Communication Intensity - Other Board Members	A number of monetary policy related statements provided by the members of the board in the inter-meeting period.
CNB Forecast	Forecast Released	A dummy variable equal to one if a new CNB forecast is released at the press conference following the monetary policy meeting.
Exchange Rate	EURCZK Inter-meeting Change	Percentage meeting-to-meeting change of EURCZK exchange rate. Positive values are associated with the depreciation of the Czech currency, negative values are associated with the appreciation.
	EURCZK Inter-meeting change (abs)	Absolute value of a percentage meeting-to-meeting change of an EURCZK exchange rate.

## 4. Estimation and Results

Employing the set of potential explanatory variables chosen, we proceed to estimate the econometric models. First, we comment on the estimates of our preferred model specifications with respect to the signs and statistical significance of the individual explanatory variables and their most functional modifications. Then we discuss modified specifications of the variables and models. Simultaneously, we include our interpretations of the results obtained.

#### 4.1 Results: Determinants of Favorableness

To estimate the model with favorableness as the dependent variable, we use ordinary least squares estimation with robust standard errors. While ordered probit would be a natural choice on the disaggregated level (due to the ordinal nature of the favorableness indicator, where the difference between favorableness values 0 and 1 can be different from the difference between values 1 and 2), the situation changes with a high level of aggregation. Once we aggregate favorableness across evaluators, articles and newspapers, we end up with 28 different values of favorableness.

The following paragraphs discuss the results of the estimation of Model 1, summarized in Table 5.

**Table 5: Determinants of Favorableness (Model 1)**

Surprise - Market IR Reaction (abs)	-0.268 (0.417)
Monetary Policy Interest Rate Change (abs)	0.421 * (0.243)
Interest Rate Level	-0.197 *** (0.068)
Recent CPI Inflation Change	-0.146 ** (0.057)
Recent GDP Growth Change	0.25 ** (0.110)
Communication Intensity	-0.018 (0.018)
Forecast Released	-0.158 * (0.079)
EURCZK Inter-meeting change	5.115 * (2.726)
Constant	0.655 *** (0.180)
Adjusted R-squared	0.37
Number of observations	69

*Note:* \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

##### *Surprise Measured as the Reaction of the Market Interest Rate*

Although the sign of the coefficient suggests a negative impact of surprising decisions on the favorableness of coverage, the effect is not statistically significant. This might be to some extent a result of the relatively high correlation between the indicator of surprising decisions and the indicator of the release of the new forecast (see the paragraph on the release of the new forecast for a more extensive explanation). Excluding the indicator of the release of the new forecast from the set of explanatory variables leads to a notably stronger estimated effect of surprising decisions on favorableness but it is still statistically insignificant. Using the alternative proxy for surprise – the difference between analysts’

expectations about the interest rate change and the actual decision – does not yield a statistically significant coefficient on surprise either. Let us say that a “neutral” media’s perception of the fact that the CNB from time to time surprises the market might be interpreted as indicating that the media has got used to the fact that surprise belongs to standard monetary policy making and that the CNB can/must lead the market through the monetary cycle.

#### *Monetary Policy Interest Rate Change*

Absolute change matters. Favorableness increases with any change of monetary policy interest rates. A typical 0.25 pp change in monetary policy rates leads to favorableness rising by 0.11 ( $0.42 \times 0.25$ ). Historically, interest rate hikes lead to an almost identical increase in favorableness as interest rate cuts do. The coefficients on positive and negative interest rate changes are estimated at 0.53 and -0.31, respectively (not reported). Thus, the media tends to welcome CNB activity materializing in interest rate changes intended to rein in inflation or steer it toward the target and to smooth economic developments, regardless of the direction of change. This can be considered a good environment for the CNB to do its job and is probably a result of the transparent inflation targeting regime the CNB applies. The other modifications of the monetary policy interest rate considered as determinants include the interest rate change (not in absolute terms), a dummy equal to one if the interest rate is changed and the interest rate level, as discussed in the next paragraph.

#### *Monetary Policy Interest Rate Level*

At times of high monetary policy interest rate levels, the press tends to perceive monetary policy decisions more negatively. An interest rate level higher by 0.25 pp accounts for favorableness being lower by approximately 0.05 ( $-0.2 \times 0.25$ ). However, as monetary policy interest rates are closely linked to CPI inflation, the result could potentially also be interpreted as a preference for low inflation. An estimation with an alternative choice of determinants presented in Table A5 in the appendix takes account of this. Once *Recent CPI Inflation* (headline figure) is used instead of *Monetary Policy Interest Rate Level* and *Recent CPI Inflation Change*, the results suggest that an increase in CPI inflation of 1 pp lowers favorableness by approximately 0.042, but the coefficient is statistically insignificant. The estimated coefficients on the rest of the determinants are similar to those estimated in Model 1, hence we prefer Model 1 to its alternative specification (Model 1 also has generally better statistical properties and a better relation to the subsequent results).

Another question stems from the fact that the statistical relationship between the interest rate level and favorableness hinges to large extent on the data from the beginning of 2002. At that time, relatively negative media coverage accompanied a period of high interest rate levels. The question is whether the negative media coverage at that time was influenced by the high interest rates or whether the concurrence was just a coincidence. Once the first six meetings in 2002 are dropped, the coefficient on the interest rate level remains negative, but not significant (table not reported here).

*CPI Inflation*

We considered a number of specifications regarding the influence of the CPI inflation data on the favorableness of monetary policy meeting coverage. Besides the levels and changes of headline CPI inflation, we tested the relevance of indicators related to the target and a one percentage point tolerance band around the target (the distance of inflation from the target, inflation below or above target, etc.) as well as the relevance of dummy indicators equal to one when inflation exceeds the sample average or the 12-month moving average. In terms of statistical significance, explanatory power and robustness across the model specifications, the month-on-month change in headline year-on-year CPI inflation is the most suitable determinant of the favorableness of coverage. A month-on-month rise of year-on-year CPI inflation by 0.5 pp (i.e. slightly more than one standard deviation) is estimated to have a negative effect on favorableness with a magnitude of approximately 0.075 ( $-0.15 \times 0.5$ ).

Looking at our results, we can offer at least two possible explanations for the potentially disappointing fact that a deviation of inflation from its target is not important for the media's assessment of monetary policy decisions. The first explanation (the optimistic one) assumes that the media understands the forward-looking element in interest rate setting. Therefore, the actual inflation deviation is considered to be of little relevance both for the CNB itself (in its own considerations) and for the media. The second explanation (the pessimistic one) is that the inflation target is too abstract a concept for the media and so it tends to focus on the recent trend in inflation instead. Bearing in mind that inflation has for most of the time been under the CNB's inflation target, the media may not be familiar enough with the "true" objective of the CNB, i.e. to have inflation at the target (and not below it).

*GDP Growth*

As in the case of CPI inflation, a number of indexes were constructed and tested to answer the question of whether GDP growth influences the favorableness of monetary policy meeting coverage. One complication with GDP releases is that new figures are released on a quarterly basis. GDP indicators with a constant value over the three months after release have a low explanatory power in our regressions. However, we identified a relatively strong power of GDP growth news in the coverage of the first monetary policy meeting after the GDP statistics are released. The indicator used to approximate GDP news is equal to the quarter-on-quarter change in year-on-year GDP growth for the first meeting after the release of the quarterly GDP figures. For the two subsequent meetings, the indicator is equal to zero. Again, as in the case of inflation, a difference between the two recently released figures has a far stronger impact on favorableness than the level of GDP growth itself. A half percentage point quarter-on-quarter rise in headline GDP growth is related to an increase in favorableness of a strong 0.13 ( $0.25 \times 0.5$ ). Thus, the media likes accelerating GDP growth and this in general coincidentally increases the favorableness of its perception of the CNB's decisions (and vice versa).

These results (CPI and GDP figures) simultaneously shed some light on the way journalists and the public might process macroeconomic news. As journalists and commentators get used to a certain level of a macroeconomic indicator quite swiftly, a change in the indicator compared to its previous month's (quarter's) value is likely to have a stronger impact on the perception of the indicator than the level of the indicator itself or a deviation from its target (trend). A level (despite being very high or very low) is often not as attractive for journalists as a change. Only a change can be perceived as an event, and the media generally tends to report on events rather than on states.

#### *Communication Intensity*

Communication intensity proxied by the number of monetary policy-related statements provided by the members of the board is not significant in explaining the favorableness of coverage. This might reflect the fact that more comments do not necessarily provide better information on the stance of the board members. It is easy to imagine a situation of high uncertainty about the next step of the central bank, which triggers demand for statements. The statements provided may be clear individually, but rather ambiguous and contradictory when aggregated across members of the board. So, the statements of individual bank board members are probably welcomed by the media at times preceding monetary meetings but are not significant for the media's perception of the actual outcome of the meeting (unless the decision taken comes as a surprise – see below).

#### *Release of a New Forecast*

Over the years 2002–2007, a new forecast was released quarterly and introduced to the public at the press conference following every third monetary policy meeting. The hypothesis that the introduction of a new forecast can influence the favorableness of coverage draws on the expectation that the forecast can be helpful in explaining and justifying the decision of the board members. The release of a new forecast is represented as a dummy variable equal to one if a new forecast is released and zero otherwise. The estimation of Model 1 shows, however, that favorableness is influenced negatively. The coefficient on the new forecast is to some extent influenced by extremely negative coverage at the beginning of the sample (see Figure A1). Estimation without the first, most extreme observation leads to a non-significant coefficient for the indicator of the new forecast (with the other coefficients and their significance being modified only to a limited extent in the reduced sample compared to the full sample as shown in Table A6). Another issue that might influence the estimation results here is a relatively high correlation between the indicators of surprise and the release of the new forecast (-0.35). The high correlation stems from the fact that members of the board tended to change interest rates more frequently when a new forecast was available than at meetings between the forecasts (Table A7 in the appendix). In combination with the fact that meetings delivering an interest rate change generate higher surprise than meetings with no change of interest rates, it is easy to see why the release of a forecast often coincides with a surprising decision (Table A8 in the appendix). Consequently, it is not easy to

disentangle the effect of the release of a new forecast from the effect of a surprising decision.<sup>7</sup>

### *Exchange Rate*

The reactions of favorableness to changes in the exchange rate are not symmetrical. Appreciation leads to negative coverage and depreciation to positive coverage. A meeting-to-meeting change in the exchange rate of 1% leads to an average change in favorableness of 0.05 (5.1 x 0.01). The size of the reaction is approximately twice as strong in the case of depreciation compared to appreciation. The coefficients are equal to 3.8 versus 5.8 (not reported), but these differences are not statistically significant.

Instead of employing the meeting-to-meeting change in the exchange rate, the distance of the exchange rate from its linear trend and the distance from the HP filtered exchange rate are used as the determinants in another two alternative setups. No significant effect can be observed in either of these cases.

## **4.2 Results: Determinants of Length**

In this section, we report the estimation results for the model explaining the extent of coverage. The sum of the lengths of all articles, defined in section 4 as *extent<sup>l</sup>*, is considered here as the dependent variable. The results of the estimations are summarized in Table 6. In addition, we consider the number of title page articles as an alternative measure of the extent of coverage and we discuss it later in section 5.4.

**Table 6: Determinants of Length (Model 2)**

Surprise - Market IR Reaction (abs)	5401.9 *** (1581.1)
Monetary Policy Interest Rate Change (abs)	2242.4 ** (1023.9)
Recent CPI Inflation Change	136.14 (132.0)
Recent GDP Growth Change	-652.5 * (352.7)
Communication Intensity	49.076 (48.5)
Forecast Released	644.87 *** (224.2)
EURCZK Inter-meeting change (abs)	17745 * (9938.1)
Constant	197.33 (176.5)
Adjusted R-squared	0.713
Number of observations	69

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

<sup>7</sup> Alternative specifications – one without the indicator for surprise and the other without the indicator for the release of a forecast – do not, however, provide significant and intuitive results.



### *Surprise Measured as the Reaction of the Market Interest Rate*

Surprising decisions lead to more extensive coverage in the newspapers. Surprise provides an opportunity to speculate about the reasons why the central bank delivered a decision different from that expected by the market and analysts. According to the estimation of Model 2, surprise proxied as the day-to-day reaction of the market interest rate is a significant determinant of the length of monetary policy meeting coverage. A surprising monetary policy decision corresponding to an absolute day-by-day reaction of the 1M interest rate of 0.1 pp is linked to an increase in coverage in the four newspapers of 540 words ( $5401 \times 0.1$ ). So, despite being perceived as neutral, a surprise generally attracts the attention of the media. When the alternative proxy for surprise is used (the difference between analysts' expectations about the interest rate change and the actual change in interest rates) the coefficient on surprise becomes insignificant.

### *Monetary Policy Interest Rate Change*

Similarly to favorableness, the extent of coverage increases when the board decides to change interest rates, irrespective of the direction of the change. On average, a 0.25 pp change in the key interest rate results in the coverage being longer by 560 words ( $2242 \times 0.25$ ). Thus, interest rate changes – irrespective of their direction – are in principle both well perceived and extensively covered in the media.

### *Communication Intensity*

Communication activity, proxied by the number of monetary policy statements provided by the members of the board in the inter-meeting communication period, is not significant in explaining the extent of monetary policy meeting coverage. This might be surprising at first sight. However, one possible explanation is that newspapers publish the statements when they are issued and do not return to them later after the meeting. When taken together with our finding that the number of statements has a neutral effect on the favorableness of the media's perception, one can say that the intensity of inter-meeting communication is insignificant for the perception of the interest rate decision in the media from both the qualitative and quantitative points of view. There is, however, a counter-finding concerning the position of an article in the newspaper being affected by the intensity of inter-meeting communication (see below).

### *Release of the New Forecast*

Every three months, when the new forecast is released at the press conference after the monetary policy meeting, the length of coverage increases by 645 words on average. Obviously, this reflects the fact that the central bank's forecasts of inflation and GDP are among the most closely monitored pieces of information provided by the central bank to the public. It is favorable that one of the most important communication channels of the CNB seems to be fulfilling its role.

### *CPI Inflation*

Unlike in the case of the favorableness of coverage, the recent CPI inflation data do not significantly influence the extent of the coverage. Besides the specification estimated and summarized in Table 6, we also considered the possibility that any change in the released CPI data influences the extent of coverage, irrespective of the direction of change. However, the absolute value of recent CPI inflation changes is not significant in explaining the extent either. Finally, none of the alternative indicators introduced in the previous section (indices related to the distance of inflation from the inflation target and to the distance from the moving average of inflation) is significant in explaining the extent of coverage.

### *GDP Growth*

Recent GDP growth data influence the extent of coverage at the edge of statistical significance. A quarter-on-quarter decline in headline GDP growth by half a percentage point is linked with an increase in the length of coverage of 326 words ( $-652 \times 0.5$ ).

### *Exchange Rate*

Despite the fact that the CNB targets inflation and has not actively intervened in the forex market since September 2002, the exchange rate is often discussed in articles following monetary policy meetings. The estimated coefficient suggests that a 1% absolute change in the EUR/CZK exchange rate during the inter-meeting period leads to an average increase in the length of coverage of 177 words ( $17,745 \times 0.01$ ). As the Czech currency exhibits relatively high volatility<sup>8</sup>, the exchange rate is an important determinant of the extent of coverage. So, volatility of the exchange rate is a good reason to write about monetary policy regardless of the actual outcome of the particular bank board meeting. This is obviously due to the fact that in such a small open economy as the Czech one, the exchange rate influences a lot of economic variables and economic agents, hence it is naturally a subject of public debate and that debate is mirrored in the media.

Compared to the other equations estimated in this paper, the determinants of Model 2 explain a fairly large portion of the variation in the dependent variable. According to the adjusted R<sup>2</sup>, more than 70% of the variation in the length of coverage can be assigned to the variation in the explanatory variables mentioned in the previous paragraphs.

## **4.3 Results: Determinants of the Dispersion of Favorableness**

The average favorableness gives a good idea about how positively or negatively a board decision is accepted. However, sometimes the stances of several journalists differ substantially from each other. This can happen either purely randomly or because the economic situation is unclear, the decision is controversial or poorly explained, or simply

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<sup>8</sup> In the period considered, the average absolute inter-meeting change amounts to 1.02%, with a maximum value of 2.67%.

different journalists base their coverage on interviews with different analysts and some of them predict the decision of the bank better or with more luck than the others, etc.

When we use the same set of explanatory variables as in the regression explaining the level of favorableness, two variables appear to be statistically significant in explaining the heterogeneity of favorableness. Surprise is the main driver of the dispersion – the more surprising is the decision, the more dispersed is the favorableness of coverage. Another statistically significant determinant of dispersion is the level of interest rates. The estimation results are summarized in Table 7.

**Table7: Determinants of Dispersion of Favorableness (Model 3)**

Surprise - Market IR Reaction (abs)	0.987 *** (0.339)
Monetary Policy Interest Rate Change (abs)	0.317 (0.256)
Interest Rate Level	0.076 * (0.041)
Communication Intensity	0.011 (0.013)
Forecast Released	-0.017 (0.057)
Recent CPI Inflation Change	-0.006 (0.057)
Recent GDP Growth Change	0.054 (0.100)
Constant	0.031 (0.101)
Adjusted R-squared	0.323
Number of observations	56

**Note:** \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . The number of observations is lower due to meetings with too few monetary policy related articles to calculate the dispersion.

While the relationship between dispersion and the exogenous determinants is limited, the analysis in part 3.4 shows strong connections between the dispersion of favorableness on the one hand and the absolute level of favorableness and the length of coverage on the other hand. As Table 2 illustrates, coverage with more dispersed favorableness is longer.

#### **4.4 Results: Explaining the Number of Title Page Articles**

Due to the count nature of the data, several count data models were considered in the estimation of the number of title page articles in the four newspapers considered. As the coverage of many meetings results in no title page articles at all and the mean and variance of our variable of interest, extent4, are not substantially different, we chose the Poisson model as our preferred one. A post-estimation goodness-of-fit test validates our choice.

**Table 8: Determinants of the Number of Title Pages (Model 4)**

	Poisson	Ordered probit
Surprise - Market IR Reaction (abs)	1.714 (3.483)	7.599 ** (3.497)
Monetary Policy Interest Rate Change (abs)	3.366 (2.703)	3.516 (2.584)
Communication Intensity - Governor	0.393 ** (0.185)	0.355 ** (0.175)
Communication Intensity - Other Board Members	0.229 ** (0.116)	0.318 *** (0.109)
Forecast Released	0.077 (0.664)	0.237 (0.434)
Recent CPI Inflation Change	0.39 (0.758)	0.414 (0.558)
Recent GDP Growth Change	0.562 (0.462)	-0.412 (0.397)
Constant	-2.352 *** (0.608)	
Constant (cut 1)		2.491 *** (0.475)
Constant (cut 2)		3.364 *** (0.636)
Constant (cut 3)		4.297 *** (0.796)
Constant (cut 4)		4.895 *** (0.937)
Pseudo R-squared	0.34	0.39
Number of observations	69	69

**Note:** \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Coefficients are estimated using Poisson regression (first column) and ordered probit regression (second column). Constants *cut 1* – *cut 4* are cut points estimated as a part of ordered probit estimation. As communication intensity defined for all board members is statistically significant determinant of the number of title pages, the effect is investigated further by distinguishing the communication of governor from communication of other board members.

Communication intensity in the inter-meeting period is not statistically significant in explaining the favorableness and length of coverage. However, it plays a major part when it comes to the number of title page articles published after the meeting. As the communication intensity defined for all members of the board is a statistically significant determinant (table not reported here), we go one step further and estimate the effect of communication intensity separately for the governor and the other board members (Table 8)<sup>9</sup>. On average, an additional inter-meeting statement of the governor or other member of the board increases the number of title page articles covering the meeting by 0.39 and 0.23<sup>10</sup>, respectively. A rising intensity of inter-meeting statements of individual board members tends to increase the probability that the article covering the subsequent

<sup>9</sup> The same differentiation is used in Berger, Ehrmann and Fratzscher (2006), where the communication of the president of the ECB is found to be more important than the communication of the other committee members in explaining both favorableness and extent.

<sup>10</sup> The difference between the two coefficients is not statistically significant.

monetary policy decision will be displayed on the title page of the dailies reporting on the bank board decision.

For the sake of robustness, we estimate Model 4 also using ordinal probit regression. The results (reported in the second column of Table 8) confirm the relationship between communication and the number of title page articles. However, the results from the ordinal probit regression emphasize the role of surprise in the decision – the more surprising the decision is for the market, the more attention it gets on the title pages of newspapers. When the difference between analysts' expectations about the interest rate change and the actual decision is used as a proxy for surprise instead of the market reaction, the significance of the coefficient on surprise remains the same but the coefficient on the absolute change in the interest rate becomes significant in both cases – Poisson as well as ordered probit regression (not reported here).

#### **4.5 Additional Estimations**

In addition to the estimations reported in the previous part, a number of alternative specifications were considered to assess the importance of particular determinants. We discuss the results estimated using these alternative specifications in the following paragraphs.

##### *Serial Correlation in Favorableness*

The favorableness of media coverage can theoretically be influenced by some kind of sentiment toward the central bank which can change only gradually over time. We tested this hypothesis by including lagged favorableness among the determinants of Model 1. The estimated coefficient on the lagged variable does not suggest any statistically significant serial correlation.

##### *Other Communication Tools*

Using the framework presented in previous parts, we tested the effects of the communication tools that were introduced during the period considered. These included a) slides at the press conference after monetary policy meetings, b) the “interest rate sentence”<sup>11</sup>, and c) the release of the ratio of the votes cast by individual board members for alternative decisions. In addition to testing the hypothesis that the introduction of the interest rate sentence influenced the favorableness or the length of coverage, we investigated whether concord of the interest rate sentence and the subsequent actual decision<sup>12</sup> matters for favorableness.

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<sup>11</sup> The so-called “interest rate sentence” is a verbal description of the future interest rate path consistent with the forecast, released together with the new forecast, i.e. once every three months, and presented at the press conference, in the minutes of the board meeting and in the Inflation Report.

<sup>12</sup> The concord of the “interest rate sentence” and the subsequent actual decision is defined in Table 41.

Although we believe that these tools help to explain the monetary policy decisions of the central bank, none of aforementioned instruments was found to be statistically significant. This could be a result, however, of the relatively small number of observations and the low variance in the data on the determinants considered (the incorporation of each tool is represented by a dummy variable equal to one from its introduction onwards and equal to zero before the month of introduction). The effect of concord is not significant either.

#### *Other Determinants*

Besides testing the effect of the additional communication tools described in the previous paragraph, we also tested the potential effects of other factors: uncertainty about the next policy decision, the ratio of votes and the interest rate setting of the ECB.

Two proxy variables for the uncertainty of the next policy decision are used. The first one, *Uncertainty*, comes from a survey called Financial Market Inflation Expectations conducted by the CNB<sup>13</sup>. The variable is equal to the standard deviation of analysts' expectations of the 2-week repo rate at the horizon of one month. This is our preferred proxy for uncertainty. The second variable, *Reuters uncertainty*, is based on Reuters polls and employs the numbers of analysts expecting no change along with the total number of analysts<sup>14</sup>. Our primary hypothesis related to uncertainty is that increased uncertainty before a monetary policy decision increases the length of coverage after the decision is made. Our estimation, however, does not support this hypothesis. At the same time, neither *IOFT uncertainty* nor *Reuters uncertainty* is a significant determinant of variation in favorableness and dispersion of favorableness. However, communication influences the extent and the dispersion of favorableness differently under low and high uncertainty, as we show in the next section.

Homogeneity of the board members' views might also play a part in how newspapers cover monetary policy meetings. To proxy homogeneity of views, we employ the ratio of the number of board members voting for the actual decision to the total number of board members present at the meeting. The estimation, shown in Table A9 in the appendix, suggests that homogeneity of the board members' views influences the extent of coverage – the more dispersed the votes are (reflected in a lower voting ratio), the longer the following coverage becomes. Besides length of coverage, the number of title pages is influenced significantly – the more dispersed are the views of the members of the board, the higher (substantially) is the number of newspapers publishing an article on the title page (Table A10 in the appendix).

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<sup>13</sup> The respondents in the Financial Market Inflation Expectations survey consist primarily of analysts from commercial banks operating in the Czech Republic.

<sup>14</sup> *Reuters uncertainty* equals  $1-2*ABS(0.5-\text{number of analysts expecting no change}/\text{total number of analysts})$ , where ABS is an operator of absolute value, i.e. it approaches zero if the fraction of analysts expecting no change is high (no interest rate change widely expected) or if the fraction of analysts expecting no change is small (either a hike or a cut widely expected). Otherwise it is higher than zero, theoretically approaching unity, if a change of interest rates is expected by just half of the analysts.

The other tested hypotheses concern the interest rate setting of the ECB. The Czech economy is closely linked to the eurozone economy through various channels, and the interest rate setting in the eurozone to a certain extent naturally influences the interest rate setting of the CNB. We tested the hypotheses that the distance between CNB and ECB interest rates explains favorableness and extent of coverage as well as the hypotheses that a CNB interest rate change occurring right after an ECB interest rate change influences favorableness and extent. We test these hypotheses by augmenting the baseline specifications of Models 1 and 2 with the distance between the two interest rates and the interaction of interest rate changes, respectively. None of these hypotheses are supported by our estimations (results not reported here).

**Table 9: Definitions of Selected Variables Used in Additional Estimations**

<b>Variable</b>	<b>Definition</b>
Slides at the press conference	Dummy equal to one since January 2004 onwards. Equal to zero until December 2003.
Introduction of "interest rate sentence"	Dummy equal to one since July 2002 onwards. Equal to zero until June 2002.
Releasing the number of board members voting for different decisions	Dummy equal to one since February 2006 onwards. Equal to zero until January 2006.
Concord of "interest rate sentence" and actual decisions	Dummy indicating whether the interest rate change suggested by the "interest rate sentence" is in line with actual decision on the interest rate. Equals one, if interest rate moves in the suggested direction either in current meeting or in any previous meeting since recent release of forecast (new "interest rate sentence" is formulated within each quarterly forecast). Equals zero otherwise. Not defined until June 2002.
IOFT uncertainty	Survey based proxy for market uncertainty. Equals standard deviation of analysts' expectations of 2-week repo rate in the horizon of one month. Survey used to be conducted approximately one to two weeks before the monetary policy meeting of the board.
Reuters uncertainty	Alternative survey based proxy for market uncertainty about upcoming interest rate decision. Equals $1-2 \cdot \text{ABS}(0.5 - \text{number of analysts expecting no change} / \text{number of all analysts})$ .
Voting ratio	Number of board members voting for the actual decision over the number of all board members present at the meeting.
Distance from the ECB interest rate	Equals the absolute value of the difference between the CNB and the ECB key interest rates.
Coordination of the interest rate change with the ECB	Dummy equal to one, if both the CNB and the ECB change their key interest rates in the same month. Zero otherwise.

## 4.6 Interactions

Finally, we consider the possibility that the effects of certain determinants depend on other factors. This is implemented using the interactions between the determinants already introduced. Interactions which are significant in explaining favorableness, its dispersion, or the extent of coverage are discussed below. Some other tested interactions are discussed afterwards.

One of the important questions is whether appropriate communication can mitigate the negative effects of a surprising decision on the favorableness of coverage. As we do not have any qualitative measure of communication, we test whether the amount of communication is related to the magnitude of the negative effect of a surprise on favorableness. More specifically, we augment Model 1 with the interaction of communication intensity and the dummy for high surprise<sup>15</sup> and with the necessary high surprise dummy itself. The results are summarized in Table A11 in the appendix. Based on the estimated coefficients, the effect of a surprising decision is more negative and statistically significant if the surprising decision is preceded by intensive communication. The same result can be found if only the communication of the governor is considered instead of the communication of all board members (Table A12 in the appendix). One could interpret the result as a recommendation for board members pursuing positive favorableness of coverage: you should not communicate your preliminary views on the upcoming monetary policy decision too strongly especially (i) under high uncertainty, when the situation is unclear and it is difficult for you to guess your peers' attitude, or (ii) when you feel you will dissent from the future final board decision. The thread is then the following: if market participants do not understand your and other board members' statements properly and they are surprised by the board's subsequent interest rate decision, then the perception will be much more negative compared to the situation where a (sometimes needed) surprising decision is not preceded by intensive communication.

Another interesting result is based on the interference of high uncertainty and intensity of communication. Although the intensity of pre-meeting communication itself does not have significant effect on the length of the coverage in general, more intensive communication expands the length of the coverage at times of increased uncertainty. Table A13 in the appendix summarizes the results of the estimation. Again, practically the same mechanism can be found if we consider only the communication of the governor instead of the communication of all members of the board (see Table A14 in the appendix). In addition to favorableness itself, the dispersion of favorableness increases with the intensity of communication if the uncertainty is high. See Table A15 in the appendix for details.

Besides interactions that are statistically significant in explaining favorableness, its dispersion and the extent of coverage, a number of other interactions were considered, tested and found to be insignificant. Among the most prominent ones, we tested the hypothesis that the release of the forecast increases the length of coverage more at times

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<sup>15</sup> Defined as follows: the high surprise dummy is equal to one if the absolute market interest rate reaction is above its average and equal to zero otherwise.



of high uncertainty and the hypothesis that the reaction to a surprising decision is different at times of high uncertainty.

#### **4.7 Reality and the Model: Looking at the Model Residuals**

The model predictions naturally do not always match reality in either the length or favorableness of articles. Generally speaking, there are number of factors that could lie behind this, although most of them are hard or even impossible to verify exactly. The length of articles could have been affected, for example, by the emergence of other, more interesting topics at a particular time, whereas the favorableness may have been influenced, say, by errors or inconsistency of the assessors. Simultaneously, a changing structure of journalists and attitude of individual dailies over time could have determined both. As far as the length of articles is concerned, some journalists tend to be rather expansive, whereas others express their opinions in fewer words. On the other hand, we do not know whether or not the extent of articles was limited by editors and, if so, to what degree. Regarding the favorableness of articles, the attitude of individual journalists to the CNB differs and may vary over time and across newspapers.

To investigate the possible causes of the deviations of the model predictions from the actual values, we identify the meetings with the highest model residuals. Figures A7, A8 and A9 in the appendix depict the residual versus fitted plots for the baseline models explaining the level, length and dispersion of favorableness, respectively. “Abnormal” articles in terms of both length and favorableness were identified twice – on February 1, 2002 and on November 1, 2002. In the former case, both the total length and the favorableness were higher than predicted, whereas in the latter case they were lower than predicted.

The articles published after the meetings with the biggest residuals can be found in Table A16 in the appendix. The columns of this table give the date of issue of the article, the change in monetary policy interest rates, information on whether this monetary policy decision was expected or not, the key issues discussed in these articles and finally the possible reasons for the deviations. A look at the articles themselves, however, does not provide a sufficient explanation. Therefore, we tried to look at the specific topics that were published on the front pages of the dailies examined, as well as in columns devoted to economic and financial topics. Although this approach cannot help to explain differences in favorableness, it can be useful in examining differences in the length of articles. Historical contextualizing of these “privileged” articles may confirm or rule out the hypotheses that (1) monetary policy texts were from time to time crowded out by more attractive topics and (2) monetary policy articles were inflated during silly seasons when there was a lack of attractive issues to be covered.

This approach yielded the expected fruits. The shorter length of the articles, for example, on February 2, 2002 can indeed be easily explained by the crowding-out effect. Dramatic events on the domestic policy scene, chiefly a disintegration of the coalition of the four governing parties, dominated the front pages and economic and financial columns.

Nevertheless, despite the shorter-than-predicted length of articles, monetary policy issues were fairly discussed at that time. They appeared on the front pages of all but one of the dailies examined and their length in the relevant columns seemed to be close to the average. One possible explanation is that the strictly limited space in the dailies did not allow these articles to be adequately, i.e. proportionally, long. The crowding-out effect also explains the shorter extent of articles focused on monetary policy issues on April 30, 2004, when the entry of the Czech Republic into the EU the next day (May 1, 2004) dominated the articles (both general and economic ones) that were published in the dailies at that time.

On the other hand, the silly season effect to large extent explains why the actual length of articles on monetary policy markedly exceeded that predicted by the model in some cases, for example on July 28, 2006. A lack of attractive topics at that time forced journalists to write about obviously insignificant topics, specifically about the extreme heat and its adverse effects on everyday life. Monetary policy issues were thus used to fill the empty space as well. This is why a rather long educative excursus appeared in one of the articles examined, and why numerous comparisons of the interest rate level at home and in the EU countries were included in the remaining articles. As a matter of fact, the actual monetary policy decision, its context and the economic circumstances at that time were rather “boring.”

## 5. Robustness Checks

To assess the robustness of the presented results, we performed a series of robustness checks. In this section, we describe the robustness checks performed and discuss their implications.

As the first step toward assessing the robustness of the reported results, we employ the alternative measures of favorableness and extent defined in detail in section 3. The estimations of the baseline models using the alternative measures reported in Tables A17–A20 in the appendix show that the results remain qualitatively the same.

Secondly, a series of alternative specifications was estimated to see whether adding or dropping a particular variable influences the regression coefficients considerably. No such case was identified, except in the case of the relatively highly correlated surprise and release of the new forecast discussed at the end of section 5.1. Indeed, the multicollinearity test provides a low VIF<sup>16</sup> for all the explanatory variables in all three baseline models.

In another step in the series of robustness checks, we investigate the influence of outliers. An obvious candidate is the very first meeting, for which the favorableness was extremely negative (-1.2, compared to the mean of 0.09 and the standard deviation of 0.29 – see

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<sup>16</sup> The variance inflation factor (VIF) is a measure of multicollinearity. The VIF quantifies how much the variance of a coefficient is increased because of collinearity.

Figure A1). The removal of this extreme observation leads to changes in magnitude for some coefficients, although the direction remains unchanged (see Table A6 in the appendix). In addition, the coefficient on the release of the new forecast becomes non-significant with the reduced sample.

Finally, we use quantile regressions to evaluate marginal effects in different quantiles of the dependent variable. Figures A10–A12 in the appendix summarize the results graphically. They enable us to answer the following question: Is the effect of the particular explanatory variable the same for the whole range of favorableness (extent and dispersion of favorableness) or does it change? The first plot of Figure A10 shows that a surprising decision has a less negative effect on favorableness in cases of very negative coverage than in cases of neutral or more negative coverage. Overall, Figures A10–A12 do not provide any worrying result.

## **6. Summary and Conclusions**

In our paper we identify factors explaining the variability of the favorableness and the extent of coverage of the CNB's monetary policy decisions in the media in the period of 2002–2007. We make use of an extensive set of articles published on the days immediately following monetary policy meetings in the four most relevant Czech daily broadsheets. The robust results of our estimates show that some parameters of the CNB's actual decisions and their communication as well as several variables characterizing the contemporary economic environment are significant in explaining the variability of the media's coverage. Simultaneously, our analyses shed some light on how the media tends to report on (economic) events in general.

Starting with the latter, we find that very positive and very negative articles tend to be longer than neutral ones. Simultaneously, more dispersed favorableness across articles is associated with more extensive coverage.

When summing up our major fundamental results concerning favorableness of coverage, we can conclude the following. The fact that the CNB from time to time surprises the market when setting interest rates is perceived neutrally in the media, which might be interpreted as indicating that the media has got used to the fact that surprise belongs to the standard monetary policy making of (not only) the CNB. In other words, the media does not get excited by the fact that the CNB usually leads the market through the monetary cycle.

The media welcomes it when the CNB makes changes to interest rates regardless of the direction of change. Thus, the media probably understands that such changes are intended and needed to rein in inflation or steer it toward the target and to smooth economic shocks. This can be considered a good environment for the CNB to fulfill its mandate. And simultaneously, it is probably a result of the transparent inflation targeting regime the CNB has been applying for years.

Finally, intensity of CNB's inter-meeting communication proxied by the number of bank board members statements proved to have a statistically significant negative effect on the favorableness of perception of the actual outcome of the subsequent meeting if intensive communication precedes a surprising decision.

All the above-mentioned conclusions are related to the factors that are under the direct influence of the CNB, since they form part of its actual monetary policy decision and of the communication of that decision. As a complement, the following facts have been discovered regarding factors capturing the contemporary economic conditions at times of individual monetary policy meetings.

The media does not like rising inflation (and conversely it likes disinflation), which is probably perceived as a failure by the CNB to fulfill its commitment. Similarly to inflation, the media likes accelerating GDP growth (and does not like slowing growth), which is quite understandable and intuitive.

These results simultaneously shed some light on the way journalists and the public might process macroeconomic news. As journalist and commentators get used to a certain level of a macroeconomic indicator quite swiftly, a change in the indicator compared to its previous month's or quarter's value is likely to have a stronger impact on the perception of the indicator than the level of the indicator itself or a deviation from its target or trend. A level (despite being very high or very low) is often not as attractive for journalists as a change. Only a change can be perceived as an event, and obviously the media generally tends to report on events rather than on states.

Appreciation of the koruna exchange rate seems to be negatively perceived in the media regardless of the actual level of the exchange rate vis-à-vis its trend. Inversely, depreciation of the exchange rate increases the favorableness of articles covering the CNB's meetings.

As for the extent of media coverage we found the following, starting again with factors under the direct control of the CNB. Despite being perceived neutrally, an unexpected CNB interest rate decision generally attracts the attention of the media. Similarly, interest rate changes – irrespective of their direction – are in principle extensively covered in the media, unlike decisions to leave interest rates unchanged. Intensity of inter-meeting communication proved to have a statistically significant effect on the extent of coverage of the interest rate decision only in the following special cases. First, higher communication intensity by bank board members leads to an increased probability that the article covering the subsequent monetary policy decision will be displayed on the title page of the dailies reporting on it. And second, more intensive communication expands the length of coverage at times of heightened uncertainty.

It is favorable that the release of a new quarterly macroeconomic forecast attracts the attention of the media. It thus turns out that one of the CNB's most important policy and communication devices seems to be – at least partly – fulfilling its role. As for macroeconomic variables, recent CPI inflation data do not significantly influence the

extent of coverage. A decline in GDP growth is, however, associated with more extensive coverage.

Based on our results, it is clear that volatility of the exchange rate is a good reason to write about the CNB's monetary policy meetings. This might be because the exchange rate influences a lot of economic variables in the Czech economy, hence it is naturally a subject of public debate and that debate is mirrored in the media.

Comparing our results with those presented in the pioneering work of Berger, Ehrmann and Fratzscher (2006) focused on the coverage of the ECB's actions, one can find a couple of differences. Most notably, unlike in the case of the ECB, surprising decisions of the CNB do not lead to significantly less favorable coverage. While a surprising decision of the ECB leads to less coverage, a surprising decision of the CNB increases the extent of coverage in terms of both length and the number of title page articles. On the other hand, the results of the two studies are similar in several aspects: an interest rate change is perceived more favorably than keeping interest rates unchanged and leads to longer coverage, while higher inflation (or inflation above the target) leads to more negative coverage.

All in all, the factors that turned out to be significant for favorableness, its dispersion and the extent of coverage of the CNB's decisions suggest that media tends to understand in general, although not in all aspects, what the CNB usually does in the field of monetary policy and why it does it, and pays proper attention to its decisions where appropriate. In our view, the most appealing results are that those CNB's decisions that surprise financial markets are – if needed – not negatively perceived by the media and that the media on the contrary welcomes interest rate changes regardless of their direction. Therefore, from the media coverage point of view, there is no need for too much smoothing.

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## Appendix

*Table A1: Descriptive Statistics of Newspaper Coverage*

	Hospodarske noviny	Mlada fronta DNES	Lidove noviny	Pravo
<b>Number of meetings covered</b>	<b>66</b>	<b>32</b>	<b>35</b>	<b>35</b>
<b>Average favorableness</b>	<b>0.11</b>	<b>-0.02</b>	<b>0.02</b>	<b>0.12</b>
Std. deviation	0.40	0.43	0.54	0.40
<b>Average absolute favorableness</b>	<b>0.32</b>	<b>0.23</b>	<b>0.44</b>	<b>0.30</b>
Std. deviation	0.32	0.39	0.39	0.31
<b>Average length (in words) of coverage per meeting (if covered)</b>	<b>551</b>	<b>396</b>	<b>445</b>	<b>406</b>
Std. deviation	404	287	373	337
<b>Average number of articles per meeting (if covered)</b>	<b>1.8</b>	<b>1.3</b>	<b>1.7</b>	<b>1.2</b>
Std. deviation	0.9	0.6	1.0	0.4
<b>Number of articles on the title page/ Number of all articles<sup>1</sup></b>	<b>0.21</b>	<b>0.16</b>	<b>0.40</b>	<b>0.31</b>

Notes: <sup>1</sup> inverse of title page coefficient (see the text)

*Table A2: Summary Statistics of the Press Articles Evaluations by Evaluators*

	Number of observations	Mean	Standard deviation
evaluator #1	263	0.13	0.68
evaluator #2	263	0.10	0.75
evaluator #3	263	-0.03	0.64
average	263	0.06	0.57

*Table A3: Comparison of Evaluations*

		Evaluator #2					Evaluator #3				
		-2	-1	0	1	2	-2	-1	0	1	2
Evaluator #1	-2	3	1	1			-2	4	1		
	-1	1	10	9	2		-1	4	9	8	1
	0	1	29	105	43	1	0	1	15	160	3
	1		4	21	23		1		33	12	3
	2			2	5	2	2			6	3
		-2	-1	0	1	2					
Evaluator #3	-2	5	4								
	-1		12	9	3	1					
	0		27	117	57						
	1		1	12	7	2					
	2				6						

Note: Number denote the number of articles evaluated by two independent evaluators as respective column and row denote.



**Table A4. The Differences between Newspapers: Pairwise Correlations of Favorableness**

	Hospodarske noviny	Mlada fronta DNES	Lidove noviny
Mlada fronta DNES	<b>0.61</b>		
Lidove noviny	<b>0.43</b>	<b>0.28</b>	
Pravo	<b>0.21</b>	<b>0.00</b>	<b>0.22</b>

**Table A5: Determinants of Favorableness (Alternative Set of Determinants)**

Surprise - Market IR Reaction (abs)	-0.299 (0.448)
Monetary Policy Interest Rate Change (abs)	0.351 (0.266)
Recent CPI Inflation	-0.042 (0.030)
Recent GDP Growth Change	0.31 ** (0.130)
Communication Intensity	-0.033 (0.021)
Forecast Released	-0.143 * (0.085)
EURCZK Inter-meeting change	(4.571) * (2.693)
Constant	0.305 *** (0.093)
Adjusted R-squared	0.254
Number of observations	69

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A6: Determinants of Favorableness (without the first, most extreme observation)**

Surprise - Market IR Reaction (abs)	-0.545 (0.338)
Monetary Policy Interest Rate Change (abs)	0.568 *** (0.188)
Interest Rate Level	-0.146 ** (0.064)
Recent CPI Inflation Change	-0.125 ** (0.055)
Recent GDP Growth Change	0.186 * (0.095)
Communication Intensity	-0.01 (0.016)
Forecast Released	-0.102 (0.065)
EURCZK Inter-meeting change	4.674 * (2.533)
Constant	0.505 *** (0.162)
Adjusted R-squared	0.267
Number of observations	68

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A7: Forecast and Interest Rate Changes**

Interest Rate Changed	Forecast released	
	Yes	No
Yes	10	8
No	13	38

**Table A8: Surprising Decisions Occurred More Often Simultaneously with the Presentation of the New Forecast**

	Not-surprising decision				Surprising decision			
	Monetary Policy Interest Rate Change (abs)				Monetary Policy Interest Rate Change (abs)			
	0	0.25	0.5	0.75	0	0.25	0.5	0.75
<b>Forecast Released</b>	13	2	-	-	-	6	1	1
<b>No Forecast Released</b>	38	5	-	-	-	3	-	-

**Table A9: Determinants of Length (voting ratio is a proxy for the homogeneity of board members' views)**

Surprise - Market IR Reaction (abs)	4394.1 *** (1584.3)
Monetary Policy Interest Rate Change (abs)	2059.3 * (1033.3)
Recent CPI Inflation Change	106.1 (115.9)
Recent GDP Growth Change	-529.9 (335.3)
Communication Intensity	30.5 (47.5)
Forecast Released	532.8 *** (198.2)
EURCZK Inter-meeting change (abs)	20724.7 ** (9656.3)
Voting Ratio	-1325.3 ** (517.2)
Constant	1458.1 *** (510.7)
Adjusted R-squared	0.737
Number of observations	69

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A10: Determinants of the Number of Title Pages (voting ratio is a proxy for the homogeneity of board members' views)**

	Poisson	Ordered probit
Surprise - Market IR Reaction (abs)	0.376 (3.233)	4.731 (3.699)
Monetary Policy Interest Rate Change (abs)	3.062 (2.555)	3.714 (2.679)
Communication Intensity - Governor	0.29 ** (0.136)	0.357 ** (0.163)
Communication Intensity - Other Board Members	0.14 (0.142)	0.32 ** (0.139)
Forecast Released	-0.074 (0.615)	0.113 (0.446)
Recent CPI Inflation Change	0.073 (0.667)	0.255 (0.544)
Recent GDP Growth Change	0.477 * (0.285)	-0.097 (0.394)
Voting Ratio	-3.818 *** (1.334)	-2.856 *** (1.067)
Constant	1.157 (1.442)	
Constant (cut 1)		2.491 (0.475)
Constant (cut 2)		3.364 (0.636)
Constant (cut 3)		4.297 (0.796)
Constant (cut 4)		4.895 ** (0.937)
Pseudo R-squared	0.41	0.43
Number of observations	69	69

**Note:** \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. Coefficients are estimated using Poisson regression (first column) and ordered probit regression (second column). Constants *cut 1 – cut 4* are cut points estimated as a part of ordered probit estimation. As communication intensity defined for all board members is statistically significant determinant of the number of title pages, the effect is investigated further by distinguishing the communication of governor from communication of other board members.

**Table A11: Determinants of Favorableness – Interaction of Surprise and Communication**

High Surprise	0.254 ** (0.101)
Communication Intensity x High Surprise	-0.096 *** (0.035)
Monetary Policy Interest Rate Change (abs)	0.531 *** (0.144)
Interest Rate Level	-0.18 ** (0.073)
Recent CPI Inflation Change	-0.128 ** (0.056)
Recent GDP Growth Change	0.284 *** (0.089)
Communication Intensity	0.006 (0.021)
Forecast Released	-0.144 ** (0.065)
Constant	0.533 *** (0.192)
Adjusted R-squared	0.44
Number of observations	69

*Note:* \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A12: Determinants of Favorableness – Interaction of Surprise and Communication (governor only)**

High Surprise	0.173 *** (0.062)
Communication Intensity (Governor) x High Surprise	-0.242 *** (0.056)
Monetary Policy Interest Rate Change (abs)	0.413 ** (0.174)
Interest Rate Level	-0.162 ** (0.077)
Recent CPI Inflation Change	-0.118 ** (0.055)
Recent GDP Growth Change	0.313 *** (0.082)
Communication Intensity - Governor	0.044 (0.035)
Forecast Released	-0.149 *** (0.054)
Constant	0.478 *** (0.174)
Adjusted R-squared	0.481
Number of observations	69

*Note:* \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A13: Determinants of Length – Interaction of Communication and Uncertainty**

Surprise - Market IR Reaction (abs)	5807.3 ***
	(1623.470)
Monetary Policy Interest Rate Change (abs)	2227.8 **
	(1101.765)
Recent CPI Inflation Change	168.74
	(136.239)
Recent GDP Growth Change	-694 *
	(353.457)
Communication Intensity	-55.84
	(54.927)
Uncertainty	-3384 *
	(1954.298)
Communication Intensity x Uncertainty	1300.5 *
	(730.268)
Forecast Released	633.64 ***
	(220.687)
EURCZK Inter-meeting change (abs)	18430 **
	(9194.745)
Constant	450.36 ***
	(159.273)
Adjusted R-squared	0.725
Number of observations	69

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A14: Determinants of Length – Interaction of Communication and Uncertainty (governor only)**

Surprise - Market IR Reaction (abs)	6396.6 ***
	(1650.046)
Monetary Policy Interest Rate Change (abs)	1862
	(1149.960)
Recent CPI Inflation Change	183.18
	(146.923)
Recent GDP Growth Change	-758.2 **
	(327.415)
Communication Intensity - Governor	-234.8 **
	(116.039)
Uncertainty	-1065
	(1060.296)
Communication Intensity - Governor x Uncertainty	2757.9 *
	(1412.653)
Forecast Released	652.35 ***
	(200.934)
EURCZK Inter-meeting change (abs)	19723 **
	(9061.972)
Constant	423.26 ***
	(120.312)
Adjusted R-squared	0.72
Number of observations	69

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A15: Determinants of Dispersion of Favorableness – Interaction of Communication and Uncertainty**

Surprise - Market IR Reaction (abs)	1.128 *** (0.340)
Monetary Policy Interest Rate Change (abs)	0.323 (0.274)
Interest Rate Level	0.063 (0.041)
Communication Intensity	-0.018 (0.021)
Forecast Released	-0.016 (0.056)
Recent CPI Inflation Change	0 (0.053)
Recent GDP Growth Change	0.025 (0.105)
Uncertainty	-1.175 * (0.674)
Communication Intensity x Uncertainty	0.374 * (0.214)
Constant	0.139 (0.123)
Adjusted R-squared	0.335
Number of observations	56

**Note:** \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . The number of observations is lower due to meetings with too few monetary policy related articles to calculate the dispersion.

**Table A16: Analysis of Residuals**

Date	Interest rates change	Decision expected	Key issues discussed	Possible reasons
<b>Coverage shorter compared to model</b>				
1.2.2002	-0,25	no	forex interventions rather than cut in interest rates expected, zig-zag policy, too much pesimism, more robust reaction expected	reasons for at least "normal" length of article → model error
30.4.2004	stability	yes	option to earlier rise in interest rates	no major differences to periods of other monetary policy decisions → model error
26.1.2007	stability	yes	correction of previous forecast, too much optimism	no major differences to periods of other monetary policy decisions → model error
<b>Coverage longer compared to model</b>				
1.11.2002	-0,25	yes	support of economic growth, against koruna appreciation, in keeping with expectations	no hot topics for long articles → model error
1.4.2005	-0,25	yes	credits will not be much cheaper, firms will resist strong koruna exchange rate, changes in the CNB Bank board	impact of dicussions, which will be the reaction of banks and comparisons to developments in Europe
28.7.2006	0.25	yes	the end of cheap loans era, rather long educative article	impact of a rather long educational article
<b>Favourableness worse compared to model</b>				
1.2.2002	-0,25	no	forex interventions rather than cut in interest rates expected, zig-zag policy, too much pesimism, more robust reaction expected	reasons exist but does not seem strong enough → model and/or assessors failures
29.3.2002	stability	no	the CNB resigned from fight against koruna appreciation, privatisation account does not work (all bears witness to predomination of exchange rate topics)	reasons exist but does not seem strong enough → model and/or assessors failures
29.7.2005	stability	yes	stable interest rates + higher inflation forecast = negative real interest rates	reasons exist but does not seem strong enough → model and/or assessors failures
27.1.2006	stability	yes	strong koruna exchange rate, criticism of shift in the CNB monetary policy	reasons exist but does not seem strong enough → model and/or assessors failures
<b>Favourableness better compared to model</b>				
1.11.2002	-0,25	yes	support of economic growth, against koruna appreciation, in keeping with expectations	reasons exist but does not seem strong enough → model and/or assessors failures
18.12.2003	stability	yes	the end of cut in interest rates due to recovery abroad and starting acceleration in inflation	reasons exist but does not seem strong enough → model and/or assessors failures
1.6.2007	0.25	yes	a demand-driven rapid economic growth, rising inflation, slower koruna appreciation dampens price growth less than before	reasons exist but does not seem strong enough → model and/or assessors failures

**Table A17: Determinants of Favorableness – Alternative Measure of Favorableness weighted by Circulation of Newspapers used (favorableness<sup>2</sup>)**

Surprise - Market IR Reaction (abs)	-0.078 (0.455)
Monetary Policy Interest Rate Change (abs)	0.284 (0.301)
Interest Rate Level	-0.193 *** (0.070)
Recent CPI Inflation Change	-0.157 *** (0.059)
Recent GDP Growth Change	0.335 *** (0.109)
Communication Intensity	-0.022 (0.018)
Forecast Released	-0.143 * (0.082)
Constant	0.63 *** (0.190)
Adjusted R-squared	0.33
Number of observations	69

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A18: Determinants of Favorableness – Alternative Measure of Favorableness weighted by Circulation of Newspapers and Title Page Coefficient used (favorableness<sup>3</sup>)**

Surprise - Market IR Reaction (abs)	-0.361 (0.437)
Monetary Policy Interest Rate Change (abs)	0.448 (0.310)
Interest Rate Level	-0.188 *** (0.068)
Recent CPI Inflation Change	-0.155 ** (0.062)
Recent GDP Growth Change	0.324 *** (0.103)
Communication Intensity	-0.019 (0.018)
Forecast Released	-0.144 * (0.077)
Constant	0.614 *** (0.181)
Adjusted R-squared	0.33
Number of observations	69

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01



**Table A19: Determinants of Length – Alternative Measure of Extent weighted by Circulation of Newspapers used (extent<sup>2</sup>)**

Surprise - Market IR Reaction (abs)	4658.3 ***
	(1455.986)
Monetary Policy Interest Rate Change (abs)	2262.5 **
	(897.448)
Communication Intensity	44.541
	(46.394)
Forecast Released	539.25 ***
	(202.376)
Recent CPI Inflation Change	42.465
	(119.394)
Recent GDP Growth Change	-494.4
	(351.241)
EURCZK Inter-meeting change (abs)	17976 *
	(9605.240)
Constant	168.01
	(163.351)
Adjusted R-squared	0.70
Number of observations	69

**Note:** \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A20: Determinants of Length – Alternative Measure of Extent weighted by Circulation of Newspapers and Title Page Coefficient used (extent<sup>3</sup>)**

Surprise - Market IR Reaction (abs)	4724.869 ***
	(1572.607)
Monetary Policy Interest Rate Change (abs)	2223.151 **
	(839.780)
Communication Intensity	30.164
	(42.845)
Forecast Released	570.593 ***
	(196.858)
Recent CPI Inflation Change	54.46
	(120.445)
Recent GDP Growth Change	-624.941 *
	(345.526)
EURCZK Inter-meeting change (abs)	17814.62 **
	(8777.234)
Constant	226.73
	(151.935)
Adjusted R-squared	0.70
Number of observations	69

**Note:** \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table A21: Summary Statistics**

	Number of observations	Mean	Standard Deviation	Minimum	Maximum
Favorableness <sup>1</sup>	69	0.09	0.29	-1.22	0.67
Favorableness <sup>2</sup>	69	0.08	0.29	-1.41	0.67
Favorableness <sup>3</sup>	69	0.08	0.29	-1.26	0.67
Extent <sup>1</sup>	69	1133.44	1108.93	58.00	5373.00
Extent <sup>2</sup>	69	1034.92	1019.87	58.00	4724.10
Extent <sup>3</sup>	69	1048.39	1018.65	58.00	4345.79
Extent <sup>4</sup> (Number of Title Pages)	69	0.59	1.10	0.00	4.00
Dispersion of Favorableness*	56	0.34	0.25	0.00	1.04
Surprise - Market Interest Rate Reaction (abs)	69	0.05	0.09	0.00	0.46
Monetary Policy Interest Rate Change	69	-0.02	0.16	-0.75	0.25
Monetary Policy Interest Rate Change (abs)	69	0.08	0.14	0.00	0.75
Interest Rate Level	69	2.45	0.60	1.75	4.25
Recent CPI Inflation	69	1.89	1.18	-0.40	4.10
Recent CPI Inflation Change	69	-0.03	0.45	-1.40	1.30
Recent GDP Growth Change	69	0.06	0.25	-0.46	1.15
Forecast Released	69	0.33	0.47	0.00	1.00
EURCZK Inter-meeting change	69	0.00	0.01	-0.03	0.03
EURCZK Inter-meeting change (abs)	69	0.01	0.01	0.00	0.03
EURCZK Inter-meeting change (appreciation)	69	-0.01	0.01	-0.03	0.00
EURCZK Inter-meeting change (depreciation)	69	0.00	0.01	0.00	0.03
Communication Intensity	69	3.23	2.13	0.00	9.00
Communication Intensity - Governor	69	0.83	1.07	0.00	5.00
Communication Intensity - Other Board Members	69	2.41	1.65	0.00	7.00
Uncertainty	69	0.06	0.07	0.00	0.35

**Note:** \* Dispersion is not defined for meetings with insufficient number of articles.

Figure A1: Evolution of Favorableness and its Standard Deviation over the Time

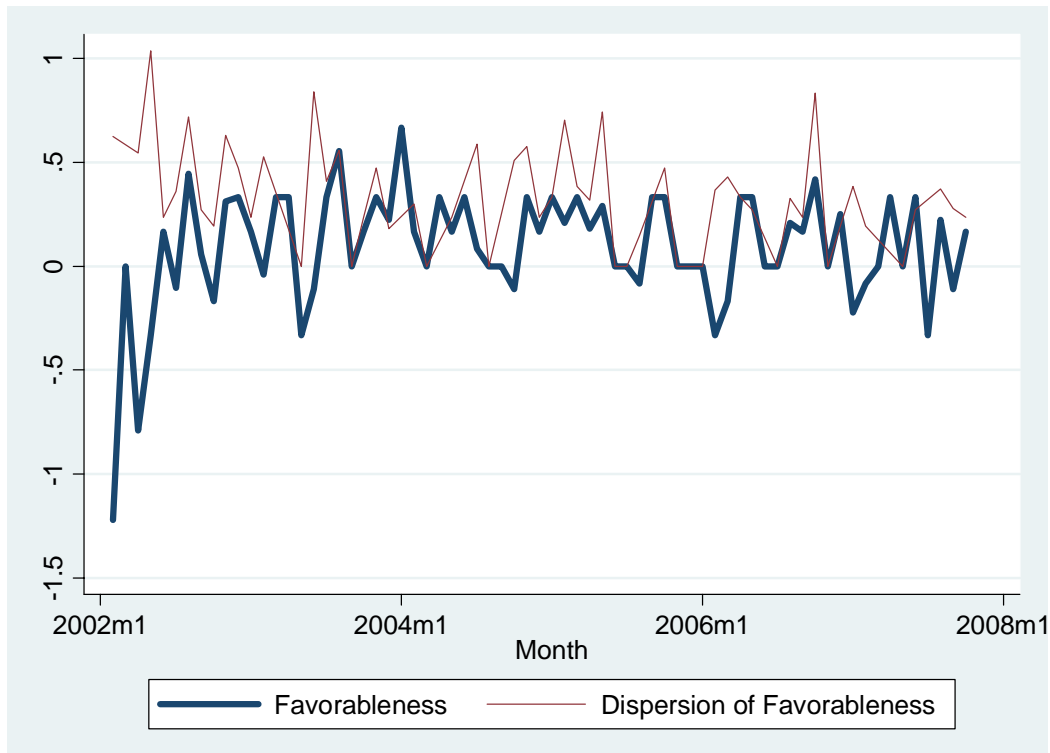
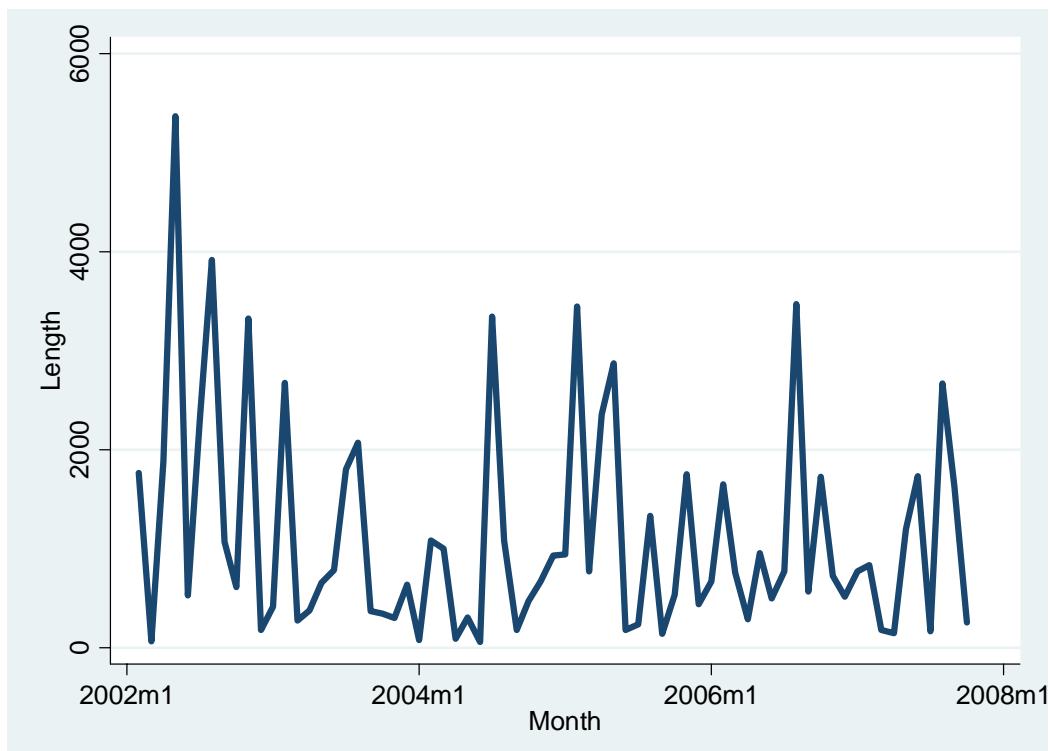
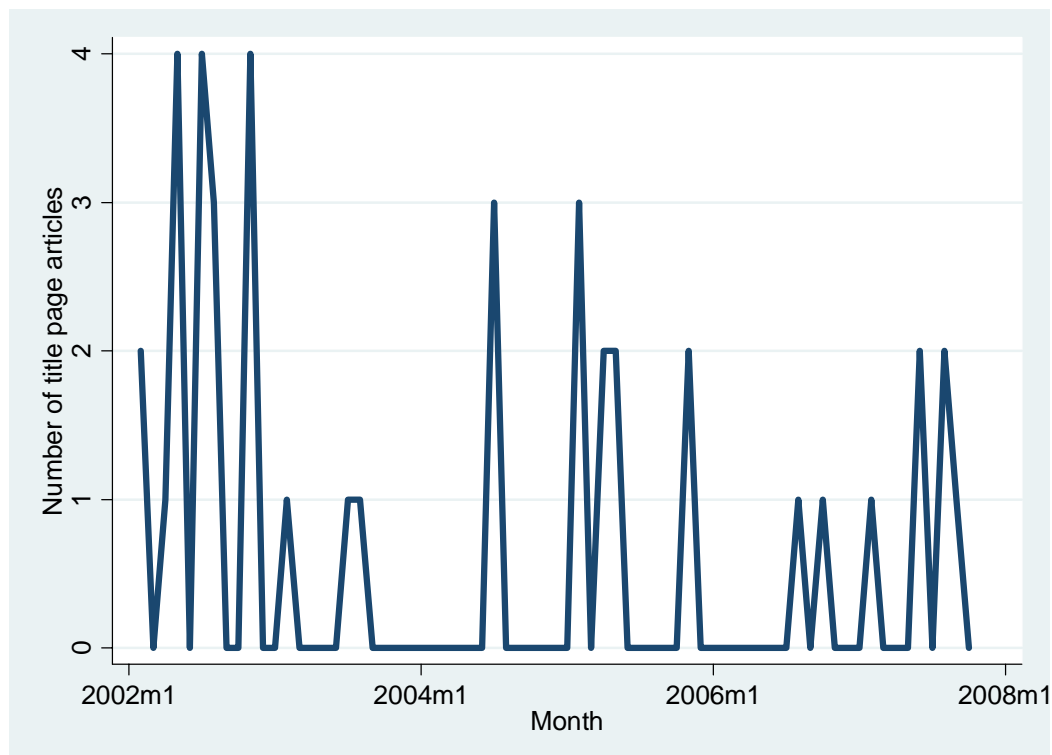


Figure A2: Evolution of Length over the Time



**Figure A3: Evolution of the Total Number of Title Page Articles per Meeting**



**Figure A4: Circulation of Newspapers over Time (% of Total Circulation of Four Newspapers)**

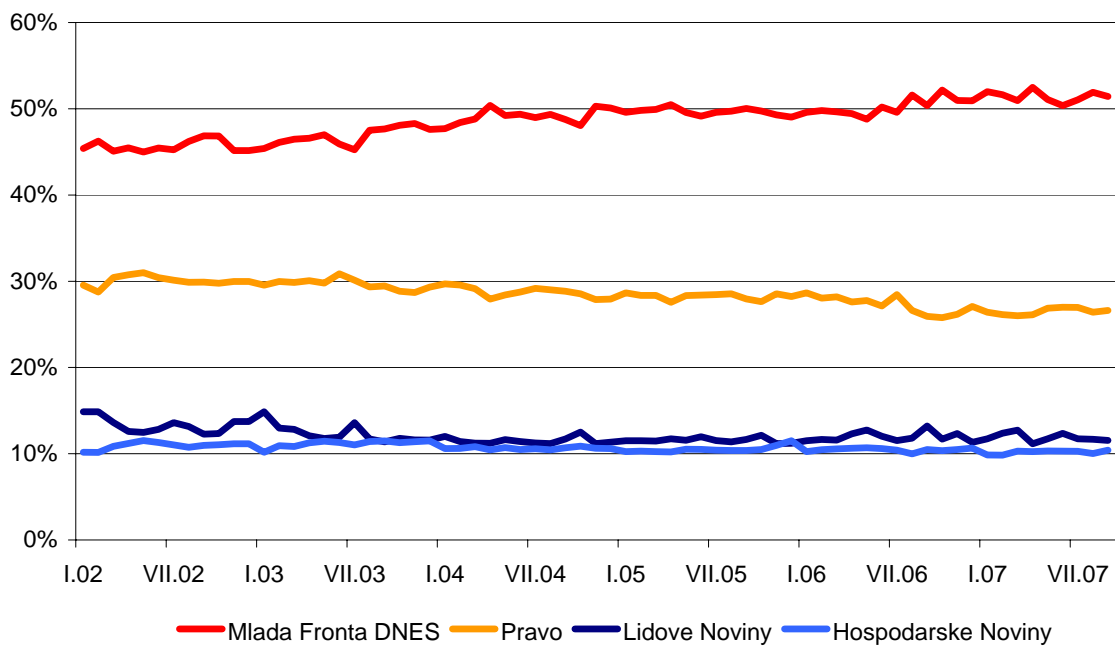


Figure A5: The Relationship between Favorableness, its Dispersion and the Extent of Coverage

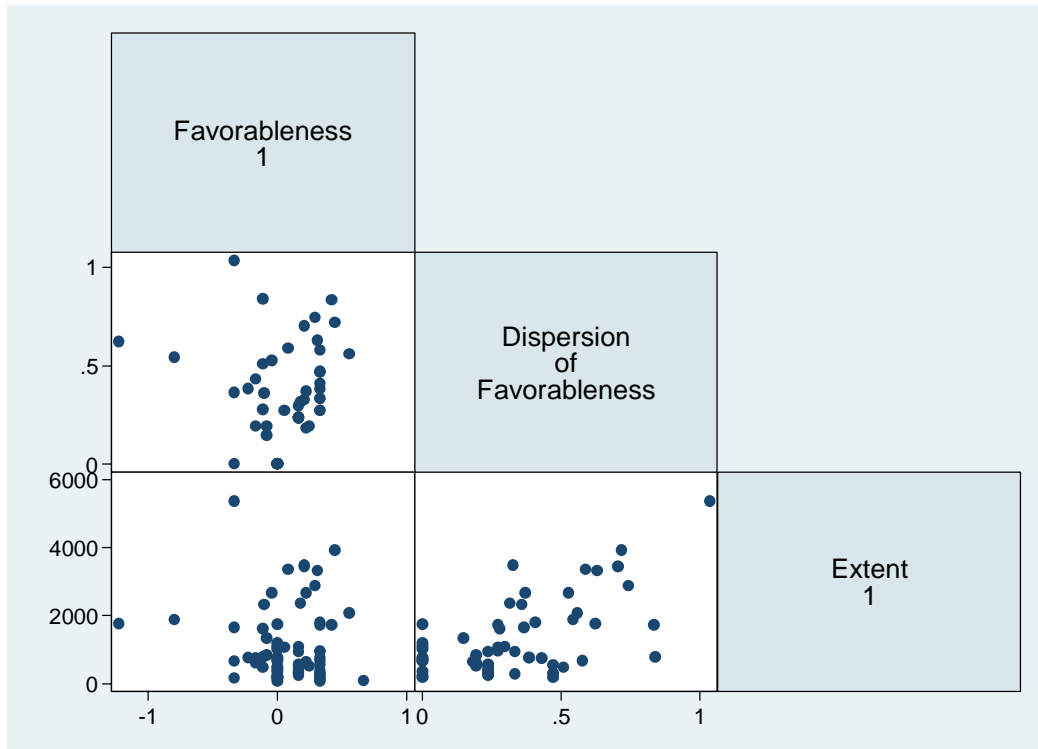


Figure A6: Histogram for the Total Number of Title Page Articles per Meeting

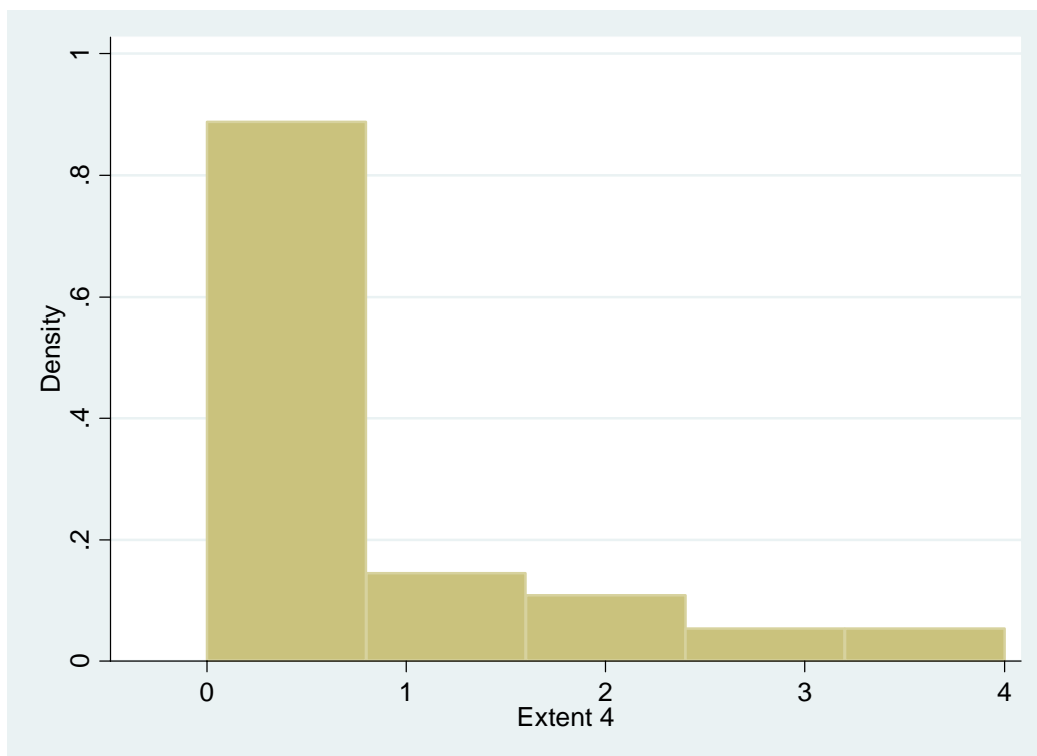


Figure A7: Residual Plot for Model 1

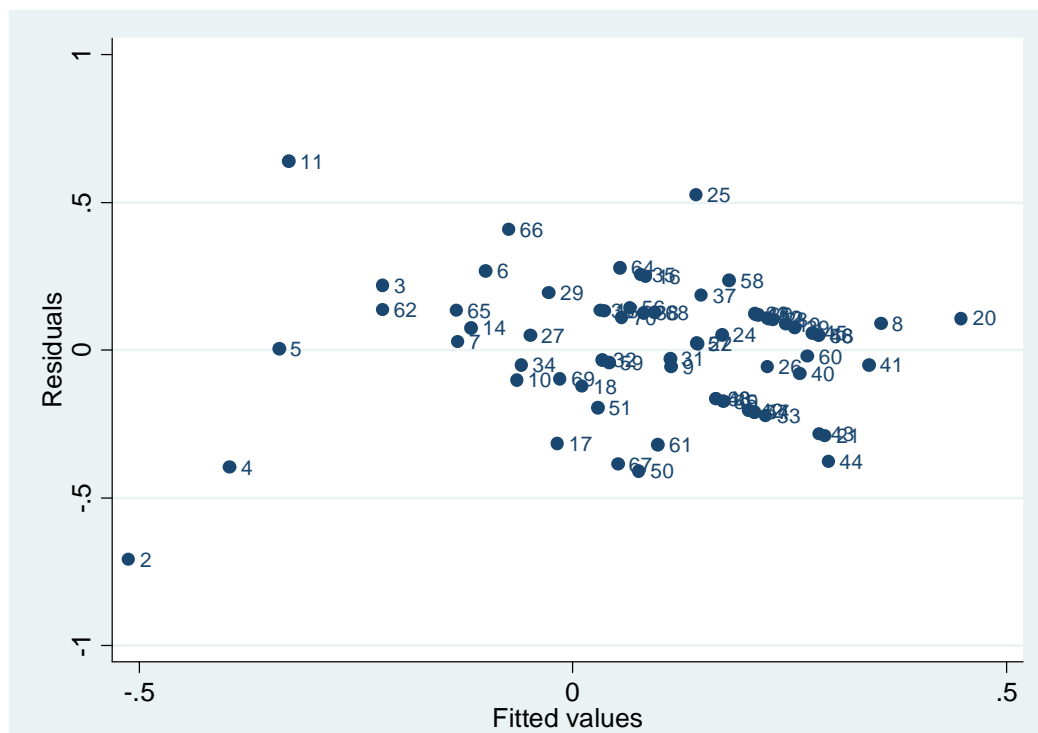


Figure A8: Residual Plot for Model 2

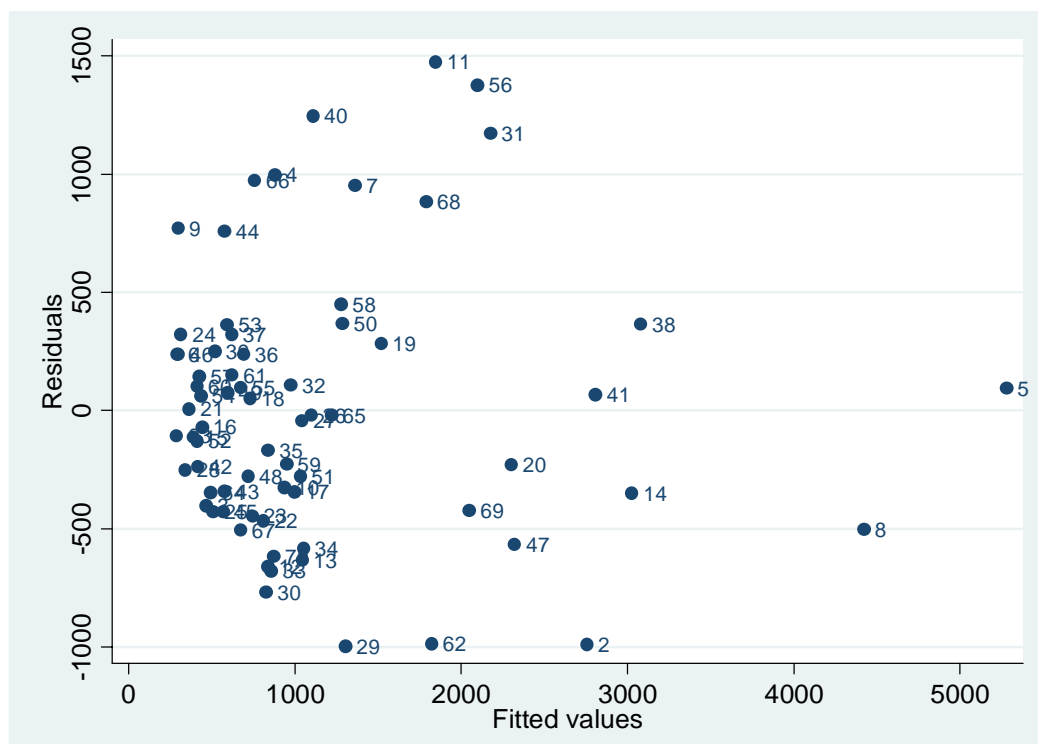


Figure A9: Residual Plot for Model 4

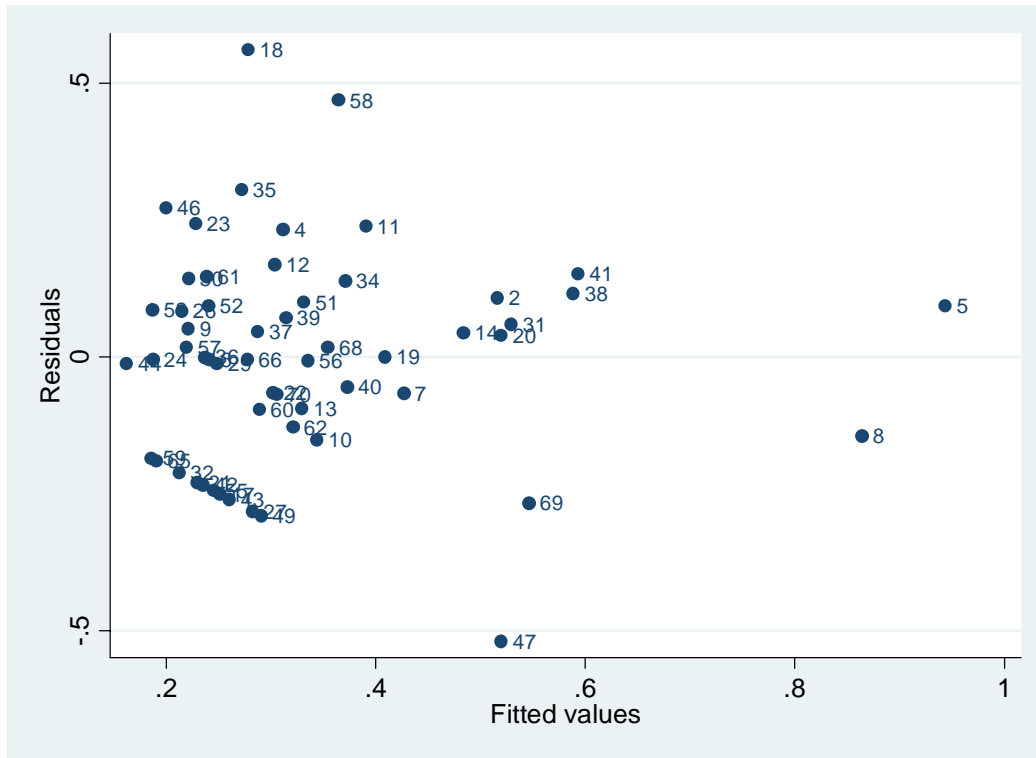
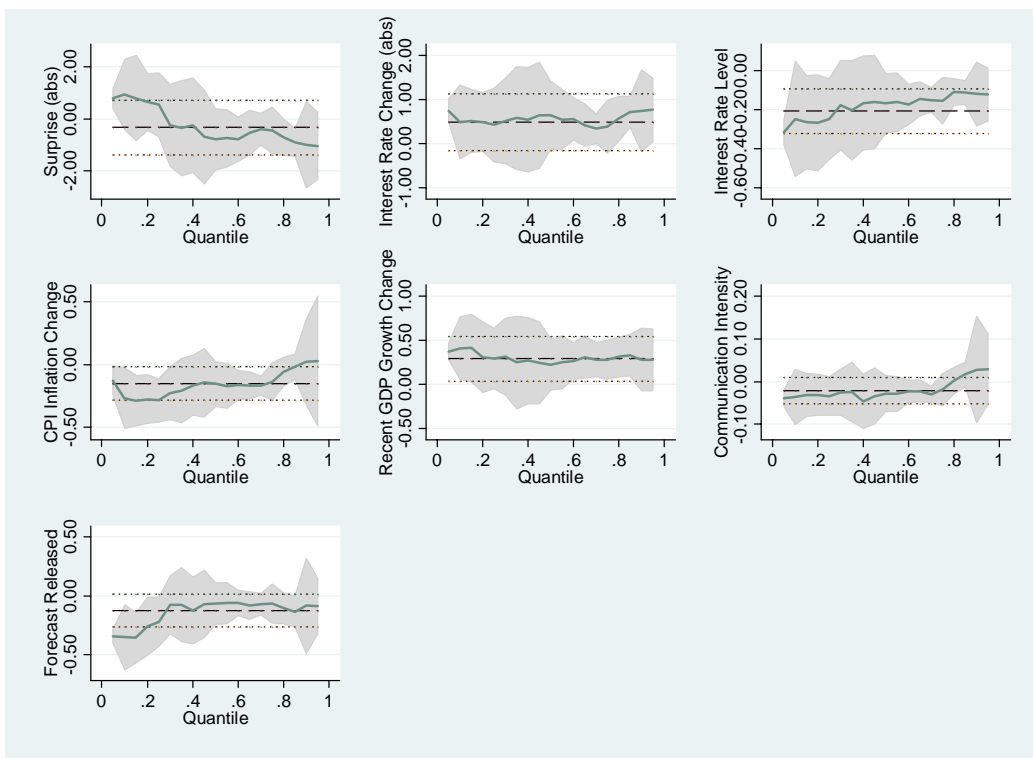
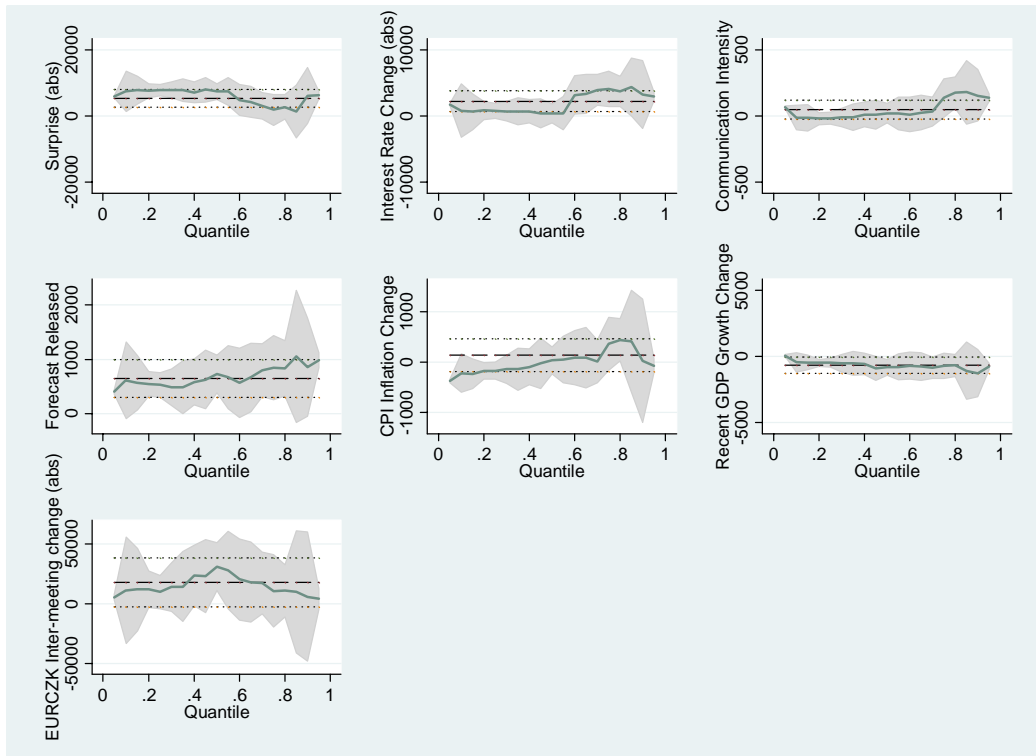


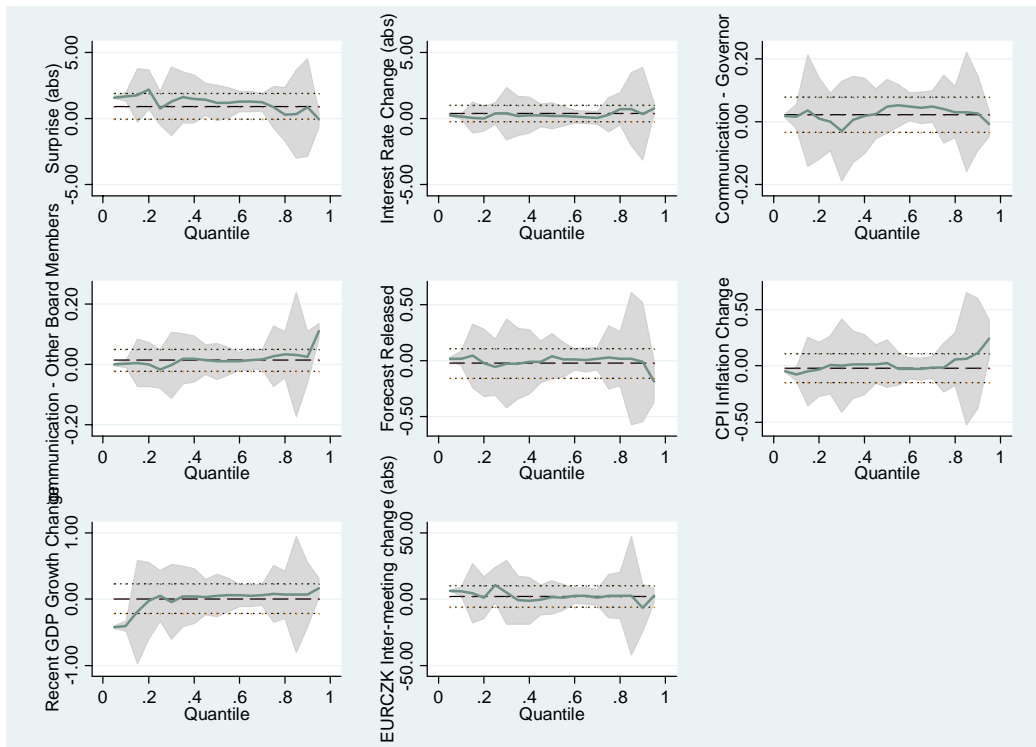
Figure A10: Determinants of Favorableness – Marginal Effects evaluated at different quantiles of Favorableness



**Figure A11: Determinants of Extent – Marginal Effects evaluated at Different quantiles of Extent**



**Figure A12: Determinants of Dispersion of Favorableness – Marginal Effects evaluated at different quantiles of Dispersion**





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April 2008	<i>Ten years of inflation targeting</i>
December 2007	<i>Fiscal policy and its sustainability</i>
August 2007	<i>Financial stability in a transforming economy</i>
November 2006	<i>ERM II and euro adoption</i>
August 2006	<i>Research priorities and central banks</i>
November 2005	<i>Financial stability</i>
May 2005	<i>Potential output</i>
October 2004	<i>Fiscal issues</i>

May 2004      *Inflation targeting*  
December 2003      *Equilibrium exchange rate*

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