Quest for Central Bank Communication.

Does It Pay To Be "Talkative"?

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Abstract

On the basis of a unique database of policy makers' verbal comments, we find that central bank "talk" in the Czech Republic, Hungary, and Poland influences behavior of financial markets. This effect, however, differs among the analyzed countries. The CEC3 central banks' communication strategies are far from uniform. The CNB does a better job than the other central banks in matching words with deeds. Communication affects monetary policy predictability, but results depend on the committee structure and communication style. Finally, we provide evidence that pursuance of too many targets leads to inconsistencies in central bank communication.

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1   Introduction

Since the beginning of the 1990s central banking practice has shifted from secrecy towards more transparency about monetary policy strategy and objectives. Indeed, three out of four central banks consider transparency as a vital or very important component of their monetary policy framework (Fry et al., 2000). One underlying factor behind this trend is undoubtedly the link between transparency, credibility, and policy effectiveness.

On the one hand, central bank power seems to be limited, since the short-term interest rate, which constitutes the main instrument of monetary policy in most industrialized economies, matters very little for the future inflation outlook and for prospective economic activity (Svensson, 2005). On the other hand, efficiency of monetary policy may greatly be improved through its impact on private sector expectations. Expectations about the entire future path of interest rate shape the yield curve and thus determine long term rates, which, in turn, largely affect private sector consumption and investment decisions. In this respect, monetary policy is increasingly becoming an art of managing private sector expectations.

Since central bank communication serves as a means to remove asymmetric information between markets and policy makers, it may influence market *expectations* regarding *future* inflation and *future* interest rate changes. Consequently, it is of paramount importance that in the decision-making process central banks account for the effects of their actions, including communication, on both short and long-term interest rates.[1]

The central bank's power to manage private sector expectations depends on its ability to communicate intentions in an intelligible manner. Therefore, the effectiveness of monetary policy should benefit from transparency the most, when it is accompanied by good communication policy (Issing 2005, Winkler 2000). In this sense, good communication is an indispensable element of transparency. Its importance has been emphasized by Woodford (2005) who argues that good communication, preferably a history dependent one, could replace policy action itself.

On the other hand, Amato et al. (2003) point to the double-edged nature of public information, which may suppress the private information of individual agents and thus crowd

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[1] The role of communication for the effectiveness of monetary policy is stressed, *inter alia*, in Blinder (1998), Issing (2005), and King (1997).

out an important source of information for a central bank.[2] The question that then arises is whether more "talkative" policy makers help to dispel doubts or rather add to confusion as regards prospective interest rate decisions? The relevance of this issue seems to be supported by the recent efforts of central bankers around the world not only to achieve more, but rather better transparency.

Despite the recent proliferation of literature on transparency and communication, including the way these concepts are measured and their role in monetary policy effectiveness, the topic is far from being exhausted, not least in the field of empirical research.[3] In particular, very few attempts have been made to assess central bank transparency in emerging economies; still less has been done to investigate the effects of central bank communication in this group of countries.[4] This paper aims to fill this gap.

In our study we assess monetary policy communication in the CEC3 countries, i.e. the Czech Republic, Hungary, and Poland. All the CEC3 central banks have conducted monetary policy under an inflation targeting (IT) strategy. Nevertheless, their frameworks are not uniform. In particular, the National Bank of Hungary (MNB), in addition to the inflation goal, has an exchange rate target.

For the purpose of our study we have built a unique database of policy makers' verbal comments. We analyze the CEC3 communication strategies and examine to what extent policy makers' words correspond with their deeds. We also investigate whether central bank "talk" provides relevant information for economic agents, and - consequently – whether it influences their behavior. Benefiting from the contribution of Bernanke et al. (2004) we have not confined ourselves to a general conclusion whether statements of the policy makers *do* influence the market-based indicators. We also examine whether central bank "talk" affects expectations of future decisions in the desired direction and whether and when this impact varies with the horizon of the potential interest rate movements. Finally, we investigate to

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[2] Svensson (2006) indicates, however, that Amato et al. (2003) findings have been misinterpreted as antitransparency results, whereas – he argues – they are actually pro transparency. Svensson stresses that except in very special circumstances, more public information is good.

[3] The role of transparency in monetary policy was examined, *inter alia*, in Canzoneri (1985), Faust and Svensson (1998), Eijffinger et al. (2000), Jensen (2002). A comprehensive overview of theoretical studies on central bank transparency is presented in: Geraats (2002), Hahn (2002), Carpenter (2004). For empirical studies on the reaction of financial assets to communication see, for example: Conolly and Kohler (2004), Ehrmann and Fratzscher (2005a), Kohn and Sack (2003), Gürkaynak et al. (2005). Research focusing on explanation of central bank decisions via its communication instruments include: Gerlach (2005), Heinemann and Ulrich (2005), and Ehrmann and Fratzscher (2005b).

[4] Central bank transparency in CEE countries was analyzed, for example, in Matousek (2001), Jarmużek et al. (2004), Czogała et al. (2005), and Łyziak et al. (2006). To our knowledge, no research has been done on the effects of central bank communication on asset prices in CEC3 countries.

what extent the predictability of monetary policy decisions has been influenced by central bank communication. To this end, we apply the method that allows examining whether more intense and/or unanimous communication on the part of a central bank helps to reduce the unexpected component of a monetary policy decision.

Our results are as follows. First, we find that communication strategies largely differ among the CEC3 countries and that policy makers' words often do not correspond with their deeds.

Second, we provide evidence that central bank "talk" does influence market expectations of future policy decisions. The strength and significance of this effect vary with the horizon of potential interest rate movements and largely depend on the adopted form of communication. Not all central banks have been equally successful in affecting market-based indicators, however. The results differ among countries, with some puzzling findings for Hungary, which might be related to the duality of its monetary policy framework. Indeed, this study shows that inclusion of additional targets under an IT regime leads to inevitable inconsistencies also in the field of central bank communication.

Third, the analysis provides mixed results as to the impact of central bank communication on the predictability of monetary policy decisions in the CEC3 countries. The extent to which the amount of statements and the degree of disagreement among policy makers affect predictability of central bank decisions may depend on the communication strategy in general, and the committee structure in particular. The effectiveness of the *individualistic committee's* communication (see Blinder, 2006) may in turn hinge on the availability of other communication instruments, such as minutes or release of voting records. Another factor that seems to influence the impact of central bank "talk" on the predictability of monetary policy decisions is the consistency of policy maker statements, i.e. the extent to which their words correspond with their prospective deeds.

The outline of the paper is as follows. In the second section our data and methodology are presented. The third section contains the evaluation of the communication strategies of the Czech National Bank (CNB), the MNB, and the National Bank of Poland (NBP). It also includes an analysis of the consistency and effectiveness of central bank communication in Poland, Hungary, and the Czech Republic, as well as an assessment of the extent to which policy makers' words influence the predictability of central bank decisions. The final section concludes.

2 Methodology

2.1 Measuring communication

In order to assess the effects of central bank "talk" we first investigate all statements of the policy makers related to future monetary policy decisions. These statements have been split into different categories, depending on whether made verbally by the policy makers (ST) or stated in the MPC Communiqué (C). In the Czech Republic, however, communiqués are limited to mere a decision. Therefore, CNB statements during the press conferences held on the meeting days were instead included in the overall assessment of communication of this central bank.

Moreover, we differentiate between the statements made by the Governor (ST_{Gov}) and other MPC members ($ST_{Non-Gov}$) in order to check whether the former might influence the markets in a more significant manner. Next, we distinguish between statements whose contents were deemed relevant for the monetary policy inclination (MP), the economic outlook (EC), or exchange rate behavior (FX)[5], although for the MNB communiqués, we have found only two relevant observations on economic outlook statements. We drop central bank "talk" when it has concerned other topics. Finally, we assign the following values to the distinguished statements:

$$ST_t^{MP} = \begin{cases} +1 & \text{inclination of tightening monetary policy} \\ -1 & \text{inclination of easing monetary policy} \end{cases}$$

$$ST_t^{EC} = \begin{cases} +1 & \text{improved economic outlook} \\ -1 & \text{weaker economic outlook} \end{cases}$$

$$ST_t^{FX} = \begin{cases} +1 & \text{indication of undervalued exchange rate} \\ -1 & \text{indication of overvalued exchange rate} \end{cases}$$

Since our assessment has to involve some degree of subjectivity, we aim at reducing it by looking at the analysts' comments and opinions on the MPC statements and communiqués.

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[5] Here we follow an approach adopted by Ehrmann and Fratzscher (2005a), although their analysis did not include the communication on the exchange rate.

These are found in the newswire services[6], such as *Reuters News, Dow Jones International News, ISI Securities* and - additionally for Poland - *PAP*. These services are also extensively used while searching statements made by MPC members. We analyze all the reports that include the name of the policy maker, which has been the search command that we employ. While picking *relevant reports* and assigning to them the exact time they were made public, following Ehrmann and Fratzscher (2005a) we choose only the first report in the newswire service and pass over subsequent reports and comments on the same statement. Using this source of information enables us to obtain statements, as well as other analyzed events (e.g. monetary policy decisions, release of macroeconomic news) with the exact time they are released.

We analyze the period between 1 January 2001 and 31 December 2004. This period covers 178 *committee days*[7], 169 communiqués, and 367 verbal statements.[8] The number and structure of all observations concerning monetary policy statements are given in Table 1.

[insert Table 1 here]

2.2   Applied methodology

2.2.1   Model framework

To investigate whether central bank statements in the Czech Republic, Hungary, and Poland influence behavior of the economic agents, we measure the reaction of financial variables to monetary policy statements. We examine how yields with different maturities react to central bank "talk" in terms of both their level and volatility. Lack of intra-day data for the CEC3 countries limits the analysis to daily movements of financial variables.

As each communiqué is preceded by a decision on interest rates, which may have a significant impact on the financial asset pricing, we need to control for this effect.[9] We achieve it by allowing each financial variable to respond to an unexpected component of the

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[6] In order to access e.g. the Reuters News the *Factiva* on-line service has been used.
[7] i.e. the days when the MPC or the Board hold the meeting during which the decision on interest rates is made.
[8] This number relates only to those statements that have been found relevant for this study.
[9] No interest rate change on the committee day has also been classified as a *decision.*

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monetary policy decision, approximated by the short-term interest rate change on that day.[10] For all other *non-committee* days the measure of the surprise component has been set to zero.

Release of macroeconomic news is another factor that may significantly influence the movements of financial variables. The need to control for this effect is particularly important when one takes into account the fact that data releases often take place on the same day or even in the short-time window surrounding a central bank decision or a policy maker statement. In order to cope with this issue, firstly, we select a number of macroeconomic variables that are important to decisions of financial market participants.[11] The relevance of these economic data seems to be supported by their inclusion in the most popular analysts forecast polls. Secondly, similarly to Kohn and Sack (2003), for each macroeconomic news we calculate the surprise component, measured as the difference between the expected value less the realized value, the former corresponding to the median from the *Bloomberg* and - where necessary - *Reuters* and *PAP* surveys. Finally, we allow each financial variable to respond to the surprise component normalized by its standard deviation. For all days with no data release that component has been set to zero.

Moreover, we include the euro area interest rate of the corresponding maturity into our regressions. Although the forecasted eurozone membership dates for all three countries in the analyzed period seemed still too distant to directly affect the yields between three-month and five-year maturity, large capital gains in convergence trades before the 1999 euro launch made many investors position themselves for the second convergence opportunity.[12] Unlike in the past, market participants started to focus on five year forward rate in five years, which even became a convergence probability indicator. These forward rates came under buying pressure, which also affected shorter maturities. Moreover, since markets started to focus on spreads between converging countries' yield curves and the euro yield curve, the latter's movements were also reflected in the local yield curve changes.[13]

As already mentioned, we aim to measure the influence of communication on both the level and volatility of financial asset prices. In order to test both and account for the interaction between the two we use the Exponential GARCH (EGARCH) model, proposed by Nelson (1991). This approach has already been applied in several research studies on the

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[10] For the yields whose quotations are set before an announcement, a respective figure from the following day is taken into account.

[11] For the CEC3 countries it gives a total of 1374 macro releases over the analyzed period.

[12] Even specialized convergence funds were established.

[13] This observation has led some authors to propose a change in monetary policy frameworks in converging countries to reflect the fact that long-term and short-term interest rates between these countries and the eurozone have to converge - see Orłowski and Rybiński (2006).

reaction of financial variables to monetary policy communication (Connolly and Kohler, 2004; Jansen and De Haan, 2005; Ehrmann and Fratzscher, 2005a). In this paper, the conditional mean equation for the asset price return and the equation for the conditional variance are specified in the EGARCH(1,1) framework as follows:

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\begin{aligned}
r_t = {} & \beta_0 + \sum_i (\delta_i r_{t-i}) + \beta_1 MSC + \sum_{k=1}^{4} \beta_{2,k} D_{k,t} + \sum_{j=1}^{n} (\beta_j^{mac} mac_{j,t}) + \beta^{EUR} r_t^{EUR} + \beta^{EC} ST_t^{EC} \\
& + \beta^{MP} ST_t^{MP} + \beta^{FX} ST_t^{FX} + \lambda^{EC} C_t^{EC} + \lambda^{MP} C_t^{MP} + \lambda^{FX} C_t^{FX} + \varepsilon_t
\end{aligned} \tag{1}
$$

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\varepsilon_t \mid \psi_{t-1} \sim N(0, h_t) \tag{2}
$$

$$
\begin{aligned}
\ln(h_t) = {} & \gamma_0 + \gamma_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \gamma_2 \left(\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right) + \gamma_3 \ln(h_{t-1}) + \gamma_4 |MSC_t| + \sum_{k=1}^{4} \gamma_{5,k} D_{k,t} \\
& + \sum_{j=1}^{m} (\gamma_j^{mac} |mac_{j,t}|) + \gamma^{EUR} |r_t^{EUR}| + \gamma^{EC} |ST_t^{EC}| + \gamma^{MP} |ST_t^{MP}| + \gamma^{FX} |ST_t^{FX}| + \chi^{EC} |C_t^{EC}| + \chi^{MP} |C_t^{MP}| + \chi^{FX} |C_t^{FX}|
\end{aligned} \tag{3}
$$

where:

r_t – change in the domestic interest rate, in basis points

r_t^{EUR} – change in the euro zone interest rate, in basis points

MSC – the unexpected component of policy decisions, approximated by the change in the one-month money market rate on the committee day, zero otherwise

mac_j – the jth macroeconomic data surprise

$\beta_{2,k}$ - denotes the day of the week effect, while $D_{k,t}$ is a corresponding value of the dummy variable taking values 1 (for the kth day of the week at time t) or 0

ψ_{t-1} - the information set at time $t-1$

h_t – the conditional variance

As the left-hand side of the equation (3) is the *ln* of the conditional variance, there is no need to impose non-negativity restrictions on the conditional variances. The model has beem estimated with the method of maximum likelihood and the heteroskedasticity consistent covariance matrix has been applied (Bollerslev and Wooldridge, 1992).[14]

For each country we arrive at a different specification of the model. We employ the *general-to-specific* approach. First, we select a group of variables[15] that could – in our assessment - be relevant for financial markets. Next, for each maturity of the yield curve, we run a separate regression on the variables chosen. Subsequently, we gradually reduce each regression by eliminating those variables (one by one) that have turned out not to be significant in either mean or variance equation. As a result, we get a different specification of the model for every maturity of the yield curve. We then collect a set of variables that have been found significant in at least one of the equations. Finally, we regress each of the analyzed yields on that set of variables. This procedure is repeated for each of the CEC3 countries. The estimation results are discussed in the section 3.2.

2.2.2   Monetary Surprise Component

We also investigate to what extent the predictability of monetary policy decisions has been influenced by the central bank "talk". To this end, we try to answer the question of whether the number of statements and unanimity among policy makers matter for the effectiveness of central bank communication. In this approach the absolute monetary surprise component on the committee days (normalized by the average volatility of money market interest rates) is regressed on the "stock" and the absolute value of the "consensus ratio" as stated in the equation (4). An alternative measure of the *consensus* or *dispersion ratio* was introduced, e.g., in Jansen and de Haan (2006). Another study that also examines the impact of frequency and dispersion of statements on the predictability of monetary policy decisions is Ehrmann and Fratzscher (2005b).

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[14] We have also estimated the model with GED and Student-t error distribution, but the results do not change the conclusions.

[15] Both communication and macro variables. Depending on their availability, the set of data differ among the analyzed countries.

$$\frac{|MSC_t|}{volatility_t} = \beta_0 + \beta_1 stock\_ratio_t + \beta_2|consensus\_ratio_t| + \sum_{j=1}^{m}(\beta_j^{mac}mac_{j,t}) + \varepsilon_t$$

(4)

where:

$\dfrac{|MSC_t|}{volatility_t}$ - ratio of the absolute monetary surprise component to the average volatility of

one month interest rate

$stock\_ratio_t = \sum_{i=1}^{n}(SUM_{t-i}^{ST^{MP}})$ - the number of statements (including communiqué) with

inclination on monetary policy made in the inter-meeting period, where:

n - the number of days that have gone by since the previous meeting day

$SUM_t^{ST^{MP}}$ - the number of statements on day t

$consensus\_ratio_t = \dfrac{\sum_{i=1}^{n}(\sum_{j=1}^{k}(ST_{t-i,j}^{MP}))}{\sum_{i=1}^{n}(SUM_{t-1}^{ST^{MP}})}$ - the net-balance of monetary policy inclination

statements and communiqué in relation to the total number of statements in the
inter-meeting period (k stands for the number of statements on the (t-i)th day).

mac_j – the jth of m macroeconomic data surprises released in the inter-meeting
period

$volatility$ – standard deviation of the daily changes in one month money market rate over
ten days preceding the committee day

One might expect that news on macroeconomic data might influence the predictability of policy decisions, as well as central bank communication. In order to deal with an omitted variable bias we include macroeconomic surprises among the explanatory variables in equation (4). At the same time, contrary to Ehrmann and Fratzscher (2005b), we do not build an index of macro surprises, for the news releases for different data should be of different importance to market participants and central bank decisions.

Moreover, we run the regression twice: first, for the absolute monetary surprise component, and second, for this component normalized by the average volatility of money market rates. The advantage of the latter approach is that it accounts for a change in one-month interest rate on the committee day, being the result of interest rate volatility that simply

reflects higher interest rate level[16] or the period of increased market uncertainty caused by factors other than monetary policy statements. As to the estimation technique, since the absolute monetary surprise component has to be a non-negative value, it requires the appliance of the tobit model.

Yet another issue we have to deal with is the potential endogeneity bias. In particular, predictability of central bank decisions may be lower, as evidenced in section 3.3, when interest rates are changed. At the same time, such circumstances may influence communication in the period preceding the committee day. Therefore, similar to Ehrmann and Fratzscher (2005b), we cope with this potential endogeneity bias by instrumenting the consensus ratio through various factors that might influence the degree of unanimity between policy makers, but at the same time are orthogonal to the consensus ratio as well as to the forthcoming monetary policy decision. Since the value of the consensus ratio ranges between zero and one, estimation is based on censored regression. After obtaining the instrumented consensus ratio we replace it for its actual values and run regression (4) again.

3   Assessment of central bank communication in CEC3

3.1   *Effectiveness of communication in CEC3*

Before moving on to a more technical analysis, we look at the central bank communication, divided into three categories, i.e. statements and quotes related to (1) monetary policy inclination, (2) to economic outlook and (3) to the strength or weakness of domestic currency. Aggregated data for all MPC (Hungary, Poland) or Board (Czech Republic) members are presented in Table 1. It groups central bank comments regarding monetary policy inclination, economic outlook, and exchange rate level into dovish/hawkish or weaker/stronger and compares these distributions with the actual outcomes. In addition, we distinguish governors' statements, as one might expect that their voice weighs more than that of other MPC members. This simple analysis shows stark differences in the communication style between the three analyzed central banks.

The preliminary assessment of the CEC3 communication strategies is based on setting the ratio of tightening to easing statements (Table 1, rows 1-2, column 3) against the ratio of interest rate increases to interest rate reductions (row 3, column 3). This simple comparison

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[16] The 2001-2004 period covers the disinflation policy accompanied by the gradual interest rate reduction from double digit levels. Therefore, the lack of scaling factor might seriously disturb our results.

suggests that among the three central banks it is the CNB - its governor in particular - that has provided the best guidance on interest rate decisions to financial markets.

In the case of Hungary and Poland, we find some "communication tightening bias", which is the most severe in the case of the NBP Governor. While rate cut decisions have vastly dominated rate hikes in Poland with a ratio of seven to one, 63% of the MPC comments and 71% of the NBP Governor statements suggest monetary policy tightening.[17] This somewhat surprising observation is confirmed by the analysis of comments on the economic outlook.[18] According to these calculations, the NBP communication has been dominated by too optimistic economic growth perspectives, while the CNB has been much more balanced in this respect.

In the case of communication on exchange rate developments, we again observe very different patterns.[19] In the presence of the currency appreciation trend, 100% of the CNB statements on the koruna level indicates its overvaluation or suggest that it should weaken. Contrary to the CNB stance, the Hungarian central bank tends to indicate that the forint should appreciate. In Poland, the MPC view on the zloty is more balanced.

Yet another difference worth noticing is that in the Czech Republic and Poland the governor's comments appear relatively less frequently than in Hungary, where the governor's statements have dominated the MNB communication.

The above analysis based on the *average* ratio of tightening to easing statements has obvious drawbacks. It does not take into account that frequency of statements vary over time and, consequently, that the analyzed ratios are also time-varying. Moreover, it interprets all, for instance, tightening statements as indicating interest rate increases, whereas in some situations they simply point to a more moderate rate cut than expected by the markets. To cope with these shortcomings, we extend our analysis by constructing the *consistency indicator*, which aims to measure whether policy makers' words match their deeds.

The indicator consists in comparing monetary policy inclination with the *actual* changes in central bank interest rates relative to the *expectations* as regards that interest rate path.[20] If,

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[17] It should be noted, however, that in a number of cases we assign tightening inclination to statements which signal that future rate cuts would be more moderate than market expectations. This shortcoming is dealt with another indicator that is presented in this section.

[18] Economic performance relative to market expectations has been approximated by comparison of industrial output releases relative to market consensus forecast (row 4, column 3) – see Table 1.

[19] For the purpose of this analysis we first count the number of months with currency appreciation against the euro. The results are similar for all CEC3 countries, with the percentage of months with currency appreciation being higher than the respective figure for the exchange rate weakening (Table 1: row 5, column 3).

[20] More precisely, we calculate the difference between the average official rate (geometric mean) over three months after the statement and the three-month money market rate quoted at the time directly preceding the statement. We also adjust the calculated difference for the average spread of the money market rate over the

for example, a tightening monetary policy statement is followed by the actual interest rate path above the one expected at the time preceding the statement, then words are deemed to be consistent with deeds, and the consistency indicator is increased by 1 (in the opposite case the indicator is reduced by 1). Figures 1a – 1c illustrate the *cumulative* value of the consistency indicators for the CEC3 countries, which have been scaled so that they range between -100 (completely misleading statements) and +100 (completely consistent communication).

[Insert Figures 1a-1c here]

The CNB communication about future interest rates is found to be the most consistent among the CEC3 countries. The MNB results, in turn, are largely affected by its communication failure in the period between November 2002 and January 2003, when Hungarian policy makers faced the inconsistency of the simultaneous pursuance of inflation and exchange rate targets (see section 3.2). Moreover, the ratio deteriorated in 2004, when a series of interest rate cuts was not preceded by the appropriate "dovish" comments. In the case of the NBP, for the most of the period the consistency indicator was fluctuating around zero. It then plummeted within the first six months of the new MPC conduct and rebounded significantly afterwards just to fall again at the end of 2004. The tentative explanation might be that the new MPC had first difficulty to communicate monetary policy, not least in the period of increased uncertainty due to EU accession, and the markets had to learn the speaking habits of the newly elected MPC members. After several months the mutual understanding seems to have improved, although some communication slip-ups were not escaped, as evidenced in Figure 1a.

These observations raise an obvious question as to why would some central bankers provide poor rate guidance and present misguiding economic outlook to the markets? In the case of Poland four hypotheses seem plausible. First, during the disinflation period the MPC might have preferred to err on the tightening side in order to secure that the process was not reversed.[21] Second, the Polish MPC might have valued deviations below and above the target

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central bank official rate (approximated by the average of three last spreads of one-month interest rate over the official rate one day after the meeting day). Although results do not change a lot, we believe that inclusion of the spread is more appropriate, since we observe systematic differences between one month money market rate and the central bank interest rate in the period covered by the analysis.

[21] Such behavior might have been induced by a rebound of inflation and sizeable target overshooting in 1999-2000.

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differently, i.e. its loss function was asymmetric.[22] If deviations above the target level were considered more costly by the MPC, it was probably reflected in the way the central bank conveyed its intentions and information to the public. Third, especially in the period preceding EU entry, the NBP staff forecasts overestimated the size and duration of the price shock related to EU accession. Finally, as Jonas and Mishkin (2005) point out, the NBP possibly "tried to use monetary policy to pressure the government to improve fiscal balance, and kept interest rates high even as inflation was falling below its target and growth came nearly to a halt". Indeed, fiscal policy played a very important role in the NBP communication, which has diminished only recently after new nine MPC members were elected in the early 2004.

The above mostly descriptive analysis suggests that central bank communication strategies in the Czech Republic, Hungary, and Poland are far from uniform. At the same time, it is the CNB whose communication seems to be the most consistent with its deeds. Whether it translates into the effectiveness of the central bank "talk" is the question that is investigated in the next section.

3.2   *Influence of communication on financial market expectations and uncertainty*

Central bank power to manage private sector expectations depends on the policy makers' ability to communicate their intentions in a clear manner. However, if a central bank is to steer those expectations as intended, policy makers must first possess the skills to guide the markets through effective communication. To assess the effectiveness of central bank communication, we investigate whether the central bank "talk" in Poland, Hungary, and the Czech Republic provides relevant information for economic agents, and - consequently – if it influences their behavior. For this purpose we use the EGARCH (1, 1) framework that has been described in the section 2.2.1.

Results reported in Tables 2 and 3 suggest that monetary policy communication in the CEC3 countries does influence the asset prices. This impact is mostly evident at the short and medium maturities of the yield curve. However, the effectiveness of communication of the three analyzed central banks is far from uniform.

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[22]This hypothesis is supported by the fact that (as indicated in Figure 2a) inclination remained biased towards tightening also in the last stage of the rate cut cycle (in 2003) and during the period of flat interest rates, when inflation had already been reduced to very low levels, significantly below the target.

[Insert Tables 2, 3 here]

An interesting observation is that almost each of the defined communication tools influences the yield curve at least in one country, but no central bank can effectively apply all of the analyzed instruments. The impact of the central bank statements on the yield curve ranges in absolute value from 0.5 to 12.5 basis points. The strength and significance of this effect differ among countries, vary with the horizon of potential interest rate movements and largely depend on the adopted form of communication.

In the case of statements about monetary policy inclination, their impact on the financial asset prices is evident in the analysis of both Polish MPC and CNB Board Members comments. Their statements influence the yield curve in a "desired" direction[23] at maturities up to two years. In Poland the effect ranges from 0.8 to 2.5 basis points (Table 2a). At the same time the CNB comments related to the prospective interest rate changes affect the yield curve more moderately than comments by the Polish MPC and their impact does not exceed 1 basis point (Table 2b).

Yet different results show up for the Hungarian MPC, whose statements about monetary policy inclination seem not to work at all (Table 2c). If anything, the direction in which such comments work is counterintuitive, i.e. tightening comments lead to a puzzling decrease in the level of interest rates, as evidenced, for example, for the three-month maturity. Contrary to this, the MNB comments on the exchange rate affect one year rate in the "right" direction[24] and this impact is significant, unlike exchange rate statements of the CNB and NBP policy makers.

The explanation of the above puzzling response of the asset prices to MNB monetary policy inclination statements might lie in the dual nature of the Hungarian monetary framework. In the world of free capital flows, pursuing both inflation and exchange rate targets might lead to contradictions between the two. It was indeed the case in Hungary where, on the one hand, persistent inflation pressure called for monetary policy tightening reflected in the "hawkish" tone of the MPC member statements. On the other hand, the potential upward movement of the central bank interest rates would often be inconsistent with

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[23] It means that MPC statements that reveal information on monetary policy tightening lead to an increase in market interest rates. Similarly, MPC statements that hint at monetary policy easing lead to a decrease in market interest rates.

[24] It means that statements indicating, for example, the overvaluation of the *forint* or suggesting that it should weaken lead to a decline in market interest rates.

the simultaneous pursuance of the exchange rate target, not least when the *forint* was approaching the appreciation end of the target band. Figure 2f confirms that a lot of statements signaling monetary policy tightening were made at the time of the strong Hungarian currency. The results reported in Table 2c suggest that in the markets' view the exchange rate target prevailed over the inflation goal[25], since comments on the *forint* level were effective in influencing the yield curve, while statements about monetary policy inclination turned out to be either useless or counter-productive. After the "communication turbulence" at the time of exchange rate pressures, consistency of the Hungarian central bank statements seem to have improved significantly in the second half of 2003, as evidenced by the indicator illustrated in the Figure 1c. However, enhancement in the effectiveness of the MNB "talk" might have been limited by the credibility loss incurred at the time of the previous communication failure.

[Insert Figure 2 here]

Moving on to policy maker statements about economic outlook, the results reported in Tables 2 a-b suggest that this form of communication seems to be ineffective in the CEC3. The only significant coefficients are those for the CNB, with a puzzling negative response of the one-year and two-year interest rate.[26]

When accounting for the effects of the MPC communiqués or - in the case of the CNB - the Board press conferences, the results are again far from uniform. When information on the monetary policy inclination is conveyed, the CNB Board conference and MNB communiqués affect the yield curve up to one-year maturity, while in Poland this form of communication does not play an important role. However, when it comes to information on the economic outlook, the Polish and Czech communiqués seem to have some positive effect. The common finding is that, when significant, the influence of communiqués on financial asset prices exceeds that of the policy makers' verbal statements.

As expected, we find that the euro yield curve has a significant impact on the local yield curves. This is particularly evident in the case of Polish and Czech financial markets,

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[25] Market participants believed that, despite higher inflation, interest rates would be decreased in order to ease the appreciation pressure on the *forint*.

[26] i.e. improved (weaker) economic outlook statement has been on average followed by a decline (increase) in the market interest rates

while in Hungary local factors play a relatively bigger role in shaping the yield curve. Quite surprisingly, we observe that in Poland and the Czech Republic also short-term interest rates are affected by the corresponding eurozone interest rates, which might suggest that markets got ahead of the game in their convergence bets (see section 2.2.1).

The effectiveness of monetary policy communication has also been analyzed in terms of its impact on the volatility of financial variables (Table 3). An interesting observation is that the NBP communication tools hardly increase volatility of the asset prices. The same cannot be said for other countries, however, where communication often goes in tandem with an increased variance of financial variable returns. Moreover, MNB statements about monetary policy inclination add to volatility of the yield curve for all maturities. Combined with a reported puzzling effect of these statements on the level of market interest rates, this emphasizes how noisy and non-transparent the communication can be in the environment of inconsistent monetary policy framework.

To get a better feeling of the importance of the communication influence on the market behavior, we compare it with the impact of macroeconomic news on financial asset prices, both approximated by the coefficients reported also in Tables 2 and 3.[27] The results indicate that in the CEC3 countries macro-news does affect the yield curve for all maturities, although its impact is getting less evident after the one-year horizon. Moreover, it is worth noting that financial variables reaction to macro-surprises is almost always consistent with intuition. However, the set of macro-news and the strength of their impact on the asset prices differ among the analyzed countries. Financial variables react to a large group of macro-news both in Poland and the Czech Republic, though in the former their responsiveness is more evident. In Hungary, in addition to CPI, financial asset prices react to the news on trade balance and current account data. This latter finding might be related to the importance of the exchange rate target in Hungary, as well as to its external imbalances that made the markets more sensitive to the balance of payments data.

Notwithstanding differences among the CEC3 countries and between the effectiveness of various forms of communication, empirical evidence indicates that the central bank "talk" does matter and seems to affect financial markets in a similar fashion as macroeconomic-news. Moreover, in most cases asset prices move in the desired direction indicated by policy makers' statements. It is also worth to note that, when significant, the strength of the impact

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[27] However, a caveat is that these coefficients are not strictly comparable due to differences in the way the macro-surprises and communication regressors have been constructed. See section on data description.

of communication on financial variables is similar to that reported for developed economies (Ehrmann and Fratzscher, 2005a). This study thus supports the evidence on the importance of monetary policy statements on the asset prices, which – to our knowledge - has so far been provided only for most developed economies (e.g. Bernanke et al., 2004; Gurkaynak et al., 2005; Ehrmann and Fratzscher, 2005a). Therefore, one might expect that in the CEC3 countries communication has also helped to increase predictability of central bank decisions. This issue is examined in the section that follows.

3.3   Predictability of monetary policy decisions

Provided that monetary policy is communicated in a transparent manner and that there is no asymmetric information between the markets and policy makers, central bank decisions should be in line with the market expectations. Consequently, the monetary surprise component, approximated by changes in short-term interest rates on the meeting day[28], should be small.

Based on this criterion, the results reported by Ehrmann and Fratzscher (2005a) point to relatively predictable monetary policy decisions of the ECB, the Federal Reserve, and the Bank of England. For these central banks the absolute surprise component ($|MSC|$) on average amounted to 3.6, 5.6, and 6.0 basis points respectively.

In the current CEC3 study, the results for the Czech Republic (5.9 basis points) might indicate that the CNB has caught up with the world leading central banks in terms of monetary policy predictability (Table 4, row 1). On the other hand, the figures obtained for Poland and Hungary would suggest that in these countries central bank decisions are hardly predictable. For the NBP the mean absolute unexpected component of the monetary policy decisions is 14.6, whereas for Hungary the respective figure amounts to 20.8 basis points.

[Insert Table 4 here]

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[28] For the Czech Republic, Hungary, and Poland, one-month PRIBOR, BUBOR, and WIBOR have been used respectively. However, if the interest rate quotation is set before the central bank decision has been made public, the following day figure for the asset price change is taken into account.

However, the data in the same Table 4 indicate that there are other factors than communication that explain differences in the surprise component of the analyzed central banks' decisions. One such factor is the varying degree of market interest rate volatility. Absolute mean changes in one-month interest rates in Poland and Hungary are much higher than those in the Czech Republic (row 4). Consequently, shifting from the surprise component measured by its absolute change to the approach based on its relative change (accounting for the average volatility of one-month interest rates) results in an entirely different picture of predictability (row 5). Differences in the *level* of interest rates in the analyzed markets also explain varying degree of monetary surprise components in the CEC3 countries. Accounting for this factor allows us to receive yet another measure of central bank decisions predictability (row 8), which again reorders the initially obtained classification.

One common finding for the analyzed central banks is that decisions on the change in interest rates produce, on average, more surprise to the market (approximated by a change in the one-month interest rate - rows: 2, 6, 9) than decisions on no change in central bank instruments[29] (rows: 3, 7, 10). This difference in the surprise component is much larger for the CNB and MNB than for the NBP. At the same time, the proportion of decision days in the total meeting periods for the Czech and Hungarian central banks is much lower than in the case of the NBP (rows 11-12).

After shedding light on some non-communication factors that help to explain the differences in the monetary surprise components in the CEC3 countries, the key question that now arises is to what extent the predictability of central banks has been influenced by their communication policy? We approach this issue by introducing the method described in the section 2.2.2. We regress the absolute surprise component of the monetary policy decision on the "stock" of statements, the absolute value of their "consensus ratio" in the period preceding the central bank decision and the macroeconomic surprises (see equation (4)). Moreover, in order to cope with a potential endogeneity problem, described in the section 2.2.2., we instrument the "consensus ratio"[30] and replace it for its actual values and run again the regression (4). We also run the regression for the absolute surprise component of the

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[29] This is consistent with findings for other countries, see e.g.: Ehrmann and Fratzscher (2005a), Wilhelmsen and Zaghini (2005).

[30] In an instrument equation, explanatory variables comprise: macroeconomic surprises, stock ratio, lagged monetary surprise component, and a dummy decision variable. The dummy variable takes the value of one when there was a change in the interest rate and zero otherwise. It thus accounts for the periods of higher uncertainty related to changes in the central bank interest rates.

monetary policy decision normalized by the average standard deviation of one-month interest rate over the last ten days preceding the meeting day.

One might expect that an inherent feature of a *good* communication policy should be that an increasing stock of *useful* information provided by a central bank enhances predictability of monetary policy decisions. As for the voiced degree of disagreement, however, it is not that clear how it should influence the surprise component of the central bank decision. Obviously, *genuinely collegial committees* should avoid going public with dissent views, since they reach their decisions through a consensus and intend to build an aura of full agreement (Blinder and Wyplosz 2004; Blinder 2005). Contrary to that, in *individualistic committees,* where each policy maker votes individually and central bank decisions are taken by majority, providing the public with different views and opinions may in fact increase transparency of monetary policy. For in these circumstances, distinct views uttered by different mouths may help the markets to learn about the group dynamics, that is what majority is to prevail over the next meetings, and thus which decisions are to be made. Clearly, if different policy makers speak with one voice, predictability of the central bank decision should be even higher. However, if there is a small number of active speakers, who do not convey the majority view to the public, there is a risk of building a "minority consensus" that may be less informative than in the case when a larger number of policy makers present openly their views in a not necessarily unanimous manner.

This *heteregonous* communication under *individualistic committees,* however, is subject to the risk of speaking with too many voices, which would result in cacophony rather than clarity (Blinder 2005). Confusing the markets and the public is likely especially when it is difficult to identify a particular policy maker with either a dovish or hawkish faction. Clearly, a tightening statement of the hawkish central banker has different meaning than that of the dovish policy maker. In this context, the minutes and voting records may constitute vital communication instruments. Whereas the NBP has published voting records by names and the CNB has released the minutes, the MNB did neither in the period covered by the analysis (2001-2004).[31]

Moving on to the results reported in Table 5, it appears that monetary policy communication in the analyzed countries does influence the predictability of central bank decisions. This impact, however, largely differs among the CEC3 countries. The above

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[31] It is worth to note that the Hungarian central bank has recently begun to publish both the minutes and voting records. This communication improvement, however, is not covered by the period analyzed in this study.

findings are valid irrespective of whether we normalize the absolute surprise component or not.

[Insert Table 5 here]

The effectiveness of the CNB communication (approximated by predictability of its decisions) seems to improve with an increasing amount of statements. The positive sign of the consensus ratio co-efficient, in turn, may suggest that dissenting views of various policy makers in fact enhance the markets' understanding of the central bank thinking, and thus make monetary policy decisions easier to predict.

In Hungary, however, the communication coefficients are of opposite signs. The smaller amount of statements and the more unanimous they are, the more predictable are central bank decisions. The tentative explanation might be twofold. First, lack of minutes and voting records make it difficult to properly weigh a policy maker statement as that of a hawk or a dove.[32] Second, contrary to the CNB and NBP, communication of the Hungarian central bank has been dominated by the governor. Since the governor usually does not contradict himself during the same inter-meeting period, Hungary, not surprisingly, ranks first in terms of the average consensus ratio.[33] Consequently, if a consensus declines, it is mostly when, in addition to the governor, another MPC member expresses his or her opinion in public. However, a conflicting signal of a policy maker, who is difficult to be classified as a representative of either hawks or doves, may add to confusion rather than provide the markets with useful information.

Moreover, taking into account the already discussed duality of the Hungarian monetary framework, we modify the regression (4) in order to examine also the influence of exchange rate communication on the predictability of the MNB decisions. The results (not reported here, but available upon request) confirm the importance of the exchange rate target, and in particular the role of communication on that variable, which – when appears – increases the predictability of the central bank decisions.[34]

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[32] Indeed, the survey that we conducted among international investment banks proved that respondents had little difficulty to distinguish hawks, doves, or neutral policy makers in Poland and the Czech Republic, whereas they reported a lot of problems to produce such a classification for the Hungarian MPC members.

[33] The figures on the consensus and stock ratios are not presented here, but are available upon request.

[34] The communication on the forint value is always unanimous during the inter-meeting period, largely due to the small number of observations and the dominance of the governor's statements on that variable. Any increase in the stock of exchange rate comments is thus always accompanied by the absolute consensus ratio equal one. Therefore, due to almost perfect collinearity between the stock and absolute consensus ratio, we limited the number of explanatory communication variables accordingly.

In Poland, communication seems to play a minor role in affecting predictability of the NBP decisions. With one exception (when larger amount of statements increases the surprise component), consensus and stock ratio coefficients are statistically insignificant. Therefore, despite producing voting records, statements of MPC members do not seem to make central bank decisions more predictable. These results are in line with our findings on the consistency ratio, which shows that in the analyzed period Polish MPC members did not provide a good guidance as to the future monetary policy decisions.

4   Conclusions

The paper pioneers an in-depth analysis of the central bank communication in Poland, Hungary, and the Czech Republic. We examine not only the communication strategies, but also the impact of the central bank "talk" on the behavior of the markets, as well as its influence on the predictability of interest rate decisions in the CEC3 countries.

We find that despite pursuing monetary policy based on inflation targeting strategy, central banks in the Czech Republic, Hungary, and Poland have adopted very different communication styles. A simple frequency analysis suggests that there is a high inflation and a positive outlook bias in the NBP and – to some extent – in the MNB communication. On the contrary, the CNB statements are more balanced. We extend this analysis by constructing the consistency indicator, which aims to measure whether policy makers' words match their deeds. The results confirm that the CNB is the CEC3 communication leader, for its statements seem to be the most consistent with its subsequent actions.

Further, we show that the central bank "talk" does influence the behavior of financial markets. The strength and significance of this effect differ among countries, vary with the horizon of the potential interest rate movements and largely depend on the adopted form of communication. For the MNB, however, the analysis brings some puzzling results which may be related to the dual nature of the Hungarian monetary policy framework. The pursuance of the additional target within the inflation targeting framework leads to inconsistencies in the field of central bank communication.

Finally, we provide empirical evidence that monetary policy communication in the analyzed countries influences the predictability of central bank decisions. However, this impact varies largely among the CEC3 countries. The extent to which the amount of

statements and the degree of disagreement among policy makers affect predictability of central bank decisions should depend, we argue, on the communication strategy in general, and the committee structure in particular. The example of the CNB shows that in the case of the *individualistic committee* it pays off to provide the public with additional information, even when it comes at the cost of the communication consensus. However, the markets' ability to learn about the group dynamics may hinge on the availability of other communication instruments, such as minutes or release of voting records. The lack thereof might have influenced the effectiveness of the Hungarian bank communication. Another factor that seems to affect the impact of the central bank "talk" on the predictability of monetary policy decisions is the consistency of policy maker statements, i.e. the extent to which their words correspond with their deeds. Indeed, the poor interest rate guidance of the Polish MPC, as evidenced by the consistency indicator, seems to explain the weak impact of central bank communication on its decisions predictability.

Acknowledgements

Appendix A. Variable definitions.

Communication variables (for more details see section 2.1. - *Measuring communication*)

C^{EC} - economic outlook communiqué
C^{FX} – exchange rate communiqué
C^{MP} – monetary policy inclination communiqué
ST^{EC} – economic outlook statement
ST^{FX} – exchange rate statement
ST^{MP} – monetary policy inclination statement

Variables that appear in Table 1 on monetary policy communication:

Decisions - % of all committee days with decisions on interest rates increase (tightening) or decrease (easing)
Industrial Output – % of industrial output data releases above or below the market consensus
Change in FX - % of months with (month over month) exchange rate appreciation or depreciation (calculated for the average monthly national currency per EUR exchange rate).

Macroeconomic news surprise components – difference between the expected value (median from the *Bloomberg* survey) less the realized value, normalized by its standard deviation:

CA – current account balance
CPI – Consumer Price Index
IO – Industrial Output
PPI – Producer price Index
RS –Retail Sales
TB – Trade balance

Other variables:

Dec / committee days - % of committee days with a change in interest rates
FRI – Friday (day of the week effect)
IR1M – one-month interest rate
MSC – monetary surprise component, approximated by a change in the 1-month money market rate after the central bank meeting
MSC_{dec} – monetary surprise component after the central bank meeting with a change in interest rates
MSC_{nondec} – monetary surprise component after the central bank meeting with no change in interest rates
MSC2 – monetary surprise component, approximated by a change in the 1-month PRIBOR after the Czech National Bank unscheduled meeting
MINUTES – day of release of the minutes
Nondec / committee days - % of committee days with no change in interest rates
r_t – asset price return on the day *t* (change in the short-term interest rate, in basis points)
REPORT – day of release of the *Inflation Report*

Appendix B. Examples of the reports from newswire services and their classification.

Czech National Bank

Czech cbanker trains guns on crown currency.
Reuters News, 15 February 2002, 14:52
Excessive Czech crown strength is the economy's largest problem and the central bank is determined to fight it with all means, including interventions and rate cuts, Czech National Bank Vice-Governor Oldrich Dedek said on Friday. "I believe the scope for intervention is not exhausted by far," he said. "A return to levels around 33 per euro could be interpreted as the elimination of the initial abnormal deviation and return to some kind of normality."

Evaluation: $ST^{FX} = -1$

CZK firming of 1-2 pct acceptable - Czech cbanker.
Reuters News, 2 October 2003, 10:47
Czech central bank board member Jan Frait said on Thursday that if the crown firmed by one to two percent at most this would be justified in the current economic environment. Frait told a business forum in the eastern town of Ostrava that the central bank's monetary policy targets were based on the assumption of exchange rate stability around current levels. "The CNB expects that the stability of the nominal exchange rate along the current levels would be consistent with underlying trend and policy targets," he said. "Only a minor exchange rate appreciation in the range of one to two percent, maximum, would be justified and understood as sound."

Evaluation: $ST^{FX} = 1$

Czech c.banker speaks against further rate cut.
Reuters News, 16 April 2003, 9:17
An expected spike in inflation from tax hikes ahead of European Union entry in May 2004 speaks against a further cut in already record low Czech interest rates, central bank Deputy Governor Oldrich Dedek told Reuters. Dedek said he felt no need to start contemplating rate hikes as yet but added vigilance must be maintained to prevent the expected temporary price increases from feeding inflation expectations in the wider economy. "I personally think that to announce to the public there is significant room for a lowering of interest rates could be counterproductive," he said in an interview late Tuesday.

Evaluation: $ST^{MP} = 1$

Czech c.banker to mull rate cut if fcasts correct.
Reuters News, 2 November 2001, 12:27
Czech National Bank (CNB) board member Jan Frait said on Friday he would start considering easing of the monetary policy if expected downside risks materialize within two months, Czech CTK agency said. CTK quoted Frait, who is seen to be usually at the dovish side of the central bank's board, as saying the risks were lower growth in the country's economy and lower-than-expected inflation. "If I obtain signals within next two months that the downside risks are getting materialized, I personally will start considering to ease the monetary policy," Frait said. The central bank said on Thursday it had cut its growth and inflation estimates for this year and next and acknowledged interest rate risks have shifted to the downside after the September attacks in the United States.

Evaluation: $ST^{MP} = -1$

Czech c.banker says GDP growing, CPI risks too.
Reuters News, 18 June 2001, 15:18
Czech central bank (CNB) Vice-Governor Ludek Niedermayer said on Monday the economy was growing a bit quicker than expected, which could lead to some inflationary pressure.
"The economy is growing, the risks are rather on the upper side of the inflation prognosis," Niedermayer said. The comment was in line with recent central bank statements that risks were gathering on the upside. The bank mentioned the risks in the minutes of its May policy meeting, but added they did not require immediate policy response."All in all figures are showing that (GDP) growth will be a tiny bit higher than expected, and that can create certain, for example inflation, pressures," Niedermayer told reporters on the sidelines of a conference. Niedermayer added that indicators showed domestic demand may be somewhat recovering, but a decline in growth abroad would have a significant negative impact.

Evaluation: $ST^{EC} = 1$
Evaluation: $ST^{MP} = 1$

Czech cbank head sees lower growth in 2001, 2002.
Reuters News, 19 October 2001, 10:32
Czech central bank governor Zdenek Tuma said on Friday that growth forecasts for 2001 and 2002 for the Czech economy were likely to be cut by around half a percentage point due to the global slowdown. "My present perception is that we would make a correction... I can imagine that it (cut in growth forecast) can be around half a percentage point," Tuma told Reuters on the sidelines of a regional conference in Budapest. Tuma said a reduction of similar size could be expected in the 2002 GDP growth projection due to the impact of a stronger-than-expected global slowdown. He said current forecast for 2001 growth was 3.8 percent and for 2002 above 4.0 percent.

Evaluation: $ST^{EC} = -1$

National Bank of Hungary

Hungary c.bank says forint weaker than desirable.
Reuters News, 9 October 2001, 13:44
National Bank of Hungary governor Zsigmond Jarai said on Tuesday that a weaker forint was the main reason why the bank left its rates unchanged on Monday. "We didn't change the rate as the forint is somewhat weaker

than desirable," Jarai told journalists. He said the forint should be trading in a range between 245 and 260 forints to the euro, and the currency was currently trading at the top of that range.

Evaluation: $ST^{FX} = 1$

Hungary cbank chief says C/A deficit "big risk".
Reuters News, 16 August 2004, 14:01
Hungary's central bank (NBH) Governor Zsigmond Jarai said on Monday that the current account deficit posed a big risk and this year's budget deficit target of 4.6 percent of GDP was achievable only with more spending cuts. (…) He noted that the forint, which has firmed significantly in recent weeks, was boosted primarily by short-term investments.

Evaluation: $ST^{FX} = -1$

Central bank vice president hints possible rate increase.
MTI - EcoNews, 28 October 2003, 09:37
Hungary's central bank (NBH) said on Tuesday it will be forced to raise interest rates if the forint weakens sharply due to a lack of investors' confidence in authorities' commitment to eurozone accession in 2008. "Should we feel that the forint eases significantly because the market sees risks in economic policy, the central bank will be forced to hike rates," NBH vice-governor Gyorgy Szapary said on state television MTV, Reuters reported.

Evaluation: $ST^{FX} = 1$
Evaluation: $ST^{MP} = 1$

Hungary c.bank - rates can go down, US rates a risk.
Reuters News, 22 May 2004, 13:54
Hungary's central bank (NBH) can cut interest rates further if foreign investors' appetite grows for Hungarian assets, but U.S. rate trends create risks, NBH Governor Zsigmond Jarai said on Saturday. "If (investor) confidence strengthens, and this is the more likely (scenario), interest rate cuts can continue," Jarai told the daily Magyar Hirlap. (…) He noted that the bank cut its forecast for December 2005 inflation on Monday to four percent, next year's inflation target, from 4.3 percent on Monday. Jarai said it was also positive that the medium-term economic programme revealed by the government recently aimed at budget deficit cuts in the next four years.

Evaluation: $ST^{MP} = -1$

Press release on the Monetary Council's meeting of 22 March 2004.
National Bank of Hungary website, 22 March 2004, 14:05
"Cyclical conditions have recently been improving gradually, as the Bank expected. Increasingly positive developments in the external business environment have been a factor contributing to the recent pick-up in Hungarian exports, which, in turn, has been reflected in a robust rise in output and an upturn in corporate investment activity. All this, encouraged by the gradual fiscal adjustment and an anticipated slowdown in household consumption, is likely to influence the pattern of growth favourably: the export sector and fixed investment are expected to become the driving forces of growth, replacing domestic consumption."

Evaluation: $C^{EC} = 1$

Hungary cbank cuts 2001 GDP forecast to 4.0-4.5 pct.
Reuters News, 13 September 2001, 16:33
National Bank of Hungary (NBH) governor Zsigmond Jarai said on Thursday that the bank had cut its GDP growth forecast for 2001 to between 4.0 and 4.5 percent. "We originally expected 5.0-5.5 percent growth," Jarai told a conference organised by the European Commission on the euro. "Because of the slowdown in the U.S. and the European Union we changed it to the range of 4.0 and 4.5 percent," he added.

Evaluation: $ST^{EC} = -1$

National Bank of Poland

RPP: Zloty weakening is temporary
PAP, 24 February 2004, 16:20

The Monetary Policy Council believes that the present weakening of the zloty against the euro is temporary, Monetary Policy Council's member Andrzej Slawinski told a press conference on Wednesday. "We believe the weakness of the zloty is temporary", Slawinski said.

Evaluation: $ST^{FX} = 1$

Polish Ctrl Bker: Nov Curr Acct Good, Future Less Bright.
Dow Jones International News, 2 January 2001, 16:37
November's dramatic narrowing in the Polish current account deficit shouldn't blind markets to uncertainty about whether improvements in the payments balance can be sustained, or to increasing downside risk to the resurgent zloty, central bank Monetary Policy Council (RPP) member Boguslaw Grabowski said Tuesday. "Despite the good (November) results, the chances for further current account improvement in 2001 are less than clear," Grabowski told Dow Jones Newswires in a telephone interview. He said slowing growth in Western Europe, the stronger zloty, and an expected uptick in domestic demand early this year could diminish Poland's export performance and boost imports. In addition, Grabowski warned that foreign investors' aggressive buying of Polish debt securities had pushed the Polish currency to unjustifiably high levels in recent days. "My feeling is that the zloty exchange rate has significantly exceeded levels justified by the economic fundamentals. Investors should keep in mind the possibility of a market overshoot and remember to hedge currency risk," he said.

Evaluation: $ST^{FX} = -1$

Latest inflation projection supports early rate hike - Council's
PAP, 17 November 2004, 11:05
The Polish central bank's latest inflation projection supports further quick steps to hike rates to return to the inflation target in the timeliest manner, Monetary Policy Council (RPP) member Dariusz Filar told PAP in an exclusive interview. The November report shows that inflation will not meet the rate authority (RPP) inflation target until December 2006, what forces further, rather early, rate hikes, RPP member Dariusz Filar believes. "The RPP inflation target is 2.5\%, so if inflation is at 3\% - without changing rates - that requires the RPP take a stand," Filar told PAP. "Such a stand could mean appropriate rate hikes, to lower inflation to 2.5\%," "RPP will have to tighten its money policy at certain point. When it should be done is an open question," Filar said. "In my opinion it would be better to act pre-emptively, that is, relatively early," he added. The November projection, which council members read Tuesday, is more optimistic than the prior report issued in August, Filar claims. The new projection claims that the Q1 inflation spike will fall short of 5\%, before price growth falls to 3.5\% at end-Q2 and stabilises at 3\% by end-2006. "The projection, when compared with the August projection, shows a much lower rise in inflation in the first quarter of next year," Filar said, citing a range of 4.5 to 5\%. "We can talk about a double-hump inflation - in the first quarter there summer-level inflation will return, after the easing we have seen since September," Filar said. Filar added that inflation will be above 4\% till the end of the year.

Evaluation: $ST^{MP} = 1$

Expected Polish CPI fall supports rate cut-Rosati.
Reuters News, 6 August 2001, 14:29
A member of Poland's Monetary Policy Council (MPC), Dariusz Rosati, said on Monday that last month's estimated fall in CPI boosted chances of a near-term rate cut, depressing the zloty in a knee-jerk reaction. Analysts and government officials said that consumer price growth is expected to fall to as low as 5.3 percent year-on-year in July from June's 6.2 percent annual rate. "Such a fall increases the probability of a policy move," Rosati, told Reuters without elaborating.

Evaluation: $ST^{MP} = -1$

Signals of economic revival more visible, NBP governor
PAP, 25 February 2004, 16:07
National Bank of Poland (NBP) governor Leszek Balcerowicz said Wednesday that signals of economic revival are currently more visible than a month ago. "Signals of the revival of Polish economy are stronger than a month ago", Balcerowicz said after a RPP meeting on Wednesday. (…) The GDP in the 4th quarter of 2003 grew by 4.7 per cent and by 3.7 per cent during the entire 2003, however January 2004 growth of production has significantly exceeded market expectations.

Evaluation: $ST^{EC} = 1$

Polish Q4 GDP growth seen at 0.3-0.4 pct-Ziolkowska.
Reuters News, 19 December 2001, 16:35
Poland's economic growth is set to slow to 0.3-0.4 percent in the fourth quarter of this year from 0.8 percent in the third quarter, Monetary Policy Council member Wieslawa Ziolkowska said on Wednesday. Ziolkowska said that full-year gross domestic product growth would amount to around one percent, less than the Finance Ministry's 1.3 percent forecast and 4.0 percent growth in 2000. "If we assume that the decline in production continues, then GDP this year would be around one percent and 0.3 or 0.4 percent in the fourth quarter," Ziolkowska told reporters.

Evaluation: ST^{EC} = -1

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Table 1. Communication on monetary policy inclination, economic outlook and foreign exchange (FX) view.

	Monetary Policy Inclination			Economic Outlook			FX view		
	Tightening	Easing	Tightening / easing ratio	Stronger	Weaker	Stronger/ weaker ratio	Appreciation	Depreciation	Appreciation/ depreciation ratio
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Poland									
(1) All MPC members (including Governor)	107 / 63%	64 / 37%	1.7	21 / 72%	8 / 28%	2.6	19 / 50%	19 / 50%	1.0
(2) Governor	25 / 71%	10 / 29%	2.5	12 / 92%	1 / 8%	12.0	5 / 83%	1 / 17%	5.0
(3) Decisions	6%	42%	0.2	50%	50%	1.0			
(4) Industrial Output				69%	31%	2.2			
(5) Change in FX	6%	20%	0.3				56%	44%	1.3
Czech Republic									
(1) All MPC members (including Governor)	26 / 44%	33 / 56%	0.8	8 / 44%	10 / 56%	0.8	0 / 0%	29 / 100%	0.0
(2) Governor	2 / 22%	7 / 78%	0.3	2 / 33%	4 / 67%	0.5	0 / 0%	10 / 100%	0.0
(3) Decisions	6%	20%	0.3						
(4) Industrial Output				69%	31%	2.2			
(5) Change in FX							60%	40%	1.5
Hungary									
(1) All MPC members (including Governor)	41 / 59%	28 / 41%	1.5	0 / 0%	2 / 100%	0.0	9 / 69%	4 / 31%	2.3
(2) Governor	32 / 57%	24 / 43%	1.3	0 / 0%	2 / 100%	0.0	7 / 70%	3 / 30%	2.3
(3) Decisions	7%	22%	0.3						
(4) Industrial Output				38%	62%	0.6			
(5) Change in FX							54%	46%	1.2

The table groups central bank comments regarding monetary policy inclination, economic outlook, and exchange rate level into dovish/hawkish or weaker/stronger and compares these distributions with the actual outcomes. For example, the frequency of tightening decisions refers to the observations on increase in the official interest rate as a share of all interest rate decisions. The frequency of 'stronger economic outlook' reflects the share of the observations on industrial output that exceeded the market expectations (approximated by the median from the Bloomberg survey). The figure on the foreign exchange appreciation relates to the number of months with currency appreciation against the euro.

Table 2a. Market reaction to communication and macroeconomic news in Poland, mean equation.

	Wibor3M	Wibor6M	Wibor1Y	Yield2Y	Yield5Y
r_{t-1}	0.074***	0.118***	0.249***	-0.090**	0.057*
	(0.028)	*(0.031)*	*(0.035)*	*(0.040)*	*(0.032)*
$r_{eur,t}$	0.326***	0.174***	0.163***	0.193***	0.270***
	(0.115)	*(0.066)*	*(0.059)*	*(0.045)*	*(0.037)*
C	-0.004***	-0.005***	-0.006***	-0.006**	-0.004*
	(0.001)	*(0.001)*	*(0.001)*	*(0.002)*	*(0.002)*
MSC	0.749***	0.529***	0.373***	0.162	0.089
	(0.076)	*(0.086)*	*(0.067)*	*(0.114)*	*(0.078)*
CA	0.017***	0.003	0.021**	-0.015	-0.004
	(0.006)	*(0.005)*	*(0.008)*	*(0.013)*	*(0.012)*
CPI	-0.023***	-0.020**	-0.027***	-0.025*	-0.025**
	(0.008)	*(0.008)*	*(0.006)*	*(0.014)*	*(0.012)*
GDP	-0.016**	-0.017**	-0.027**	-0.019	-0.005
	(0.007)	*(0.007)*	*(0.012)*	*(0.014)*	*(0.013)*
IO	-0.005	-0.017	-0.028***	-0.029**	-0.017
	(0.006)	*(0.011)*	*(0.006)*	*(0.014)*	*(0.010)*
PP	-0.008	-0.013	-0.022***	-0.011	0.000
	(0.006)	*(0.009)*	*(0.006)*	*(0.010)*	*(0.009)*
RS	-0.012*	-0.008	-0.015	-0.018*	-0.005
	(0.007)	*(0.008)*	*(0.009)*	*(0.010)*	*(0.007)*
ST^{FX}	0.012	0.016	0.014	0.013	-0.012
	(0.009)	*(0.010)*	*(0.009)*	*(0.014)*	*(0.016)*
ST^{MP}	0.008**	0.009**	0.011*	0.025***	0.009
	(0.004)	*(0.003)*	*(0.006)*	*(0.007)*	*(0.006)*
ST^{EC}	0.016	-0.005	-0.006	0.007	0.023
	(0.011)	*(0.011)*	*(0.013)*	*(0.020)*	*(0.016)*
C^{MP}	0.003	0.014	0.013	-0.019	-0.016
	(0.009)	*(0.016)*	*(0.018)*	*(0.017)*	*(0.016)*
C^{EC}	-0.006	0.025**	0.003	0.019	0.009
	(0.009)	*(0.011)*	*(0.016)*	*(0.015)*	*(0.014)*

Notes to Tables 2-3: ***,**,* indicate significance at the 99%, 95% and 90% levels, respectively. Standard errors are shown in brackets below the coefficients.

In the case of the Czech Republic 134 observations are missing for 5Y yield curve (Tables 2b and 3b).

In the case of Hungary 348 observations are missing for BUBOR1Y (time series is available from May 2002, Tables 2c and 3c).

Table2b. Market reaction to communication and macroeconomic news in the Czech Republic, mean equation.

	Pribo3M	Pribo6M	Pribo1Y	Yield2Y	Yield5Y
r_{t-1}	0.044**	0.097***	0.244***	-0.094***	0.161***
	(0.019)	(0.037)	(0.038)	(0.013)	(0.035)
$r_{eur,t}$	0.111***	0.144***	0.109***	0.197***	0.217***
	(0.010)	(0.032)	(0.019)	(0.003)	(0.027)
C	0.000	0.000	0.000	-0.002	-0.001
	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)
MSC	0.840***	0.455***	0.551***	0.273***	0.058
	(0.030)	(0.025)	(0.059)	(0.065)	(0.059)
MSC2	0.386***	0.213***	0.191***	-0.012	-0.217**
	(0.018)	(0.070)	(0.064)	(0.044)	(0.096)
CA	0.003	0.010	0.010	0.031	0.003
	(0.003)	(0.011)	(0.009)	(0.024)	(0.006)
CPI	-0.009***	-0.018**	-0.030***	-0.032***	-0.044***
	(0.003)	(0.008)	(0.007)	(0.000)	(0.010)
GDP	-0.005***	-0.009	-0.003	-0.010	0.000
	(0.000)	(0.007)	(0.002)	(0.007)	(0.011)
RS	-0.003**	-0.004**	0.000	0.007	-0.005
	(0.001)	(0.002)	(0.002)	(0.005)	(0.004)
PPI	-0.003*	-0.002*	-0.002	-0.018***	-0.012**
	(0.002)	(0.001)	(0.002)	(0.002)	(0.005)
MINUTES	-0.004	0.005	0.003	-0.002	0.001
	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)
REPORT	-0.001	-0.003	0.004	0.007	-0.011
	(0.002)	(0.004)	(0.005)	(0.005)	(0.011)
ST^{FX}	0.005**	0.001	0.002	0.008	-0.010
	(0.002)	(0.003)	(0.003)	(0.009)	(0.015)
ST^{MP}	-0.002	0.010**	0.005**	0.010**	0.003
	(0.008)	(0.004)	(0.002)	(0.004)	(0.007)
ST^{EC}	0.002	-0.004	-0.012**	-0.022**	0.003
	(0.004)	(0.005)	(0.005)	(0.000)	(0.010)
C^{MP}	0.010**	0.046***	0.022**	0.007	0.007
	(0.005)	(0.013)	(0.010)	(0.008)	(0.007)
C^{EC}	0.004	-0.001	0.003	0.032*	0.015
	(0.004)	(0.003)	(0.012)	(0.017)	(0.015)
C^{FX}	0.002	0.015	0.005	-0.001	0.010
	(0.004)	(0.013)	(0.011)	(0.007)	(0.008)

Table2c. Market reaction to communication and macroeconomic news in Hungary, mean equation.

	Bubo3M	Bubo6M	Bubo1Y	Yield3Y	Yield5Y
r_{t-1}	0.196***	0.171***	0.198***	0.002	0.061
	(0.064)	*(0.064)*	*(0.071)*	*(0.054)*	*(0.040)*
$r_{eur,t}$	0.008	-0.036	-0.067	0.090*	0.134***
	(0.066)	*(0.050)*	*(0.044)*	*(0.052)*	*(0.049)*
C	0.000	-0.001	-0.004**	-0.005	-0.002
	(0.001)	*(0.002)*	*(0.002)*	*(0.003)*	*(0.003)*
MSC	0.708***	0.572***	0.625***	0.551***	0.083
	(0.088)	*(0.082)*	*(0.109)*	*(0.131)*	*(0.071)*
CA	-0.055**	0.078***	0.020	0.013	0.039**
	(0.028)	*(0.025)*	*(0.017)*	*(0.015)*	*(0.018)*
CPI	-0.022**	-0.023***	-0.022**	-0.054***	-0.034*
	(0.009)	*(0.0080*	*(0.009)*	*(0.015)*	*(0.019)*
PPI	0.003	0.005	0.003***	0.006	0.017
	(0.003)	*(0.003)*	*(0.001)*	*(0.008)*	*(0.012)*
TB	0.023***	0.034***	0.001	0.028*	0.038***
	(0.008)	*(0.012)*	*(0.022)*	*(0.016)*	*(0.012)*
ST^{FX}	0.023	0.022	0.125***	0.021	0.014
	(0.015)	*(0.016)*	*(0.037)*	*(0.043)*	*(0.019)*
ST^{MP}	-0.022*	0.003	-0.034	-0.030	-0.008
	(0.012)	*(0.010)*	*(0.021)*	*(0.019)*	*(0.016)*
C^{MP}	0.033***	0.014	0.025*	-0.025	0.007
	(0.012)	*(0.011)*	*(0.013)*	*(0.018)*	*(0.017)*
C^{EC}	-0.009	0.009	0.030	-0.003	-0.022
	(0.012)	*(0.016)*	*(0.017)*	*(0.031)*	*(0.029)*

Table 3a. Market reaction to communication and macroeconomic news in Poland, variance equation.

	Wibor3M	Wibor6M	Wibor1Y	Yield2Y	Yield5Y
$r_{eur,t}$	2.708**	2.990**	4.298**	1.537**	-0.524
	(1.261)	*(1.220)*	*(2.037)*	*(0.682)*	*(0.532)*
CA	-0.134	-0.124	-0.206	-0.064	0.048
	(0.137)	*(0.147)*	*(0.167)*	*(0.117)*	*(0.134)*
CPI	0.176	0.415	-0.016	0.116	0.059
	(0.194)	*(0.294)*	*(0.171)*	*(0.161)*	*(0.149)*
GDP	-0.006	0.007	-0.238	-0.578***	-0.192
	(0.261)	*(0.280)*	*(0.290)*	*(0.182)*	*(0.163)*
IO	0.145	0.114	-0.246	-0.075	-0.122
	(0.191)	*(0.216)*	*(0.253)*	*(0.185)*	*(0.150)*
PP	-0.168	-0.088	-0.331	-0.160	-0.217
	(0.255)	*(0.347)*	*(0.274)*	*(0.204)*	*(0.174)*
RS	0.242	0.092	-0.102	-0.027	-0.115
	(0.455)	*(0.345)*	*(0.335)*	*(0.203)*	*(0.297)*
FRI	-0.175	-0.664***	-0.201	-0.431	-0.263
	(0.197)	*(0.247)*	*(0.280)*	*(0.278)*	*(0.227)*
ST^{FX}	0.116	-0.065	0.296	0.012	-0.125
	(0.141)	*(0.129)*	*(0.223)*	*(0.147)*	*(0.094)*
ST^{MP}	0.083	0.043	0.256	-0.172*	0.066
	(0.111)	*(0.112)*	*(0.185)*	*(0.104)*	*(0.073)*
ST^{EC}	-0.078	-0.046	0.404	0.127	0.222*
	(0.260)	*(0.205)*	*(0.274)*	*(0.135)*	*(0.134)*
C^{MP}	0.082	0.258	0.864	0.065	-0.163
	(0.299)	*(0.293)*	*(0.589)*	*(0.189)*	*(0.239)*
C^{EC}	-0.070	0.018	0.172	0.224	0.226
	(0.323)	*(0.322)*	*(0.611)*	*(0.231)*	*(0.216)*

Table 3b. Market reaction to communication and macroeconomic news in the Czech Republic, variance equation.

	Pribo3M	Pribo6M	Pribo1Y	Yield2Y	Yield5Y
$r_{eur,t}$	13.889***	18.049***	2.835*	8.792***	3.392*
	(3.093)	*(5.665)*	*(1.715)*	*(2.225)*	*(1.808)*
CA	0.749	0.695	0.512	1.036**	-0.854**
	(0.786)	*(0.735)*	*(0.633)*	*(0.526)*	*(0.368)*
GDP	-2.038***	0.345	-0.290	-0.573*	0.345
	(0.274)	*(0.340)*	*(0.329)*	*(0.346)*	*(0.276)*
RS	-0.635**	0.016	-0.168	-0.825**	-0.548*
	(0.291)	*(0.425)*	*(0.274)*	*(0.345)*	*(0.322)*
PPI	0.720**	0.056	-0.498**	-0.736***	-0.046
	(0.299)	*(0.305)*	*(0.196)*	*(0.244)*	*(0.250)*
MINUTES	0.483	0.892**	0.415	-0.319	-0.230
	(0.353)	*(0.442)*	*(0.280)*	*(0.331)*	*(0.333)*
REPORT	0.059	0.098	0.329	-2.138***	-0.071
	(0.339)	*(0.417)*	*(0.451)*	*(0.355)*	*(0.447)*
ST^{FX}	0.530	0.012	-0.289	-0.147	0.713**
	(0.514)	*(0.405)*	*(0.284)*	*(0.337)*	*(0.359)*
ST^{MP}	0.890	1.047***	-0.178	0.037	0.444
	(0.634)	*(0.359)*	*(0.235)*	*(0.270)*	*(0.333)*
ST^{EC}	0.016	0.377	0.353	1.620**	-0.084
	(0.689)	*(0.643)*	*(0.378)*	*(0.768)*	*(0.378)*
C^{MP}	1.574**	3.253***	1.070**	-0.580	-0.455
	(0.689)	*(0.435)*	*(0.442)*	*(0.381)*	*(0.423)*
C^{EC}	-0.488	-1.231***	0.665	1.413***	0.975**
	(0.692)	*(0.473)*	*(0.533)*	*(0.512)*	*(0.479)*
C^{FX}	-0.236	1.948**	0.583	-1.938***	-1.213***
	(0.543)	*(0.923)*	*(0.568)*	*(0.418)*	*(0.416)*

Table3c. Market reaction to communication and macroeconomic news in Hungary, variance equation.

	Bubo3M	Bubo6M	Bubo1Y	Yield3Y	Yield5Y
$r_{eur,t}$	0.568	-3.913	-3.516	1.718	1.870
	(2.983)	*(3.908)*	*(3.459)*	*(1.482)*	*(1.163)*
CA	0.651***	0.938***	0.995**	0.270	0.109
	(0.217)	*(0.312)*	*(0.519)*	*(0.165)*	*(0.191)*
CPI	0.085	0.496	0.160	0.233	0.493**
	(0.275)	*(0.351)*	*(0.250)*	*(0.182)*	*(0.230)*
REPORT	-1.755**	-0.649	0.147	0.267	-0.111
	(0.760)	*(0.484)*	*(0.576)*	*(0.433)*	*(0.336)*
ST^{MP}	1.019***	1.078***	0.598**	0.739***	0.753***
	(0.316)	*(0.335)*	*(0.280)*	*(0.199)*	*(0.285)*
ST^{FX}	-0.530	0.334	2.127***	0.600	-0.953***
	(0.859)	*(0.570)*	*(0.626)*	*(0.717)*	*(0.464)*
C^{MP}	0.896	1.234**	0.653	0.443	0.373
	(0.605)	*(0.547)*	*(0.620)*	*(0.328)*	*(0.286)*
C^{EC}	-0.094	-0.327	-0.101	0.292	0.160
	(0.735)	*(0.655)*	*(0.751)*	*(0.381)*	*(0.450)*

Table 4. Basic statistics on monetary surprise component.

Mean	NBP	CNB	MNB
(1) |MSC|	0.146	0.059	0.208
(2) |MSC$_{dec}$|	0.199	0.180	0.520
(3) |MSC$_{nondec}$|	0.101	0.015	0.074
(4) |ΔIR1M|	0.059	0.007	0.058
(5) |MSC/ΔIR1M|	2.46	8.11	3.58
(6) |MSC$_{dec}$/IR1M|	3.36	24.83	8.93
(7) |MSC$_{nondec}$/ΔIR1M|	1.71	2.07	1.26
(8) |MSC|/IR1M	0.014	0.018	0.023
(9) |MSC$_{dec}$|/IR1M	0.019	0.055	0.053
(10) |MSC$_{nondec}$|/IR1M	0.011	0.005	0.011
(11) Dec/ committee days	50%	27%	28%
(12) Nondec/ committee days	50%	73%	72%

Table 5. Monetary surprise component equation (dependent variable: $\dfrac{|MSC|}{volatility}$, $|MSC|$).

	POLAND		CZECH REPUBLIC		HUNGARY	
	$\dfrac{|MSC|}{volatility}$	$|MSC|$	$\dfrac{|MSC|}{volatility}$	$|MSC|$	$\dfrac{|MSC|}{volatility}$	$|MSC|$
c	0.691**	0.085	-0.575	-0.044	0.465***	0.086
	(0.323)	*(0.076)*	*(1.096)*	*(0.050)*	*(0.179)*	*(0.064)*
stock ratio	0.252*	0.005	-0.563*	-0.061***	1.502***	0.682***
	(0.142)	*(0.030)*	*(0.303)*	*(0.020)*	*(0.280)*	*(0.194)*
consensus instrument	-5.362	-0.357	1.333***	0.127***	-1.267***	-0.600***
	(4.323)	*(0.791)*	*(0.315)*	*(0.027)*	*(0.230)*	*(0.174)*
|CA|	0.222	0.036	0.438	-0.017	5.593***	2.683***
	(0.357)	*(0.082)*	*(0.685)*	*(0.033)*	*(1.111)*	*(0.789)*
|CPI|	0.059	0.090**	0.106	0.010	0.331	0.135
	(0.132)	*(0.038)*	*(0.371)*	*(0.021)*	*(0.242)*	*(0.099)*
|GDP|	0.588	0.110*	0.549	0.016	8.099***	3.777***
	(0.380)	*(0.064)*	*(0.350)*	*(0.021)*	*(1.647)*	*(1.146)*
|IO|	2.838	0.203	-0.829*	-0.092***	1.669***	0.419***
	(2.048)	*(0.370)*	*(0.443)*	*(0.020)*	*(0.396)*	*(0.120)*
|PPI|	-1.070*	-0.089	1.354**	0.139***	-9.221***	-4.454***
	(0.556)	*(0.106)*	*(0.614)*	*(0.041)*	*(1.696)*	*(1.295)*
|RS|	0.570*	-0.011	-0.545	-0.067***	-	-
	(0.320)	*(0.064)*	*(0.532)*	*(0.023)*		
|TB|	-	-	-	-	-3.026***	-1.387***
	-	-	-	-	*(0.528)*	*(0.380)*
Total observations	48	48	48	48	80	80
R²	0.23	0.23	0.32	0.61	0.35	0.26

Notes to Table 5: ***,**,* indicate significance at the 99%, 95% and 90% levels, respectively. Standard errors are shown in brackets below the coefficients.
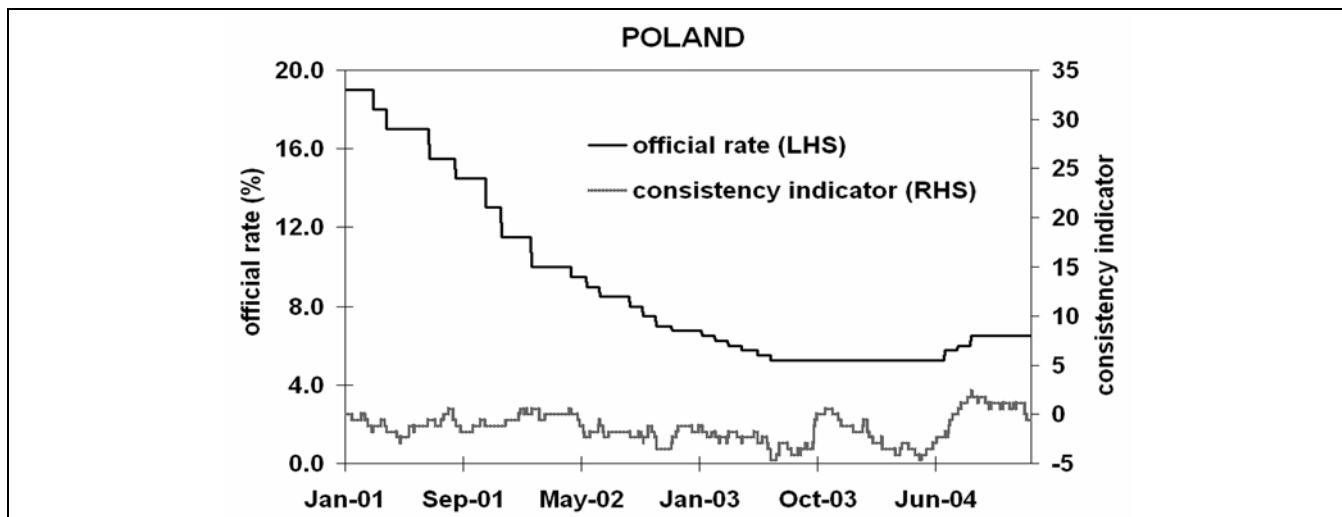
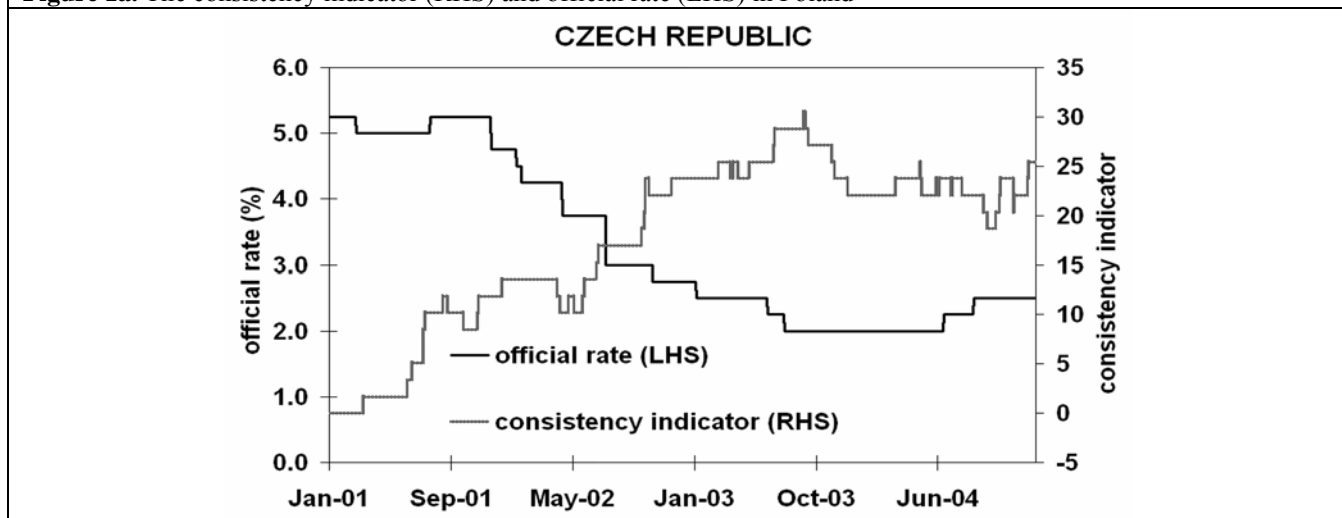**Figure 1a.** The consistency indicator (RHS) and official rate (LHS) in Poland

Figure 1b. The consistency indicator (RHS) and official rate (LHS) in the Czech Republic
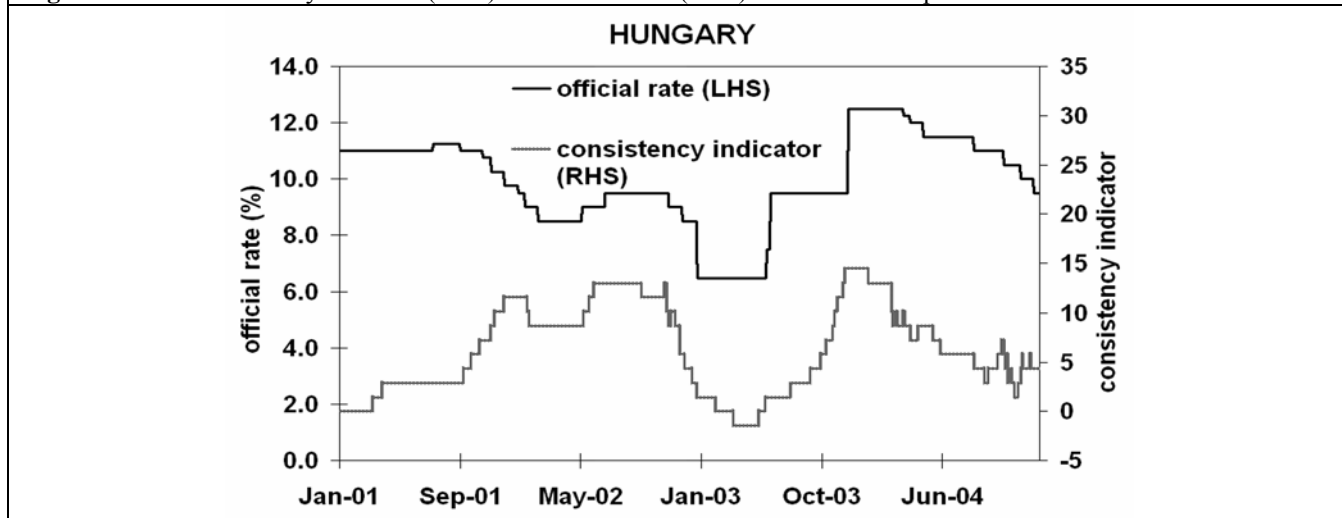

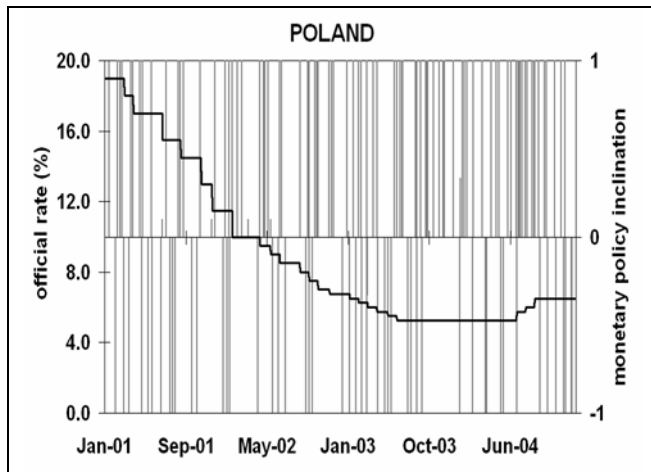**Figure 1c.** The consistency indicator (RHS) and official rate (LHS) in Hungary

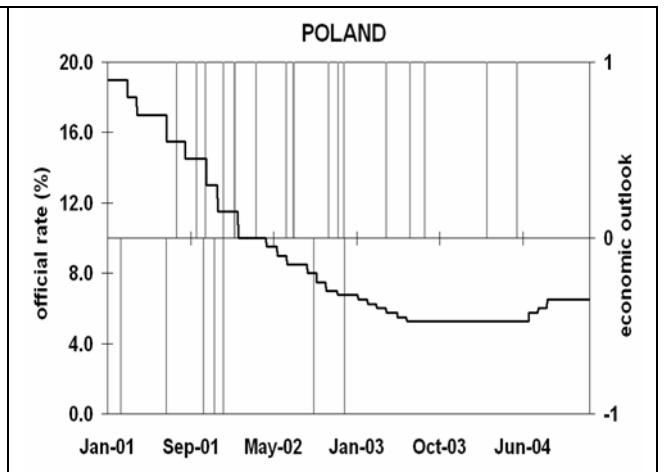**Figure 2a.**The average daily MPC statements about monetary policy inclination in Poland

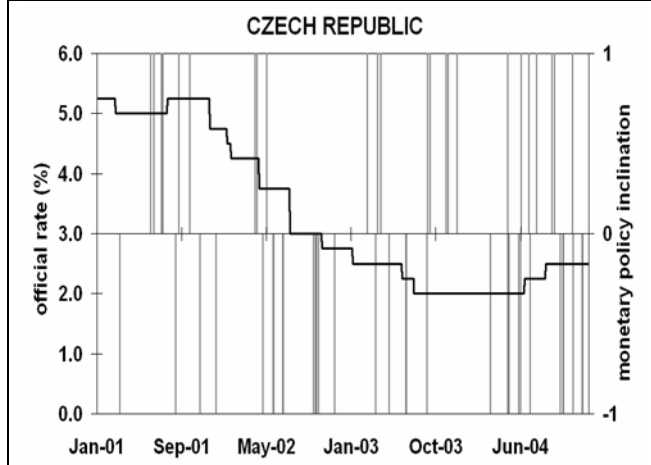**Figure 2b.** The average daily MPC statements about economic outlook in Poland

Figure 2c. The average daily CNB Board statements about monetary policy inclination in the Czech Republic
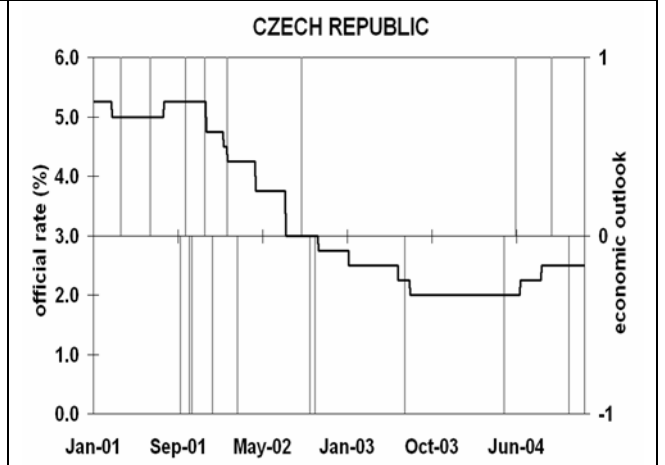

Figure 2d. The average daily CNB Board statements about economic outlook in the Czech Republic
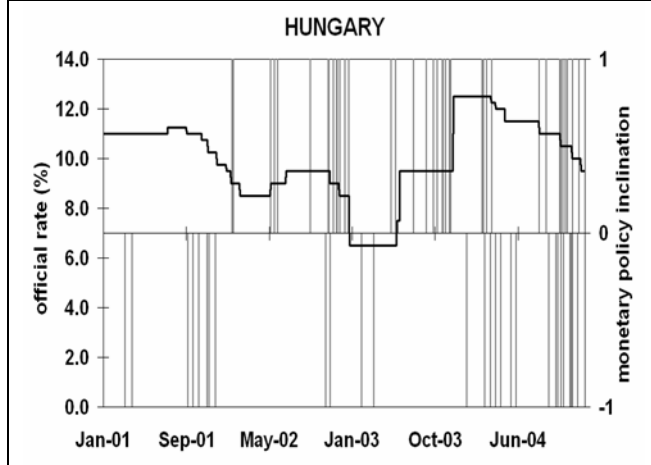

Figure 2e. The average daily MPC statements about monetary policy inclination in Hungary
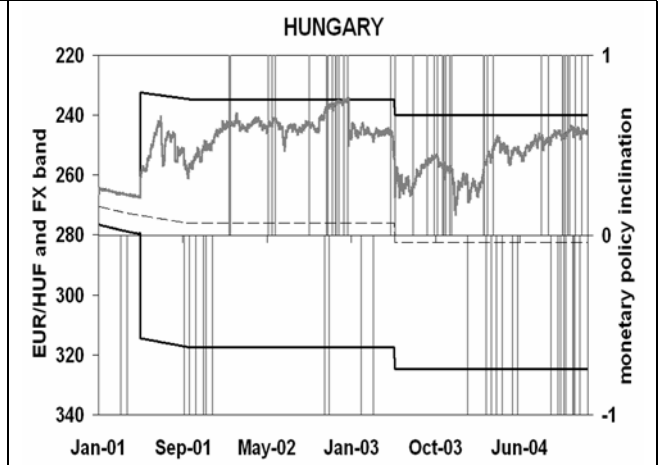

Figure 2f. The average daily MPC inclination and EUR/HUF exchange rate in Hungary