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**| RESEARCH ARTICLE**

**A study of Implicit disagreement in MPC meetings for selected Eastern European Economies using the Taylor Rule**

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**| ABSTRACT**

This paper in an empirical attempt to study implicit disagreement among MPC members of central banks contained in the minutes of the MPC meetings for three Eastern European economies, viz., Poland, Czech Republic and Hungary. NLP sentiment analysis techniques, specifically a BERT model trained and fine-tuned on the corpus of the text of the minutes of the MPC meetings of the three countries, are applied to extract sentence level sentiment scores in terms of hawkish, dovish or neutral sentiment which are then used to calculate meeting level Disagreement Index(DI) variable by taking the Standard Deviation of the sentence level sentiment scores. We augment the standard Taylor rule formula for setting monetary policy rates with this DI variable and see that it impacts the interest rate negatively, suggesting that higher implicit disagreement might restrain the MPC members from being too hawkish which might be influenced by higher uncertainty about economic conditions, especially fears of a looming recession. So, we find that disagreement has a significant impact, even implicit disagreement, on the policy rate decisions of the MPC members. This offers insights into why central banks might hesitate to raise rates immediately in face of higher inflation or output gap pressures.

**| KEYWORDS**

Monetary Policy Committee, Implicit measure of disagreement, NLP, BERT method, Tobit Model

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**1. Introduction**

Monetary policy, when conducted by setting interest rates to control inflation and unemployment, often utilizes some mathematical equation-based rules like the Taylor Rule (1993) to do so. The role of disagreement amongst the Monetary Policy Committee (MPC) members in affecting the validity of the Taylor rule has been scarcely discussed in the literature.

Traditional monetary policy has mainly focused on conventional transmission channels such as the interest rate channel, credit channel, asset pricing channel and the exchange rate channel (Mishkin, 1996). However, with the 2008 Global Financial Crisis the traditional channels ceased to be effective as interest rates reached the lower bound in many countries. Transparency in monetary policy communication was seen as an effective way to send better signals to the market in this case.

MPC (Monetary Policy committee) in a country is responsible for setting the central bank interest rates where the members vote on the policy decision. The minutes of the MPC meetings serve as a valuable repository of information regarding interest rate decisions.

Characteristics of individual MPC members may affect their opinions and there might not always be perfect consensus among the members. This difference of opinion can be expressed in two forms, firstly, explicit disagreement, which is captured by the voting patterns of the members on the policy rate decision. The difference in votes cast will capture the explicit disagreement, if any. The other form of disagreement is the one not evident in the voting patterns, that is the implicit or latent disagreement. Now, the explicit disagreement between the monetary policymakers can be gauged by the voting patterns of the MPC members in favour of maintaining status quo over interest rates or in favour of increasing or decreasing it. There has been plenty of literature regarding this kind like **Belden (1989)** who analyses the dissenting votes at the FOMC meetings to determine whether factors like composition of FOMC and others affect monetary policy decisions or not.

However, there has been relatively sparse literature on the potential impacts of disagreement amongst the MPC members that is not overtly evident at first (i.e., implicit disagreement). The disagreement which is expressed by the MPC members explicitly can most objectively be measured. However, often some MPC members might disagree with the monetary policy proposals internally but do not make their disagreement public by voting against the majority opinion. Such disagreement, which is latent and implicit, can be captured by analysing the text of the minutes of the MPC meetings which these members attend.

Here the role of Monetary Policy communication becomes important. In the past, especially up until the onset of the 2008 global recession, central banks placed scant importance on transparency of communication of monetary policy decisions to the general public and markets, which changed after the recession hit and measures like 'forward guidance' gained prominence (**Yilmaz and Kahveci, 2014**). Former Fed chairman Ben Bernanke in the inaugural post for his blog (**Bernanke, 2015**) emphasized on the role of communication in improving the transmission process of monetary policy.

The Taylor rule equation is often considered as a benchmark for setting monetary policy interest rates. This equation states that the gap between the nominal interest rate and the desired interest rate is a function of the gap between inflation rate and target inflation rate and the gap between actual output and target output. In short, the interest rate gap is a function of inflation gap and output gap. It was first proposed by **Taylor (1993)** as a guideline to set interest rates for inflation-targeting and stabilizing economic activity by central banks. This is opposed to discretionary monetary policy which is dependent upon the personal choices of the monetary policy authorities. The Taylor rule has often been found to be an accurate method for explaining interest rate setting policies though it also suffers from some limitations as well. The four-month period used is considered too long for setting interest rates. The rule doesn't consider other policy tools such as reserve funds adjustments or balance sheet policies. Despite this, it remains widely popular even as modifications emerge.

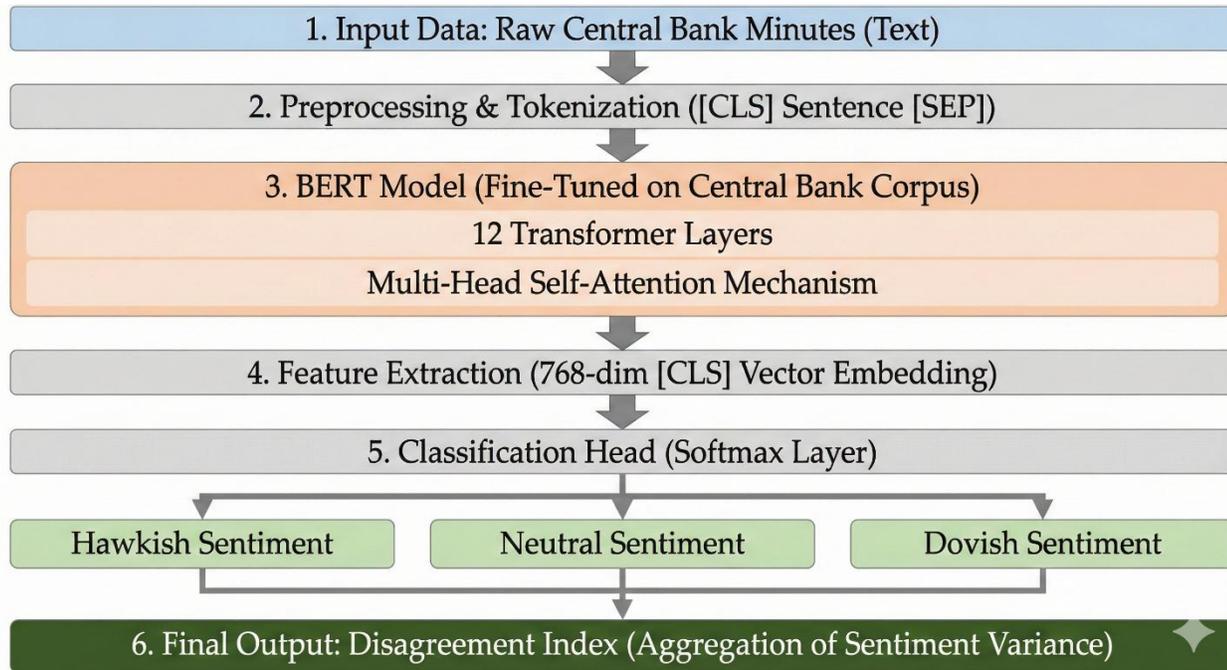
Our study here attempts to quantify implicit disagreement amongst the MPC members as opposed to explicit disagreement which is recorded by the voting patterns of the members at the meetings. We aim to extract this implicit disagreement from performing sentiment analysis using NLP (Natural Language Processing) Techniques, specifically a BERT model trained on the corpus of the text of the minutes of the MPC meetings, for three Eastern European economies Poland, Czech Republic and Hungary by using the fine-tuned BERT model to classify sentiment contained in the minutes of the MPC meetings of these three countries as Hawkish, Dovish and Neutral . We subsequently construct a Disagreement Index(DI) variable the steps of constructing which are given in the succeeding sections, and analyse its impact on the interest rate setting process according to the Taylor rule

The rest of the paper is structured as follows: (Section-2) details the data extraction process and the methodology used to conduct the empirical analysis. The next section (Section-3) contains the results of the analysis, and the final section wraps up the paper by offering concluding remarks and policy implications and scope for future studies. Before getting into section-2, here is a brief note on the BERT modelling process we have used for our study.

#### *A note on the BERT Model*

The analysis for this paper has been done using NLP sentiment analysis techniques, specifically BERT sentiment modelling. We will briefly explain BERT modelling in this section.

**Fig 1: The BERT Process**



BERT (Bidirectional Encoder Representations from Transformers) is a state-of-the-art model developed by Google for the purpose of sentiment analysis. Although it was originally developed to better understand the meaning of google search, it has since generated state-of-the-art results for tasks like sentence pair classification tasks, question answer tasks, etc.

The foundation of BERT is the idea of exploiting bidirectional context to acquire complex and insightful word and phrase interpretations. By simultaneously examining both sides of a word’s context, BERT provides a more complete interpretation of the meaning than earlier models which only examined the left or right side of a word’s context.

FinBERT is a specialised version of BERT which is used for the sentiment analysis and other NLP tasks with regards to financial text. It is trained using deep learning on a corpus of financial text including financial reports, articles in newspapers and other financial documents.

BERT can also be adapted to different contexts by training the model on suitable corpuses of texts like for example central bank MPC meetings minutes for central bank communication sentiment analysis.

Figure 1 details the BERT modelling process where the process of training the model and obtaining the output is described. The diagram illustrates the end-to-end process of transforming the unstructured text(central bank minutes) into a structured economic variable(the disagreement index).

**Input Data:** This is the raw text corpus of the entirety of the minutes of the MPC meetings of the three countries for the time period 2007-2025.

**Preprocessing and Tokenisation:** (CLS and SEP) BERT doesn’t recognise or read words like humans do, it reads numeric tokens. We use a Word Piece tokeniser that breaks words into sub-words (e.g., "tightening" "tight", "##en", "##ing").

**Domain-Specific BERT Model:** Unlike pre-trained BERT models like FinBERT which are attuned to financial domain texts, we have trained our own BERT model for the sentiment analysis using the corpus of the minutes’ text of the MPC meetings of the three countries to better conform to the nature of the Monetary policy communication. The model utilises twelve transformer layers with multi-head self-attention, but the weights of these layers have been adjusted to minimise loss specifically on the vocabulary and sentence structures used by central bankers.

**Feature Extraction:** After the model passes through the twelve layers, it produces a vector representation for every token. Only the vector corresponding to the [CLS] token was extracted. This is a 768-dimensional vector (a list of 768 numbers) that serves as the "mathematical summary" of the entire sentence's semantic meaning.

Classification Head (SoftMax Layer): The 768-dimensional vector is fed into a simple feed-forward neural network (the "Head") that projects it down to 3 dimensions (representing our 3 classes). The SoftMax function converts the raw numbers (logits) into probabilities that sum to 100%.

Sentiment Classification Output(Hawkish/Dovish/Neutral): The output is classified into one of three categories, hawkish, dovish or neutral. Sentences favouring higher interest rates or citing higher inflation risks are hawkish in nature, sentences favouring lower interest rates or citing lower inflation risks are dovish in nature, and status quo maintaining sentences or not sentences not mentioning interest rates or inflation are neutral in nature.

## 2.Data and Methodology

We have taken the annotated sentence corpus for the three countries Hungary, Czech Republic and Poland from **Niţoi et.al (2023)** and have retrained the BERT model based on the minutes of the three countries and fine-tuned it to extract sentiments from the minutes of the MPC meetings of the three countries.

The choice of the three countries is pertinent because all three are Eastern European Economies which were previously Communist republics and members of the Warsaw Pact and saw communism collapse after the fall of the Soviet Union. All three then transitioned to a capitalist system and are members of the European Union(EU) now. So, we want to see the dynamics of the central banking system of the three EU constituent countries and so we are basing this study on the most famous monetary policy rule, the Taylor rule. The study of how monetary policy and related communication has evolved in these countries which have made the transition to the capitalist system fairly recently can throw up interesting results, especially considering the fact dissent or disagreement was something communist regimes historically didn't approve of as they liked to project unanimity.

We have then analysed the minutes of the MPC meetings for the three countries for the time period 2007-2025 based on the updated BERT model and calculated the probabilities of hawkish, dovish and neutral stances for each sentence in the minutes of a particular meeting. The time period has been chosen keeping in mind the availability of the minutes for the countries and the onset of the global recession of 2007-08, and the time period also includes the Covid-19 period and its aftermath.

We have then calculated the sentence level sentiment score according to the following formula

$$\text{Sentiment\_score}_{ij} = \text{Probability}_{\text{Hawkish-}j} - \text{Probability}_{\text{Dovish-}j}$$

Which is the sentiment score for the  $j^{\text{th}}$  sentence in the  $i^{\text{th}}$  meeting.

A purely hawkish statement would put the sentiment\_score variable at value of 1 while a purely dovish statement would make the value -1.

Then we have calculated the average sentiment score for the meeting by taking the mean of all the sentence level scores. Then we have constructed a disagreement index which is basically the standard deviation of all the sentiment scores for a specific meeting. This disagreement index captures the deviance of the sentiment scores from the meeting level average. The disagreement index is given by the formula

$$\text{Disagreement\_index}_i = \text{S.D}(\text{Sentiment\_score}_{ij})$$

The higher the value of the disagreement index, it means there's more volatility in the sentence level sentiments compared to the consensus mean sentiment score for that meeting. This captures the magnitude of disagreement amongst the MPC members sufficiently well as a proxy in absence of their individual statements because it represents how much sentence level sentiments deviate from the mean consensus. This acts as our main variable of interest in this study. We study the impact of this disagreement index on the policy interest rate using the Taylor rule formula.

The Taylor rule for setting interest rates is one of the most popular formulas for nominal interest rate setting by central banks balancing inflation and economic output(GDP).

The Taylor rule equation is given in the following form:

$$r_t = r^* + \beta_t(\pi_t - \pi^*) + \theta_t(Y_t - Y^*) + \epsilon_t \dots(i)$$

Where  $r_t$ =Nominal rate of interest in  $t^{\text{th}}$  time period

$r^*$ =Natural rate of interest

$\pi_t$ = Actual rate of inflation in  $t^{\text{th}}$  time period

$\pi^*$  = Target rate of inflation

$Y_t$  = Actual Output(GDP) in  $t^{th}$  time period

$Y^*$  = Potential Output(GDP)

$(\pi_t - \pi^*)$  = Inflation gap

$(Y_t - Y^*)$  = Output gap

The interest rate data, inflation data and output data have all been collected from the websites of the Central Banks and the FRED database. For output, we have taken the Production Volume: Economic Activity: Manufacturing data as a proxy variable for output.

The Inflation Gap and Output gap variables are constructed by applying the HP Filter (Hodrick & Prescott, 1997). Bulř & Vlček (2023) support the use of HP filter for calculating the inflation gap as the key benefit of having time varying inflation target is that we will be more likely to achieve a reliable and credible inflation outcome than relying on an official but unreliable constant inflation target. Brouwer (1998) discusses many methods of estimating the output gap among which the HP filter is one method.

The  $r^*$  or natural rate of interest is a constant entity which is estimated by the constant coefficient in our regression as it is linear regression.

We use Tobit regression for our empirical analysis part. Tobit regression is used when the dependent variable is censored, meaning that it has an upper or lower threshold, often clustered near zero. Now, for monetary policy, the policy interest rate is often constrained by the Zero Lower Bound (ZLB) which means the interest rate cannot drop below zero. Though, after the 2008 global financial crisis shook the financial system, many central banks resorted to unconventional monetary policy which meant adopting negative policy interest rates like Japan did. However, for the Eastern European economies in our study, the policy interest rate has a lower bound of zero and doesn't cross into negative territory.

So, we can conduct Tobit regression by augmenting the Taylor rule equation in (i) with the disagreement index, so the augmented Taylor rule equation is given as follows:

$$r_t = \alpha_t + r^* + \beta_t(\pi_t - \pi^*) + \theta_t(Y_t - Y^*) + \rho_t di_t + \epsilon_i \dots (ii)$$

Where  $di_t$  = Disagreement index for  $t^{th}$  meeting

The case for use of the Tobit regression method in study of the Taylor rule is strengthened by prior studies exploring the same like Kim & Pruitt (2017) who explored Tobit type regression to solve the censoring problem which arose from applying the Taylor rule for setting interest rates in presence of the ZLB. They found that Tobit regressions yielded better, and more reliable coefficient estimates than standard OLS as Tobit deals with the censored data more appropriately when applied on the full sample.

### 3. Results and Discussion

The results of Tobit regression on the augmented Taylor rule equation are given as follows:

**Table 1: Tobit Regression results**

| Variable\Country  | Poland           | Czech Republic   | Hungary          |
|-------------------|------------------|------------------|------------------|
| di                | -1.24*<br>(0.12) | -0.99*<br>(0.20) | -2.97*<br>(0.20) |
| $(\pi_t - \pi^*)$ | 0.39*<br>(0.10)  | 0.28*<br>(0.04)  | 0.36*<br>(0.09)  |
| $(Y_t - Y^*)$     | 0.09*<br>(0.03)  | 0.06**<br>(0.03) | -0.03<br>(0.04)  |
| Cons              | 6.58*<br>(0.36)  | 3.61*<br>(0.55)  | 13.18*<br>(0.62) |

\*=1% level of significance

\*\*=10% level of significance

Source: Authors' estimations

The results here demonstrate a number of interesting insights. The main variable of interest disagreement index is found to be statistically significant for all three countries with a negative sign. That means that the interest rate decreases when disagreement increases. So that means higher disagreement leads to the MPC members taking a more dovish tone. This might be due to higher disagreement signalling more uncertainty about the economy's health in the short run and thus the policymakers err on the side of caution and opt for a possible "under-tightening" of monetary policy and risking a bit of inflation instead of "over-tightening" and risking an economic recession. This is in accordance with **Brainard's(1967)** uncertainty principle which says that when the policymaker is less certain about the possible impact of their policy, they should move conservatively and less aggressively. That might promote a dovish tone.

**Martin & Milas(2009)** analyse the impact of uncertainty about the true state of the economy on monetary policy rules in the United States by extending the Taylor rule. They show that uncertainty reduced interest rates by up to 80 basis points in 1990-91 and up to 70 basis points in 1996-2001. This shows that increased uncertainty reduces interest rates. This is borne out by our own findings as higher disagreement means higher volatility and higher uncertainty, and that reduces interest rates, as we have explained in the preceding paragraph.

Anyway, the more important conclusion for our study is that disagreement cannot be dismissed as mere noise as studies like **Tilmann(2021)** have previously declared. The most significantly used monetary policy rule in literature, i.e. the Taylor rule augmented with the disagreement index shows us the statistically significant impact of disagreement on the interest rate setting process.

As for the inflation gap ( $\pi_t - \pi^*$ ) and output gap ( $Y_t - Y^*$ ) coefficients, they are positive and statistically significant for Poland and Czech Republic while for Hungary, only the inflation gap coefficient is statistically significant with a positive sign. This is in conjunction with standard economic theory and the Taylor rule principle where both inflation and output gap affect the interest rate positively.

It has to be mentioned that regarding the stationarity checks of the variables in our study, which is normally required as we are dealing with time series data, the independent variables output gap, and the disagreement index have been found to be stationary using unit root tests like ADF(Augmented Dickey Fuller Test). The results are given in the Appendix in Table A-1. We consider the dependent variable, the nominal interest rate and the independent variable inflation gap to be stationary theoretically according to the seminal work of **Clarida et.al(2000)** who explicitly assume that the inflation and nominal interest rate are both stationary when presenting their forward-looking monetary policy function. They also state that the unit root tests are conventionally low powered.

#### *Robustness check*

For the purposes of our study, we conduct a robustness check to confirm the veracity of the findings. The robustness checks are conducted in the following manner:

Augmented Taylor Rule check: In papers like, the standard Taylor rule is often augmented with the exchange rate to control for the Central Banks often having a role in managing the exchange rate and keeping it stable, mainly through a managed floating exchange rate system. We augment our Taylor rule equation in (ii) with the exchange rate variable and the Taylor rule equation now is given as follows:

$$r_t = \alpha_t + r^* + \beta_t(\pi_t - \pi^*) + \theta_t(Y_t - Y^*) + \rho_t d i_t + \varphi_t f x_t + \epsilon_t \dots(iii)$$

The results of the Tobit regression on this augmented Taylor rule formula shows that the disagreement index coefficient is still negative and statistically significant for all three countries.

#### **4.Policy Implications and Conclusion**

The core premise of our analysis here is that higher disagreement in MPC meetings isn't necessarily always detrimental to the efficacy of the central bank's objectives. Rather, higher disagreement might open up newer perspectives and lead to increased transparency and might help in disseminating important economic information to the markets and public in a better way. Here in our study, we determine the efficacy of the Taylor rule for setting monetary policy interest rates in case of three Eastern European economies which happen to be former communist strongholds and have since transitioned to the capitalist system after the fall of the Soviet Union and are now members of the EU. We find the augmented Taylor rule with the disagreement

index(DI) variable which we have constructed is still valid and gives results consistent with the theory behind the Taylor rule. The Disagreement Index(DI) is found to negatively impact the interest rate set by the Taylor rule for all three countries, which might signify that though the inflationary pressures and the output gap exert pressure on the MPC members to revise the policy interest rate upwards, the volatility and disagreement in the tone of their discussions in the meeting which might stem from uncertainty about economic conditions, especially fears of a looming economic recession, might restrain them from raising the interest rates even though the inflationary and the output pressures may seem to suggest otherwise. This is borne out by studies like **Martin & Milas(2009)** where they find increased uncertainty caused interest rates to reduce in the US, and we posit that higher disagreement is due to higher uncertainty. **Montoro(2007)** also provides a theoretical framework from a political economy perspective on how disagreement amongst MPC members can slow down the pace of adjustment of interest rates, consistent with our findings.

Another important thing to note that disagreement is found to be statistically significant in the Monetary policy decision making process after we tested its impact using one of the most popular Monetary policy rules, the Taylor rule. This is consistent with the findings of **Sil et.al (2024)** and **Banerjee et.al(2024)** who confirm the significant role of disagreement amongst MPC members in achieving the central banks' objectives but contradicts the assertions of papers like **Tillmann et.al (2021)** who dismiss such disagreement as mere noise.

The policy implications arising from this is that disagreement amongst MPC members warrants attention not only in its explicit form as evidenced by the votes cast at the MPC meetings, but also in its implicit form as noted in the volatility of tone and sentiment contained in the minutes of the MPC meetings, and that might influence the policymaker's decisions regarding setting interest rates especially in times of greater economic instability and uncertainty, when it comes to looming fears of an economic recession that might temper the hawkishness of the MPC members as unemployment and recessionary conditions are pretty damaging to the populace and might fuel resentment against the Government and the central bank. This study provides clues as to why Central banks might sometimes hesitate before raising interest rates even in face of increased inflation and why they might not do it immediately. It provides insights into the balancing act the Central banks have to perform even if their primary mandate is inflation-targeting.

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## References

- [1]. Banerjee, S., Paramanik, R. N., Sil, R., & Kurup, U. (2024). When all speak, should we listen? A cross-country analysis of disagreement in policymaking and its implications. *Economic Notes*, 53(2), e12234.
- [2]. Belden, Susan. "Policy preferences of FOMC members as revealed by dissenting votes." *Journal of Money, Credit and Banking* 21, no. 4 (1989): 432-441.
- [3]. Bernanke, Ben. "Inaugurating a new blog." *Brookings Institute* (2015).  
a. <https://www.brookings.edu/blog/ben-Bernanke/2015/03/30/inaugurating-a-new-blog/>
- [4]. Brainard, W. C. (1967). Uncertainty and the Effectiveness of Policy. *The American Economic Review*, 57(2), 411-425.
- [5]. Bulíř, Aleš, and Jan Vlček. "Monetary Policy Is Not Always Systematic and Data-Driven: Evidence from the Yield Curve." *Open Economies Review* 34, no. 1 (2023): 93-112.
- [6]. Clarida, R., Gali, J., & Gertler, M. (2000). Monetary policy rules and macroeconomic stability: evidence and some theory. *The Quarterly journal of economics*, 115(1), 147-180.
- [7]. De Brouwer, Gordon. "Methods of Estimating the Output Gap| RDP 9809: Estimating Output Gaps." *Reserve Bank of Australia Research Discussion Papers* August (1998).
- [8]. Hodrick, Robert J., and Edward C. Prescott. "Postwar US business cycles: an empirical investigation." *Journal of Money, credit, and Banking* (1997): 1-16.
- [9]. Kim, J., & Pruitt, S. (2017). Estimating monetary policy rules when nominal interest rates are stuck at zero. *Journal of Money, Credit and Banking*, 49(4), 585-602.
- [10]. Martin, C., & Milas, C. (2009). Uncertainty and monetary policy rules in the United States. *Economic Inquiry*, 47(2), 206-215.
- [11]. Mishkin, Frederic S. "The Channels of Monetary Transmission: Lessons for Monetary Policy [Working Paper no. 5464]." (1996).
- [12]. Montoro, C. (2007). Why Central Banks Smooth Interest Rates? A Political Economy Explanation. *Central Reserve Bank of Peru Working Paper Series, Ocak*.

- [13]. Nițoi, M., Pochea, M. M., & Radu, Ș. C. (2023). Unveiling the sentiment behind central bank narratives: A novel deep learning index. *Journal of Behavioral and Experimental Finance*, 38, 100809.
- [14]. Sil, R., Kurup, U., Goyal, A., Singh, A., & Paramanik, R. N. (2024). Chorus in the cacophony: Dissent and policy communication of India's monetary policy committee. *Applied Economics Letters*, 31(18), 1900-1906.
- [15]. Taylor, John B. "Discretion versus policy rules in practice." In *Carnegie-Rochester conference series on public policy*, vol. 39, pp. 195-214. North-Holland, 1993.
- [16]. Tillmann, P. (2021). Financial markets and dissent in the ECB's Governing Council. *European Economic Review*, 139, 103848.
- [17]. Yılmaz, Canan Binal, and Eyüp Kahveci. "Merkez Bankası İletişiminde Yeni Bir Araç: Sözle Yönlendirme (Forward Guidance)." *Canan Binal Yılmaz/Dr. Eyüp Kahveci Merkez Bankası İletişiminde Yeni Bir Araç: Sözle Yönlendirme (Forward Guidance) Ülke Örnekleri ve Türkiye Uygulamaları 5* (2014): 5.

## APPENDIX

Table-A1. Stationarity Test Results

MacKinnon approximate p-value for Z(t)

| Variable\Country | Poland | Czech Republic | Hungary |
|------------------|--------|----------------|---------|
| $(Y_t - Y^*)$    | 0.00   | 0.00           | 0.00    |
| di               | 0.04   | 0.02           | 0.02    |