Inflation Forecasting and Targeting: Experience from Central Europe

Jiří Šindelář[1] | *University of Finance and Administration, Prague, Czech Republic*
Petr Budinský[2] | *University of Finance and Administration, Prague, Czech Republic*

Abstract

This paper deals with inflation forecasting and targeting performance of selected Central and Eastern-European central banks. Using battery of absolute and scaled forecasting errors along with significance tests, we have evaluated inflation predictions on the optimal monetary policy transmission horizon (14–16 months), as well as adherence to long-term inflation targets. Out of the evaluated Czech, Hungarian and Polish central banks, complemented by the European Central Bank for comparison, it was found, that even though the bank´s performance improved during the last decade, notably with the forecasting component, some issues are still present. These are mostly connected to the inflation targeting mechanism, which was found to contain systemic bias in the case of the Czech national bank, as well as failing in comparison with the naïve benchmark in the case of the European Central Bank. Both outcomes pave the way for further investigation in a wider economical context.

Keywords

Central bank, inflation forecasting, inflation targeting, forecasting error

JEL code

E58, E37, E31

INTRODUCTION

Inflation targeting (IT) has become the central method of monetary policy in most central banks around the globe over past decades. Relying heavily on inflation forecast, it applies point or interval target that the bank tries to achieve with tools at its disposal (Svensson, 2010). While at the start of 2010, some twenty-seven banks were considered "fully fledged" targeters (Hammond, 2012), a decade later the number grew almost two-fold only among the OECD member states. Performance of the targeting mechanism itself was subject to intense scrutiny, both in direct and indirect terms. When it comes to (lower) inflation stabilisation and economic growth, a strong majority of studies agree on its beneficial effect (e.g. Mishkin and Schmidt-Hebel, 2001; Walsh, 2009; Roger, 2010; or Bernanke et al., 2018), overriding older papers suggesting inconclusive evidence (e.g. Ball and Sheridan, 2004), even with selection bias allegedly present (Balima et al., 2020).

[1] University of Finance and Administration, Estonská 500, Prague 10, Czech Republic. Corresponding author: e-mail: sindelar@mail.vsfs.cz.
[2] University of Finance and Administration, Estonská 500, Prague 10, Czech Republic. E-mail: petr.budinsky@vsfs.cz.

In central and eastern Europe, most central banks ascended inflation targeting in the early 2000s. Out of the so-called Visegrad countries, the Slovak Republic adopted the Euro, thus becoming part of the Eurosystem, while the Czech Republic, Poland and Hungary gathered experience with their own targeting regime. Over the years, their performance was surveyed, both internally and externally. The evaluation generally gained favourable results, confirming IT success predominantly in the disinflation area (Krušec, 2014; Jonas and Mishkin, 2004; Mackiewicz-Łyziak, 2016). While many studies focus on the long-term macroeconomic benefits of the targeting itself, they seldom aspire to answer how successful the banks were in hitting the target and forecasting the inflation accurately. Relevant evaluations are rather limited in scope, focusing mostly on methodology issues (e.g. Faust and Wright, 2012), transparency (e.g. Woodford, 2013) or (positive) synergy with the IT itself (Hall and Jääskelä, 2009; Diron and Mojon, 2005). The accuracy aspects, however, are no less fundamental than the overall macroeconomic benefits of the IT mechanism, indicating monetary policy overall effectiveness and accountability. For other economic agents, these are crucial traits (Hubert, 2015).

The Czech national bank (CNB), as the main subject of our study, regularly evaluates its forecasting and targeting performance in periodic inflation reports (CNB, 2020). Aside from these, dedicated one-time assessments are also conducted, indicating undershooting of target in the first decade of IT (Šmídková, 2008), along with potential biases in forecasts (Babecký and Podpiera, 2008) yet with improving accuracy over time (Antal et al., 2008). The mechanism experience on a longer time-frame mostly confirmed those results (Rusnok, 2018), with the Polish (Grostal and Niedźwiedzińska, 2019) central bank reaching a similar conclusion – i.e. the target was mostly undershot, forecasting error gradually decreased over time. On the contrary, the Hungarian experience on the 15-year IT period led to mostly undershooting of the target (MNB, 2020), providing a different record of accomplishment.

With respect to the above, this paper seeks to comprehensively evaluate the accuracy of inflation targeting & forecasting in the Czech, Polish and Hungarian central banks. In order to achieve this, the paper is divided into four sections. First, we define data sources and describe the inflation targeting mechanism, along with methods used in the analysis. Then, results of the analysis are presented, in terms of both error measures and their significance testing (systemic bias, differences between institutions, and improvement over time). The final part consists of a results discussion, along with a synthesis of conclusions and policy recommendations.

1 DATA AND METHOD

We use three main data sets for each of the central banks analysed, with the ECB being the final addition. The first set of data represents predictions of annual inflation produced by each institution in its preceding year autumn forecast (usually September–November). This forecast was chosen because of its vital role in other agents decision-making (Jain and Sutherland, 2020), and also because it combines a 14–16 month horizon of optimal monetary policy transmission in the final quarter, along with shorter horizons in the preceding quarters of the year being forecast.[3] Second, the dataset is comprised of inflation targets set by banks in individual years. The third line represents real inflation data, with a precise indicator being chosen for each bank according to its forecasting & targeting methodology. Although inflation data are usually not subject to later revisions, we used values produced by the autumn report in the following year (i.e. first outturn).

As evinced by Table 1, the forecasting horizon evaluated with the inflation predictions oscillates between 15 months (September forecasts) and 13 months (December forecasts). Regarding range, we always use the maximum length of the time-line available, marking first natural distinction from many

[3] Because the CNB predicts inflation only on a quarterly basis, the annual forecast has been created synthetically as a simple average of these quarterly forecasts for a given year.

Table 1 Data specification

Subject	Forecast data		Inflation target data		Real inflation data	
	Data set range	Source	Data set range	Indicator targeted	Data set range	Source
Czech national bank (CNB)	2006–2020	Autumn forecast (2006–2008 October, 2009 on November)	1998–2020	Net inflation (1998–2001) Monetary policy-relevant inflation (2002–2020)*	1998–2020	Inflation report (CNB, 2020) (2006–2008 October, 2009 on November)
Hungary national bank (MNB)	2002–2020	Autumn forecast (2002–2011 November, 2012 on September)	2001–2020	Consumer price index (CPI) (2001–2020)	2001–2020	Inflation report (MNB, 2020) (2002–2011 November, 2012 on September)
Polish national bank (NBP)	2006–2020	Autumn forecast (2006–2020 October)	1999–2020	Consumer price index (CPI) (1999–2020)	2001–2020	Inflation report (NPB, 2020) (1999–2020 October)
European central bank (ECB)	2001–2020	Autumn forecast (2001–2020 September)	2001–2020	Harmonised consumer price index (HCPI) (2001–2020)	2001–2020	ECB statistics database (ECB, 2020)

Note: * The CNB targeted net inflation in 1998–2001. In 2001–2007, it targeted overall inflation, yet with a permanent subtraction of the primary effect of indirect tax change, hence using *de facto* monetary policy-relevant inflation. This was explicitly targeted from 2008 onwards (CNB, 2020).
Source: Own research

older, more restricted studies (e.g. Antal et al., 2008; or Jonas and Mishkin, 2004). Because of different timing of targeting/forecasting, this creates slightly longer datasets for some institutions than for others, which needs to be taken into account during the results interpretation. As our first analytical step, we used comprehensive battery of three forecasting errors covering both magnitude of forecasting error, systemic bias and performance in changes. This marks the second distinction from the available studies (e.g. Babecký and Podpiera, 2008), which rely on a limited range of measures, typically absolute and relative errors. Denoting Y_t as the real value in the year being forecast (targeted) and F_t as the forecast (target) value, we define forecasting error E_t as $(Y_t - F_t)$, leading to the following error measures definitions:

- Mean Absolute Error (MAE),

$$MAE = mean(|E_t|),$$

- Root Mean Squared Error (RMSE),

$$RMSE = \sqrt{mean\,(E_t^2)},$$

- Mean Average Scaled Error (MASE),

$$RMSE = mean\,\frac{E_t}{\frac{1}{n-1}\sum_{i=2}^{n}|Y_i - Y_{i-1}|}.$$

Finally, we used battery of statistical methods to identify significant patterns inside data, in three crucial dimensions. In order to determine systemic bias, we utilised **Wilcoxon signed rank test** (Wilcoxon, 1945) testing the null hypothesis that the distribution of forecasting errors is symmetric around zero

against the alternative hypothesis that such distribution is not symmetric around zero. Potentially significant differences between the forecasting errors of individual institutions were evaluated using **Kruskal-Wallis test**[4] testing null hypothesis that the distribution of forecasting errors is the same for all individual institutions against the alternative hypothesis that such distributions are not the same. Lastly, in order to detect incremental improvement, i.e. whether the average error size reduces as the horizon advances, the **Page trend test** was applied (Page, 1963) to test the null hypothesis that there is no shift in the forecasting error between the two studied horizons against the alternative hypothesis that such shift exists. P-values less than 0.05 were considered statistically significant and the analysis was conducted using the R statistical package, version 3.2.3.

2 RESULTS

How did the individual institutions fare, when it comes to the "raw" forecasting and targeting accuracy? Let us begin the results presentation with the Czech national bank (CNB).

Table 2 Error measures – CNB

Period	MAE		RMSE		MASE	
	Forecast	Inflation target	Forecast	Inflation target	Forecast	Inflation target
1998–2000	-	2.24%	-	2.82%	-	0.781
2001–2005	-	1.74%	-	2.14%	-	1.162
2006–2010	1.13%	1.18%	1.23%	1.28%	0.977	1.017
2011–2015	0.69%	1.36%	0.73%	1.51%	0.883	1.744
2016–2020	0.62%	0.60%	0.64%	0.80%	0.733	0.714
Total period	**0.81%**	**1.35%**	**0.90%**	**1.74%**	**0.877**	**1.038**

Source: Own research

As evinced by Table 2, aside from total period results, we also divided the timeframe into five shorter – mostly five year – intervals. Overall, the results indicate three main findings. Firstly, the error magnitude generally decreased over the years (both simple and squared), with the largest values being found in the first two sub-periods. In most of the years, real inflation undershot the target, as well as the predicted value. Second, the forecast errors were on average notably lower than the deviations connected to the inflation target, which in turn generally surpassed a one percentage-point toleration interval. Finally, scaled MASE metrics has shown, that while the bank made predictions in every period surpassing the accuracy of the in-sample naïve forecast (i.e. MASE value lower than 1), the naïve version of the inflation target (i.e. previous year inflation real value) made a better predictor than the actual inflation target. This implies that inertia inside the system might have been sometimes stronger than the monetary policy tools applied by the bank.

The Hungarian central bank results presented a largely different image, both in total (shorter) period and individual sub-periods.

The MNB exhibited slightly worse performance when it comes to its MAE & RMSE forecast errors and to its ability to target inflation. Contrary to the CNB, it was generally able to forecast and target inflation more accurately in the earlier post-transformation years, yet exhibited visibly worse accuracy in later periods. Its forecasting performance vs. the naïve benchmark was notably better, with forecast

[4] Traditional methods, i.e. Diebold-Mariano test, exhibit substantial problems in dealing with serial persistence present in the data (rejecting null too often – oversized type I error), making them unsuitable – see Christensen (2007) for details.

Table 3 Error measures – MNB

Period	MAE		RMSE		MASE	
	Forecast	Inflation target	Forecast	Inflation target	Forecast	Inflation target
2001–2005	0.92%	1.46%	1.07%	1.63%	0.444	0.704
2006–2010	0.56%	1.48%	0.69%	1.79%	0.445	1.182
2011–2015	1.53%	1.69%	1.74%	2.04%	0.900	0.999
2016–2020	0.73%	0.88%	0.86%	1.24%	0.836	1.007
Total period	**0.93%**	**1.38%**	**1.16%**	**1.70%**	**0.618**	**0.935**

Source: Own research

mostly overshooting real inflation, which was in turn generally higher than the inflation target. MASE value of inflation targeting again suggested high inertia inside the economy, almost making the previous year inflation a better predictor than the target itself.

The Polish experience with inflation forecasting and targeting was probably the most volatile among the institution set, with forecasting errors highest across the field.

Table 4 Error measures – NBP

Period	MAE		RMSE		MASE	
	Forecast	Inflation target	Forecast	Inflation target	Forecast	Inflation target
1998–2000	-	2.05%	-	2.83%	-	0.562
2001–2005	-	1.64%	-	1.89%	-	0.612
2006–2010	0.91%	0.86%	1.00%	1.11%	0.769	0.729
2011–2015	1.44%	2.10%	1.52%	2.24%	1.043	1.522
2016–2020	0.90%	1.10%	1.00%	1.51%	0.900	1.100
Total period	**1.12%**	**1.48%**	**1.23%**	**1.86%**	**0.933**	**0.847**

Source: Own research

Both simple and squared errors of the Polish NBP forecasts and target deviations markedly surpassed one percentage point. Inflation undershot both projections in the given period, marking similarity with the CNB, a fact in the 2011–2015 five-year period. Regarding the performance versus the naïve forecast, MASE values suggest a slightly better performance in the targeting sphere, with notably worse performance related to inflation forecasting. Here, the value-added by the bank´s prediction compared to the in-sample naïve benchmark was very limited, albeit on the shortest timeframe.

The ECB formed a sort of control element in our central bank sample. As such, it was evaluated on a shorter range of data, similarly to the NBP, yet still with interesting results.

With the aforementioned shorter data set in mind, we can summarize that both MAE and RMSE measures indicate the ECB´s superior accuracy among surveyed institutions. Simple and squared errors did not surpass a one percentage point deviation, with the real inflation again mostly undershooting the forecast and inflation target. The MASE metrics, however, paints a different picture. The in-sample naïve forecast was found to be a better inflation predictor than the bank´s own forecasts and set inflation target. This suggests inferior forecasting value added as well as questionable monetary policy effectiveness.

Table 5 Error measures – ECB

Period	MAE		RMSE		MASE	
	Forecast	Inflation target	Forecast	Inflation target	Forecast	Inflation target
1998–2000	-	-	-	-	-	-
2001–2005	-	0.20%	-	0.22%	-	2.000
2006–2010	0.92%	0.74%	1.21%	0.98%	0.821	0.661
2011–2015	0.82%	1.04%	0.84%	1.17%	1.139	1.444
2016–2020	0.48%	1.00%	0.57%	1.19%	0.774	1.613
Total period	**0.65%**	**0.75%**	**0.82%**	**0.97%**	**1.008**	**1.164**

Source: Own research

Following the evaluation of error deviances, we now approach the crucial question of suggested traits´ statistical significance. Table 6 summarizes the first batch of tests undertaken in this regard.

Table 6 Wilcoxon test and Page trend test results (p-values)

Period	Wilcoxon test		Page trend test
	Forecast	Inflation target	
CNB	0.639	0.005	0.342
MNB	0.258	0.133	0.002
NBP	0.140	0.313	0.033
ECB	0.913	0.217	0.967

Source: Own research

The introductory group of tests is concerned with the existence of systemic bias (Wilcoxon test) and gradual improvement of accuracy from the inflation target to the inflation forecast (Page trend test). In the first aspect, the hypothesis of the systemic character of the forecasting error was not rejected in regards to the inflation targeting of the CNB. With all other items reaching the opposite outcome, our results suggest that only the Czech central bank error-pattern contained systemic bias, related to the aforementioned real inflation undershooting the target. There was no such finding associated with the inflation forecasts surveyed. As for incremental improvement, Page test suggests that with two institutions, the MNB and the NBP, the quality of their projections improved with a shortening horizon between (longer-term) the inflation target and the inflation forecast.

Table 7 Kruskal-Wallis test results (p-values)

Kruskal-Walis test – forecast (whole sample)			0.654
Kruskal-Walis test – infl. target (whole sample)			0.014
IT differences decomposition	**CNB**	**ECB**	**MNB**
ECB	0.274	-	-
MNB	0.020	0.091	-
NBP	0.646	0.798	0.274

Source: Own research

Was there a significant difference between the forecasting/targeting accuracy of individual institutions? Results in this regard are summarized in Table 7.

The application of the K-W test across the whole sample indicated a significant difference between the accuracy of inflation targeting among our central banks. Specifically, the CNB was found to be a significantly more accurate targetter than the MNB, with the ECB nearing a similar result (p-value would be significant at 0.1 level). That was, however, the sole case we have detected.

3 DISCUSSION

Our results point out a rather positive picture of the inflation forecasting and targeting performance of the surveyed central banks. The direction of the targeting error mostly confirms a disinflation tendency of the system suggested by Krušec (2014), Jonas and Mishkin (2004), or Mackiewicz-Łyziak (2016). In the majority of the institutions, the magnitude of the forecasting and targeting (absolute) error gradually decreased to a circa one percentage point in the post-2015 period, with conducted tests not verifying the inflation-forecast bias indicated earlier (Babecký and Podpiera, 2008). Worse outcomes, however, were also found. Some central banks, namely the NBP and the ECB, struggled to make their inflation target a better predictor than the naïve in-sample forecast, utilised by the MASE metric. This might lead to concerns over the effectiveness of the targeting concept as a whole, outlined by e.g. Ball and Sheridan (2004). Systemic bias detected with the CNB´s inflation targeting accuracy add to this scepticism.

Comparing the performance of individual central banks is precarious. The results should not only be interpreted with different data-ranges in mind (the CNB being analysed on the longest one), but also with respect to a different inflation targeting framework being used. This important variable, as evinced by e.g. Baxa et al. (2015), determines not only the resulting accuracy, but also its subsequent interpretation. While the CNB, for example, centres its policy actions to achieve the inflation target, which is typically identical to the same-horizon forecast, other banks employ different paradigms. For the ECB both forecast and target diverge frequently and the MNB with the NPB have a wider set of aspirations in their function. With this in mind, our results show that the CNB is a significantly more successful targetter than the MNB, when it comes to overall accuracy on the surveyed period. Other significant differences were not found, adding to the general targeting-success-thesis formulated earlier.

Comparing the accuracy of inflation forecasting and inflation targeting between themselves yielded interesting outcomes. The banks in question exhibited decent forecasting accuracy, compared to their earlier scores (Roger and Stone, 2005) or GDP predictions segment (Šindelář, 2017). No systemic bias and some incremental improvement on shortening the time horizon were observed. While forecasting itself can be considered a purely analytic exercise, inflation targeting is where real monetary actions come into play. The results were more flawed with this activity, indicating not only higher error deviances (frequently over toleration interval), but also sub-par performance versus the naïve benchmark and in a single case, systemic bias. Successfully executing monetary policy through such optics is obviously challenging for CEE countries and even though the ECB reached lower absolute deviances from its inflation target, it did not represent a statistically significant difference.

CONCLUDING REMARKS

The goal of this paper was to evaluate the effectiveness of CEE central banks in inflation forecasting and targeting. The evaluation was done on the basal accuracy level and as such, it indicates a rather satisfactory result. Our analysis shows that while the Czech, Polish and Hungarian central banks struggled with forecasting and targeting accuracy in the earlier period, since 2015 they have become notably more efficient in this regard – including the Covid-19 affected year 2020. The ECB performance, on the contrary, lacked such an improvement trajectory, despite attaining comparable error sizes and not differing significantly from the rest of the sample.

The issues worth further investigation contain systemic bias found in the CNB targeting track record and subpar performance versus the naïve benchmark, mainly in the ECB case (both forecasting and inflation targeting). In the CNB context, the thesis of a small open-economy central bank not being able to decisively execute the monetary policy seems disproved by the MNB and the NBP results. In the Eurozone, though, the ECB´s outcome is puzzling. Our study here is bound by a strict focus on the accuracy itself and a wider macroeconomic investigation of the problem is viable. Incorporating particularly economic growth and potentially unemployment as the most policy (and politically) sensitive elements.

ACKNOWLEDGEMENTS

This paper was supported by institutional support for long-term conceptual development of research organization University of Finance and Administration.

References

ANTAL, J., HLAVÁČEK, M., HORVATH, R. Prediction Bias and Undershooting of the Inflation Target. In: *Evaluation of the Fulfilment of the CNB's Inflation Targets 1998–2007*, Czech National Bank, 2008.

BABECKÝ, J. AND PODPIERA, J. Inflation forecasts errors in the Czech Republic: Evidence from a panel of institutios. In: *Evaluation of the Fulfilment of the CNB's Inflation Targets 1998–2007*, Czech National Bank, 2008.

BALIMA, H. W., KILAMA, E. G., TAPSOBA, R. Inflation targeting: Genuine effects or publication selection bias? *European Economic Review*, 2020, 128, pp. 103–120.

BALL, L. M. AND SHERIDAN, N. Does inflation targeting matter? In: *The inflation-targeting debate*, University of Chicago Press, Ill., 2004, pp. 249–282.

BAXA, J., PLAŠIL, M., VAŠÍČEK, B. Changes in inflation dynamics under inflation targeting? Evidence from Central European countries. *Economic Modelling*, 2015, 44, pp. 116–130.

BERNANKE, B. S., LAUBACH, T., MISHKIN, F. S., POSEN, A. S. *Inflation targeting: lessons from the international experience.* Princeton, NJ: Princeton University Press, 2018.

CIŻKOWICZ-PĘKAŁA, M., GROSTAL, W., NIEDŹWIEDZIŃSKA, J., SKRZESZEWSKA-PACZEK, E., STAWASZ-GRABOWSKA, E., WESOŁOWSKI, G., ŻUK, P. Three decades of inflation targeting. *NBP Working Paper No. 314*, Narodowy Bank Polski, 2019.

CZECH NATIONAL BANK (CNB). *Inflation reports* [online]. CNB, 2021. <https://www.cnb.cz/cs/menova-politika/zpravy-o-inflaci>.

DIRON, M. AND MOJON, B. Forecasting the central bank's inflation objective is a good rule of thumb. *ECB Working Paper*, No. 564, European Central Bank, 2005.

EUROPEAN CENTRAL BANK (ECB). *Inflation forecasts* [online]. ECB, 2021. <https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/table_hist_hicp.en.html>.

FAUST, J. AND WRIGHT, J. H. Forecasting inflation. In: *Handbook of economic forecasting*, Elsevier, 2013, Vol. 2, pp. 2–56.

HALL, J. AND JÄÄSKELÄ, J. Inflation Volatility and Forecast Accuracy. *Research Discussion Paper 2009–06*, Reserve Bank of Australia, 2009.

HAMMOND, G. *State of the art of inflation targeting.* 4th Ed. Centre for Central Banking Studies, Bank of England, 2012.

HUBERT, P. Do central bank forecasts influence private agents? Forecasting performance versus signals. *Journal of Money, Credit and Banking*, 2015, 47(4), pp. 771–789.

CHRISTENSEN, J. H., DIEBOLD, F. X., RUDEBUSCH, G., STRASSER, G. Multivariate Comparisons of Predictive Accuracy. *University of Pennsylvania working paper*, University of Pennsylvania, 2007.

JAIN, M. AND SUTHERLAND, C. S. How do central bank projections and forward guidance influence private-sector forecasts? *Bank of Canada Staff Working Paper No. 2018-2*, Bank of Canada, 2018.

JONAS, J. AND MISHKIN, F. S. Inflation targeting in transition economies experience and prospects. In: *The Inflation-Targeting Debate*, University of Chicago Press, Ill., 2004, pp. 353–422.

KRUŠEC, D. Is inflation targeting effective? Monetary transmission in Poland, the Czech Republic, Slovakia, and Hungary. *Eastern European Economics*, 2011, 49(1), pp. 52–71.

MACKIEWICZ-ŁYZIAK, J. Active and passive monetary policy in CEE countries with inflation targeting: the case of the Czech Republic, Hungary, and Poland. *Eastern European Economics*, 2016, 54(2), pp. 133–152.

MAGYAR NEMZETI BANK (MNB). *Inflation reports* [online]. MNB, 2021. <https://www3.mnb.hu/en/publications/reports/inflation-report>.

MISHKIN, F. S. AND SCHMIDT-HEBBEL, K. One decade of inflation targeting in the world: What do we know and what do we need to know? *Working paper 8397*, NBER, Cambridge, MA, 2001.
NARODOWY BANK POLSKI (NBP). *Inflation reports* [online]. NBP, 2021. <https://www.nbp.pl/homen.aspx?f=/en/publikacje/raport_inflacja/raport_inflacja.html>.
PAGE, E. B. Ordered hypotheses for multiple treatments: a significance test for linear ranks. *Journal of the American Statistical Association*, 1963, 58(301), pp. 216–230.
ROGER, S. Inflation targeting turns 20. *Finance and development*, 2010, 47(1), pp. 46–49.
ROGER, S. AND STONE, M. On target? The international experience with achieving inflation targets. *IMF Working paper 05/163*, Washington D.C., USA: IMF, 2005.
RUSNOK, J. Two Decades of Inflation Targeting in the Czech Republic. *Finance a Uver*, 2018, 68(6), pp. 514–517.
SVENSSON, L. E. Inflation targeting. In: *Handbook of monetary economics*, Elsevier, 2010, Vol. 3, pp. 1237–1302.
ŠINDELÁŘ, J. GDP forecasting by Czech institutions: an empirical evaluation. *Prague Economic Papers*, 2017, 26(2), pp. 155–169.
ŠMÍDKOVÁ, K. *Evaluation of the Fulfilment of the CNB's Inflation Targets 1998–2007.* Czech National Bank, 2008.
WALSH, C. E. Inflation targeting: what have we learned? *International Finance*, 2009, 12(2), pp. 195–233.
WILCOXON, F. Individual comparisons by ranking methods. *Biometrics*, 1945, 1(6), pp. 80–83.
WOODFORD, M. Forward guidance by inflation-targeting central banks. *Discussion Paper No. 1314–15*, Columbia University, NY, 2013.