Problems and Opinions

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IS IT WORTH REVEALING MORE?
CENTRAL BANKS' TRANSPARENCY
AND ITS MEASUREMENT

1. INTRODUCTION

The discussion on central banks' transparency commenced with the analysis by Cukierman and Meltzer[1], which provided a theoretical model of a central bank's ambiguity and credibility under the assumption that the central bank acts discretionally under information asymmetry. The model was developed for the central bank that tries to control money growth but whose impact on monetary aggregates is limited: it can decide only partially the extent to which it controls money growth. Less control over the instrument expresses lower transparency, which results in slower adjustment of economic agents' expectations. Ambiguity may be beneficial for policymakers when they wish to support economic growth. The current discussion on the central bank's transparency draws the same

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[1] A.C. Cukierman, A.H. Meltzer, *Theory of Ambiguity, Credibility and Inflation under Discretion and Asymmetric Information*, "Econometrica", 1985, Vol. 54, No. 5, pp. 1099–1128. There are previous papers on the time inconsistency problem and central bank credibility that indirectly cover the transparency of the policymaker: F. Kydland, R. Prescott, *Rules rather than Discretion: The Inconsistency of Optimal Plans*, "Journal of Political Economy", 1977, Vol. 85, No. 3, pp. 473–492, R.J. Barro, D. Gordon, *Rules, Discretion and Reputation in a Model of Monetary Policy*, "Journal of Monetary Economics", 1983, Vol. 12, No. 1, pp. 101–121.

general conclusion: there are pros and cons to revealing policymakers' goals, actions, forecasts and intentions. However, due to the broad acceptance of New Neoclassical Synthesis (NNS), which highlights expectations as the transmission channel of monetary policy, among policymakers a somewhat broad transparency is standard. Moreover, this transparency is continuously rising, and the practice of central bankers shows that the limits of transparency shift quite quickly. The National Bank of Poland in its comprehensive report on the evolution of inflation targeting (IT) mentions two dimensions of such modification – the increasing transparency of policymakers, especially in the field of decision-making and intentions, and incorporation of financial stability issues into the monetary policy optics[2]. Communication of the central bank's intentions is crucial in this period of low inflation or deflation and zero lower bound (ZLB) reached by several central banks. It generates new practices as forward guidance.

Standard tools of transparency assessment do not capture monetary policy innovations in communication. Forward-looking announcements have the impact on the financial markets while pricing the assets and on the expectations of economic agents. If a standard signalling tool – an interest rate – loses its impact, new paths of communication are explored. New boundaries of transparency are set nowadays and new measures should follow this practice. This is the main motivation for the following research.

Transparency is an unobservable variable. Rather it is a concept of a qualitative nature, defined with the flexibility according to the perspective of the research. If one desires to check whether transparency has any impact on the possibility of the central bank's goal achievements, a transparency measure is needed. Some transparency indices exist and are broadly explored in the empirical research. Their remarkable shortcoming is that they depend on the actual central banks' practice and become stale over time, as they do not capture up to date practices. Which is why there is room for their methodological development and as such the goal of this paper is of a methodological nature. The paper aims at modification of the most commonly used transparency measures. As a result, it should capture the central banks' most up to date practices in the field of communication. A four-step methodology is applied to develop the tool and prove its applicability. The first step covers a comparative analysis of transparency indices and their forward-lookingness (FL). The second step offers a subindicator of central banks' forward-lookingness (FR) in communication with the markets. The index can be incorporated into standard measures of transparency. In the third step, new measures of transparency are created. These are the results of an extension procedure.

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[2]   W. Grostal, M. Ciżkowicz-Pękała, J. Niedźwiedzińska, E. Skrzeszewska-Paczek, E. Stawasz, G. Wesołowski, P. Żuk, *Inflation Targeting Evolution. Some Examples*, National Bank of Poland, Warsaw 2015, Chapter II.

In the last step, the transparency of the central banks is assessed using the three indicators and their extension – the FL subindex.

The research covers the Czech National Bank (CNB) and the National Bank of Poland (NBP). These are IT central banks, where IT is a strategy promoting transparency and a clear commitment to achieving inflation goal[3]. They are quite natural candidates for the comparison due to their recent experiences of transformation as well as European Union accession. The CNB and NBP apply different practices in the field of communication so they are quite a reasonable choice with regard to methodology testing. The indices are calculated for three years: 2005, 2010 and 2015. This time range captures the pre-crisis and post-crisis situation. The following paper contributes to the literature on monetary policy transparency and implementation of IT. The paper is organised as follows: section 2 follows with a literature review on transparency measurement and enhancement of forward-looking communication. Section 3 presents the research methodology. Section 4 contains the results. The final section concludes the paper.

2. LITERATURE OVERVIEW

As transparency is of a qualitative nature, there can be difficulties in its measurement. Measurement makes it possible to compare a central bank's practices and their evolution over time. Moreover, it paves the way to including transparency in more methodologically developed research and drawing conclusions on its relations to the central bank's results. Usually, when measurement of a qualitative concept is applied, an index is created on the basis of the factor analysis – possible variables influencing transparency are identified theoretically and empirically. A broad set of such factors is usually captured by the index, as a central bank's practice does not vary greatly. This is why an index limited to only a few factors would not capture any change over a longer period. Categories that assess the aspects of transparency related to strategic choices tend to reveal slow-moving values, whereas they are more volatile when central banks' day-to-day challenges are covered[4]. This research focuses on transparency in the field of signalling intentions.

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[3] B. Bernanke, T. Laubach, F.S. Mishkin, A.S. Posen, *Inflation Targeting: Lessons from the International Experience*, Princeton University Press, Princeton 2001, p. 36.

[4] P.L. Siklos, *Transparency is Not Enough: Central Bank Governance as the Next Frontier*, in:, *Handbook of Central Banking, Financial Regulation and Supervision. After the Financial Crisis*, Eds.: S. Eijffinger, D. Masciandaro, Edward Elgar Cheltenham, UK, Northampton, US, 2010, pp. 133–157.

Table 1. Transparency measures – examples

Authors	Factors covered	Comment
Fry et al. (2000) FRY	– prompt public explanation of policy decision, – **frequency and form of forward-looking analysis provided to the public**, – assessment and analysis,	**Policy explanation** index. First approach to this measurement presented in the literature, covering 94 countries. Narrow approach to transparency: it does not cover strategic announcements. This was in line with the authors' intentions as they focused on measurement of policy explanation. The index has been used in other research (Łyziak, Mackiewicz, Stanisławska, 2007).
Bini-Smaghi & Gros (2001) **BSG**	– objectives, – strategy, – **publication of data and forecasts**, – communication strategy,	Joint analysis of transparency and accountability. Transparency is the precondition of accountability so it is covered by the index. Points range: 0–2 for each criterion. Total index value: 30.
Fracass, Genberg, & Wyplosz (2003) **FGW**	– quality of information provided, – assumptions about key macroeconomic variables, – quantity of information provided, – finding information, – presentation of policymaking process, – **inflation forecast**, – **underpinnings of inflation forecasts**, – executive summary: number of pages and readability, – executive summary: quality,	Index produced on the basis of Inflation Reports (IR) analysis. The authors delivered an overall rating of IR: quantity, quality and accessibility of information are assessed. As the most important information about monetary policy actions is revealed in IR the index can be interpreted as a transparency measure. Each of the criteria enumerated in the middle column is divided into subfactors. Points attribution from 0 to 10 (when the quality of information is assessed) and 0–1 (when the appearance of information or non-appearance is assessed).
Eijffin-ger & Geraats (2006) **EG**	– political transparency, – **economic transparency**, – procedural transparency, – **policy transparency**, – operational transparency,	The background of the index was the taxonomy of transparency (Geraats, 2001). This measure is frequently used in the literature (Crowe, Meade, 2008), (Dincer, Eichengreen, 2007), (Dincer, Eichengreen, 2014) (Siklos, 2011) to compare across countries and over time.

Authors	Factors covered	Comment
		Wide coverage of transparency aspects, consistency with IT and good description of the points attribution, which facilitates measurement. It inspires other measurements (Bajalan, Raei, Tehrani, 2012).
Bajalan, Raei & Tehrani (2012) **BRT**	– **openness of** the policy (based on the Eijffinger-Geraats index), – clarity referring to presentation and analysis of information, – honesty: the intentions of the information sender, – common understanding referring to the linguistic code of the sender and receiver.	More developed conceptual framework of the index. It tries to capture the possible gap between the intentions of the sender and the understanding of the receiver of the information. Points attribution depends on the question., The index still refers to the extent of information revealed by the central bank but analysed in a detailed way. The idea of the index derived from the transparency concept given by Winkler (2000).

Note: full references to the literature mentioned in the column *Comment* are given in the references section.

Source: author's own on the basis of: S. Bajalan, T. Raei, R. Tehrani, *Development of an Index for Measuring the Central Bank's Transparency*, "Argumenta Oeconomica", 2012, Vol. 1, No. 28. pp. 14–40; L. Bi- ni-Smaghi, D. Gros, *Is the ECB Sufficiently Accountable and Transparent*? European Network of Economic Policy Research Institutes Working Paper, 2001, No. 7, pp. 1–28; A. Fracasso, H. Genberg, Ch. Wyplosz, *How Do Central Bank Write? An Evaluation of Inflation Targeting Central Banks*, Geneva Reports on the World Economy Special Report 2, International Center for Monetary and Banking Studies, 2003, pp. 11–30; M. Fry, D. Julius, L. Mahadeva, S. Roger, G. Sterne, *Key Issues in the Choice of a Monetary Policy Framework*, [in:] *Monetary Policy Frameworks in a Global Context*, Eds.: L. Mahadeva, G. Sterne, Routledge, London, 2000, pp. 1–16; S.C.W. Eijffinger, P.M. Geraats, *How Transparent Are Central Banks*? "European Journal of Political Economy", 2006, Vol. 22, pp. 1–21.

Even broad-coverage indices become stale over time. It is not possible to create an index that is not time-related. They usually refer to the central bank's actual practice. When Cukierman and Meltzer conducted their analysis, central banks were opaque and used monetary control as the way to achieve their main goal. No clear commitment to inflation was made. During the second decade of the 21st century, monetary policy has mostly been conducted within the IT framework. Table 1 presents the most popular measures of transparency applicable to modern monetary strategy. Only subsections of factors covered by the measure are enumerated in the second column. Bolded subsections refer to the central bank's forward-lookingness and its signalling of subsequent steps. The first measure

focuses on particular aspects of a central bank's communications. The remaining ones account for summary measures of transparency.

Transparency measures differ according to the authors' assumptions about the factors influencing it and the goal of the research. Nevertheless, when the index is created, the authors refer to the up to date solutions applied by the central banks. Each of the indices presented in table 1 refers to signalling intentions by the central banks, whether directly or indirectly. Recently, the field of forward-looking communication has been enhanced. There are at least two remarkable developments: extension of the way in which a macroeconomic forecast is presented and published, and forward guidance implementation. These are not captured in the standard transparency measures.

Table 2. Evolution of revealing the forecast

Stages	Information content on the future development of the economy
I: Inflation outlook	Descriptive analysis of future trends in the economy, especially inflation. This is produced when the central bank does not wish to reveal the inflation forecast explicitly. It presents the view of the central bank on the inflation trend. It covers some inflation factor analysis as well.
II: Inflation forecast	Numerically at least, the inflation forecast is revealed on the fan chart. When the economic model is advanced enough to produce a macroeconomic forecast, the GDP forecast is revealed as well. Some other macroeconomic forecast outcomes may be published: unemployment or bilateral exchange rate.
III: Policy path	The macroeconomic forecast is produced under assumption of endogenous interest rates consistent with some rule (usually a Taylor-type rule). The policy path is the sequence of current and expected interest rates consistent with the achievement of central bank goals. It can be revealed verbally, as a description of the next change in rates, or numerically – usually on the fan chart.

Source: author's own.

Central banks' practice in the field of forecasting – and publishing the forecast – moves towards greater transparency over time. This is a result of recent economic development as well as change in central banks' attitudes. Three main steps may be enumerated regarding the extent of the information revealed here. These are presented in table 2. The transparency measures mentioned in table 1 were developed when stage 2 of revealing the forecast was the standard.

In contrast to a broad consensus in favour of publishing an inflation forecast, the discussion on the pros and cons of revealing the policy path continues. As it is probably the most obvious way of signalling a central bank's subsequent actions,

the discussion on its revealing is summarised here. There are some benefits to interest rate publication: enhanced accountability due to raised transparency (here: publication of policy path); a commitment to achievement of long-term goals by showing the path toward this achievement; improved assets pricing due to better anchoring of short term expectations; and greater leverage of policymakers over long-term interest rates[5]. Moreover, the central bank uses analytical and forecasting models that assume that economic agents are rational (or near-rational) and thus forward-looking. They require at least an implicit time profile for future policy actions[6]. Policy path announcement or qualitative communication of a central bank's intentions improves the ability of market operators to predict monetary policy decisions. Empirical research for the Reserve Bank of New Zealand, which has been releasing a quantitative assessment of its future policy intentions since 1997, shows that even for a very transparent central bank, the publication of the expected interest rate path has a significant impact on market expectations[7].

Some theoretical papers also give support to publishing the policy path when there is an information asymmetry between the public and the central bank[8]. They develop a standard New-Keynesian framework to examine the macroeconomic effect of revealing a central bank's own policy path. These papers conclude that the publication of additional information (policy path) raises economic performances. However, in the analysis of Brzoza-Brzezina and Kot, the marginal benefits from revealing a path are relatively small in comparison with the situation when the central inflation path is published. The conclusion of the theoretical analysis depends on the model specifications and some underlying assumptions.

There are several disadvantages to publishing the policy path as well[9]: starting with the one that such a path does not exist. Creating a plausible approximation of it may be a daunting task. Moreover, central banks' procedures are not in line with making decisions over a longer timeframe. Today's meeting brings only today's decisions. Any other information revealed is just the signal, not a commitment. The central banks do not follow their own, previously published paths: interest rate forecasts had little or no informational value when the horizon exceeded two quarters, although they were good for the next quarter after their production

[5]   G.A. Kahn, *Communicating a Policy Path: the Next Frontier in Central Bank Transparency?* Federal Reserve Bank of Kansas City Economic Review, Q1, 2007, pp. 30–33.

[6]   A.S. Blinder, *Central Banking in Theory and Practice*, MIT Press, Cambridge, MA 1998.

[7]   G. Ferrero, A. Secchi, *The Announcement of Future Policy Intentions*, Economic Working Papers, No. 720, Bank of Italy, 2006, pp. 17–37.

[8]   G.D. Rudebusch, J.C. Williams, *Revealing the Secrets of the Temple: The Value of Publishing Central Bank Interest Rate Projections*, Federal Reserve Bank of San Francisco Working Paper, 2006, No. 31, pp. 267–280; M. Brzoza-Brzezina, A. Kot, *The Relativity Theory Revised: Is Publishing Interest Rate Forecast Really so Valuable? National Bank of Poland Working Paper Series*, 2008, No. 52, pp. 14–17.

[9]   G.A. Kahn, *Communicating a Policy Path…*, *op. cit.*, pp. 33–36.

and reasonable for the following one[10]. Regardless of this reproach, the current policy decision is the result of thinking through both the first and the subsequent steps, considering the magnitude of the policy problem to be solved and the degree of uncertainty[11]. So in fact, the central banker's decision is the first step along the path. The path, if revealed, may be seen as the central bank's unconditional commitment by economic agents; it can force the central banks to follow the path even if unexpected economic issues make it invalid. Regardless of the drawbacks of publishing the policy path, the title of Kahn's paper: *Communicating a Policy Path: the Next Frontier in Central Bank Transparency*, gives quite an obvious conclusion to the subject. The question is when and how rather than whether to publish the policy path. The checklist of criteria to fulfil prior to such a decision is also proposed in the literature[12]. It covers assessment of a central bank's strategic choices, its technical preparation and markets' ability to capture the message of the forecast. However, central banks are rather cautious when it comes to revealing policy path. There are only a few examples of inflation targeters that do so: New Zealand, the Czech Republic, Israel, Norway and Sweden.

Besides revealing the policy path there are other possibilities for signalling central banks' intentions. Central banks' qualitative announcements have a somewhat longer history. Traditionally the central banks produced some description of the economic outlook. In some countries this was formalised in the monetary policy indications or the risk balance for inflation. When the central bank started to release the inflation forecast, such commentary became a general summary of the message of the forecast. Verbal indications usually denote the central banks' intentions over the shorter term; up to a quarter. The latest economic developments have brought the need for a longer-term approach to suggestion of the central banks' intentions. Except for the standard need for shaping economic agents' expectations in the uncertain environment and under lag existence, the central banks of some countries reach the zero lower bound. Their standard instrument – the interest rate – is no longer effective. The central banks' longer-term commitment generates a boom through the expectations channel. The commitment may refer to keeping low interest rates, stabilising the exchange rate or supporting the economy via quantitative easing programmes. While implementing the forward guidance, the central bank announces the period for implementing special conditions. It can do so qualitatively – when the period during which the central bank intends to

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[10] Ch.A.E. Goodhart, W. Bin Lim, *Interest Rate Forecast: a Pathology*, International Journal of Central Banking, 2011, Vol. 6, pp. 135–171.

[11] D. Archer, *Central Bank Communication and the Publication of Interest Rate Projections*, A paper for a Sveriges Riksbank conference on inflation targeting, Stockholm, June 2005, http://www.riksbank.se/Upload/Dokument_riksbank/Kat_foa/Archer17May.pdf (accessed 10.08.2014).

[12] T.A. Phan, *Should Central Banks Publish Interest Rate Forecasts? A Survey* (March 1, 2013). http://ssrn.com/abstract=1913990 (accessed 10.05.2015).

maintain a very loose monetary policy stance is defined in rather general terms (e.g. for a considerable period), with fixed date (e.g. until mid-2016), and with some conditions that may trigger a policy shift (e.g. until the unemployment rate falls below 9%)[13].

Some authors identify policy path publication as quantitative forward-guidance[14]. Forward guidance, when held verbally, does not require revealing the policy path, so it can be implemented by those central banks that are reluctant to employ such a practice. It is also easier to communicate that forward guidance is a tool for special times and abandon this practice when standard conditions for monetary policy conduct reappear. Description of the future policy actions is less costly in terms of the time and effort paid to producing the forecast. Finally, the policy path is not the central bank's commitment. At special times, more engagement is obviously needed.

3. METHODOLOGICAL ISSUES

The study consists of 4 steps (scheme 1). The first step compares the transparency indices from table 1 in the light of the forward-looking component's importance. The relative importance of FL analysis is calculated here. The FGW index is excluded from further examination as the measure is built to assess each part of the Inflation Report separately. The points attribution across sections is not consistent and extension of the index would impose further arbitrary decisions on the points attributions. BRT is excluded as well. The index captures more than the scope of information revealed. Clarity of information, honesty and common understanding are not evaluated by the simple points attribution procedure. Moreover, the openness of the central bank in the BRT proposal is just the EG index. The other subsections of the index do not refer to the forward-looking component. Three indices covered by the further examination refer to signalling intentions.
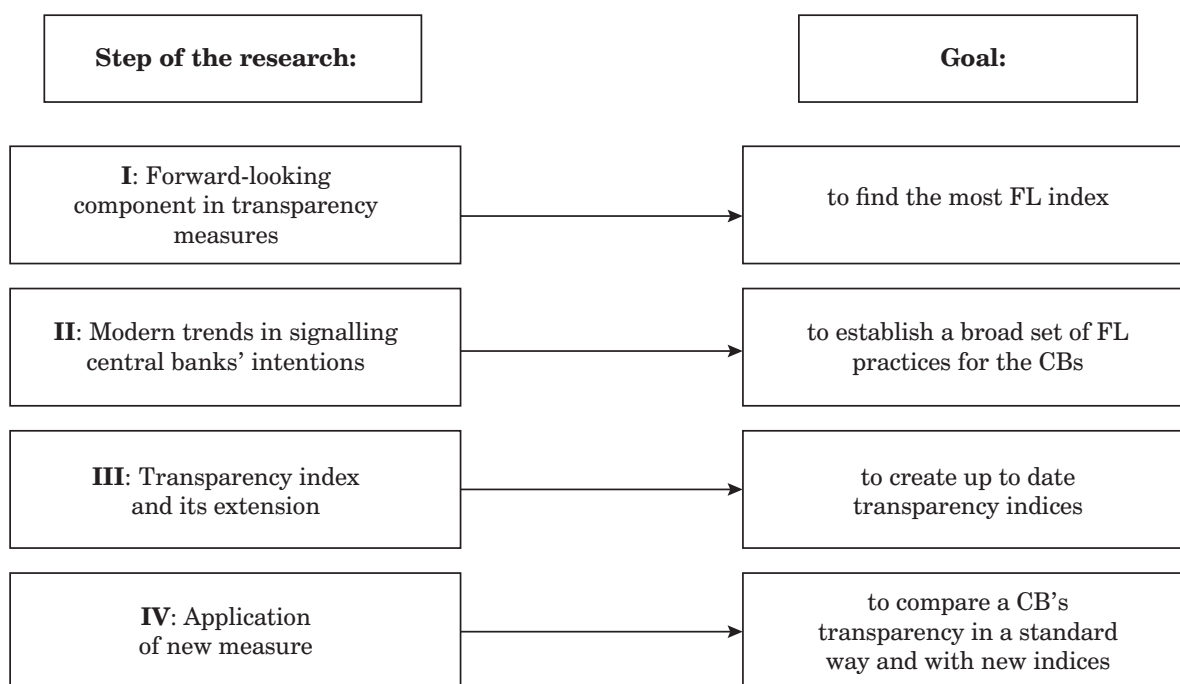
The second step of the research results in the development of the FL component of transparency measurement, which can be an extension to any transparency index. It should capture up to date practices of communication with the markets.

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[13]   NBP, *Inflation Report*, Warsaw, November 2013, pp. 40–43.
[14]   P.M. Geraats, *Monetary Policy Transparency*, CESifo Working Paper Series 2014, No. 4611; L.E.O. Svensson, *Forward Guidance,* "International Journal of Central Banking", 2015, No. 1, Supplement 1; M. Woodford, *Forward Guidance by Inflation Targeting Central Bank*, Paper prepared for the conference Two Cambridge Decades of Inflation Targeting: Main Lessons and Remaining Challenges, Sveriges Riksbank, June 3, 2013. http://www.columbia.edu/~mw2230/RiksbankIT.pdf (accessed 10.05.2015).

As so, it is based on the central banks' practice analyses: these were discussed in the previous section.

Scheme 1. Steps of the research

Step of the research:		Goal:
I: Forward-looking component in transparency measures	→	to find the most FL index
II: Modern trends in signalling central banks' intentions	→	to establish a broad set of FL practices for the CBs
III: Transparency index and its extension	→	to create up to date transparency indices
IV: Application of new measure	→	to compare a CB's transparency in a standard way and with new indices

FL – forward-looking
CB – central bank

Source: author's own.

The third step of the research is an extension procedure: each index is reconstructed to cover the forward-looking component. The newly created indices should be consistent with their genuine form. The genuine and extended indices are then compared to find the importance of the direct forward-looking component (DFLC). The DFLC covers information on future economic conditions or the central bank's next possible decision. It does not cover information that may help shape expectations indirectly; for example, publication of the central bank model is excluded.

The last step of the research covers the measurement of transparency in the Czech Republic and Poland at three points – the ends of 2005, 2010 and 2015 – with standard and newly developed transparency measures. Table 3 presents the sample and the sources of information used to assess transparency.

Table 3. Sample and the data

Features	Description
Central banks	Czech National Bank, National Bank of Poland
Points of indices calculation	Ends of the three years: 2005, 2010, 2015
Data sources	Central banks' web sites, Inflation Reports for the year under examination, Annual Reports, Minutes, Decision rationale
Search for information	The last publication from the calendar year was checked first; to detect regularity of publications the rest of the documents for the calendar year were checked

Source: author's own.

4. EMPIRICAL RESULTS

Table 4 compares the direct forward-lookingness (DFLC as defined in the methodological section) of the three transparency indices described in table 1. FRY, as the index of policy explanation, does this in the most detailed way: the forward-looking analysis component accounts for 35% of the index. At the same time this index does not cover the central bank's strategic choices.

Table 4. Weight of DFLC in indices of transparency

Index	Direct FL component	
	Originally	**After extension**
FRY	35%	47%
BSG	13%	38%
EG	13%	38%

Source: author's own.

Table 5 presents a possible extension of the measures with a direct forward-looking component. There are two possible groups of FL factors: model-based and verbal explanations. Model-based factors refer to the way in which the inflation forecast is presented together with the macroeconomic forecast. The proposition includes the most common practices of the central banks; even if not all of them are widespread and some of them – as described in the literature section – are disputable. Verbal explanations may deliver other, non-forecast-related suggestions on the outcomes for the economy and possible decision by the central bank. Expectations analysis, except for signalling possible threads for inflation, can be held in terms of additional

intermediate targets[15], as the expectations interchangeably with inflation forecast are accounted to inflation gap. The Monetary Policy Committee (MPC) may react to the divergence of the longer-term expectations for the target as well as to the forecast divergence. The indication of the MPC means direct verbal signalling of the next movements of the central bank's instrument. It refers to the short-term horizon and can be announced as expansionary, neutral, restrictive or in any other consistent way, i.e. balance of risk for inflation. Forward guidance shows the longer-term position of the central bank. This also covers possible MPC engagements besides the interest rate change adjustment. For the purposes of this analysis, the indications and forward guidance are distinguished on the basis of the way in which they are expressed. If the central bank's intentions are presented qualitatively, with a fixed date or conditionally, they are classified as forward guidance (as described at Section 2).

Table 5. DFLC in central bank's communication

Group	Information covered	Explanation
Model-based factors	Macroeconomic forecast: – central path of inflation, – policy path, – GDP/ unemployment forecast, – risk/uncertainty, – past forecast errors/forecast decomposition.	Broad approach to revealing the forecast. Except for the central path of inflation, the forecast for the real sphere should be conveyed as the central bank loss function capturing the inflation gap and real sphere component. The policy path directly presents a model-consistent interest rate forecast. The risk/uncertainty description presents the possible alternative developments of the economy. Past forecast errors or decomposition of two subsequent forecasts show the reliability of the forecast and reasons underlying their divergences. The information presented in IR or equivalent documents.
Verbal description of FL factors	Central bank's statements/ declarations: – expectations analysis, – inclinations, – forward-guidance.	Verbal declarations of the central banks expressed at decision rationale, minutes, press conferences. Inclination refers to short-term declaration (one quarter ahead) about policy perspective. Forward-guidance refers to any information of longer-term policy stance. Expectation analyses in discussion of the MPC are considered as they help to assess future inflation development.

Source: author's own.

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[15]   D. Pfajfar, E. Santoro, *News on inflation and the epidemiology of inflation expectations*, "Journal of Money, Credit and Banking", 2010, Vol. 45, Issue 6, p. 1045.

The way in which the FL component is incorporated into the indices (table 6) and the way in which the points are attributed (table 7) are consistent with the original index. In some cases some factors were replaced with a group of factors to avoid multiplication of the same variable in the index.

Table 6. FL component incorporation

Index	Subsection	Variables changed
FRY	Frequency and form of forward-looking analysis provided to the public	Deleted: – forward-looking analysis in standard documents, – the way forecasts are presented, – risks to the forecasts, – discussion of past forecast errors. Inserted: all factors from table 5.
BSG	Publication of data and forecast – model-based factors Communication strategy – with verbal description of FL factors	Inflation forecast replaced with detailed model-based factors. Statement of future moves replaced with verbal description of FL factors.
EG	Economic transparency – model-based factors Policy transparency – with verbal description of FL factors.	Inflation forecast replaced with detailed model-based factors. Inclinations replaced with verbal description of FL factors.

Source: author's own.

After simple reconstruction of the indices with broadened DFLC, the FL component weight in total for the index rose for all three indices (table 3). The difference is more remarkable for BSG and EG as they initially covered the more general aspects of policy-making and less of its forward-looking attitude. As genuine indices do not capture enhanced transparency in the field of signalling possible central bank actions, the extension seems reasonable.

The transparency measures for the two central banks in standard and extended versions are presented in graphs 1 (NBP) and 2 (CNB). CNB outperforms the NBP regardless of the measure and the time. As the CNB is a Central Banking Publications Award 2015 winner in transparency this result is not surprising. The CNB has paid great attention to openness of monetary policy since its switch to IT in 1998. It was very quick to reveal its inflation forecast and then its policy path as well (for 6 years – verbally, since 2008 – numerically). At the beginning of the

2009 as the first central bank, the CNB started to reveal a bilateral exchange rate forecast on the fan chart. According to the Dincer and Eichengreen transparency measure[16] the CNB was one of the five most transparent central banks worldwide. The CNB sets the standards for transparency. This extraordinary approach to transparency seems to be the philosophy of the CNB's actions.

Table 7. FL component points attribution

Index	FRY	BSG	EG
Model-based factors			
Central path of inflation	100 quarterly or more often 50 triannually, biannually 25 once a year 0 none	2 quarterly or more often 1 1–3 times per year 0 none	1 quarterly or more often ½ 1–3 times per year 0 none
Policy path	100 quarterly or more often 50 biannually 25 once a year 0 none when only verbally – half of the points	2 numerically 1 relation to the inflation target described 0 none	1 numerically ½ relation to the inflation target described 0 none
GDP/ unemployment forecast	100 quarterly or more often 50 biannually 25 once a year 0 none	2 numerically 1 relation to the inflation target described 0 none	1 numerically ½ relation to the inflation target described 0 none
Risk/uncertainty	100 graphs and text 50 one of them 0 none	2 graphs and text 1 one of them 0 none	1 graphs and text ½ one of them 0 none
Past forecast errors/forecast decomposition	50 for each of them	1 for each of them	½ for each of them

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[16]   N.N. Dincer, B. Eichengreen, *Central Bank Transparency and Independence: Updates and New Measures*, "International Journal of Central Banking", 2014, Vol. 10, Issue 1, pp. 189–253.

| Index	FRY	BSG	EG
Verbal explanations			
Expectations analysis	100 yes 50 sometimes 0 none	2 yes 1 sometimes (or superficially) 0 none	1 yes ½ sometimes (or superficially) 0 none
Indications	100 yes 50 sometimes 0 none	2 yes 1 sometimes 0 none	1 yes ½ sometimes 0 none
Forward-guidance	100 yes 50 sometimes 0 none	2 yes 1 sometimes 0 none	1 yes ½ sometimes 0 none

Source: author's own.

Besides the more prolonged transparency of the CNB some remarks on the indices are needed. The indices extended with the FL component are more detailed as they capture some aspects not captured or captured in an aggregated way by the original measures. In the case of Poland transparency is increasing mainly due to the rise in the FL component. The CNB reached a high level of transparency in the field of signalling intentions at an earlier stage. One substantial change besides signalling intentions was made in 2008. The CNB started to reveal voting patterns with the names of the Board Members. The CNB did not publish monetary policy indications. However, as it started to publish an inflation forecast with a policy path quite early, the quantitative guiding seemed to be enough for the markets. Forward guidance as a communication tool was introduced in November 2013 when the Bank Board launched the koruna exchange rate as an additional instrument for easing monetary conditions. Since then, the Bank Board has repeatedly confirmed the validity of this exchange rate commitment. For some time after the rates were cut to historically low levels in 2013, the NBP published information on its intentions to keep rates low for some time. In 2015, however, this practice was abandoned.

As extended indices are prolonged measures – in comparison to the genuine version – the relative level of transparency may be lower. They also capture innovations in monetary policy communications. It takes time for the central banks to accept the next step in transparency. As a result, the differences between countries are larger. A revealing policy path consistent with the central bank's inflation forecast is quite a meaningful example. As theoretical and empirical research does not bring unambiguous conclusions on the benefits and costs of such publication, only a few central banks instigated publication of a policy path. These

are enumerated in section 2. Iceland abandoned this practice with the outbreak of the recent financial crisis. NBP prepared itself for such publication in 2010, and then this idea was discontinued. In the long run, the number of central banks revealing a policy path will grow – it is the next step in central bank transparency.
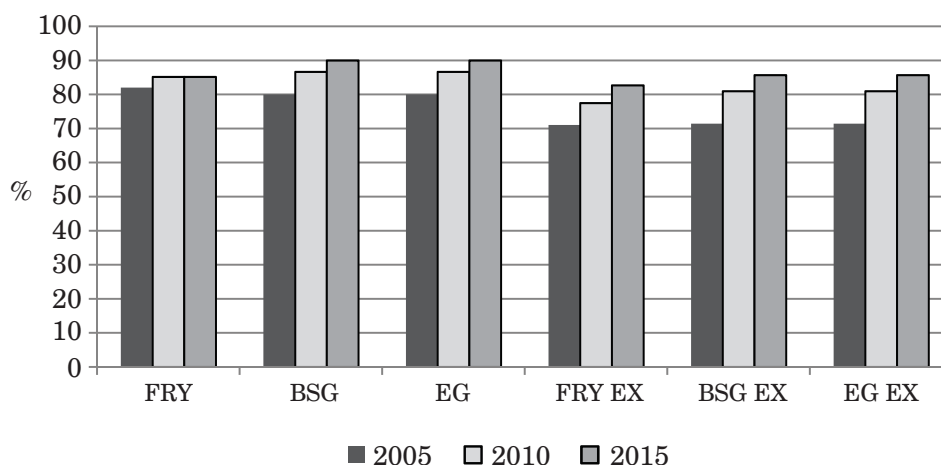
Graph 1. Transparency of the NBP
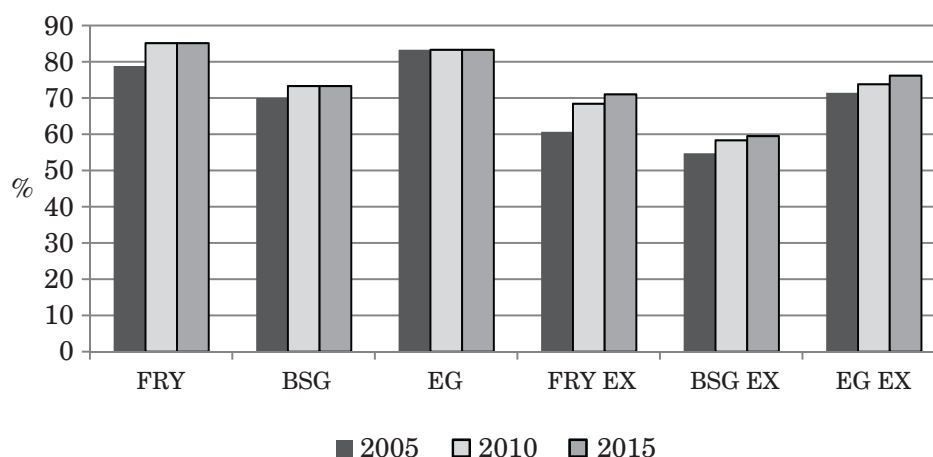
Note: names of the indices according to tab. 1. EX means extended version

Source: author's own.

Graph 2. Transparency of the CNB

Note: names of the indices according to tab. 1. EX means extended version

Source: author's own.

Besides revealing the policy path, forward guidance can be considered as an innovation in monetary policy communication. It is certainly needed when the central bank hits the zero level bound and the expectations channel becomes the

only one. It is uncertain whether the central banks will keep to such a long-term commitment when the situation normalises and interest rates regain their position as the main monetary policy tool. Because they cover innovations it is possible that extended measures will exhibit volatility.

5. CONCLUSION

The following paper presents a possible enlargement to the standard transparency measures. The qualitative indices are not resistant to the changes. When the Fry et al. index was developed there was no discussion on revealing central banks' policy path. Nowadays, the transparency in the field of goals is quite obvious. The discussion on optimal transparency focuses on signalling the central bank's intentions. That is why the three indices of transparency, widely used in the literature, were rebuilt to capture the up-to-date practices of the central banks in revealing their intentions. Some central banks – including the CNB – almost reach the limits of transparency expressed by the maximum levels of standard measures. This does not mean that there is no room for further transparency. It just signals that the central bank's practice has been significantly changing and new tools are needed to capture this evolution. It is possible that the new economic environment together with technological change have shifted the natural limits of transparency. Blog posts from CNB senior officials and use of social networks, in particular Facebook and Twitter, are the best examples. Up to now the central banks have addressed their information to mysterious *market participants*. The language of the message suggested that they have to be specialists to understand it. Nowadays the central banks address their explanation to ordinary citizens: they use infographics, simple words and social media. The Bank of England's explanation of its extraordinary measures undertaken in August 2016 was entitled: *How will the changes help you?* During turbulent times the central bank's practice, including communication, varies substantially. If one wants to assess the effectiveness of the innovations in communication, a tool tailored to the new conditions is needed. Extended transparency measures may become such tools. Moreover, there is room for further development and elaboration of the measures that focus on a chosen aspect of monetary policy. Possible extension of the research may cover more countries and a longer time span. It will possibly bring more conclusive remarks on the transparency of the modern central bank.

Eventually, more general concluding remarks on measurement of central bank transparency will be needed. Enhanced communication between the policymaker with the market participants in the post-crisis era is a reality. It is not possible to identify additional or alternative ways of communication that will be implemented in the future. Transparency measures should vary and adjust to the situation. And

they do. Otherwise it is not possible to assess transparency in light of the most recent developments. Some innovations in communication that nowadays seem above standard – such as blogs conducted by policymakers – may become standard tools of communication tomorrow. From the other hand – a measure must not capture everything: the natural limits to transparency which exist, impose some limits to assessing the central banks' communication.

Abstract

This paper focuses on monetary policy transparency. Central banks' practice in the field of communication, especially while signalling their intentions, is not reflected in most known transparency measures. The following paper presents a comparison of the best-known transparency indices and offers an extension to them that focuses on the forward-lookingness of the central bank. A more elaborate approach to signalling intentions is not covered by transparency measures developed in the pre-crisis period. Thus the purpose of this paper is methodological: developing extended transparency measures. Additionally, the application of these extensions is presented. The empirical part of the research covers the Czech Republic and Poland.

Key words: forward-looking central bank, transparency, transparency measurement, signalling intentions

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