

Surveys S-25

CNB Transparency and Monetary Policy

Katja Gattin Turkalj and Igor Ljubaj

Zagreb, August 2017



HNB

SURVEYS S-25

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ISSN 1334-014X (online)



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CROATIAN NATIONAL BANK

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Zagreb, August 2017

Abstract

Central bank transparency implies clarity and openness in the implementation of monetary policy and comprehensive communication with the professional and general public. Transparency includes various aspects of activity, primarily the transparency of monetary policy instruments as well as procedural transparency and transparency of implementation. It is closely connected to central bank independence, which implies the highest level of accountability. In addition, transparency is significantly determined by the monetary policy framework and, particularly, by the exchange rate arrangement. Literature measuring central bank transparency is relatively scarce, and established measures are biased in favour of inflation targeting regimes, which in the literature are considered the most transparent. Therefore, essential monetary framework characteristics can by themselves make individual central banks more or less transparent. If various monetary policy frameworks and exchange rate arrangements are considered, the CNB's transparency is around the average of peer countries, while regarding financial stability, it is significantly above the average. The Croatian National Bank increased its transparency from 2010 to 2017, in line with the general trends.

Keywords:

transparency, central bank, monetary policy, CNB

JEL:

E52, E58, E61

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1 What does central bank transparency mean?

Institutional arrangements of central banks have recently started to develop in the direction of increased independence from the executive power, in line with the findings proving that monetary policy outcomes are closer to optimum when the central bank is independent. This implies the independence of monetary policy instruments, while the executive and the legislative power continue to set the target to the central bank. Greater independence implies a greater level of accountability in monetary policy implementation, to which transparency is key.

The paradigm change towards an open and public monetary policy is not only an obligation of the central bank, associated with accountability. On the contrary: according to Blinder et al. (2008), transparency is a “key instrument” at the disposal of central bankers.

In modern central banking, transparency is not only a democratic standard, but also a tool to improve the set of information on the economic outlook available to the public and to enhance the credibility, predictability and, ultimately, the efficiency of monetary policy. This can be achieved by anchoring inflationary expectations and reducing “noise” on the financial markets. At the same time, the question arises whether too much transparency can be harmful (see Box 1) and whether central banks should always act transparently (see Box 2).

The simplest definition of central bank transparency is the clarity of the communication of monetary policy. The next level of transparency is the content of communication. The central bank has to convey important information on economic developments and targets and monetary policy decisions to the professional and

Box 1 Can central bank transparency be excessive?

The literature on transparency examines, among other things, the question of the optimal level of central bank transparency. Mishkin (2004) asserts that there are cases in which central banks can be excessively transparent. He claims that central bank transparency always has to be a means to achieve optimal monetary policy. Transparency enables communication with the public and helps generate support to optimal monetary policy; however, some types of transparency do not contribute to that end (particularly where quantity obscures the clarity of content).

Van der Crujssen, Eijffinger and Hoogduin (2010) warn against an overload of information that may cause any additional information, after a certain level, to fail to contribute to monetary policy clarity. Paradoxically, the public perceives central banks that publish a great amount of information as “uncertain”, leading to a negative impact on expectations.

Hansen, McMahon and Prat (2014) performed an empirical test on the benefits of increased transparency. They used the fact that FOMC meeting transcripts¹ had been intended for internal use only until 1993, after which FOMC members knew that the transcripts would be publicly disclosed, albeit with a time lag. The authors investigated the quality and the content of each

participant’s discussion using complex linguistic algorithms. They predicted a channel of influence of increased transparency on the essence of the discussion, which they referred to as “career concern” and which is based on the assumption that professionals build and maintain professional reputations, particularly at the early stages of their career. The effect of “career concern” can be positive, when increased visibility motivates professionals to stronger engagement and more effort in preparing for discussions. Negative effects include conformism and mere repetition of what was already said (Prat, 2005). Greenspan himself expressed concern that the planned disclosure of transcripts might result in a “sterile set of bland pronouncements scarcely capturing the necessary debates which are required of monetary policymaking” (Hansen et al., 2014). The authors conclude that after 1993, FOMC members (particularly the younger ones) largely used notes compiled by staff, that the discussions became more technical and uniform and that discussion participants essentially did not dare to contradict Greenspan; the authors refer to this as the “conformity effect”. They recommend achieving a careful balance between transparency, i.e. public interest in content of meetings and an environment that will not impede the exchange of ideas.

1 Federal Open Market Committee

general public. Finally, the third level of transparency is the openness of the central bank for public consultation (Blinder, 2004). However, it is very difficult to translate such a general and theoretical description of transparency into concrete forms of central bank activity, which is

why one of the strands of the literature examines aspects of transparency that are possible to assess numerically and, consequently, rank, as described in the following chapter.

2 Measuring central bank transparency – literature insights

There is an abundance of literature examining the theory of monetary policy transparency, including research on the “optimal level of transparency” and the connection between transparency and macroeconomic outcomes (Bernanke, 2010; Blinder, 2004; Friedman, 2005; Mishkin, 2004 and Siklos, 2011). In contrast, empirical research measuring the level of central bank transparency is scarce, particularly research including Croatia. This includes only the research conducted by Crowe and Meade (2008), three research papers by Dincer and Eichengreen (2007, 2009, 2014) often referred to in expert discussions, Siklos (2011), and, among more recent works, Naszodi, Csavas, Erhart and Felcser (2016). To assess transparency, all of the above authors use the matrix developed by Geraats (2002) and the Eijffinger-Geraats index (2006) based on that matrix, which defines transparency using five aspects:

- **Political transparency:** official statement regarding monetary policy objectives, including ranking in case of multiple objectives, quantification of the primary objective and an explicit statement on the institutional arrangement.
- **Economic transparency:** availability of economic data used in managing monetary policy. This includes the publication of economic data, models and internal forecasts (based on models or judgement) used by the central bank for projections or assessments of the impacts of monetary policy measures.
- **Procedural transparency:** the manner and the sequence in which decisions are made and monetary policy measures implemented.
- **Policy transparency:** open communication regarding measures implemented and instruments used, so that press releases, along with explanations, ensue immediately after measures are implemented.
- **Operational transparency:** open communication regarding the implementation of monetary policy measures. It includes discussion on any deviation

from the projected level of operational targets and the impact of (unexpected) macroeconomic disturbances on the monetary policy transmission mechanism.

Crowe and Meade (2008) and Dincer and Eichengreen (2007, 2009, 2014) use information publicly available at the websites of central banks to assess transparency instead of using surveys as is usual in research related to central banking, where central banks themselves provide answers to questions in a questionnaire. Information unavailable to the interested public is considered non-transparent. Based on information thus gathered, the authors aim to objectify transparency, i.e. assess it numerically and rank central banks according to such assessment. This, in turn, enables the comparison of the transparency of central banks at a certain point in time, the monitoring of changes in transparency over time and, most importantly, the assessment of the effects of greater transparency on monetary policy outcomes. In line with the methodology devised by Eijffinger and Geraats (2006), in order to assess the total index, the authors decompose transparency into five different aspects, each important for the clarity and openness of monetary policy. Each aspect of transparency is quantified based on answers to particular questions (the entire questionnaire with scores and comments regarding the transparency of the CNB is provided in Appendix II), and the points are then added up to calculate the transparency index of a particular central bank (the higher the index, the greater the transparency).

Standardizing and ranking more than a hundred central banks of various types with various combinations of monetary frameworks and exchange rate arrangements is a challenging task, and research results provide a good starting point for comparison, as well as a source of recommendations for a further increase in the openness of monetary policy implementation. However, the results have certain flaws. Some of the limitations are specified by authors themselves, primarily the

Table 1 Distribution of countries according to monetary policy frameworks and exchange rate arrangements for 2010

Monetary frameworks	Exchange rate arrangements				Total
	Fixed	Managed floating	Floating	Other exchange rate arrangements	
Exchange rate anchor	5	40		4	49
Monetary aggregate target		8	9	3	20
Inflation targeting		1	29		30
Other monetary frameworks		2	10	3	15
Total	5	51	48	10	114

Note: The group including Croatia is shown in white.

Sources: IMF, Dincer and Eichengreen (2014) and authors' assessment.

unavailability of particular information in the English versions of central bank websites, which may systematically reduce the transparency index of central banks outside the English-speaking area.

However, an “absolute” ranking of central bank transparency, without any consideration of the different monetary policy frameworks and exchange rate arrangements of individual central banks, is a much greater limitation. The questionnaire based on the methodology developed by Eijffinger and Geraats (2006) constructs a transparency index that is biased towards central banks with inflation targeting regimes. To be more precise, the questionnaire itself primarily reflects the procedures and practices of central banks that target inflation, which is why these countries rank highest with scores unattainable to other countries. In order to study the transparency of the CNB's monetary policy in the context of peer countries, we will group countries based on different monetary policy frameworks and accompanying exchange rate arrangements. The countries will be grouped in line with the IMF classification of countries described in more detail in Appendix I. As for monetary policy frameworks, the IMF classifies similar frame-

works into four groups: exchange rate anchor, monetary aggregate target, inflation targeting and other monetary frameworks. The CNB is categorised into the group of countries with the exchange rate anchor framework. The IMF groups exchange rate arrangements into nine categories, but essentially, they can be reduced to four main groups: fixed, managed floating, floating and other exchange rate arrangements.

The central banks analysed by Dincer and Eichengreen (2014), 114 of them in total, have been categorised into 16 groups under the IMF classification according to monetary policy frameworks and exchange rate arrangements (Table 1). The group of countries with monetary policies based on an exchange rate anchor with a managed floating exchange rate arrangement, which includes Croatia, is the largest of all the 16 groups of countries (shown in white in Table 1). When only the four groups of countries categorised according to monetary framework type are observed, most of them implement the monetary policy of exchange rate anchor. Equal in share, managed floating and floating are the most frequent exchange rate arrangements.

3 CNB transparency in the context of the current monetary policy framework

The results of the aforementioned research assessing CNB transparency differ greatly, in spite of the fact that all the authors base their research on the same original methodology and numerical quantification scale developed by Eijffinger and Geraats (2006). Dincer and Eichengreen (2014) assess the total transparency index of the CNB for 2010 at 2.5, a relatively low score. On

the other hand, Naszodi et al. (2016) rate CNB transparency for 2009 with a much higher index value of 6 points, ranking Croatia at 39th place out of 97 countries in total according to the transparency criterion. Siklos (2011) also allocated 6 points to Croatia. In less recent research, Crowe and Meade (2008) rank the CNB's transparency similarly, at 47th of 90 countries in total,²

as early as for 1998.

Croatia's low score in Dincer and Eichengreen (2014) is primarily a result of particular data published by the CNB at the time being overlooked. Specifically, in 2010, the CNB regularly published not only the five series the authors required as the necessary standard, but almost all economic data relevant for the implementation of monetary policy. The CNB reported promptly on the changes to its main operating instrument and the direction of its monetary policy, as well as on, for example, a performed exchange rate intervention and a change to the reserve requirement rate. Furthermore, the CNB explained decisions related to monetary policy through frequent press releases, analyses and public appearances of the Governor, which, even in cases where no forward-looking assessments had been provided, was enough to "win" half a point in the index. In addition, the CNB always provided regular information and analyses of current macroeconomic developments (which, again, should have been enough for another half a point). The same held true for explanations of monetary policy outcomes in the light of macroeconomic objectives. Even taking into account the authors having been unable to find all information easily on the CNB's website and some of the information having been probably available only in Croatian, the 2010 CNB transparency was in fact higher than assessed by Dincer and Eichengreen (2014).

Taking into account only the information that was publicly available at the time, we assessed the index of monetary policy transparency in Croatia for 2010 at 5 points based on a questionnaire equivalent to that of Eijffinger and Geraats (2006). The score is higher than that in Dincer and Eichengreen (2014) and slightly lower than that in Naszodi et al. (2016) and Siklos (2011).

By reassessing the questionnaire, we document the information published by the CNB and elaborate why certain questions are, in fact, not applicable to the combination of monetary policy framework and exchange rate arrangement implemented by the CNB. The same applies to other countries with similar monetary frameworks, which simply cannot "win" any points in some of the questions. The detailed questionnaire used to assess the transparency index in line with the methodology developed by Eijffinger and Geraats (2006) with corresponding points for Croatia, our score for 2010 and comments and explanations are available in Appendix II.

The same questionnaire filled out today would result in a transparency index for Croatia of 7.5 (see Table 2 and Appendix II). Over the past several years, the CNB has improved its transparency in line with the general trend in central banking. The relative intensity of this trend cannot be assessed due to the lack of more recent assessments for other central banks. Additional points are primarily related to the fact that since December 2010, the CNB has, twice a year, published macroeconomic forecasts with comments on deviations from previous forecasts in its Bulletin. Forecasts have been published for a set of variables encompassing more than simply inflation and GDP growth, as stated in the related question: the CNB publishes forecasts for main GDP components, the number of employed persons, balance of payments current and capital account, external debt, M4 monetary aggregate and placements. Since December 2016, the content and the title of the publication in which the CNB publishes projections has been changed; it is now entitled *Macroeconomic Developments and Outlook* in order to increase clarity and improve the central bank's communication of forecasts.

Furthermore, since March 2015, the CNB has

Table 2 Total and individual transparency indices for the CNB according to the Eijffinger and Geraats (2006) methodology

	Exchange rate anchor /Managed floating exchange rate – 2010 average for all countries	Dincer and Eichengreen (2014) – CRO assessment for 2010	Naszodi et al. (2016) – CRO assessment for 2009	Authors' assessment for CRO:	
				2010	2017
Political transparency	1.7	2.0	3.0	2.0	2.0
Economic transparency	0.5	0.0	0.0	0.5	1.5
Procedural transparency	0.7	0.0	0.0	0.0	1.0
Policy transparency	0.4	0.0	2.0	1.5	1.5
Operational transparency	0.5	0.5	1.0	1.0	1.5
Total	3.7	2.5	6.0	5.0	7.5

Sources: IMF, Dincer and Eichengreen (2014), Naszodi et al. (2016) and authors' assessment.

2 The research utilises a standardised index not directly comparable to other studies.

Table 3 Total transparency index of countries according to monetary policy frameworks and exchange rate arrangements for 2010

Monetary frameworks	Exchange rate arrangements				Total
	Fixed	Managed floating	Floating	Other exchange rate arrangements	
Exchange rate anchor	5.50	3.71		3.00	3.84
Monetary aggregate target		4.50	3.89	3.33	4.05
Inflation targeting		9.00	9.28		9.27
Other monetary frameworks		4.25	8.00	4.83	6.45
Total	5.50	3.96	8.00	3.65	5.62

Note: The group including Croatia is shown in white.

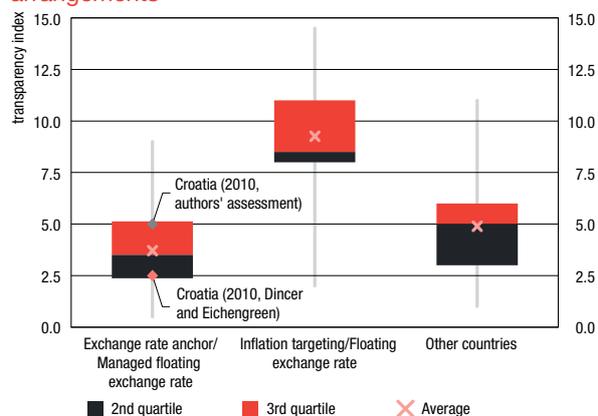
Sources: IMF, Dincer and Eichengreen (2014) and authors' assessment.

significantly redesigned and improved the content of its official website, which now includes a description of its strategy and an explanation of the entire monetary policy framework, i.e. its objectives, instruments, exchange rate policy, the significance of price and exchange rate stability, etc. (which should have been enough to earn the CNB at least one point in the question regarding procedural transparency). CNB publications regularly include boxes which contain analyses and research related to, among other things, macroeconomic shocks and cover topics relevant for monetary policy implementation. Presentations by the CNB's management, which contain expert discussions on topics from areas relevant for the CNB, are also regularly published. All of the above surely contributes to greater transparency.

Furthermore, if the total index of central bank transparency for 2010, as assessed by Dincer and Eichengreen (2014), is decomposed according to different monetary frameworks and exchange rate arrangements, it is evident that the highest level of transparency is, on average, associated with the monetary framework of inflation targeting and the floating exchange rate arrangement (Table 3). If scores are observed according to combinations of monetary frameworks and exchange rate arrangements for the possible 11³ groups of peer countries, it is that very combination of monetary framework and exchange rate arrangement that carries the highest score of 9.28 on a scale of a maximum of 15 points.⁴ This, however, does not necessarily mean that central banks belonging to that group are always transparent in practice (see Box 2).

According to its monetary policy framework and exchange rate arrangement, which combines exchange rate anchoring and managed floating, the CNB belongs

to a group of countries which, on average, have the lowest transparency score for 2010 (3.71, shown in white in Table 3). That average is not far from the 2.5 points the CNB “won” according to Dincer and Eichengreen (2014) or from the five points allocated by the authors of this survey (six points allocated by Naszodi et al. (2016) and Siklos (2011) are slightly above the range typical for the majority of countries with a similar monetary framework). This alone leads to the conclusion that CNB transparency hovers around the average of peer countries, i.e. that this particular combination of monetary framework and exchange rate arrangement leads to lower transparency, at least based on the method used by the authors in their work. In addition, if the distribution of assessed transparency indices for the group of countries comprising Croatia is compared with the most transparent group (inflation targeting and floating

Figure 1 Transparency index distribution according to groups of monetary frameworks and exchange rate arrangements

Note: The highest and lowest transparency index value in a particular group of countries is shown by vertical lines.

Sources: IMF, Dincer and Eichengreen (2014) and authors' assessment.

³ All groups of monetary policy frameworks and exchange rate arrangements in fact constitute 16 different groups, but only 11 of them are active. For example, there is no central bank combining inflation targeting and fixed exchange rates.

⁴ The same results are obtained if countries are categorised according to transparency indices assessed by Naszodi et al. (2016).

exchange rate arrangement), as shown in Figure 1, the systematic difference in the transparencies of the two largest groups is obvious. On the other hand, this does not have to mean that monetary frameworks and exchange rate arrangements of countries belonging to the same group as Croatia are not adequate or efficient simply because they are less transparent on average. In fact, one of the distinctive features of the arrangement that uses a stable exchange rate as the main anchor for expectations is that it is a very transparent model; on a daily basis, it provides clarity concerning the direction of monetary policy for all the participants in the economy.

The methodology used in the research conducted by Dincer and Eichengreen (2014) and other similar pieces of research measures the similarity of monetary frameworks and exchange rate arrangements to the “ideal” inflation targeting regime, which is why the transparencies of central banks whose monetary frameworks and exchange rate arrangements deviate from inflation targeting are systematically ranked lower. The difference between the fixed and the managed floating exchange rate arrangement is evident as well, as fixed exchange rate arrangements were systematically assessed as more transparent, although not nearly as transparent as the indices assessed for inflation targeting frameworks show.

Box 2 Non-transparent moves of some of the most transparent central banks

High-ranking transparency of a central bank’s monetary policy does not mean that the bank cannot make or that it does not make unexpected moves or even moves in contrary to its proclaimed monetary and exchange rate policy direction in order to achieve its goals or increase monetary policy efficiency. Quite the opposite: at times the situation in the market requires precisely an extraordinary and unannounced move by the central bank which will surprise all participants and thus contribute to monetary policy objectives. Recent examples include exchange rate policy changes of the central banks of Switzerland and the Czech Republic, which are considered some of the most transparent.⁵

On 15 January 2015, the Swiss central bank discontinued the minimum exchange rate of CHF 1.20 per euro, which resulted in a strong appreciation of the Swiss currency and disturbances in financial markets. The change in the Swiss National Bank’s (SNB) policy was introduced despite the statements of the institution’s highest-ranking officials in which they highlighted its importance. For instance, on 5 January 2015⁶, Thomas J. Jordan, the SNB’s governor, asserted that enforcing the minimum exchange rate was “absolutely central” for fighting the overly low inflation, while Jean-Pierre Danthine, deputy governor of the SNB at

the time, emphasized on 12 January 2015⁷ that the minimum exchange rate had to remain the cornerstone of the SNB’s monetary policy. Therefore, although the SNB was able to defend the minimum exchange rate for an unlimited period, because the domestic currency can be printed in unlimited amounts to buy up foreign exchange in the event of appreciation pressures, the Swiss National Bank had to act in contrary to the publicly announced and transparent regime and allowed the exchange rate to appreciate considerably.

In the second example, in November 2013, the Czech National Bank began to use foreign exchange interventions to weaken the Czech koruna due to strong appreciation pressures on the domestic currency; the exchange rate was maintained near CZK 27 per euro. The purpose of the new measure was to achieve the current inflation target of 2% because the interest rate as the principal instrument of the inflation targeting regime became inefficient having reached the zero lower bound. The decision was rationally motivated, but clashed completely with the publicly announced monetary policy framework of inflation targeting, which implies precisely the free movement of the exchange rate of the domestic currency, without any interference of the central bank in the foreign exchange market.

5 According to Dincer and Eichengreen (2014), the Czech Republic shares the fourth, and Switzerland the seventh position among all central banks based on the transparency index for 2010.

6 <http://www.reuters.com/article/us-swiss-snb-idUSKBN0KE1DO20150105>

7 <http://www.reuters.com/article/swiss-snb-idUSL6N0UR3LW20150112>

4 Transparency and financial stability

Central bank transparency can be observed not only in the context of monetary policy framework and exchange rate arrangement, but also from the viewpoint of financial stability. Since recently, and particularly after the global financial crisis, financial stability has become an important central bank objective. Financial stability today is primarily supported by macroprudential policy, whose effectiveness is difficult to measure precisely because, due to the length of the financial cycle, its effects are usually noticeable only with a significant lag. Moreover, macroprudential policy instruments are extremely extensive and diverse; some measures are difficult to calibrate, and their interaction even more so. That is why the policy of maintaining financial stability is largely focused on the qualitative description of its objectives and on “leaning against the wind” instead of on the strict quantification of measures, transmissions and targets. These targets and measures, as well as the macroprudential policy in total, need to be transparent as well, as this is of particular importance for all financial market participants.

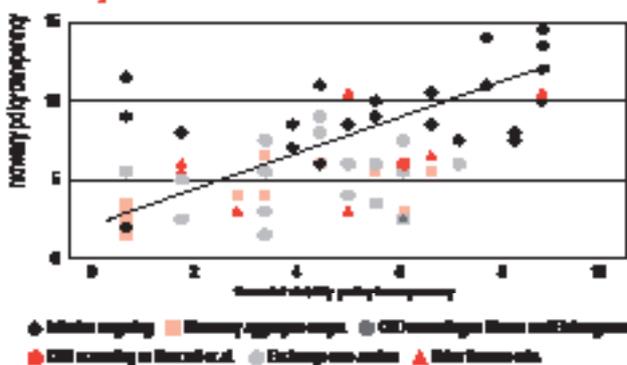
The results of the CNB’s policy of maintaining financial stability are very good. Croatia managed to overcome the second largest recession in the EU (after Greece) without the need to inject public assets in the banking system, which remained extremely highly capitalised. As regards the communication with the professional and general public, over the past eight years, the CNB has been publishing a semi-annual report entitled Financial Stability, which discusses developments in various economic sectors and the related risks to the financial sector and includes regular banking sector stress testing. Furthermore, for several years the CNB has been collecting and publishing a wide set of internationally

comparable quantitative financial soundness indicators, in line with the IMF’s initiative. Finally, links to numerous papers focusing on financial stability are available on the CNB website.

Based on all of the above, Horváth and Vaško (2013) classified the CNB among the most transparent central banks regarding financial stability policy. With six points in total, the CNB surpasses the European average of 5.5 points. Moreover, Croatia stands out from the group of countries with comparable monetary frameworks and exchange rate arrangements (average of 1.7) and has better results than some central banks that are generally considered very transparent (Denmark 4.5, Canada 4.5, France 3).

Despite the fact that, when it comes to the transparency of the financial stability policy, the inflation targeting monetary policy framework again has the highest

Figure 2 Central bank monetary policy and financial stability transparency indices for 2010 according to monetary framework



Source: Monetary policy transparency indices for individual countries are taken from Oscar and Eichengreen (2004) and financial stability transparency indices from Horváth and Vaško (2013). Additionally, also are characterise the transparency assessment for Croatia with graphics classified by Horváth et al. (2011).

Table 4 Financial stability transparency index according to monetary framework and exchange rate arrangement as calculated by Horváth and Vaško (2013) for 2010

Monetary frameworks	Exchange rate arrangements				Total	Croatia
	Fixed	Managed floating	Floating	Other exchange rate arrangements		2010
Exchange rate anchor	4.40	1.70		2.70	2.10	6.00
Monetary aggregate target		3.10	1.80	1.80	2.40	
Inflation targeting		5.50	4.90		5.00	
Other monetary frameworks			4.90	3.00	4.50	
Total	4.40	2.10	4.60	2.50	3.50	

Note: The group including Croatia is shown in white.

Sources: IMF, Horváth and Vaško (2013) and authors' estimate.

average transparency, the relation between the financial stability transparency index and the monetary policy regime/framework is not decisive: the difference between the inflation targeting framework and e.g. exchange rate anchor with a fixed exchange rate is significantly less pronounced as regards this type of transparency than when the transparency of monetary policies themselves are observed. Therefore, countries such as Croatia,

which use the exchange rate anchor framework and the managed floating exchange rate arrangement, can nevertheless achieve a high level of financial stability transparency using their policies (as shown in Figure 2). To sum up, where the CNB can be transparent, it is transparent, while with regard to monetary policy, the transparency largely depends on the monetary framework itself (Šošić, 2017).

5 Conclusion

Considering the differences between central bank monetary frameworks and exchange rate arrangements, it is evident that a higher transparency of a central bank's operations is strongly related to the wider acceptance of the inflation targeting monetary framework. Moreover, the rise of transparency as a desirable determinant of central bank operations coincided precisely with the inauguration of inflation targeting as a monetary policy ideal. Inflation targeting and an increase in the transparency of central bank operation was followed by greater exchange rate flexibility because, among other reasons, foreign exchange (exchange rate) interventions are considered an extremely non-transparent monetary policy instrument.

Nevertheless, foreign exchange interventions constitute an integral part of the monetary framework and exchange rate arrangement implemented by the CNB. Exchange rate stability is extremely important for maintaining price stability, which is one of the CNB's core objectives, particularly if one considers the fact that the Croatian economy is small, open and extremely highly euroised. On the other hand, the CNB never advocated a fixed exchange rate regime, a very transparent form of monetary policy, but allowed the exchange rate to gradually adapt to the developments in economic fun-

damentals. The exchange rate is thus formed on the market, with potential interventions of the CNB in the event of stronger pressures or fluctuations in the foreign exchange market. It is also necessary to emphasize that any *a priori* transparency related to exchange rate policy, unless it is reflected in a firm commitment to maintain a fixed exchange rate, makes it easier for speculators to attack the exchange rate, which, in the case of CNB, may significantly hamper the attainment of monetary policy objectives and have unfavourable consequences for international reserves and financial stability in general.

Overall, transparency is significantly determined by the monetary policy framework and especially by the exchange rate arrangement. Therefore, essential monetary framework characteristics can, in and of themselves, make individual central banks more or less transparent. Taking into consideration various monetary policy frameworks and exchange rate arrangements, the CNB's transparency hovers around the average of peer countries, while, as regards financial stability, it exceeds the average substantially. In addition, in the period from 2010 to 2017 the CNB increased the transparency of its monetary policy.

6 APPENDICES

Appendix I IMF classification of monetary policy frameworks and exchange rate arrangements

The IMF classifies *de facto* exchange rate arrangements in its annual publication Exchange rate arrangements and exchange rate restrictions (AREAER). According to that classification, exchange rate arrangements comprise ten defined categories classified into four groups of arrangements:

- **Hard peg arrangements** – refers to the firm pegging of a currency against another currency or a basket of currencies (hard pegs) and include exchange rate arrangements with no separate legal tender and currency board arrangements.
 - **Soft peg arrangements** – exchange rate arrangements with moderate pegging against another currency or a basket of currencies (soft pegs), comprising five categories: conventional pegged arrangements, pegged exchange rates within horizontal bands, stabilized arrangements, crawling pegs and crawl-like arrangements.
 - **Floating arrangements** – arrangements under which the exchange rate is market-determined, comprising two categories: floating and free floating arrangements.
 - **Residual exchange rate arrangements** – refers to all other managed exchange rate arrangements.
- Within the publication referred to above, the IMF publishes its classification of monetary policy frameworks comprising four categories:
 - **Exchange rate anchor** – monetary frameworks where the exchange rate serves as the nominal anchor or monetary policy operational target.
 - **Monetary aggregate target** – monetary frameworks where the central bank uses its instruments to achieve a target growth rate for a monetary aggregate, such as money, and the targeted aggregate becomes the nominal anchor or monetary policy operational target.
 - **Inflation targeting** – monetary frameworks which include a public announcement of numerical targets for inflation, with a commitment by the monetary authority to achieve these targets, typically over a medium-term horizon.
 - **Other monetary frameworks** – this category usually includes countries that have no explicitly stated nominal anchor, but rather monitor various indicators in conducting monetary policy and countries on which no relevant information is available.

Appendix II CNB transparency according to the methodology developed by Eijffinger and Geraats (2006) – questionnaire with comments

	Dincer and Eichengreen (2014) – assessment for 2010	Authors' assessment		Comment
		2010	2017	
Political transparency				
Is there a formal statement of the objective(s) of monetary policy, with an explicit prioritisation in case of multiple objectives?	1	1	1	
<ul style="list-style-type: none"> No formal objective(s) = 0 Multiple objectives without prioritisation = 0.5 One primary objective, or multiple objectives with explicit priority = 1 				
Is there a quantification of the primary objective(s)?	0	0	0	
<ul style="list-style-type: none"> No = 0 Yes = 1 				
Are there explicit contracts or other similar institutional arrangements between the monetary authorities and the government?	1	1	1	
<ul style="list-style-type: none"> No central bank contracts or other institutional arrangements = 0 Central bank without explicit instrument independence or contract = 0.5 Central bank with explicit instrument independence or central bank contract although possibly subject to an explicit override procedure = 1 				
Political transparency index (1)	2	2	2	
Economic transparency				
Is the basic economic data relevant for the conduct of monetary policy publicly available? (The focus is on the following five variables: money supply, inflation, GDP, unemployment rate, and capacity utilization.)	0	0.5	1	All five variables mentioned are publicly available, of which some on a monthly basis. Within the scope of its regular analyses, the CNB publishes a series of macroeconomic and financial variables. This includes official statistical tables, but also a wide set of additional tables, figures and presentations with data series of professional and public interest. The capacity utilisation variable, published for Croatia by the European Commission with the support of the CNB, was not publicly available in 2010.
<ul style="list-style-type: none"> Quarterly time series for at most two out of the five variables = 0 Quarterly time series for three or four out of the five variables = 0.5 Quarterly time series for all five variables = 1 				
Does the central bank disclose the macroeconomic model(s) it uses for policy analysis?	0	0	0	Considering the fact that the CNB's monetary policy framework is based on exchange rate stability, the use of models for monetary policy analysis is difficult compared with the monetary framework that uses the interest rate as its main instrument. Nevertheless, the CNB publishes working papers and other materials describing models developed within the CNB and used for the analysis of current developments or for projections (an example of this is the GDP nowcasting model as described in Kunovac, D., and B. Špalat (2014): Nowcasting GDP Using Available Monthly Indicators, W-39, October).
<ul style="list-style-type: none"> No = 0 Yes = 1 				

Does the central bank regularly publish its own macroeconomic forecasts?	0	0	0.5	Since December 2010, macroeconomic forecasts with comments on the deviations from earlier forecasts have been published twice a year in the CNB's Bulletin. Forecasts are published for a wider set of variables than stated in the question. Since 2016, the title and the content of the publication in which the CNB publishes forecasts have been changed, and it is now entitled Macroeconomic Developments and Outlook in order to increase clarity and improve the central bank's communication of forecasts. Furthermore, it is important to note that, considering that the CNB's monetary policy framework is based on exchange rate stability, it is impossible for the CNB to score an entire point in this question as the assumption about the change of monetary policy instrument (interest rate) cannot be modelled.
<ul style="list-style-type: none"> • No numerical central bank forecasts for inflation and output = 0 • Numerical central bank forecasts for inflation and/or output published at less than quarterly frequency = 0.5 • Quarterly numerical central bank forecasts for inflation and output for the medium term (one to two years ahead), specifying the assumptions about the policy instrument (conditional or unconditional forecasts) = 1 				
Economic transparency index (2)	0	0.5	1.5	
Procedural transparency				
Does the central bank provide an explicit policy rule or strategy that describes its monetary policy framework?	0	0	1	Since March 2015, the CNB has significantly redesigned and improved the content of its official website, which now includes a description of its strategy and an explanation of the entire monetary policy framework, i.e. its objectives, instruments, exchange rate policy, the importance of price and exchange rate stability, etc.
<ul style="list-style-type: none"> • No = 0 • Yes = 1 				
Does the central bank give a comprehensive account of policy deliberations (or explanations in case of a single central banker) within a reasonable amount of time?	0	0	0	
<ul style="list-style-type: none"> • No, or only after a substantial lag (more than eight weeks) = 0 • Yes, comprehensive minutes (although not necessarily verbatim or attributed) or explanations (in case of a single central banker), including a discussion of backward- and forward-looking arguments = 1 				
Does the central bank disclose how each decision on the level of its main operating instrument or target was reached?	0	Not applicable	Not applicable	In contrast to the inflation targeting regime, the outcome of voting on monetary policy instruments is irrelevant in the managed floating exchange rate arrangement because it usually uses foreign exchange interventions made at the governor's discretion. The same applies for many other monetary policy instruments used to affect the domestic foreign exchange and money market.
<ul style="list-style-type: none"> • No voting records, or only after substantial lag (more than eight weeks) = 0 • Non-attributed voting records = 0.5 • Individual voting records, or decision by single central banker = 1 				
Procedural transparency index (3)	0	0	1	
Policy transparency				
Are decisions about adjustments to the main operating instrument or target announced promptly?	0	1	1	The CNB uses press releases on its website to promptly inform the public about foreign exchange interventions and other operations conducted on the day of implementation; in some cases, decisions on the changes to monetary policy instruments are announced prior to their application.
<ul style="list-style-type: none"> • No, or only after the day of implementation = 0 • Yes, on the day of implementation = 1 				

Does the central bank provide an explanation when it announces policy decisions?	0	0.5	0.5	<p>This question implies instrument change which allows forward looking estimates, while foreign exchange interventions are made ad hoc and cannot, essentially, offer additional monetary policy explanations apart from confirmation that the central bank is continuing to pursue its exchange rate stability policy, nor can it provide future expectations. For certain other instruments, such as the introduction of structural repo operations in 2016, the CNB published press releases that announced and explained the motivation for the introduction of such operations, and also gave information about their expected scope.</p>
<ul style="list-style-type: none"> No = 0 Yes, when policy decisions change, or only superficially = 0.5 Yes, always and including forwarding-looking assessments = 1 				
Does the central bank disclose an explicit policy inclination after every policy meeting or an explicit indication of likely future policy actions (at least quarterly)?	0	Not applicable	Not applicable	<p>The CNB frequently reports on the character of its monetary policy (e.g. in its last issue of the publication Macroeconomic Developments and Outlook of December 2016, it clearly states that the monetary policy will remain expansionary in 2017), but only occasionally in press releases from CNB Council meetings. On the other hand, the orientation of monetary policy towards “exchange rate stability” is regularly included in press releases following Council meetings and is clearly conveyed through all other channels (interviews, presentations, current analyses, etc.). Finally, it is important to note that, considering the current monetary policy framework, the CNB cannot announce when and how much the exchange rate may change in the future.</p>
<ul style="list-style-type: none"> No = 0 Yes = 1 				
Policy transparency index (4)	0	1.5	1.5	
Operational transparency				
Does the central bank regularly evaluate to what extent its main policy operating targets (if any) have been achieved?	0	Not applicable	Not applicable	<p>Not applicable in the manner the question is formulated as the CNB maintains relative exchange rate stability, which means that the exchange rate fluctuates on the market, while the CNB prevents excessive oscillations. There is no explicit boundary or targeted level in such an arrangement which would allow a precise evaluation of the achievement of a monetary policy operational objective.</p>
<ul style="list-style-type: none"> No, or not very often (at less than annual frequency) = 0 Yes, but without providing explanations for significant deviations = 0.5 Yes, accounting for significant deviations from target (if any); or, (nearly) perfect control over main operating instrument/target = 1 				
Does the central bank regularly provide information on (unanticipated) macroeconomic disturbances that affect the policy transmission process?	0	0.5	1	<p>The CNB publishes regular (monthly) analyses of current macroeconomic and financial developments, and since end-2010, it has been releasing a publication containing forecasts and comments on the deviations from earlier expectations twice a year. Publications contain boxes with analyses and research related to, among other things, macroeconomic disturbances and topics relevant for monetary policy implementation. Presentations of the CNB's management are also regularly published, containing expert discussions on the topics relevant for the CNB.</p>
<ul style="list-style-type: none"> No, or not very often = 0 Yes, but only through short-term forecasts or analysis of current macroeconomic developments (at least quarterly) = 0.5 Yes, including a discussion of past forecast errors (at least annually) = 1 				
Does the central bank regularly provide an evaluation of the policy outcome in light of its macroeconomic objectives?	0.5	0.5	0.5	

- No, or not very often (at less than annual frequency) = 0
- Yes, but superficially = 0.5
- Yes, with an explicit account of the contribution of monetary policy in meeting the objectives = 1

Operational transparency index (5)	0.5	1	1.5
Total transparency index (1+2+3+4+5)	2.5	5.0	7.5

Appendix III Results of the questionnaire from Dincer and Eichengreen (2014) according to monetary policy frameworks and exchange rate arrangements with the comparison for Croatia

Political transparency

	Exchange rate arrangements				Total	Croatia
	Fixed	Managed floating	Floating	Other		
Exchange rate anchor	2.70	1.65		1.88	1.78	2.00
Monetary aggregate target		2.06	2.33	1.83	2.15	
Inflation targeting		3.00	2.83		2.83	
Other monetary frameworks		1.50	1.92	1.83	1.82	
Total	2.70	1.74	2.60	1.85	2.14	

Economic transparency

Monetary frameworks	Exchange rate arrangements				Total	Croatia
	Fixed	Managed floating	Floating	Other		
Exchange rate anchor	0.90	0.54		0.50	0.57	0.00
Monetary aggregate target		0.44	0.33	0.33	0.38	
Inflation targeting		1.50	1.90		1.88	
Other monetary frameworks		0.75	2.08	1.00	1.55	
Total	0.90	0.55	1.60	0.60	0.99	

Procedural transparency

Monetary frameworks	Exchange rate arrangements				Total	Croatia
	Fixed	Managed floating	Floating	Other		
Exchange rate anchor	1.00	0.65		0.50	0.67	0.00
Monetary aggregate target		0.69	0.56	0.33	0.58	
Inflation targeting		1.00	1.67		1.65	
Other monetary frameworks		1.00	1.58	0.67	1.23	
Total	1.00	0.68	1.43	0.50	0.98	

Policy transparency

Monetary frameworks	Exchange rate arrangements				Total	Croatia
	Fixed	Managed floating	Floating	Other		
Exchange rate anchor	0.00	0.44		0.00	0.35	0.00
Monetary aggregate target		0.56	0.28	0.50	0.43	
Inflation targeting		1.50	1.62		1.62	
Other monetary frameworks		0.75	1.33	0.50	1.00	
Total	0.00	0.49	1.31	0.30	0.78	

Operational transparency

Monetary frameworks	Exchange rate arrangements				Total	Croatia
	Fixed	Managed floating	Floating	Other		
Exchange rate anchor	0.90	0.45		0.13	0.47	0.50
Monetary aggregate target		0.75	0.39	0.33	0.53	
Inflation targeting		2.00	1.26		1.28	
Other monetary frameworks		0.25	1.08	0.83	0.86	
Total	0.90	0.52	1.06	0.40	0.74	

Notes: The data show the simple index average for countries with the specified exchange rate arrangement and monetary framework. The group including Croatia is shown in white.

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ISSN 1334-014X (online)