

# Transparency of Monetary Policy in the Post-Crisis World

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## 1. Introduction

Transparency is a touchstone of monetary policy in the post-crisis world. There is a broad consensus in scholarly and practical policy-making circles on its desirability and utility. At the same time, however, there remains uncertainty about how best to implement and pursue it.

Transparency is a desirable characteristic of a central bank to the extent that it enhances the effectiveness of monetary policy. It involves a commitment to clear communication that makes it easier to understand the central bank's policymaking and thereby enhance the credibility of monetary policy. Transparency imposes self-discipline on monetary policy makers as unsubstantiated policy changes have reputational costs. It can help to render policy more predictable, which will prevent changes in the central bank's policy stance from destabilizing financial markets. Insofar as a predictable policy is more rapidly incorporated into financial variables, its impact on the real economy is enhanced.

In addition, transparency can help to foster support for the independence of the central bank. Independence is a way of solving time-inconsistency problems, avoiding short-termism and insulating decision making from the political pressures that otherwise bedevil monetary policy. Independent central bankers are free to choose their tactics while being obliged to advance a broader strategy or mandate defined by society through its political representatives. Transparency, in this light, is a way for those independent central bankers to explain how their actions are consistent with that mandate. Independence must be paired with accountability in order to be socially acceptable, and transparency, procedural transparency about the decision-making process in particular, allows the central bank to be more effectively held accountable in the court of public opinion.

But there is disagreement, and even confusion, over how central banks should best communicate their intentions and actions so as to enhance the effectiveness of their policies and ensure their adequate accountability. One source of confusion derives from the failure of central bankers and their critics to adequately distinguish different dimensions of transparency. Following Geraats (2002), scholars distinguish: *political transparency*, or openness about policy objectives; *economic transparency*, or openness about data, models and forecasts; *operational transparency*, or openness about the implementation of policy decisions and the extent to which the central bank's main policy targets have been achieved; and, most relevant to this paper, *procedural transparency*, which involves providing systematic information about the monetary policy decision-making process, and *policy transparency*, which involves prompt disclosure of policy decisions and a policy inclination or indication of future policy actions. The problem is that there is less than full agreement about the relative importance of these different facets of central bank transparency and wide variation among central banks in the extent to which they are embraced.

This paper focuses on three aspects of transparency practice by central banks. First, we analyze best practice in terms of procedural transparency. We ask how many central banks follow it, where a key aspect is the release of monetary policy committee votes and minutes without undue delay.

Second, we analyze the evolution of policy transparency in the wake of central banks' post-crisis experiments with forward guidance. In particular, we discuss whether policy makers will retreat from explicit quantitative forward guidance as policy rates rise from their recent low levels.

Third, we analyze how central banks are coping with expansion of their mandates to include financial stability. Specifically, we discuss whether there is a conflict between this new responsibility and the independent conduct of monetary policy.

The remainder of this paper is organized as follows. In Section 2, we provide an overview and discussion of these challenges. Section 3 then presents and analyzes a new index of monetary policy transparency that captures its political, economic, procedural, policy and operational aspects for more than 100 central banks. This index differs from those in our own previous work and that of other scholars in being better focused and more granular, in particular with respect to procedural and policy transparency. Section 4 is a set of case studies of how several prominent central banks are dealing with these dilemmas. Section 5 summarizes our conclusions and provides some speculations about the future.

## **2. Overview of Issues**

Most central banks consider transparency to be a very important component of their monetary policy framework.<sup>1</sup> The European Central Bank even maintains a webpage headed "Transparency" that provides a window onto how central banks conceive of the concept.<sup>2</sup> It defines transparency as "[providing] the general public and the markets with all relevant information on [the central bank's] strategy, assessments and policy decisions as well as its procedures in an open, clear and timely fashion".

Transparency has three benefits, the webpage briefly explains: self-discipline, credibility, and predictability. It is useful to discuss them a bit further.

Transparency imposes self-discipline on central bankers as it requires them to provide consistent explanations for their monetary policy decisions. In order for decisions to make sense to the public, policy makers have to explain why they make sense to themselves. By publishing their economic models and forecasts, policy makers are further encouraged to make decisions that are consistent with their mandate, because the public can more easily detect any deviations. This causes the reputations of policy makers to quickly suffer from inconsistent behavior. As a result, transparency (especially economic and operational transparency) improves policy makers' incentives and mitigates 'inflation bias' problems (see e.g. Faust and Svensson 2001, and Geraats 2001 and 2005). All this heightens the likelihood and strengthens the public's belief that monetary policy decision makers will act in a manner consistent with their mandates.

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<sup>1</sup> In their survey of 94 central banks, Fry, Mahadeva, Roger and Sterne (2000) find that 74% consider transparency 'vital' or 'very important'.

<sup>2</sup> <https://www.ecb.europa.eu/ecb/orga/transparency/html/index.en.html> , accessed May 22, 2016.

Thus, transparency enhances credibility, which means that inflation expectations are well anchored and in line with the central bank's inflation objective.<sup>3</sup> This anchoring also occurs because there is clarity about the central bank's mandate to maintain, *inter alia*, a low and stable rate of inflation (there is political transparency in other words). And when inflation expectations are well anchored, it becomes easier for the central bank to achieve price stability.

Consequently, transparency also enhances the predictability of policy outcomes. In addition, monetary policy actions become more predictable by providing a prompt explanation of policy decisions and an indication of likely future policy moves (i.e. policy transparency). This means monetary policy makers are unlikely to catch financial market participants and others off-guard, causing fewer monetary policy surprises that could result in destabilizing disturbances to financial markets. Predictability of monetary policy actions is further enhanced by publishing the monetary policy strategy and releasing the votes and minutes of monetary policy meetings without undue delay (i.e. procedural transparency). This enables the private sector to learn how monetary policy responds systematically to economic developments and disturbances, leading to the formation of more accurate expectations of future policy. As a result, asset prices are likely to move in the direction desired by the central bank even in advance of policy action. This in turn accelerates the speed with which monetary policy affects financial variables and thereby influences consumption and investment decisions, reducing monetary transmission lags and making monetary policy more effective.

Furthermore, publishing individual voting records facilitates accountability of central bankers and allows the government to re-appoint those who act according to their mandate (e.g. Gersbach and Hahn 2004), thus further fostering self-discipline, credibility and predictability of monetary policy. Such accountability also helps to prevent a democratic deficit, which is important for the legitimacy of independent central banks.

However compelling these rationales, it can also be argued that transparency can go too far (see e.g. Mishkin 2004). Too much information, or the release of too much information too quickly, may be difficult for observers to absorb and only confuse market participants. In this case the result of greater openness could be more volatility, not less. The release of different bits of information simultaneously (both the monetary policy committee statement and inflation report, for example) may make it hard for officials to identify the separate reaction of market participants to each, and so prevent policy makers from ascertaining whether investors' positive (or negative) reaction reflects reassurance (or disappointment) about current policy, expected future policy, or something else.

Finally, detailed information about data, models, forecasts and decisions may create a false sense of confidence and precision about future monetary policy. Market participants may underestimate the uncertainty surrounding future policy and take on excessive risk on that basis (Barwell and Chadha 2014). Investors may herd in response to public monetary signals in an environment where higher order beliefs matter, causing greater volatility when the signals are noisy (Morris and Shin 2000). In addition, public communications dilute the information content of market expectations (Morris and Shin 2005), and they may reduce private sector forecast efforts (Tong 2007), rendering monetary policy less predictable (Kool, Middeldorp and Rosenkranz 2011). If the economy is thrown off course by these or other developments, the central bank will then be faced with the Hobson's choice of having to

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<sup>3</sup> In his survey of 88 central banks, Blinder (2000) finds that they consider transparency a very important factor to establish or maintain credibility.

modify or abandon its prior guidance or else stick to its previous (now suboptimal) policies, either way damaging its ability to perform its core functions.

These dilemmas are especially acute in a post-crisis world where interest rates have fallen close to zero and central banks are forced to turn to unconventional monetary policies. A central bank that engages in quantitative easing will have to explain how its purchases of different classes of publicly-traded securities will affect financial markets and, thereby, the economy. This is likely to be more difficult to communicate than in the case of conventional monetary policy actions; different unconventional policies (purchases of different classes of securities) may have different policy rate equivalents, and these may not even be formally represented in the central bank's model. Moreover, large-scale asset purchases by a central bank, it is sometimes argued, distort asset prices and therefore market expectations inferred from them, making it even more challenging for central banks to navigate uncharted waters.

Insofar as unconventional policy operates via expectations, policy may depend even more than in other circumstances on forward guidance – on the efforts of the central bank to influence expected future interest rates through its communications – which in turn creates all the dangers described above about the private sector relying on central bank information. A central bank operating via forward guidance with its policy rate close to zero, may only be able to influence price expectations by committing to keep interest rates low for longer than would otherwise be optimal.<sup>4</sup> The responsible thing for the central bank, in effect, would be to act irresponsibly (Woodford 2012), which is an uncomfortable position for a monetary policy committee, to put an understated gloss on the point.

It can also be argued that these issues become more complex and difficult when the central bank has a mandate and operational responsibilities for the maintenance of not just price stability but also financial stability, as is the case for a number of central banks in our post-crisis world. If the central bank has separate policy instruments for each objective, it would be able to achieve a dual mandate of both price and financial stability (e.g. Geraats 2010). In practice, however, instruments to maintain financial stability are still in their infancy and their effectiveness remains untested, so trade-offs between price and financial stability may arise (see the case study of Sweden in Section 4). In addition, the mapping from tactics to policy objectives is more complex and difficult when there are multiple policy instruments and the mandate has multiple dimensions. Compared to information about inflation, information about financial stability can be harder to summarize in compact and cogent ways. Some information about threats to financial stability (e.g. financial institutions burdened by 'toxic assets' or liquidity problems) may be destabilizing if communicated before corrective action is taken. This is another specific instance of the more general argument that at some point efforts to enhance central bank transparency may become counterproductive.

Central banks have pursued a variety of different organizational initiatives in the effort to address these challenges. They have sought to develop multiple policy instruments (macroprudential as well as monetary policies) suitable to pursuing multiple objectives. Some central banks have created separate monetary policy and financial stability committees so as to avoid creating conflicts between these different aspects of their mandates, while allowing their members to focus narrowly on their respective charge; the central bank governor typically chairs both committees so as to ensure information sharing and a minimal degree of coordination. They have issued separate "Inflation Reports" and "Financial Stability Reports" as vehicles for communicating information about these respective instruments.

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<sup>4</sup> Large-scale assets purchases are another possibility, but they raise the dilemmas described in the preceding paragraph.

Time will tell whether these initiatives will suffice to resolving the dilemmas posed by multi-dimensional mandates.

### **3. Measures of Central Bank Transparency**

In this section we present new indices of transparency for 112 central banks around the world, building on our own previous work (Eijffinger and Geraats 2006, Dincer and Eichengreen 2008, 2010, 2014). The transparency index still consists of five sub-indices capturing (1) political, (2) economic, (3) procedural, (4) policy, and (5) operational transparency, with each sub-index consisting of three items. In addition, the overall index still equals the sum of the scores across all items, ranging from 0 to a maximum overall score of 15. But the new transparency index, which is included in appendix 1, differs from in three noteworthy respects. First, the indices are updated so that they now cover the period 1998-2015. Including the post-crisis period through 2015 allows us to identify a number of interesting cases where central bank transparency has declined, contrary to the dominant trend in international practice.

Second, the transparency index now explicitly focuses on monetary policy. This clarification, which mostly affects the political aspect pertaining to policy objectives and institutional arrangements, has become relevant in the post-crisis world since many central banks no longer confine themselves to monetary policy but have also started to actively pursue macroprudential policy to achieve financial stability objectives. An analysis of transparency of the latter will be an interesting topic for future research.

Third, the new transparency index is based on a more granular description of procedural and policy transparency than in our own previous work and the previous work of others. In terms of procedural transparency, since the financial crisis has shown the importance of timely information, we have tightened the criteria to get full marks and now distinguish a wider variety of alternatives. When it comes to the central bank's account of its monetary policy deliberations, we now require comprehensive minutes or explanations (in the case of a single central banker) to be published within three weeks (previously eight weeks) to get full marks for 3(b), while also giving some credit for summary minutes or more comprehensive minutes published with a significant delay (of no more than eight weeks). With respect to voting records, full marks for 3(c) now require individual voting records to be released on the day of the policy announcement (previously within eight weeks) or the decision to be taken by a single central banker, while partial credit is awarded to individual voting records published within eight weeks or non-attributed voting records released within three weeks. In terms of policy transparency, in light of the greater prevalence of forward guidance in the post-crisis world, we now similarly distinguish more alternatives when it comes to disclosure of the central bank's policy inclination. In particular, to get full marks for 4(c), the central bank should provide quantitative forward guidance, whereas partial credit is given to those who give a qualitative policy inclination.

Figures 1-4 summarize trends in transparency of monetary policy over time from 1998 to 2015 based on our index for a sample of 112 central banks. Figure 1 shows that the trend toward greater monetary policy transparency since the late 1990s is widespread. Only one central bank, Mozambique's, experienced a net decline in the transparency index during our sample period from 1998 to 2015. A similar picture emerges when focusing on the second half of our sample period (2007-2015) that was dominated by the global financial crisis (see Figure 2). Only a few central banks had a net decline in their overall transparency score, according to our calculations: Argentina (-2), Barbados (-1), Colombia (-1), the East

Caribbean Monetary Union (-0.5), Guatemala (-1.5), Kenya (-0.5), Nigeria (-0.5) and again Mozambique (-2). In a few cases, these declines in transparency scores reflected fundamental changes in central bank statutes (Argentina in 2002, Kenya in 2010), which inter alia limited the independency of the institution and removed prior quantification of monetary policy objectives. In others they reflect the decisions of the central banks in question to stop or suspend publication of inflation reports and other documents (Guatemala, the East Caribbean Central Bank).<sup>5</sup>

Figure 3 shows the annual time series of the monetary policy transparency index from 1998 to 2015, where countries are aggregated into income categories using the standard World Bank classification (for fiscal year 2016) and weighted by 2006 GDP expressed in U.S. dollars at market exchange rates (2006 being roughly the mid-point of our sample period and before financial market turmoil started in 2007). We use 2006 weights because this year falls roughly at the midpoint in our sample period. The rise in average transparency across all countries (similarly GDP weighted) is also shown (indicated by 'World'). Transparency has increased over time in all of the country-income categories distinguished there, although the increase has tapered off since 2008. Monetary policy transparency tends to be higher for advanced-country central banks throughout, and the time profiles differ by economic development, with most of the increase for high-middle-income countries occurring toward the beginning of the period considered. Romania, Thailand and Turkey, whose central banks noticeably increased their transparency in this period, are among the countries lying behind this trend. Transparency, while trending upward over time in all income groups, tends to be higher in richer, more advanced country groupings, although this does not appear to hold for the high-middle-income and low-middle-income country groups. However, this is due to the use of GDP-weighted averages, with transparency increasing substantially in the last couple of years in India, which has a GDP weight of roughly 40 per cent in the low-middle-income grouping, while the average for the high-middle-income group is reduced by the relative opacity of China. This distortion disappears when using unweighted averages as shown in Figure 3b.

There are also some interesting patterns in changes in transparency levels over time. For example, there is a noticeable increase in the GDP-weighted transparency average among the high income countries in 2012; this is driven by a big boost in transparency for the U.S. Federal Reserve, which has a weight of 0.35 in this country grouping. The Fed moved in this period toward the announcement of explicit inflation and employment targets.<sup>6</sup> It regularly released more economic data. It began disclosing explicit policy inclinations after each FOMC meeting. In addition, there is a dip in GDP-weighted average levels of transparency in high middle-income countries during the global financial crisis (in 2008-9). In practice, this

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<sup>5</sup> Another such case is Colombia, where inflation reports in English do not currently appear on the central bank's website post-2012. Spanish-language versions are still posted, but since English is the language of international financial markets (and since counting foreign-language reports would raise difficult questions of which languages), our rankings for the country decline after 2012. We understand that the English-language versions may have appeared on the website at one point in time, though we have not been able to verify this independently. The case points up some of the challenges and judgmental nature of attempting to rank central banks on a single transparency scale.

<sup>6</sup> Specifically, the notes of the FOMC enunciated a long-run inflation goal of 2% PCE inflation starting in 2012. Although the Fed does not have a fixed goal for employment, as explained in their "Statement on Longer-Run Goals and Monetary Policy Strategy", policy makers have provided since the beginning of 2012 a quantification of a "maximum employment" goal in the form of the FOMC participants' estimates of the longer-run normal rate of unemployment. Finally, the Fed's third goal of "moderate long-term interest rates" is implied by their price stability goal (as indicated in the Statement), so they really have a 'dual mandate' of stable prices and maximum employment.

is due to slight declines in transparency in China and Brazil, countries with weights in this group of 0.37 and 0.15. In both cases the central bank provided less information on its economic forecasts.

Figure 4 shows the trends in transparency by monetary policy framework (inflation targeters, exchange rate targeters, monetary aggregate targeters and others), using the IMF's de facto classification and unweighted averages. Transparency tends to be much higher for inflation targeters than for the all the other monetary frameworks. Inflation targeting is arguably the most information-intensive of the three targeting regimes distinguished in the figure; in this sense it is intuitive that central banks adopting this regime should rely most heavily on transparency as part of their monetary-policy strategy. It is tempting to argue that the "other" category is even more complex and information intensive. In practice, however, this category is made up of a very heterogeneous group of central banks, and in practice it is dominated by two unusual and unusually transparent institutions, namely the U.S. Federal Reserve and the European Central Bank (more on which below).

Table 1 shows the countries with the highest scores for monetary policy transparency in 2015: Sweden, which gets full marks in nearly every respect according to our index, followed by the Czech Republic, New Zealand, and joint fourth, the United Kingdom and the United States. In 1998, New Zealand ranked first according to our transparency index and although it further improved its score, it got overtaken by the rapidly rising Sweden (in 2007) and the Czech Republic (in 2008). Likewise, the United Kingdom and Canada, which were ranked joint second in 1998, got outpaced and lost their place in the transparency top three.

We can also compare the transparency of monetary policy for central banks with one formally stated objective or else multiple objectives with explicit priority attached to one, versus central banks with multiple objectives. Dincer and Eichengreen (2016) classify central banks according to this distinction (dropping central banks whose objectives were unspecified). Figure 5 shows the average GDP-weighted transparency score for central banks with a single or prioritized objective versus central banks with multiple objectives in each year. Although central banks with multiple objectives and no explicit prioritization between them are slightly more transparent on average, there is essentially no difference across categories (a standard significance test does not reject the null of equality). In part this reflects the relatively heavy weights of the Fed and ECB in the two categories. When instead all central banks are weighted equally, those with single or clearly prioritized objectives are clearly more transparent (average score of 7 vs. 4.5), where a t-test rejects the null of equality at the 99 per cent confidence level. Table 2 shows that the greater transparency of central banks with multiple objectives is driven by flexible inflation targeters (inflation targeters with multiple objectives), but also confirms that any difference is insignificant. An earlier political economy argument suggested that central banks with multiple objectives may find accountability more difficult and therefore seek to be more transparent. The present comparisons suggest that this effect is weak in practice.

In the wake of the global financial crisis, particular attention has been devoted to central banks' procedural and policy transparency. Policy transparency is important for forward guidance, in the context of unconventional monetary policy in particular. Procedural transparency is critical for accountability, which becomes all the more important when central banks engage in unconventional policies and is a quid pro quo for central bank independence. Figure 6 therefore shows trends over time in our central banks' procedural transparency and policy transparency scores. Both aspects of transparency trend upward over time, as

expected. But policy transparency rises first, and procedural transparency tends to follow with a lag. A number of central banks moved relatively quickly, already in the late 1990s, to more fully disclose and explain their policy decisions and indicate inclinations regarding future policy changes. In general, only later did they begin to explain more fully how they reached those decisions – that is, to become more transparent about how their decision-making procedures.

Table 3 provides further detail on the specific ways in which central banks have increased their procedural and policy transparency. The prevalence of an explicit monetary policy strategy has further increased from 53 in 1998 to 84 in 2015 for our sample of 112 central banks. The publication of comprehensive, timely minutes or voting records is much less common but they have also noticeably increased. The largest increase has been in the prompt announcement of policy adjustments, a practice which has spread from 16 central banks in 1998 to 59 central bank in 2015. Providing a prompt explanation of the policy decision, also when policy settings remain unchanged, is far less common, though it increased from only 3 to 26 central banks. Finally, few central bank regularly use forward policy guidance, although it clearly has been deployed more in the post-crisis period. Qualitative forward guidance (e.g. expecting to keep policy rate low for an ‘extended period’) was used by 10 central banks in 2015, while 5 central banks used quantitative forward guidance. The latter could be calendar-based (as adopted by Canada in 2009), in the form of a numeric threshold for inflation (as used by Japan in 2001) or unemployment (deployed by the US Federal Reserve in 2012 and the Bank of England in 2013), or the projected path for the policy rate (as currently done by the Czech Republic, New Zealand, Norway, Sweden and the United States).

#### **4. Case Studies**

This section has a closer look at some of the transparency challenges faced by prominent central banks in the post-crisis world, including the European Central Bank and Bank of England.

##### **4.1 European Central Bank**

The primary objective of the European Central Bank (ECB), as stipulated by article 105(1) of the Treaty establishing the European Community as amended by the 1992 ‘Maastricht’ Treaty on European Union, is to maintain price stability, and subject to that to support the general economic policies of the European Union. The ECB has defined price stability as 0-2% HICP inflation for the euro area, but clarified in 2003 that it aims to maintain inflation ‘below but close to’ 2% over the medium term. The operational independence of the ECB is enshrined in the Maastricht Treaty, which arguably makes it the most independent central bank in the world.

In response to the turmoil in money markets that started on 9 August 2007, the ECB introduced supplementary longer-term refinancing operations (LTROs) with a maturity of three months. At the end of March 2008, the ECB announced the introduction of six-month

LTROs. The ECB has often provided considerable advance notice for these supplementary LTROs, thereby helping to stabilize money market conditions for longer maturities.<sup>7</sup>

After the collapse of Lehman Brothers on 15 September 2008, the ECB took further measures to help stabilize euro money markets and achieve its “objective to keep short term rates close to the interest rate on the main refinancing operation”.<sup>8</sup> In particular, its weekly main refinancing operations (MROs) changed from a variable-rate tender procedure with a minimum bid rate equal to the ECB’s main refinancing rate (or ‘refi rate’), to a fixed-rate tender procedure with full allotment at the refi rate. The three-month and six-month LTROs increased in frequency and were also changed to fixed-rate tender procedures with full allotment.<sup>9</sup> This had a dramatic effect on the euro-area overnight interbank rate, EONIA, which used to fluctuate closely around the refi rate. Since the full-allotment provision of liquidity started on 15 October 2008, however, EONIA has generally been significantly below the refi rate, which is the key policy rate that is meant to signal the ECB’s monetary policy stance. Instead, the ample provision of liquidity on demand has driven EONIA very close to the rate on the ECB deposit facility and it is typically only about 10 basis points above it. As a result, during the post-crisis period, the main refi rate has no longer been a good indication of the ECB’s de facto monetary policy stance, hampering its policy transparency (see also Geraats, 2011).

This is illustrated in Figure 7, which shows EONIA and the ECB’s main refinancing rate and the interest rates on its marginal lending facility and deposit facility from 1 January 2007 to 1 April 2016. The money market turmoil starting in August 2007 clearly led to greater fluctuations in EONIA around the ECB’s main refi rate. During the post-Lehman period of policy easing, when the refi rate was cut from 4.25% to 1%, EONIA remained quite volatile, but was usually well below the refi rate. The subsequent introduction of one-year LTROs at the end of June 2009 with full allotment and a fixed rate equal to the refi rate brought greater stability but also systematic distortion to euro area money markets. For over a year, EONIA was around 65 basis points below the refi rate, just 10 basis points above the deposit rate, with a standard deviation of just 6 basis points.<sup>10</sup> The euro-area sovereign debt crisis again led to greater volatility in euro money markets, although EONIA usually remained well below the refi rate. The introduction of three-year LTROs in late 2011 was followed by nearly two years of remarkable stability in EONIA. Although EONIA started moving much closer to the refi rate again from early 2014 to early 2015, after the start of large-scale asset purchases by the ECB on 9 March 2015, initially at a rate of €60bn per month, EONIA has dropped closer to the deposit rate again. Since mid 2015, EONIA has generally been only around 6 basis points above the deposit rate, dropping to about -0.34% after the main refi rate had been cut to 0%

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<sup>7</sup> For instance, the six-month LTRO on 10 July 2008 was announced on 28 March 2008, and the renewal of the three-month LTRO on 11 December 2008 was announced on 4 September 2008.

<sup>8</sup> See ECB press release “Changes in tender procedure and in the standing facilities corridor”, 8 October 2008, which also announced a (temporary) reduction in the interest rate corridor range from 200 to 100 basis points.

<sup>9</sup> See ECB press release “Measures to further expand the collateral framework and enhance the provision of liquidity”, 15 October 2008.

<sup>10</sup> This refers to the period from 25 June 2009 (the settlement date of the first one-year LTRO) to 30 June 2010, during which significant fluctuations in EONIA were generally confined to a spike at the end of each two-week MRO maintenance period.

and the deposit rate to -0.40% on 16 March 2016. As a result, the main refi rate has been an inaccurate signal of the ECB's monetary policy stance in the post-crisis period as very short-term market interest rates in the euro area have been generally been significantly lower (see also Geraats, 2011).

Among its non-standard measures in response to the financial crisis, the ECB has introduced several programs involving significant asset purchases, with various degrees of transparency. For instance, the first covered bond purchase program was pre-announced on 7 May 2009, with operational details (including the amount of €60bn and period from July 2009 to July 2010) released on 4 June, and first purchases starting on 6 July 2009. An example of an even more drawn-out introduction is the asset-backed securities (ABS) purchase program. On 5 June 2014 the ECB stated at its press conference that it had decided to “intensify preparatory work related to outright purchases in the ABS market”. On 4 September 2014 the ECB announced an ABS purchase program, but left the “detailed modalities” of it to be announced on 2 October 2014, although it still did not reveal the size or duration of the ABS purchase program at that time. Even by 6 November 2014 the ECB had only indicated that its asset purchases would have a “sizeable impact” on its balance sheet. Clearly, policy transparency has been rather limited for this asset purchase program.

Nevertheless, the premature announcement of asset purchase programs under development could still be useful and help to stabilize asset prices even before the full details of the program have been announced. This effect could be very powerful. For instance, during the euro-area periphery sovereign debt crisis, when fears arose of a break-up of the eurozone, ECB President Draghi declared on 26 July 2012 that the ECB was “ready to do whatever it takes” to preserve the euro as single currency. After its meeting of 2 August 2012, the ECB stated that it “may undertake outright open market operations of a size adequate to reach its objective”. On 6 September 2012, the ECB announced its ‘outright monetary transactions’ (OMT) program of potentially unlimited sterilized purchases of euro area sovereign debt with maturities between one and three years on the secondary market, with further details to be published later. This announcement has proved so effective at reducing euro-area periphery sovereign debt yields that even to this date (mid 2016) the ECB has not needed to make any purchase under this program. This example illustrates the power of central bank communications.

## **4.2 Bank of England<sup>11</sup>**

The Bank of England (BoE) adopted inflation targeting after it exited the European Monetary System in September 1992 and it gained operational independence for monetary policy in May 1997. Its monetary policy objective, stipulated by the Bank of England Act of 1998 (Chapter 11, Part II, Section 11), is to maintain price stability, and subject to that, to support the UK government's economic policy, including its objectives for growth and employment.

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<sup>11</sup> The source of much of the information in this section is the Bank of England website: <http://www.bankofengland.co.uk/>

The inflation target, currently an annual rate of 2% for CPI inflation, is specified by the government in an annual remit letter to the Bank's Monetary Policy Committee (MPC). If the inflation target is missed by more than one percent point, the MPC remit asks for an open letter to the Chancellor of the Exchequer to spell out the reasons for the deviation and how the MPC plans to bring inflation back to target.

MPC members are also held accountable through regular appearances before Parliament, in particular the House of Commons' Treasury Committee. The BoE's operational independence on monetary policy is subject to an explicit override mechanism; the Treasury may give the BoE directions with respect to monetary policy if required "in the public interest and by extreme economic circumstances", but any such order is subject to subsequent parliamentary approval and limited to a period of three months (Bank of England Act 1998, Chapter 11, Part II, Section 19). But this does not detract from its political transparency, for which the BoE got full scores based on our index throughout the 1998-2015 sample period.

In terms of economic transparency, the BoE has been a leading example. It has published a quarterly Inflation Report since 1993, which is presented by the Governor at a press conference, which allows for further clarification and media scrutiny. The Inflation Report provides extensive information about macroeconomic developments, including a medium-term projection for inflation. Since 1996 the projection has been shown in a fan chart that illustrates the underlying uncertainty using confidence bands of gradually fading colors, an effective presentation technique which has been adopted more widely by other central banks.<sup>12</sup> Since 1997 the Inflation Report includes fan charts of quarterly MPC projections for both inflation and GDP growth. Initially, the projections were for a two-year horizon and based on the assumption of a constant policy rate, but the path of market interest rate expectations inferred from the yield curve was soon used as well and became the main conditioning assumption in August 2004, when the horizon of the MPC projections was extended to three years. The projections reflect the MPC's judgments and are based on the BoE macroeconomic models, which have also been publicly available since 1999. An annual discussion of the MPC's forecasting record has been included in the Inflation Report since 1999, which contributes to operational transparency.<sup>13</sup> In response to the BoE forecasting review by Stockton (2012), the Inflation Reports have started to provide more detailed information about the key judgments and risks underlying the MPC forecasts, and monitor whether these judgments are being borne out by data, thus improving both the transparency and the quality of the forecasting process.

The BoE has been weaker on policy transparency, however. Until recently the BoE usually only provided a prompt explanation of monetary policy decisions when policy settings were adjusted and it merely released a terse announcement of the policy decision when no change

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<sup>12</sup> Fracasso et al (2003, Table 3.6) reported that 12 out of 20 inflation targeters published their inflation projections using fan charts.

<sup>13</sup> Much more extensive evaluations of BoE forecasting are provided by the 2012 Stockton Review and the November 2015 report "Evaluating forecast performance" by the BoE Independent Evaluation Office.

was made.<sup>14</sup> And for many years the BoE left the private sector in the dark about its policy inclination or likely upcoming policy actions, insisting on making its monetary policy decisions one month at a time.

The BoE abandoned its month-by-month approach, however, when it lowered its policy rate to 0.5% and embarked on unconventional monetary policy measures in response to the financial crisis, in particular its large-scale asset purchases of predominantly medium- to long-term UK government bonds ('gilts') in the secondary market, financed by issuing central bank reserves. On 5 March 2009 the BoE announced the purchase of £75bn of mostly gilts over a period of three months.<sup>15</sup> An expansion by £50bn was announced in advance on 7 May 2009 and expected to take three months to complete. This was followed by a £50bn expansion over three months announced on 6 August 2009, and a £25bn expansion over three months announced on 5 November 2009, taking the total of the first round of asset purchases ('QE1') to £200bn. By announcing its large-scale asset purchases in advance for three months at a time, the BoE managed to affect financial market expectations and significantly reduce yields even before its asset purchases started.<sup>16</sup>

The BoE adopted a similar approach for its second round of asset purchases ('QE2'), which started with £75bn over four months announced on 6 October 2011, with a £50bn expansion over three months announced on 9 February 2012, and a final £50bn expansion over four months announced on 5 July 2012, taking the total amount of BoE QE to £375bn by the end of October 2012. The BoE has also been quite transparent in the operation of its large-scale asset purchases; it releases the nominal value and proceeds of purchases by gilt issue at the end of each operation day, together with summary information on total offers received, allocation and prices accepted.<sup>17</sup>

Nevertheless, it took a change of guard at the helm of the Old Lady of Threadneedle Street before the BoE also embraced greater policy transparency for its interest rate setting. After Mark Carney had been announced as the successor of Mervyn King as BoE Governor, the MPC received a new remit in March 2013 that requested the MPC to provide an assessment of the merits of explicit forward guidance, including the use of (state-contingent) 'intermediate thresholds' (as used by the US Federal Reserve). This MPC remit letter was also the first to clarify that the UK government considers the use of forward guidance to be subject to the MPC's operational independence in setting monetary policy. In response the MPC released a report<sup>18</sup> and issued quantitative forward guidance on 7 August 2013 that it intended not to raise the policy rate or reduce its stock of purchased assets at least until the

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<sup>14</sup> The BoE even did so in the aftermath of the financial crisis – no explanation was provided for its monetary policy decisions on 9 April, 4 June, 4 July, 10 September, 8 October and 10 December in 2009.

<sup>15</sup> The BoE also purchased corporate bonds and commercial paper.

<sup>16</sup> Long-term nominal gilt yields dropped by about 70 and 90 basis points for a maturity of 10 and 20 years, respectively, from 4 to 6 March 2009, while the BoE gilt purchases only started on 11 March 2009.

<sup>17</sup> The information is available at <http://www.bankofengland.co.uk/markets/Pages/apf/gilts/results.aspx>.

<sup>18</sup> "Monetary policy trade-offs and forward guidance", Bank of England, August 2013. Curiously, despite the MPC's remit to assess explicit forward guidance and the MPC's decision "to provide explicit guidance about the future path of monetary policy" (p. 16), the report makes no mention at all of a straightforward way of doing so – publishing the projected path of the policy rate and stock of purchased assets.

unemployment rate had fallen to 7%, subject to two price stability and one financial stability ‘knockouts’.

A drawback of such ‘threshold’ guidance is that it leaves uncertainty about when the unemployment threshold is likely to be reached. To overcome this, the Inflation Report in August 2013 introduced a fan chart of the MPC’s three-year ahead projection for the unemployment rate. It also included a separate graph showing the probability of the unemployment rate falling below the 7% threshold, which didn’t reach 50% until 2016,<sup>19</sup> indicating that the policy rate would not be raised for at least two years. Many private sector observers, however, expected the unemployment rate, which was 7.8% at the time, to reach the 7% threshold much more swiftly, so they expected the policy rate to stay low for a lot less longer. As a result, the 7% unemployment threshold guidance probably provided considerably less stimulus than was intended.

Nevertheless, the unemployment rate quickly approached 7% after only two quarters, defying the MPC’s predictions. In response, the MPC provided further forward guidance on 12 February 2014 that “[d]espite the sharp fall in unemployment, there remains scope to absorb spare capacity further before raising Bank Rate”, and that the rate rise is “expected to be gradual”, with the normal level of Bank Rate “likely to be materially below” the 5% pre-crisis average.<sup>20</sup> In 2015 the phrasing of this qualitative forward guidance evolved into “when Bank Rate does begin to rise, it is expected to do so more gradually and to a lower level than in recent cycles”.<sup>21</sup>

Further significant improvements in policy and procedural transparency were introduced in August 2015. The BoE initially released the minutes of its monthly MPC meetings, including individual voting records, with a delay of about five weeks, which is after the decision of the next MPC meeting and therefore likely to cause confusion. But in October 1998 the delay was reduced to two weeks. This allowed people to use the summary of the policy discussions and the individual votes to better understand the MPC reaction function and update their expectations for the next monetary policy decision. Once a quarter the Inflation Report with the MPC projections was also released at a press conference about one week after the monetary policy meeting. But this release schedule led to a ‘drip feed’ of information - first the policy announcement (with usually only an explanation in case of a policy adjustment), about a week later the Inflation Report (once a quarter), and after two weeks the minutes. This gradual release of key information often led to undesirable market volatility. So the Warsh (2014) review of BoE transparency sensibly recommended that the BoE should adopt international best practice by releasing a prompt announcement of the monetary policy

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<sup>19</sup> BoE Inflation Report, August 2013, Chart 2. There was also a graph showing the probability of inflation exceeding the 2.5% ‘knockout’ (Chart 4), which indicated the probability was less than 50% for the 18-24 month horizon relevant for this ‘knockout’. Unusually, though in line with its forward guidance, the projections in this Inflation Report were based on a constant policy rate.

<sup>20</sup> BoE Inflation Report, February 2014, Box “Monetary policy as the economy recovers” (pp. 8-9). It also provided forward guidance on the stock of purchased assets, stating that the MPC intends to maintain it “at least until the first rise in Bank Rate”. In the November 2015 Inflation Report, this was extended to “until Bank Rate has reached a level from which it can be cut materially”, which the MPC judged to be around 2% (Box “The MPC’s asset purchases as Bank Rate rises”, p. 34).

<sup>21</sup> E.g. in the Monetary Policy Summary of August 2015.

decision that includes an explanation and the individual voting records. In addition, the MPC projections could be published on the same day (with the full Inflation Report released a week later if needed) to ensure that financial markets promptly receive the key monetary policy information they are most interested in.

The BoE, however, decided to go even further. It made the unprecedented decision to release not only a prompt policy explanation including MPC votes and the full Inflation Report (as is done by some other central banks), but also the minutes of the MPC meeting – all at the same time as the monetary policy announcement. As a result, the BoE has replaced a drip feed by a data deluge that is harder to digest by financial market participants. The simultaneous release also deprives researchers and policymakers from the valuable opportunity to separately identify the impact on asset prices of the policy statement, Inflation Report and minutes to assess how informative they are to financial markets. Furthermore, the BoE had to make undesirable adjustments to the structure of the MPC meetings to publish the minutes at the same time as the monetary policy announcement. (See also Eichengreen and Geraats, 2015)

The MPC used to meet on two consecutive days: the genuine policy deliberations took place on Wednesday, and the next morning a ‘policy discussion’ was held in which each MPC member made an (often prepared) statement of his/her views and decision, with the policy decision determined by the majority and announced shortly afterward at 12 noon.<sup>22</sup> But to allow sufficient time to prepare agreed minutes, the MPC meetings have been restructured to three meetings held in the course of seven days. The genuine deliberations now take place on Thursday, a full week before the policy announcement. This is followed by the staged ‘policy discussion’ on Monday and the policy vote on Wednesday.

Spreading the MPC meetings over seven days greatly increases the risk that macroeconomic data releases, developments in financial markets or geopolitical events significantly affect the appropriate monetary policy stance. MPC members could disregard the new information, which would distort the monetary policy decision. Or the MPC could redo its deliberations, which is inefficient. Furthermore, if the MPC members re-deliberate before they vote on the eve of the announcement and decide to change their policy stance, then it will be impossible to have their views and reasoning properly and coherently captured overnight in the MPC minutes to be released together with the policy announcement. So, it becomes harder for the BoE to communicate clearly, especially in times of turmoil and heightened uncertainty when clarity is most needed. As a result, the restructured MPC meetings reduces BoE transparency.<sup>23</sup>

The BoE has already experienced several significant ‘news shocks’ during the weeklong window of MPC meetings. At the first meeting under the restructured format, during 2-8 July 2015, the Chancellor of the Exchequer, George Osborne, made the shock announcement in

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<sup>22</sup> This description is based on the inside accounts by Warsh (2012) and Lambert (2005), which curiously differ from the impression created by the MPC minutes and the annex of the BoE report “Transparency and accountability at the Bank of England” (11 December 2014) that describes the changes.

<sup>23</sup> On the other hand, the more prolonged MPC meeting schedule increases the chances of inadvertent openness. Goodhart (2015) suggest that it raises the risk of leaks, as MPC members already present their policy views at the Monday meeting, three days before the policy announcement.

the ‘Summer Budget 2015’ on 8 July 2015 that the government would introduce a ‘national living wage’ that involves a large increase in the minimum wage over five years, starting with a nearly 7.5% rise in April 2016 to the ambitious target of 60% of median earnings by 2020. This news seems very relevant to the BoE, but it is not mentioned at all in the MPC minutes, which suggests that it was not discussed, despite that fact that the minutes report (on pp. 4-5) that the Treasury representative attending the MPC meeting had briefed the MPC on the Budget.

Another interesting example is the turbulent aftermath of the ‘Brexit’ referendum that the MPC faced during its 7-13 July 2016 meeting. On the morning of Thursday 7 July 2016, only two weeks after the UK had voted to leave the European Union, the UK faced the prospect of several months of political uncertainty about who would succeed David Cameron as Prime Minister, and the pound sterling had fallen to less than \$1.30. This was the setting against which the MPC had its genuine deliberations. But on Monday, when the MPC’s scripted ‘policy discussion’ was scheduled, Theresa May suddenly became the only remaining candidate for the Conservative party leadership and she was installed as the new Prime Minister on Wednesday 13 July, when the pound had risen to around \$1.33 and the MPC made the monetary policy decision. Yet, in the minutes there is no sign that the MPC members had reconsidered their views in light of these significant developments.

The MPC minutes could provide a valuable opportunity to better understand the MPC’s monetary policy reaction, but this requires knowing what information they are based on. Unfortunately, the minutes do not make this clear; they do not even specify the dates on which the MPC met (only the date the MPC meeting ended). There also appears to be little evidence of the ‘genuine deliberations’ that are held on the first day. In fact, the first half of the minutes often looks more like the summary of a staff briefing on economic and financial developments. And some parts of the MPC minutes feel highly censored. For instance, the July 2016 minutes report that “The Committee reviewed a range of possible stimulus measures and combinations thereof” (p. 7), without even mentioning what measures were considered, let alone the MPC’s assessments. In light of the unanticipated outcome of the Brexit referendum, one would have expected extensive discussions among MPC members to evaluate the challenging new situation. Yet the MPC minutes were only a paltry 8 pages long, less even than for the July 2015 meeting. Greater detail will likely be available in the transcripts of MPC meetings, which the BoE decided to release with a delay of 8 years, but these are restricted to the Monday and Wednesday meetings, so they exclude the genuine deliberations.

All in all, it is clear that considerable procedural opacity prevails at the BoE and that attempts to improve transparency can be taken too far.

## **5. Conclusion**

This paper has presented an updated index for monetary policy transparency for 112 countries from 1998 to 2015. It reveals a rise in transparency throughout the world, regardless of the level of economic development or monetary policy framework, although high-income countries and inflation targeters tend to be the most transparent.

The trend towards greater monetary policy transparency has continued after the financial crisis, although it appears to be more subdued in the post-crisis world. This could be due to the fact that monetary policymaking in post-crisis world has been changed and often complicated by financial stability issues and unconventional measures.

Nevertheless, the financial crisis has shown that central bank communications can provide powerful policy tool to help manage expectations and improve effectiveness of monetary policy. So transparency of monetary policy remains very important.

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## Appendix 1: Monetary Policy Transparency Index

This appendix contains the exact formulation of the monetary policy transparency index. The index is the sum of the scores for the answers to the fifteen questions below (min = 0, max = 15). Note that all questions pertain to published information that is freely available in English.

### 1. Political Transparency

Political transparency refers to openness about monetary policy objectives. This comprises a formal statement of objectives, including an explicit prioritization in case of multiple goals, a quantification of the primary objective(s), and explicit institutional arrangements.

- (a) Is there a formal statement of the objective(s) of monetary policy, with an explicit prioritization in case of multiple objectives?
  - No formal objective(s) = 0
  - Multiple objectives without prioritization = ½
  - One primary objective, or multiple objectives with explicit priority = 1
  
- (b) Is there a quantification of the primary or main objectives of monetary policy?
  - No = 0
  - Yes, but not for the primary objective or all main objectives = ½
  - Yes, for the primary objective or all main objectives = 1
  
- (c) Are there explicit institutional arrangements or contracts for monetary policy between the monetary authorities and the government?
  - No central bank, contracts or other institutional arrangements = 0
  - Central bank without explicit instrument independence or contract = ½
  - Central bank with explicit instrument independence for the body responsible for monetary policy or a central bank contract for monetary policy (although possibly subject to an explicit override procedure) = 1

### 2. Economic Transparency

Economic transparency focuses on the economic information that is used for monetary policy. This includes economic data, the model of the economy that the central bank employs to construct forecasts or evaluate the impact of its decisions, and the internal forecasts (model based or judgmental) that the central bank relies on.

- (a) Is the basic economic data relevant for the conduct of monetary policy publicly available? The focus is on the release of current data for the following variables: (i) money supply growth, short and long-term interest rates, inflation, GDP growth and unemployment rate; and (ii) a measure of capacity utilization or [the central bank's estimate of the] 'output gap', and a timely [update of the central bank's] estimate of the 'natural' or long-run equilibrium interest rate (at least once a year).
  - Quarterly time series not available for all variables ad (i) = 0
  - Quarterly time series available for all variables ad (i) = ½
  - Quarterly data available for all variables ad (i) and (ii) = 1

(b) Does the central bank disclose the formal macroeconomic model(s) it uses for monetary policy analysis?

No = 0

Yes = 1

(c) Does the central bank regularly publish its own macroeconomic forecasts?

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 or only for the short term = ½

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

### 3. Procedural Transparency

Procedural transparency concerns the way monetary policy decisions are taken. It involves an explicit monetary policy rule or strategy that describes the monetary policy framework, an account of monetary policy deliberations and how the monetary policy decision was reached.

(a) Does the central bank provide an explicit policy rule or strategy that describes its monetary policy framework?

No = 0

Yes = 1

(b) Does the central bank give a comprehensive account of monetary policy deliberations (or explanations in case of a single central banker) within a reasonable amount of time?

No, or only after a substantial lag (more than eight weeks) = 0

Only summary minutes or more comprehensive minutes published with a significant delay (of at least three but no more than eight weeks) = ½

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, published within three weeks = 1

(c) Does the central bank disclose how each decision on the level of its main monetary operating instrument/target was reached?

No voting records, or only released after a substantial lag = 0

Only non-attributed voting records released within three weeks, or individual voting records released within eight weeks = ½

Individual voting records released on the day of the policy announcement, or decision by single central banker = 1

### 4. Policy Transparency

Policy transparency means prompt disclosure of monetary policy decisions. In addition, it includes an explanation of the decision, and an explicit policy inclination or indication of likely future policy actions.

(a) Are decisions about adjustments to the main monetary operating instrument/target promptly announced?

No, or after a significant lag = 0  
Yes, at the latest on the day of implementation = 1

(b) Does the central bank provide an explanation when it announces monetary policy decisions?

No = 0

Only when policy decisions change, or only superficially =  $\frac{1}{2}$

Yes, always and including an assessment of economic prospects = 1

(c) Does the central bank disclose an explicit policy inclination after every monetary policy meeting or an explicit indication of likely future monetary policy actions (at least quarterly)?

No = 0

Only a qualitative policy inclination =  $\frac{1}{2}$

Yes, quantitative forward policy guidance = 1

## 5. Operational Transparency

Operational transparency concerns the implementation of the central bank's monetary policy actions. It involves a discussion of control errors in achieving operating targets and (unanticipated) macroeconomic disturbances that affect the transmission of monetary policy. Furthermore, the evaluation of the macroeconomic outcomes of monetary policy in light of its objectives is included here as well.

(a) Does the central bank evaluate to what extent its main monetary policy operating targets (if any) have been achieved?

No, or not very often (at less than annual frequency) = 0

Yes, but without providing explanations for significant deviations =  $\frac{1}{2}$

Yes, accounting for significant deviations from target (if any); or, (nearly) perfect control over main operating instrument/target = 1

(b) Does the central bank provide information on (unanticipated) macroeconomic disturbances that affect the monetary policy transmission process?

No, or not very often = 0

Yes, but only through short-term forecasts or analysis of current macroeconomic developments (at least quarterly) =  $\frac{1}{2}$

Yes, including a discussion of its forecast errors (at least annually) = 1

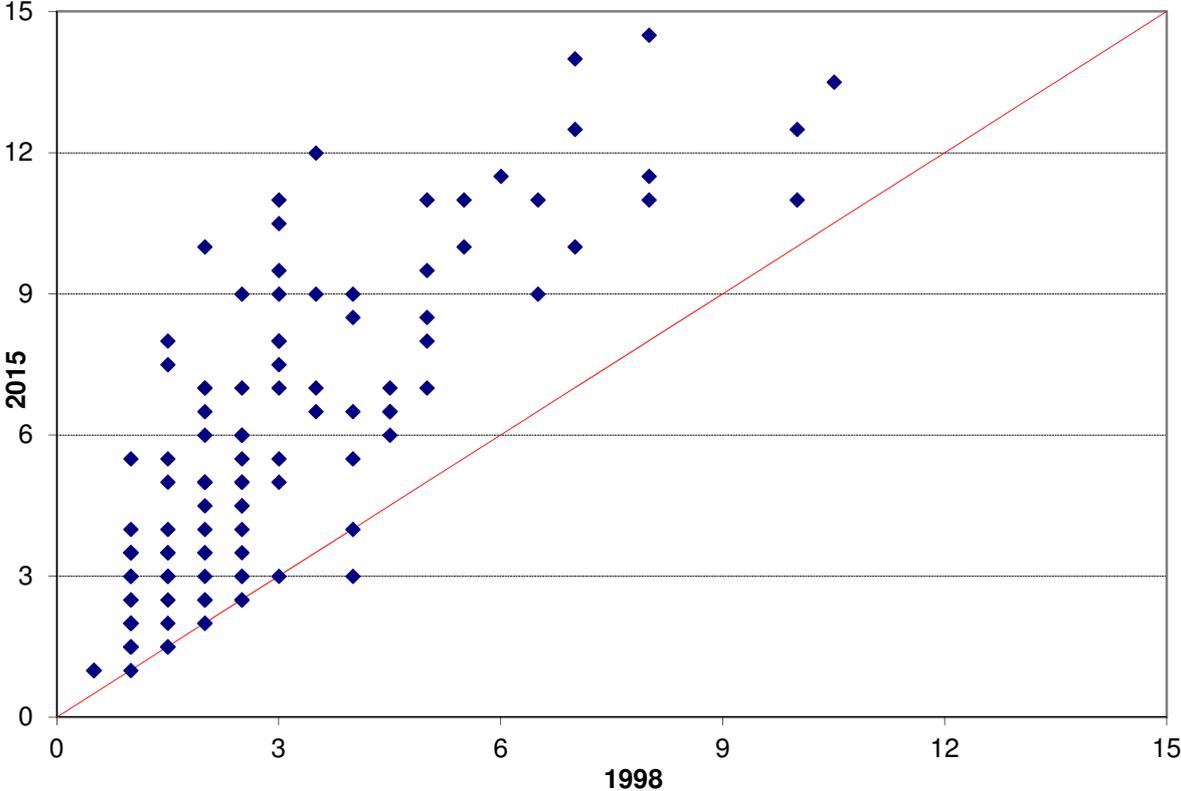
(c) Does the central bank provide an evaluation of the monetary policy outcome in light of its macroeconomic objectives?

No, or not very often (at less than annual frequency) = 0

Yes, but superficially =  $\frac{1}{2}$

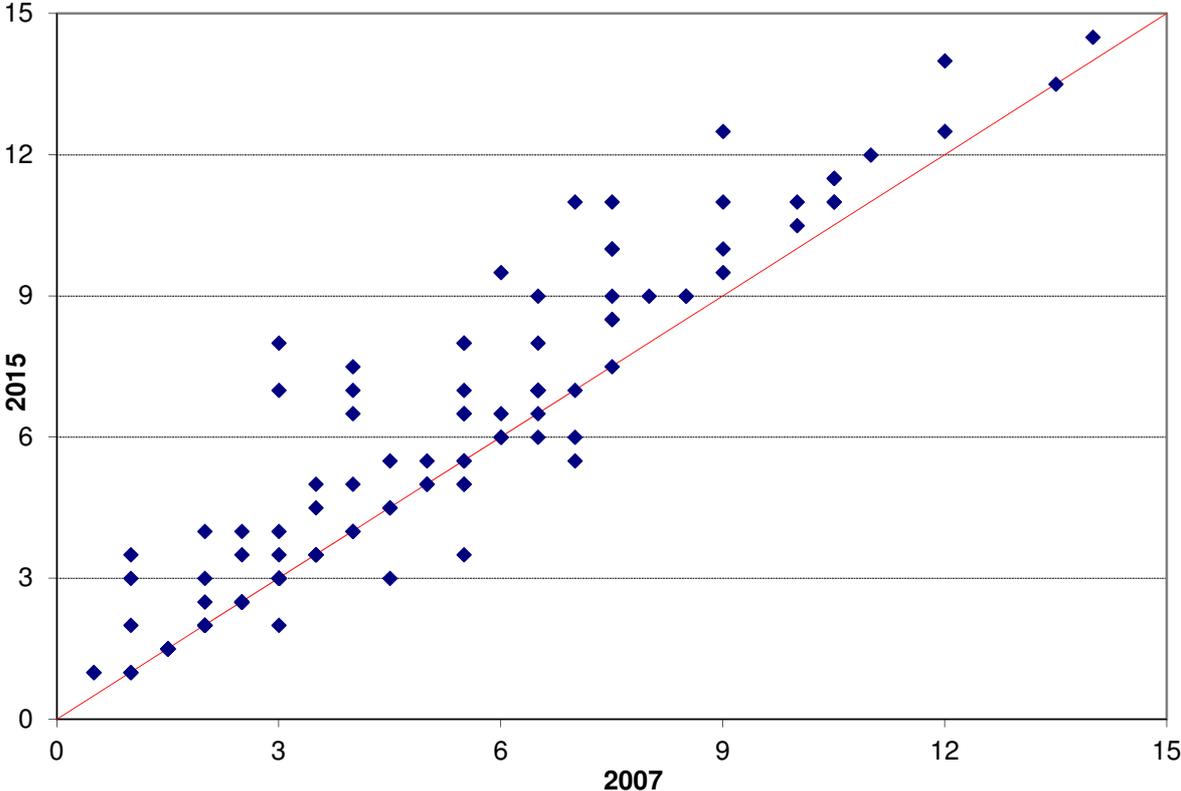
Yes, with an explicit account of the contribution of monetary policy in achieving the objectives = 1

**Figure 1. Comparison of Monetary Policy Transparency Index in 1998 and 2015**



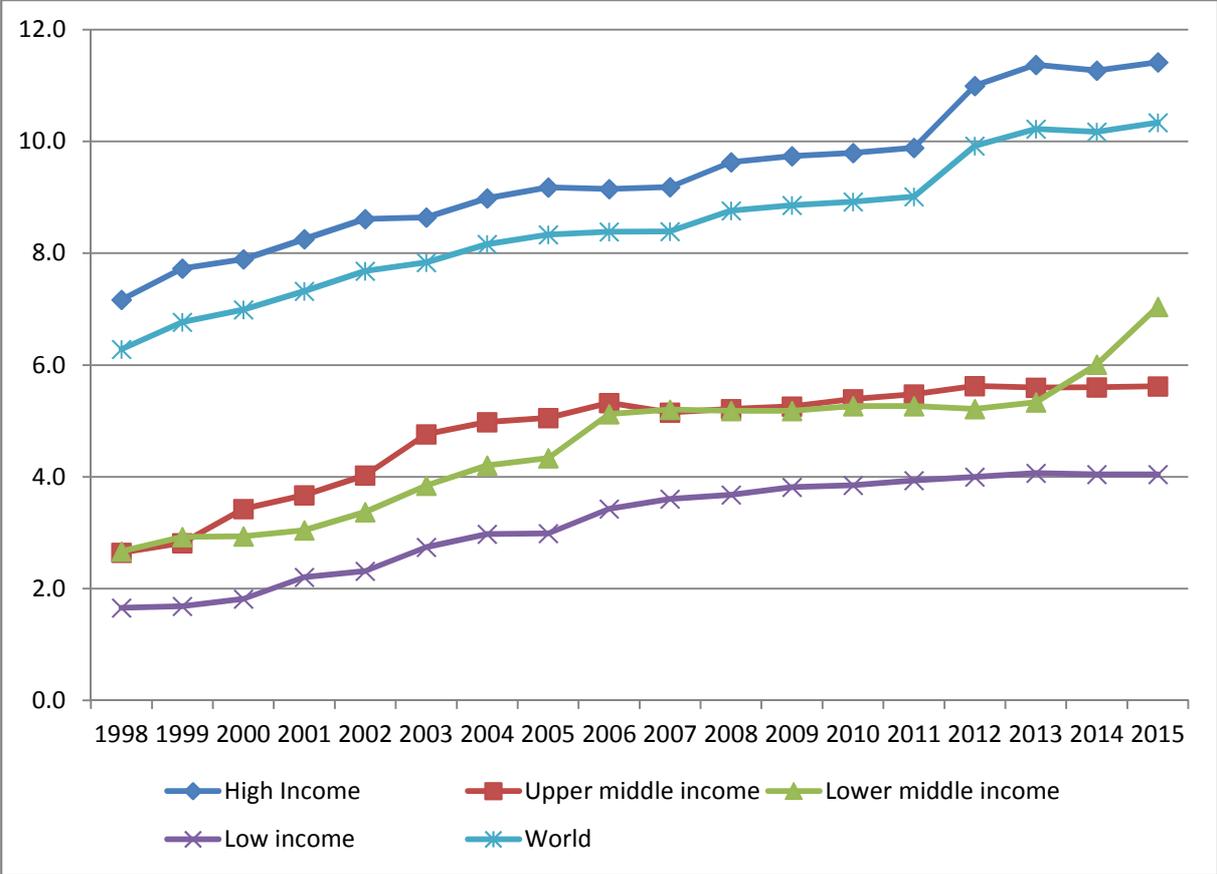
Note: The outlier country for which the transparency index declined from 1998 to 2015 is Mozambique.

**Figure 2. Comparison of Monetary Policy Transparency Index in 2007 and 2015**



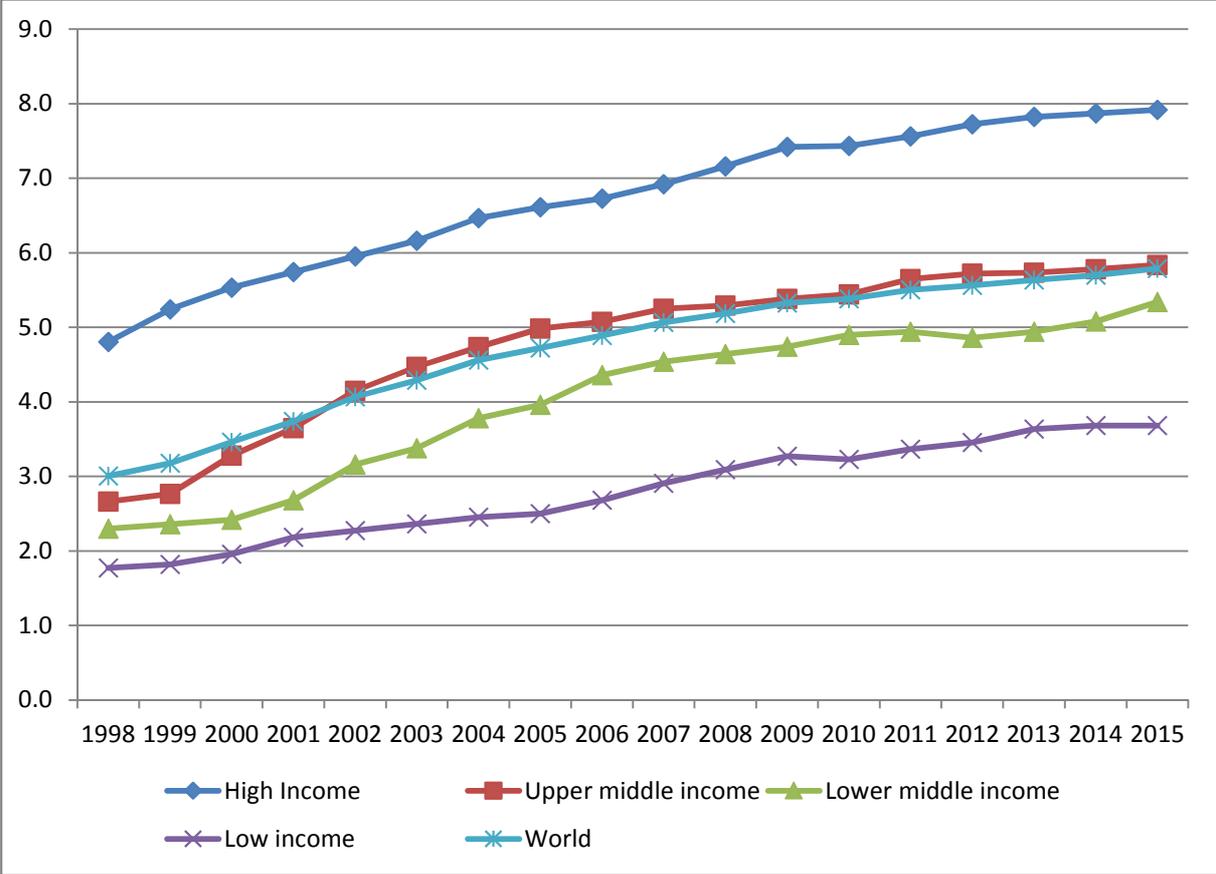
Note: The outlier countries for which the transparency index declined from 2007 to 2015 are Argentina, Barbados, Columbia, East Caribbean, Guatemala, Kenya, Nigeria and Mozambique.

**Figure 3. Trends in Monetary Policy Transparency by Level of Economic Development - GDP-Weighted Averages**



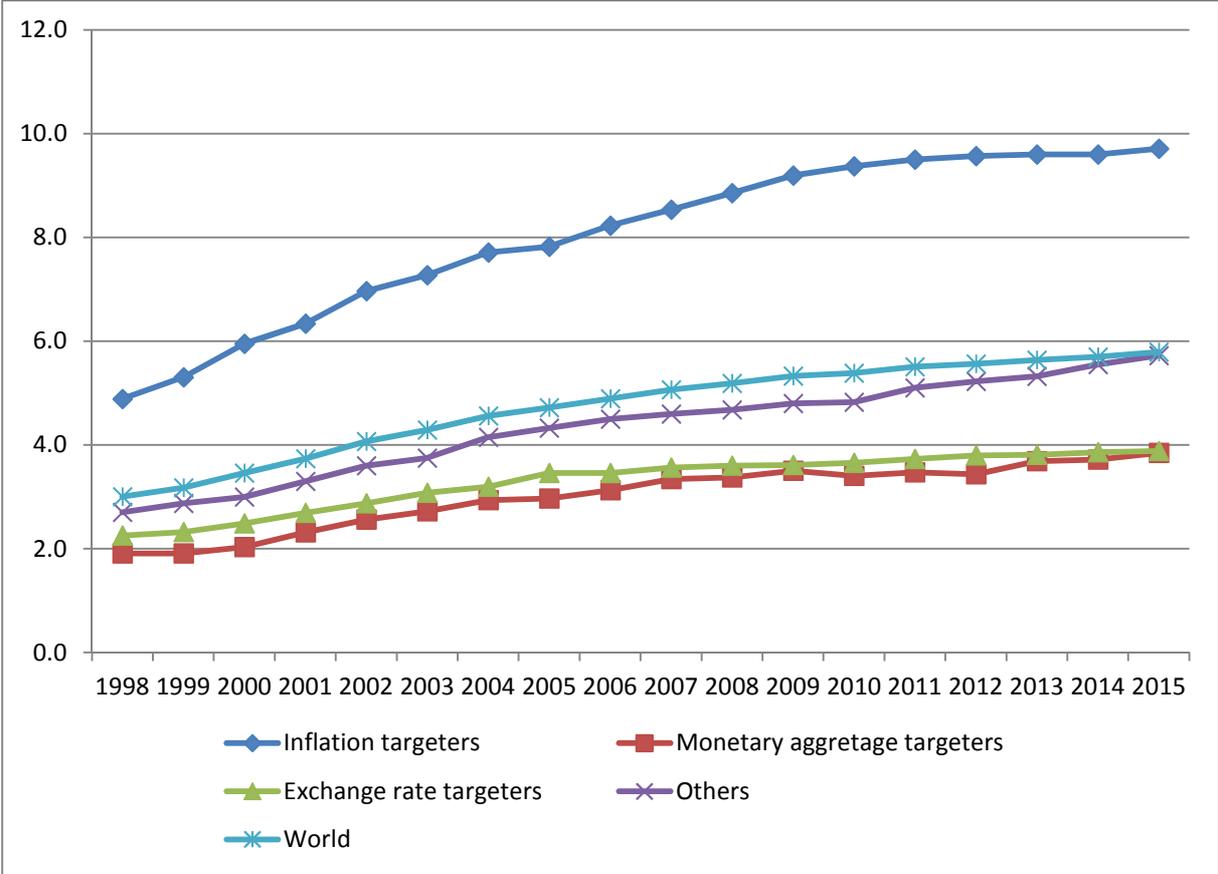
Average transparency index weighted by GDP in US dollars at market prices in 2006 for the entire sample (World) and for each World Bank income classification (for fiscal year 2016). GDP data is taken from *World Development Indicators* of the World Bank. Countries for which this data was not available (Angola, Aruba, Bermuda, Cayman Islands, Cuba, Curaçao, Iraq and Yemen) are excluded.

**Figure 3b. Trends in Monetary Policy Transparency by Level of Economic Development - Unweighted Averages**



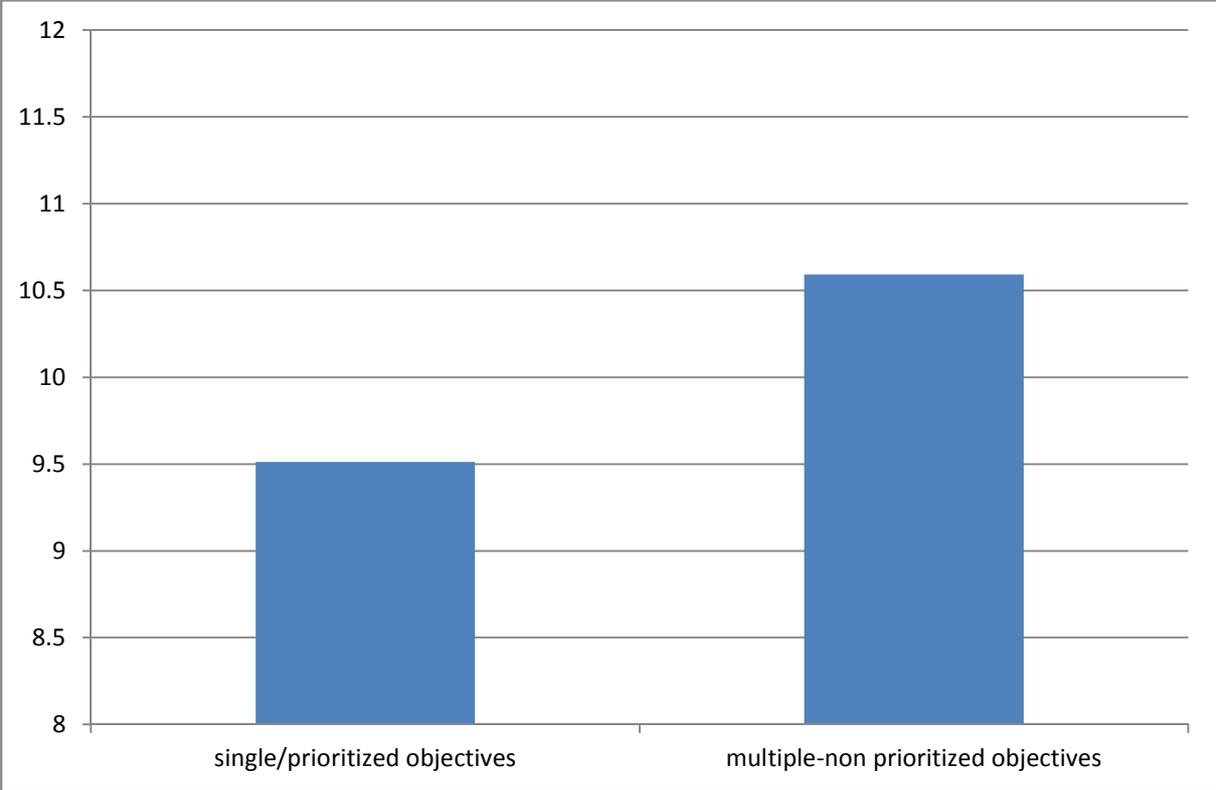
World Bank income classification (for fiscal year 2016) was used.

**Figure 4. Transparency trends by monetary policy framework**



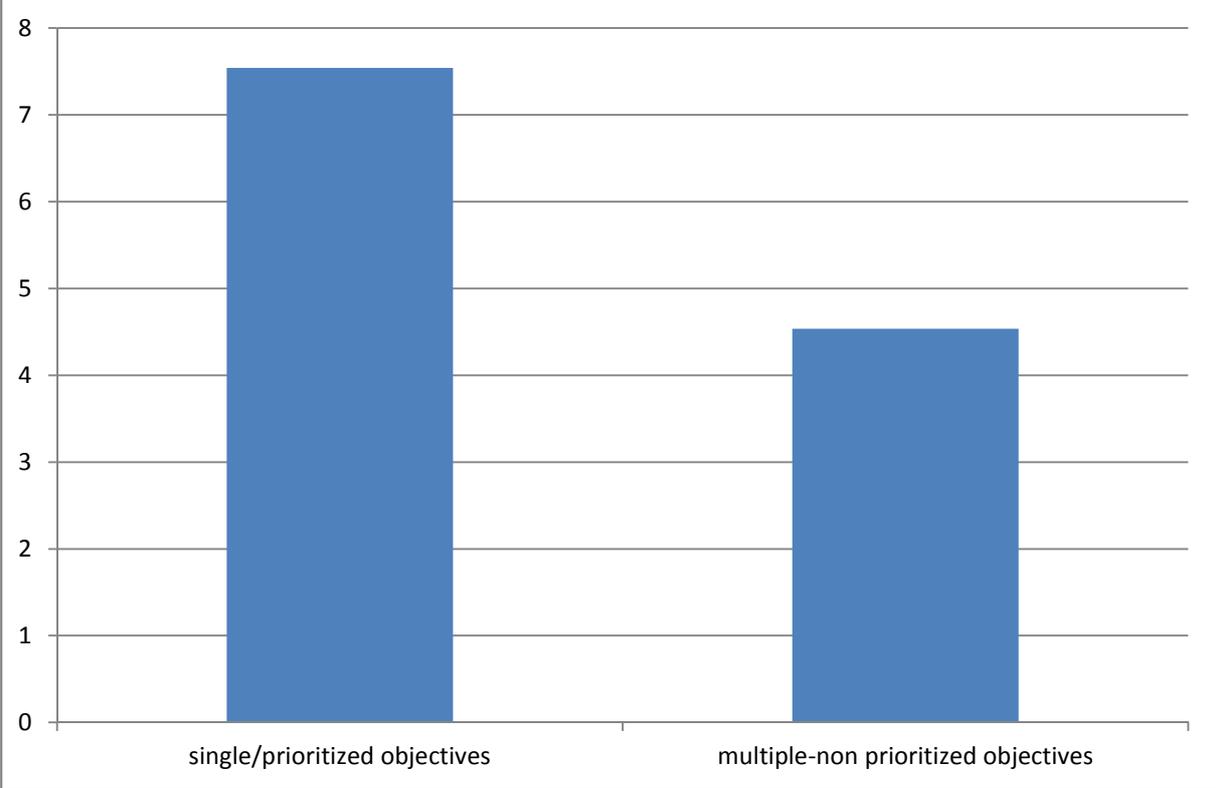
Note: Unweighted average of monetary policy transparency; 2014-IMF-de facto classification is used.

**Figure 5. Comparison of transparency of central banks having single/prioritized objective vs multiple & non-prioritized objectives (2015, GDP-weighted)**



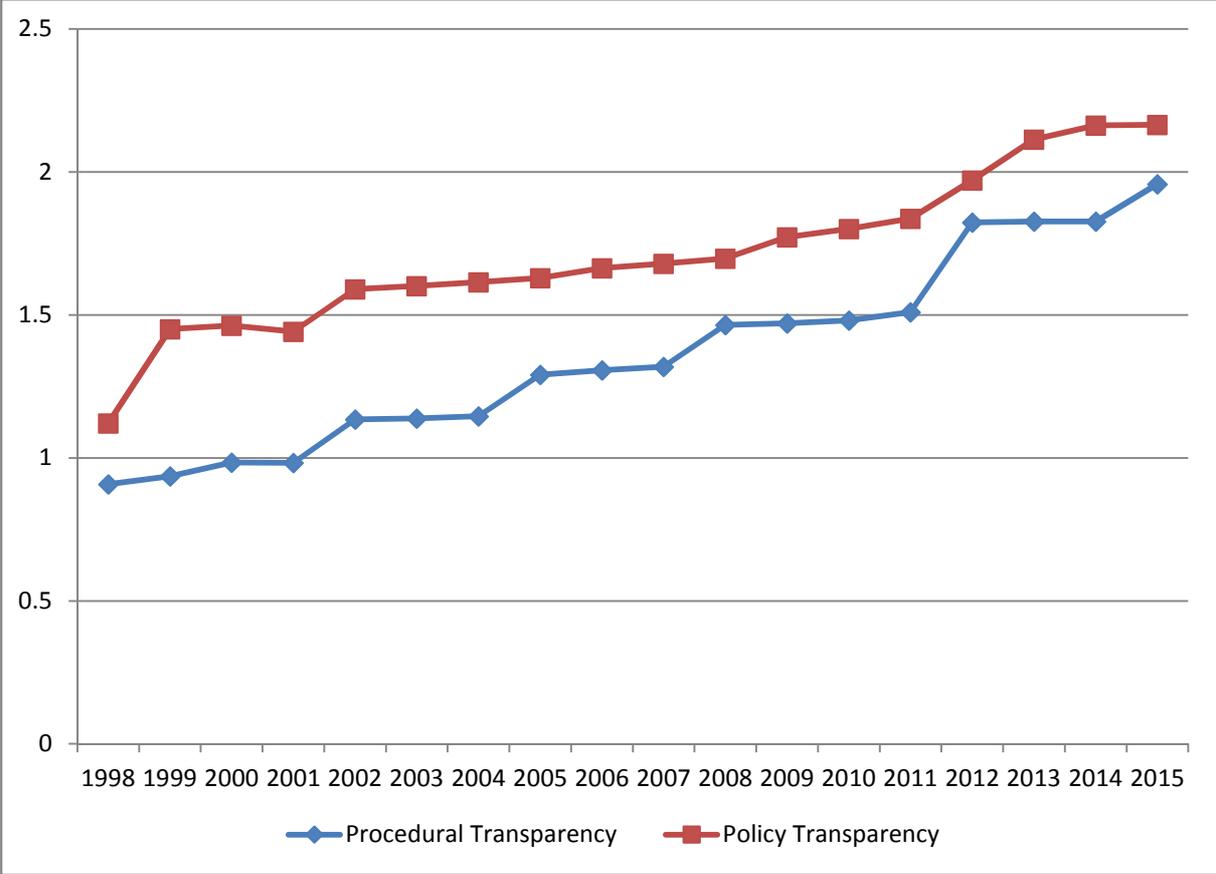
Note: Classification of central banks according to their objectives are done following Dincer and Eichengreen (2016). Fixed weights of 2006 US \$ GDP shares of the countries in their category is used. Transparency score has adjusted for single/prioritized central banks by subtracting 0.5 to account for the advantage from criterion 1a.

**Figure 5b. Comparison of transparency of central banks having single/prioritized objective vs multiple & non-prioritized objectives (2015, unweighted)**



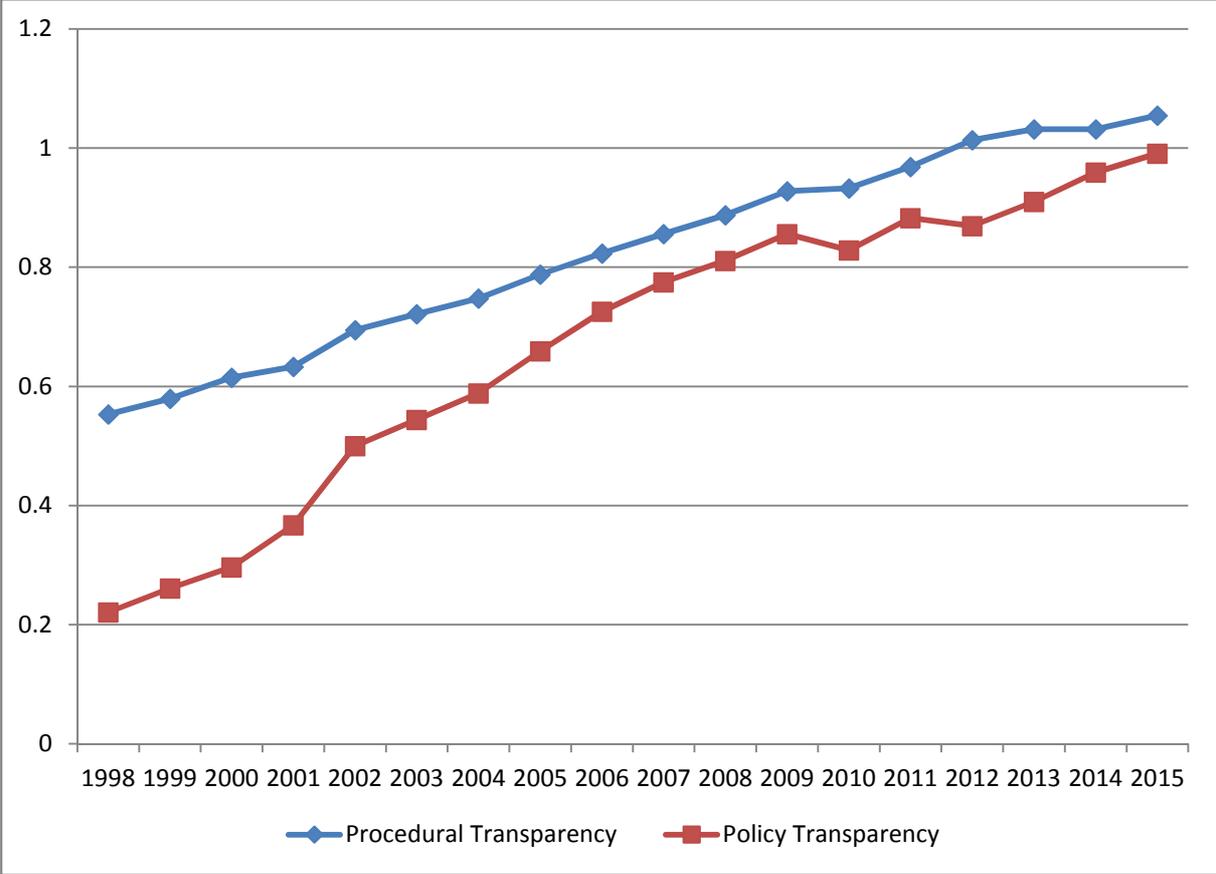
Note: Classification of central banks according to their objectives are done following Dincer and Eichengreen (2016). Transparency score has adjusted for single/prioritized central banks by subtracting 0.5 to account for the advantage from criterion 1a.

**Figure 6. Comparison of Policy Transparency and Procedural Transparency – GDP-Weighted Averages**

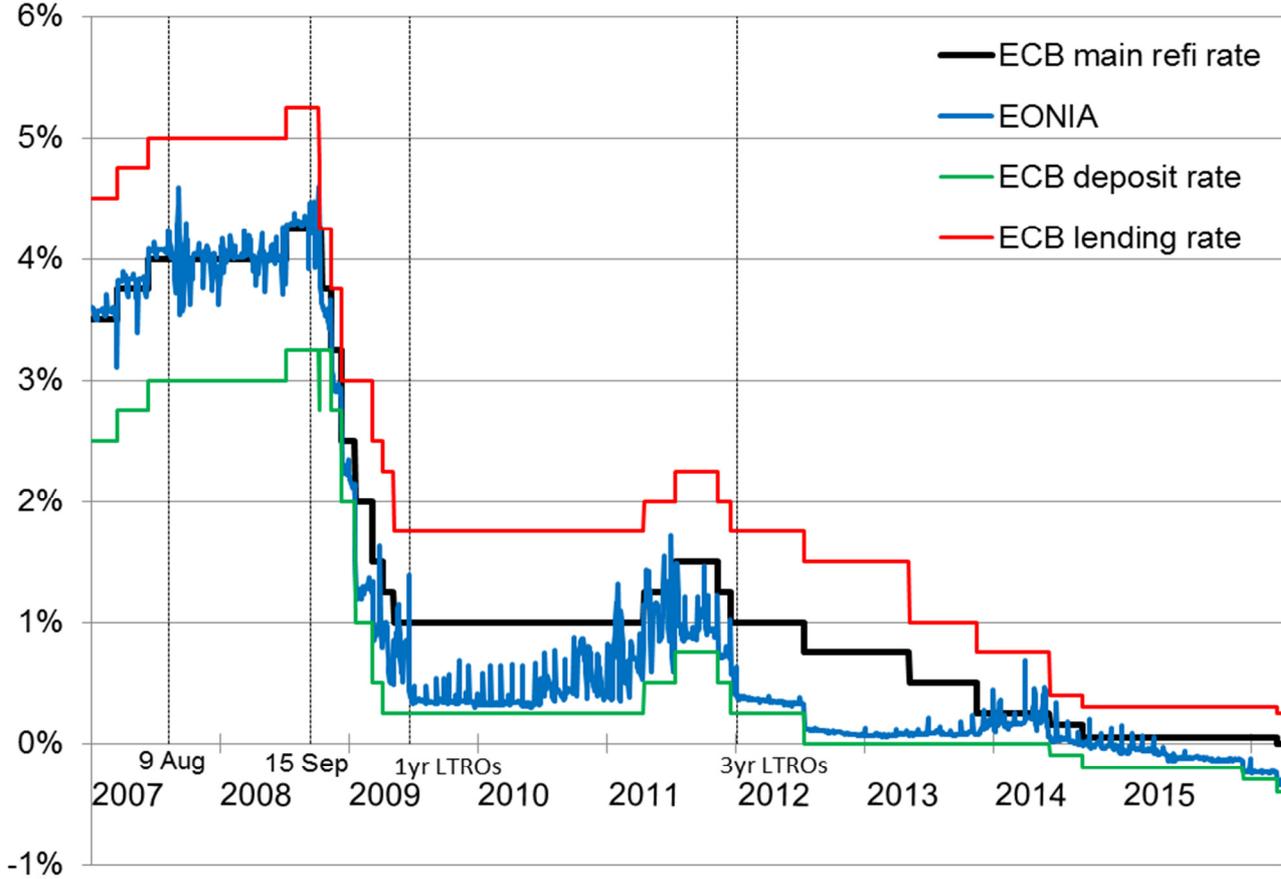


Note: 2006 shares of GDP in US\$ of the countries in world GDP (sum of GDP of the countries in our sample) is used as the weights.

**Figure 6b. Comparison of Policy Transparency and Procedural Transparency - Unweighted Average**



**Figure 7. Eurozone money market since financial crisis**



Notes: EONIA and ECB main refinancing rate, deposit rate and lending rate, 02-01-2007 - 01-04-2016.  
 Source: ECB

**Table 1. Monetary Policy Transparency Index and Its Components in 2015 for the top 5 countries**

|               | Total | 1a  | 1b | 1c  | 2a  | 2b | 2c | 3a | 3b | 3c  | 4a | 4b  | 4c  | 5a | 5b  | 5c  |
|---------------|-------|-----|----|-----|-----|----|----|----|----|-----|----|-----|-----|----|-----|-----|
| Sweden        | 14.5  | 1   | 1  | 1   | 0.5 | 1  | 1  | 1  | 1  | 1   | 1  | 1   | 1   | 1  | 1   | 1   |
| Czech         | 14    | 1   | 1  | 1   | 0.5 | 1  | 1  | 1  | 1  | 0.5 | 1  | 1   | 1   | 1  | 1   | 1   |
| New Zealand   | 13.5  | 1   | 1  | 1   | 0.5 | 1  | 1  | 1  | 1  | 1   | 1  | 1   | 1   | 1  | 0.5 | 0.5 |
| UK            | 12.5  | 1   | 1  | 1   | 0.5 | 1  | 1  | 1  | 1  | 0.5 | 1  | 0.5 | 0.5 | 1  | 1   | 0.5 |
| United States | 12.5  | 0.5 | 1  | 0.5 | 1   | 1  | 1  | 1  | 1  | 1   | 1  | 1   | 1   | 1  | 0   | 0.5 |

**Table 2. Comparison of transparency scores with single/prioritized and multiple/unprioritized objectives for inflation targeting and non-inflation targeting countries in 2015**

|                               | Single/Prioritized Objectives | Multiple/Unprioritized Objectives | p-value of t-test |
|-------------------------------|-------------------------------|-----------------------------------|-------------------|
| Inflation Targeting Countries | 9.2                           | 9.7                               | 0.6904            |
| Others                        | 4.8                           | 4.0                               | 0.1368            |

Note: 2014-IMF-de facto classification is used. Transparency score has adjusted for single/prioritized central banks by subtracting 0.5 to account for the advantage from 1a

**Table 3. Number of countries with specific types of policy and procedural transparency**

|                                          | 1998 | 2006 | 2015 |
|------------------------------------------|------|------|------|
| Explicit monetary policy strategy        | 53   | 74   | 84   |
| Comprehensive, timely minutes            | 2    | 10   | 18   |
| Non-attributed or delayed voting records | 4    | 5    | 10   |
| Prompt individual voting records         | 3    | 4    | 6    |
| Prompt announcement policy adjustments   | 16   | 52   | 59   |
| Always prompt policy explanation         | 3    | 11   | 26   |
| Qualitative forward guidance             | 0    | 3    | 10   |
| Quantitative forward guidance            | 0    | 1    | 5    |