Actual versus Perceived Transparency:
The Case of the European Central Bank*

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Abstract

Central banks have become more and more transparent about their monetary policy making process. In the central bank transparency literature the distinction between actual and perceived transparency is often lacking. However, as perceptions are crucial for the actions of economic agents this distinction matters. We investigate the mismatch between actual and perceived transparency and its relevance by analyzing data of a Dutch household survey on the transparency of the European Central Bank (ECB). A discrepancy between actual and perceived transparency exists because of incomplete and incorrect transparency knowledge and other (psychological) factors. We find that respondents with relatively high transparency perceptions are more likely to have more trust in the ECB and better aligned inflation perceptions and expectations. Therefore, it might be beneficial for a central bank to increase transparency perceptions, either by improving its actual disclosure practices or by focusing on its transparency strengths in its communication policy.

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1 Introduction

A worldwide trend among central banks is the increasing degree of transparency about their monetary policy making process. Central bank transparency is used as an instrument to keep independent central banks accountable for their actions. In addition, central banks use transparency as a tool to achieve their policy goals. Transparency and day-to-day communication affect expectations that are relevant for the financial decisions of households and financial experts (e.g. wage claims and consumption decisions). In addition, through improved credibility more transparency may lead to better anchored inflation expectations. This might make long-term interest rates and inflation more stable - which would result in more efficient investment and pricing decisions of firms - and easier to predict.

Van der Cruijsen and Eijffinger (2007) and Blinder et al. (2008) give thorough up-to-date overviews of the numerous studies on central bank transparency and day-to-day communication. It turns out that the distinction between *actual* and *perceived* transparency is seldom made in the central bank transparency literature. Some first empirical proof of the existence of a discrepancy between these two measures of transparency is given by De Haan et al. (2005). We show that there are two reasons for a disparity between actual and perceived transparency. First, knowledge about the actual transparency practice of central banks might be incomplete or incorrect. If this would be the only reason for a mismatch between actual and perceived transparency then it may be resolved relatively easily by improving the central bank's communication. However, psychological factors (e.g. belief perseverance, sampling memories) are complicating the link between transparency knowledge and perceptions and are not so simply resolved.

The main contribution of our paper is that it provides more insight into perceptions of central bank transparency. We contribute in several ways to the transparency literature. First, we use psychological insights to explain a potential mismatch between actual and perceived central bank transparency. Second, by holding a questionnaire among the CentERpanel, which includes over 2000 Dutch households, we have collected micro data on people's knowledge and perceptions of the transparency of the European Central Bank (ECB). We use this data to get more insight into the central bank transparency knowledge of the public at large and its determinants. In addition, we investigate to what extent knowledge about the ECB's monetary policy transparency is relevant for people's transparency perceptions and what role other factors might play. Furthermore, we test the relevance of transparency perceptions from an economic viewpoint empirically. Our documentation and analysis of households' perceptions of the ECB's transparency is especially useful for the ECB, but potentially for other central banks too. It could help them to assess and improve their communication strategy.

Figure I provides a visual summary of the expected causes and effects of perceived central bank transparency, which we analyze in this paper. Starting with the determinants of transparency perceptions, we show that knowledge about the actual disclosure practices of the central bank is likely to influence transparency perceptions. In addition, other (psychological) factors might be relevant for the formation of transparency perceptions. Thereafter, we move to the lower part of Figure I and analyze the transmission mechanism by which transparency perceptions might affect important economic variables, such as the inflation gap (the difference between perceived and actual inflation) and the credibility gap (the difference between expected and targeted inflation).[1]   More

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[1] We define trust as "...one's belief and expectation about the likelihood of having a desirable action

specific this transmission mechanism works as follows. Higher perceived central bank transparency is one of the possible ways in which a central bank might improve its credibility. As a result of the higher trust in its monetary policy, inflation perceptions might be well aligned and inflation expectations might be in line with the inflation goal of the central bank. As Ranyard et al. (2008) point out a better understanding of the formation of inflation perceptions and expectations is desirable.

[insert Figure I here]

We start the remainder of this paper by theoretically explaining Figure I (Section 2). We clarify in more detail why a disparity between actual and perceived central bank transparency might exist and why it is relevant for a central bank to get more insight into transparency perceptions. Next, we test empirically for the hypothesized relationships by reading down Figure I from top to bottom. In Section 3 we discuss the data and survey methodology. Thereafter, in Section 4, we first provide more insight into the self-assessed and actual knowledge about the ECB's transparency (the first box in Figure I: "Knowledge of central bank transparency") before looking into households' transparency perceptions in Section 5 (the second box in Figure I: "Perception of central bank transparency"). Then, in Section 6, we analyze the relevance of investigating transparency perceptions by examining its relationship with the inflation gap and credibility gap via trust (boxes "trust" and "inflation gap and credibility gap" in Figure I). Last, we conclude (Section 7).

2   Theory

If one assumes that agents are fully rational, their transparency perceptions should be in line with actual transparency of the central bank. But in reality agents might not know everything and processing information "correctly". Psychological insights are helpful to get a feeling why such a mismatch might exist.

". . . Because psychology systematically explores human judgment, behavior and well-being, it can teach us important facts of how humans differ from the way they are traditionally described by economists. . . " (Rabin, 1998: 11)

In the literature on central bank transparency it is often assumed that by giving more insight into the central bank's monetary policy the degree of *actual* central bank transparency is enhanced. Throughout this paper we define the actual transparency of a central bank as the degree to which it provides information about its monetary policy making process. One way in which actual transparency has been measured in the literature is by constructing indices based on disclosure practices of central banks, like whether they are open about their inflation goal and policy decisions. Several indices exist, such as the ones developed by Fry et al. (2000) and Eijffinger and Geraats (2006). It is however difficult to measure transparency because there is always some judgement involved in the construction of transparency indices. This concerns the inclusion as well as the weighing of various aspects of monetary policy making about which the central bank could be transparent. In this paper we show that even when abstaining from problems in measuring actual central bank transparency, transparency *perceptions* might not be in line with the actual degree of central bank transparency.

performed by the trustee." (Das and Teng, 1998, p.494). Here the trustee is the European Central Bank. We use this definition of trust throughout the paper.

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2.1 Reasons for misaligned transparency perceptions

A mismatch between actual and perceived transparency may exist for two reasons: (1) psychological effects and (2) lack of knowledge or even incorrect central bank transparency knowledge.

2.1.1 Psychological reasons

Psychological factors may play a role explaining misaligned transparency perceptions and why perceptions differ between people.

First, a psychological finding is that people often disregard new information that is not in line with their previous beliefs (Rabin, 1998, p.26). Applied to the topic discussed here this means that if someone beliefs that the central bank is ambiguous about its monetary policy making practice then he or she may not pay sufficient attention to evidence pointing in the opposite direction. Information that confirms their prior belief is noticed more, so people are slow to adapt their beliefs.

Second, people might even suffer from what is called in psychology a *confirmation bias*: new information is interpreted in such a way that it confirms prior beliefs. The resulting belief perseverance might worsen a central bank's possibility to improve its credibility through becoming more transparent. It will be difficult to teach people something new that is not in line with their previous beliefs. Although the central bank provides the same information to everyone, economic agents interpret information differently because of their dissimilar views on the environment (Babcock and Loewenstein, 1997). Heuristics make it easier to perform complex tasks but they may lead people to make large mistakes (Tversky and Kahneman, 1974).

Third, *sampling memories* may be relevant. As Camerer (2003) puts it:

"...much evidence suggests that human perception deviates systematically from the camera benchmark and memory deviates from the computer benchmark." (Camerer, 2003: 595).

Although it is logical to use your memory to form perceptions, because memories are a sample of real life experience, it will most likely lead to "incorrect" perceptions. People give a disproportional weight to evidence that they can remember the best and the liveliest, even when better sources of information are available (e.g. Tversky and Kahneman 1973). How information is processed is likely to depend on the stock of old information that people possess. Exciting newspapers headings like "The central bank mumbles" are relatively easily retrieved from memory. In addition, media coverage is not random; unexpected steps of the central bank get more attention and there is a bias towards discussing transparency weaknesses. De Haan et al. (2004) find that information given by the central bank is distorted by the media. By comparing the Financial Times and the Frankfurter Allgemeine Zeitung they show that different newspapers give different signals based on the same information of the central bank. The public may base its opinion on this kind of media information as it can be obtained with little effort, whereas searching central bank publications and websites for information might be too cumbersome. Soroka (2006) found an asymmetry of media reporting economic developments (inflation and unemployment). The media emphasizes detrimental economic changes and this affects expectations. The influence of the media and by word of mouth is called *social amplification* (Pidgeon et al., 2003). Berger et al. (2006) have analyzed the press reporting after ECB press conferences on monetary policy decisions. They also find an asymmetry: critical views get relatively more attention by the press. It turns out that monetary policy decisions that are

poorly understood get more space in the newspapers. Therefore clear communication is important. The media may help transmitting the ECB's message to the public in a clear manner.

Last, *individual characteristics* may affect transparency perceptions. From psychological research (e.g. Babcock and Loewenstein, 1997 and Malmendier and Tate, 2005) we know that people are *overconfident* in what they believe and this overconfidence is pervasive. For example, individuals might get overconfident about their belief that the central bank is not transparent, which makes it more difficult to change these perceptions. As persons vary in their degree of confidence, the ease by which perceptions can be changed differs too. Another example of an individual characteristic that might be relevant is the extent to which one is *optimistic*. Intuitively one would think that those people that are relatively optimistic will have a more positive view on the degree to which the central bank is transparent.

2.1.2 Lack of transparency knowledge

The second factor that could cause a discrepancy between actual and perceived central bank transparency is the presence of lack of or even incorrect knowledge about the transparency practices of the central bank. For two reasons one could argue that misaligned transparency perceptions are not so relevant. First, by learning people will eventually form the correct perceptions. So the issue of misaligned perceptions is only a temporary problem. Second, central banks might be especially interested in economic experts (e.g. wage negotiators), as they might have a relatively strong influence on economic outcomes, and they are more likely to get things right.

Let us first take a look at learning. Learning influences the degree to which the central bank is perceived to be transparent. People can learn in many different ways, which may lead to diverse perceptions. But learning cannot fully evade the effect of psychological factors on the formation of transparency perceptions because people are often unaware of the psychological biases they suffer from (e.g. Babcock and Loewenstein, 1997). For the central bank this might complicate getting perceptions in line with their actual transparency practice because it is not only a matter of raising transparency knowledge. The fact that people process information in different ways makes it even more difficult to construct a beneficial communication policy.

Economic experts work regularly with economic matters, so they are expected to learn faster as they would benefit more from it. Some believe that although the general public might have a low degree of knowledge about the central bank's monetary policy and may possess misaligned transparency perceptions, this does not hold for economic experts. As economic experts (e.g. wage setters, economic advisors and journalists) might be making and influencing a large part of economic decisions that are made, the central bank might have a special interest in aligning the experts' transparency perceptions with the actual practice of the central bank.

The idea that experts are not prone to misalignments can be dismissed based on psychological findings. Although learning might improve perceptions, psychological evidence shows that even experts suffer from biases and their beliefs might depart from reality (e.g. Babcock et al., 1996). It might be that for experts, who are confronted with a lot of information, it is even easier to, unconsciously, distill information that is in line with their previous beliefs. And it is more likely that people are overconfident when they regard themselves experts in a particular field. By combining some of the findings of De Haan et al. (2005), we can illustrate that expertise does not solve the transparency mismatch (Table I). Financial experts were asked to rank central banks according to

their level of transparency. The US Fed was perceived to be much more transparent than the Bank of England, while a transparency measure based on the actual disclosure practice of central banks demonstrates that the Bank of England was the most transparent one.

[insert Table I here]

2.2 Implications of misaligned transparency perceptions

Despite the above, the distinction between actual and perceived transparency has been absent in the central bank transparency literature for a long time (as is shown by van der Cruijsen and Eijffinger, 2007). Recently, Geraats (2007) theoretically showed that it is important to make a distinction between these two forms of transparency and that the desirability of transparency depends on which concept is being used. Actual transparency reduces the uncertainty faced by the private sector by reducing the noise of communication and is therefore desirable. In contrast, perceived transparency might make markets more sensitive to information and is therefore not always desirable. It is shown that although clarity about the inflation target is desirable, this does not hold for the output gap target and supply shocks.

Transparency perceptions are important as they might affect the economy. When many people perceive the central bank as transparent, this might help the central banks to become or stay credible. This trust in the monetary policy of the central bank might, for example, result in inflation expectations that are well anchored. Note that inflation expectations are important for current decisions with future consequences, such as saving and borrowing. However, psychological factors might disturb the effect of transparency perceptions on inflation perceptions and inflation expectations via trust.

First, whether people have *trust* in the central bank is likely to depend on many psychological factors, like belief perseverance and sampling memories. In addition, individual circumstances, like unemployment, have an impact on trust in the central bank (Hudson, 2006). Fischer and Hahn (2008) have researched the determinants of trust in the ECB. It turns out that the extent to which the ECB achieves its price stability objective is crucial for the amount of trust people have in the ECB. But other factors are also relevant for the level of trust. National income and spending on unemployment are positively related to trust, whereas the level of active labor market policies is negatively related to trust in the ECB.

Second, *inflation perceptions* are affected by psychological factors. After the introduction of the Euro people perceived inflation as being much higher than it actually was and even when actual inflation reached lower levels it was still perceived as being high for a long time. All kinds of psychological processes seems to have played a role (for an overview see Ranyard et al., 2008). For example, Ehrmann (2006) finds that the complexity of the conversion rate (how high prices in euros look compared to prices in the old national currency) was a relevant factor for the gap between inflation perceptions and actual inflation. In countries with a relatively easy conversion rate this gap was smaller and more quickly reduced. Shiller (1997) points out that the public at large worries about different effects of inflation as compared to economists. The public concentrates on the detrimental effects associated with higher inflation and forgets that their nominal income will increase as well. If people sample memories, price increases are more easily retrieved from memory because they made a bigger impression than price decreases. This will lead to incorrect perceptions of inflation. Incorrect

inflation perceptions are also present when people give a disproportional weight to the products that they buy often. Unconsciously, people may use this information as a confirmation of their beliefs and not search further for more reliable information. Another good example of a potentially important psychological factor is the so-called *false contribution error*. The idea is that when inflation is low people will feel it is their own achievement (e.g. by keeping wages low), whereas when inflation is high they sense it is due to the central bank's policy. The false contribution error clouds the perceptions the public has of the central bank and its achievements.

Third, *expectations of future inflation* are most likely also influenced by most of the psychological factors mentioned before. For example, price rises are more likely to be retrievable from memory and therefore likely to bias inflation expectations upward. For a more complete and detailed overview of the progress that has been made in the understanding of the psychology of inflation we refer to Ranyard et al. (2008).

To summarize, transparency perceptions might affect inflation perceptions and expectations in a desirable way through their impact on trust in the central bank, but other (psychological) factors might cloud this effect. A high degree of actual transparency is likely to be helpful to create high transparency perceptions, but it is not necessarily the only way. If transparency perceptions were to be higher than the actual transparency practice of a central bank (e.g. because of incorrect transparency knowledge or psychological factors), the central bank might not be keen to change matters. Possible economic gains from misaligned perceptions (e.g. better aligned inflation expectations, which increase the central bank's effectiveness) might hold the central bank back from clarifying matters. The central bank might face an incentive to not be too transparent about its transparency practices. Because psychological factors keep on playing a role, a mismatch between actual and perceived transparency need not be resolved as time passes by.

3   Data and survey methodology

To test whether a gap between actual and perceived transparency exists in practice and whether it matters we have performed an internet-based survey through the CentERpanel, which is a more or less continuous household panel. This panel is run by CentERdata, which is a research institute belonging to the CentER group at Tilburg University. Our questionnaire was sent out to 2534 members of the CentERpanel (16 years and older) from Friday afternoon the 1st of June 2007 until Tuesday night the 5th of June 2007. The response rate is 71%, which corresponds to 1800 people. Compared to the response rates which are common in other forms of surveys (e.g. Baruch, 1999 and Cook et al., 2000), the response rate to this continuous internet-based survey is very high. The questions in the survey, which were pre-tested on consistent comprehensiveness by CentERdata, cover various matters on the ECB's transparency. In this paper we focus on the questions on the knowledge and perceptions of the ECB's transparency and on the possible economic effects of transparency perceptions. More information on the survey data is in Appendix A.

In the next section (Section 4) we provide more insight into people's knowledge of the transparency of the ECB. Thereafter, in Section 5, we analyze to what extent knowledge of the ECB's transparency is relevant for households' transparency perceptions and which role other (psychological) factors play. In the last empirical section, Section 6, we use survey participants' responses to questions on trust,

inflation expectations and inflation perceptions to discuss the relevance of misaligned transparency perceptions.

4 Knowledge of central bank transparency

We have used several ways to measure Dutch households' knowledge about the ECB's transparency. First, we asked households to make a self-assessment of their transparency knowledge (Section 4.1). Second, we measure the depth and correctness of respondents' transparency knowledge by asking questions about the actual transparency practice of the ECB (Section 4.2). As we mention in the theoretical section, the mismatch between the actual and perceived transparency by the main economic actors might be of special interest to the central bank. As poor transparency knowledge is partly responsible for this mismatch, we look at the transparency knowledge of "economic experts" into more detail (Section 4.3).

4.1 Self-assessed transparency knowledge

Before asking questions about central bank transparency we checked the share of people who are aware of the existence of the ECB which turned out to be 67%. Actually more people are aware of the existence of the Dutch central bank: 9 out of 10 people.[2] Throughout the questionnaire people could respond "I don't know" to all the knowledge questions regarding the ECB such that guessing the correct answers is prevented and a clear picture of the lack of knowledge is achieved.[3]

We have asked people to judge their own knowledge on four aspects, which they ranked on a five point scale (from high to low assessed knowledge): 1) their own financial situation, 2) financial matters in general, 3) economic developments, and 4) the transparency of the ECB. Figure II provides an overview of the responses. Not surprisingly, as it is a more specialized topic, survey participants judge their knowledge of the ECB's transparency as being the worst.[4] The majority of respondents report to have bad or very bad transparency knowledge (32% and 19%), 30% give as answer "neutral", but there are some people who judge themselves as having a high knowledge (5%) or even a very high knowledge (1%). This self-assessment gives a first indication that one of the reasons for a mismatch between actual and perceived transparency, poor knowledge about transparency, is probably present.

[insert Figure II here]

4.2 Actual transparency knowledge

To analyze survey participants' *actual* knowledge of the ECB's transparency, we gave survey participants various questions about the ECB's transparency practice. As mentioned before, we define the actual transparency of a central bank as the degree to which it provides information about its monetary policy making process. To prevent guessing and to disentangle those persons that lack

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[2]Note that after this first question we gave the survey participants a definition of the ECB, monetary policy and transparency.

[3]Other factors that prevent guessing are the introductory text of this part of the questionnaire ("Next, we measure whether you have knowledge about this type of transparency and if so, how much.") and the fact that the questionnaire is filled in anonymously.

[4]Knowledge about the transparency of the ECB has the strongest, positive correlation with assessed knowledge about economic developments in general (0.54).

knowledge from those who have incorrect or correct knowledge, we added a separate "I don't know" response option in addition to the options "yes" and "no". The questions cover the various aspects of transparency as identified by Eijffinger and Geraats (2006) (abbreviated by EG) based on the transparency definitions of Geraats (2002). We use this broad measure of transparency to get a better feeling of what people do and do not know. For this purpose the weighing of the various subcomponents is not relevant.

Table II summarizes the responses to the transparency questions. The check mark (✓) indicates which answer is correct according to EG(2006) and provides information on were there is room for more transparency by the ECB. In the majority of cases there is no doubt about what is the correct answer is, as it refers to a fact, for example that the ECB provides economic forecasts. However, in some cases, regarding some aspects of the ECB's monetary policy transparency the indices are not sophisticated enough. We will discuss these cases later on.[5]

[insert Table II here]

4.2.1 Political transparency

This first aspect of transparency defined by Geraats (2002) is political transparency. It incorporates information disclosure on the central bank's goals: a formal statement of its target(s), how they are prioritized and quantified. Institutional arrangements like central bank independence raise political transparency because they reduce the pressure to deviate from these objectives.

According to the EG-index the ECB receives the maximum score for political transparency. The main objectives of the ECB are formally stated and prioritized: *"The primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2 of this Treaty."*.[6] Sustainable and non-inflationary growth and a high level of employment are part of these objectives. The Governing Council clarified in a press release on 8 May 2003 what is exactly meant by price stability, namely that the year-on-year increase in the Harmonized Index of Consumer Prices (HICP) for the euro area should be below, but close to 2% over the medium term.

On most questions about political transparency about half of the respondents believe they know the correct answer. The fact that the main goals of the ECB are laid down is known very well by this "I know"-group. When asked whether supporting the economy is the ECB's most important task, a lot of people incorrectly think this is indeed the case. When asked instead whether "price stability is the ECB's main goal" more people respond and of those respondents a big majority answers "yes". Only few people think they know whether price stability is quantified. Of these respondents 2/3 say the ECB's main goal is not quantified, while 1/3 say it is. EG(2006) argue that price stability is quantified. However, this is not so obvious. One could discuss the extent to which price stability is quantified. What is the exact meaning of "close to but below 2%"?

While seen as an important aspect of the monetary policy framework, only one third of the people know that the ECB can act independently. As independence is often regarded an important tool to

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[5]For a discussion of the transparency practices of other central banks, we refer to EG(2006) and Dincer and Eichengreen (2007).

[6]Protocol on the Statute of the European System of Central Banks and of the European Central Bank, Art. 2. This protocol is annexed to the Treaty establishing the European Community.

building up credibility any attempt to increase communication about it might be beneficial.

4.2.2 Economic transparency

Economic transparency considers the disclosure of knowledge about the economy which is used for monetary policy making: the economic data, policy models and internal forecasts (Geraats, 2002). The ECB provides a lot of economic information: economic data, its forecasts for inflation and output, and the economic models it uses. When compared to political transparency fewer respondents have knowledge about economic transparency. But of the ones that report to possess knowledge, about 80% correctly respond that the ECB provides economic information and forecasts. People are less sure about economic models. This is reflected both in a higher amount of "I don't know"-answers as well as a higher amount of incorrect answers.

4.2.3 Procedural transparency

The third aspect of transparency defined by Geraats (2002) is transparency about the procedures used to make monetary policy decisions. What is needed for procedural transparency is openness about the monetary policy strategy of the central bank, the publication of its voting records and minutes.

According to the ECB's monetary policy strategy there is an important role for (1) money and (2) a broadly based judgement of future price developments and risks to price stability at a Euro area level. Although the ECB has made its so-called "Two Pillar Strategy" strategy explicit in the Monthly Bulletin of January 1999, it is obvious that the survey respondents feel interest rate decisions are not made in such a clear fashion.[7] Actually this response is in line with reality, as it is difficult to know what weights these two pillars get, how these weights change over time and what these pillars exactly consist of. The unclear and changing weights may confuse people (De Haan et al., 2005: 16-25). Therefore the answer "no" may be judged to be correct.

Less people have knowledge about whether minutes and voting records are being published, but the ones that do have knowledge answer correctly that the ECB does not report what was said during the Governing Council meetings and what standpoint Council members had. Overall, a lot of the respondents lack knowledge on procedural transparency, an aspect of monetary policy making on which the ECB is relatively less transparent, both in comparison with other major central banks and in comparison with its own transparency on other aspects of monetary policy making (see EG2006).

4.2.4 Policy transparency

According to the definition of Geraats (2002), policy transparency is present when the central bank announces and explains its policy decisions immediately and when it indicates the future policy paths. The ECB announces its monetary policy decisions at a press conference which takes place immediately after the Governing Council meeting. The ECB's president then explains the decision that has been taken. The likely future policy path is not made explicit by the ECB. Most respondents

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[7]In 2003 the ECB evaluated its monetary policy strategy (see the ECB press release of 8 May 2003: "The ECB's monetary policy strategy"). It concluded that the two-pillar strategy worked well as a framework for internal analysis and for the debate within the Governing Council, but it functioned less well in external communication. As a result external communication was improved upon (e.g. by changing the structure and content of the introductory statement of the President at the press conference after monetary policy meetings).

lack knowledge about policy transparency (57-68%), especially about transparency about future policy preferences. There is not only lack of knowledge about policy transparency but incorrect knowledge as well. Unfortunately, of those survey participants thinking to have correct knowledge, 1 out of 3 give the incorrect answer.

4.2.5 Operational transparency

Operational transparency considers openness about how the ECB implements it monetary policy actions by being open about the control errors in realizing its operating instrument or the goals set, and by disclosing the macroeconomic disturbances that influence the transmission process from policy instruments to outcomes (Geraats, 2002).

Knowledge on this aspect of monetary policy making is very low (65-70%). Current macro-economic developments are analyzed in the ECB's Monthly Bulletin but a discussion of past forecast errors is absent. The latter is known by more people than the previous fact. Policy outcomes are discussed and evaluated in the Monthly Bulletin, but what role monetary policy has played is not made explicit. It is debatable whether people should indeed answer "yes" or "no" to the question "Does the ECB provide public information about the extent to which it achieved her goals?".

To summarize, we find both a lack of ECB transparency knowledge as well as incorrect knowledge. Unfortunately, we cannot compare our results to a benchmark because, to our knowledge, there is no other research on households' central bank transparency knowledge. The general picture of low knowledge about transparency suggests that monetary policy is a very difficult to explain field of expertise and does not interest everybody.[8] Our finding of a low degree of transparency knowledge is probably not ECB-specific but generic: holding for all central banks. However, findings on the relative degree of knowledge on various subaspects of transparency are likely to differ between central banks, because they depend on the specific communication strategy and monetary policy framework at practice. Next, before analyzing to what extent transparency knowledge explains transparency perceptions, we first investigate why transparency knowledge differs among respondents.

4.2.6 Explaining actual transparency knowledge

Actual transparency knowledge is measured by constructing knowledge indices (KI's). For each aspect of transparency we have constructed a KI. The higher the number of correct answers about a specific aspect of transparency, the higher the specific KI. A detailed description of the design of these KI's is presented in Appendix A, Table AII and AIII. The total KI ranges between 0 and 15. Based on a sample of 1519 persons we try to explain the degree of transparency knowledge (Table III). We include a reasonable set of observed household characteristics as explanatory variables. However, it is impossible to control for unobserved household characteristics because we have no repeated observations. Appendix A contains a description of all the explanatory variables used throughout the paper. Note that multicollinearity is not a problem.

[insert Table III here]

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[8]Note that this might be so for good reasons. Transparency information might not be significant to everybody.

Transparency knowledge depends on personal characteristics. For example, it is better for those respondents who are relatively old, earning a relatively high income, and belonging to a higher social class. The explanation for this finding could be that all three factors are related to respondents' general degree of knowledge. Not surprisingly, those respondents that knew of the existence of the ECB before receiving a definition of the ECB report higher transparency knowledge. Economic expertise is relevant in explaining actual transparency knowledge. Actual transparency knowledge is higher for those who are confronted with economic, monetary and financial matters during working hours, although this need not be on a daily basis, and for those people assessing their economic knowledge to be relatively high. Furthermore, it is found that those respondents who judge their transparency knowledge to be higher do have better transparency knowledge in practice.[9] However data inspection reveals that even those respondents who assess their transparency knowledge to be very good, lack or even have incorrect actual transparency knowledge.

The results are robust to a slight change in the manner in which actual transparency is measured. Column 2 of Table III shows the results based on an alternative KI, which is less stringent regarding those aspects of transparency for which the right answer is ambiguous.

Next, we provide more insight into the effect of economic "expertise" on transparency knowledge.

4.3 Transparency knowledge and learning

In the theoretical section (Section 2) we argue that even economic experts might suffer from lacking or even incorrect knowledge and psychological factors resulting in a mismatch between their transparency perceptions and actual transparency. To find empirical support, we analyze the survey results in more detail. We test both the depth and correctness of the transparency knowledge of the economic "experts" among the people in the household survey. Two expert-definitions are used. According to the first definition respondents are economic experts if they consider their economic knowledge to be very good. Based on the second definition survey participants are economic experts when they deal with economic, financial or monetary matters on a daily basis.[10]

4.3.1 Economic expertise based on self-assessment

To get more of a feeling for the relevance of learning, Table IV shows an overview of the actual transparency knowledge of people who judge their economic knowledge to be "very good" (N=36), which is the first expert definition we use.

[insert Table IV here]

Compared to the respondents' average transparency knowledge (Table II), a relatively low share of respondents with good economic knowledge answered "I don't know" (the share is between 0% and 28%). This resulted in both a higher share of respondents choosing the correct answer but also a bit higher share of respondents giving the incorrect answer (except to the question on the ECB's independence).[11] Although performing the best compared to groups with a lower self-assessed

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[9] This is in line with van Rooij et al. (2007) who find that respondents' own assessments of their degree of financial literacy are a good proxy for their actual degree of financial literacy.

[10] See Appendix A, Table AV for an overview of the overlap between these two expert-definitions.

[11] A higher degree of optimism/confidence might both lead people to assess their economic knowledge to be better as well as make them feel more confident about their transparency knowledge.

degree of economic knowledge, even the most economic knowledgeable people suffer from missing and incorrect transparency knowledge and as a result are likely to have misaligned transparency perceptions.

4.3.2 Economic expertise based on work experience

Relevant work experience might cause some people to have a transparency knowledge advantage. Knowledge about the transparency of the ECB is expected to be more important for those who in their day-to-day work are confronted with economic, monetary or financial matters as they are likely to make more economic decisions. Our questionnaire contains a question which asks for this. Possible answers (and the proportion of respondents choosing the particular answer) are: "yes, every day" (11%), "yes, but not every day" (19%) and "no" (70%). The responses of the "yes, every day"-group are in Table V. Taking a look at the 197 people in this group (so belonging to a still broadly defined expert group, from administrators to managers) several observations can be made. The category "I don't know" varies for different statements about transparency. For example, 71% of the respondents think they know whether the ECB can act independently of governments, while only 40% report to have knowledge about whether the main target of the ECB is quantified. Absence of knowledge is the least for political transparency questions (with the exception of knowledge about whether the target is quantified or not). Roughly speaking, of those individuals responding the majority gives the correct answer. This does not hold for categories for which the correct answer is disputable, as we saw before.

[insert Table V here]

Detailed inspection of the data confirms the findings based on the first expert definition. People working daily with economic matters report to have relatively more knowledge about transparency: the unknown category is often about 30% smaller than in case of the people not working with economic matters. In addition, we observe a higher proportion of correct and incorrect answers, but the increase of the amount of correct answers is higher.[12]

To summarize, experts have better transparency knowledge, but it is far from perfect even about the transparency practices that are in practice for a long time. This contradicts the idea that the observed lack of transparency knowledge is only a temporary phenomenon. The misalignment of perceptions is likely to be a problem all over the population. In the next section we analyze to what extent transparency knowledge matters in the formation of transparency perceptions.

5 Perceptions of central bank transparency

We measure perceptions of the ECB's transparency in two ways. We have asked Dutch households questions on their perceptions of the ECB's monetary policy transparency in general (Section 5.1) and more specific, on various subaspects of transparency (Section 5.2).

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[12]The difference of the answers of the "yes, every day"-group and the "yes, but not every day"-group is smaller than the difference in the responses of the "yes, but not every day"-group and the "no"-group.

5.1 General transparency perceptions

Figure III gives an overview of the perceptions respondents have about the transparency of the ECB. These perceptions are measured on a 1 to 5 scale (ranging from "absolutely not transparent" to "very transparent") plus the option "no opinion". 4 out of 10 people do not report a view on the ECB's monetary policy transparency, but the ones that do give their perceptions have transparency perceptions which are slightly biased on the side of intransparency. The first finding, that a share of people do not have an opinion on the monetary policy of the central bank, confirms the general view that monetary policy making is a difficult to explain field of expertise, which is something all central banks have to cope with.

[insert Figure III here]

Another question tests whether people are satisfied with the ECB's amount of transparency (again measured on a 1 to 5 scale plus a "no opinion" option). Less than half of the respondents have an opinion on this matter (37%), which means that for a substantial share of people the ECB currently cannot use the transmission channel looked at in this paper. For the ECB there is room to create these transparency perceptions in the future. Of the people that do report their transparency perceptions 40% is satisfied with the degree of transparency, almost 60% say the ECB's transparency is too low and only 3% think transparency is already too high. Most people regard transparency of the ECB to be important (given answers with the share of the total population between brackets: "absolutely not important" (1%), "not important" (1%), "neutral" (12%), "important" (34%), and "very important" (27%), "no opinion" (25%)). So even when people lack knowledge about the ECB's transparency this does not imply that they don't care. They might just not want to know all the details or it might be that the information given by the ECB does not reach them.

We expect transparency knowledge to be an important, but imperfect, determinant of transparency perceptions. Ordered probit regressions test for this. Transparency knowledge is included in two ways in the regressions: 1) via the self-assessed transparency knowledge, and 2) via the knowledge indices which measure individuals' actual transparency knowledge. A detailed description of the design of these KI's is presented in Appendix A, Table AII and AIII.

First, we look at the regressions of the level of perceived ECB transparency of which the results are presented in Table VI, column 1. Based on a sample of 960 respondents that do report their transparency perceptions, we find that both transparency knowledge and psychological factors affect transparency perceptions. Starting with the latter, the more optimistic one is, the higher is the perceived ECB's transparency. In addition both *self-assessed* and *actual* transparency knowledge matter for the formation of transparency perceptions. The higher the self-assessed transparency knowledge is, the higher the transparency perceptions are. The effect of actual transparency knowledge depends on the aspect of transparency under consideration. Better knowledge about the political, economic, and policy transparency of the ECB enhances the extent to which it is perceived as a transparent institution. This is not surprising as the ECB is relatively transparent on these aspects. In contrast, more knowledge about the ECB's procedural and operational transparency reduces the extent to which it is perceived as transparent. Again this is an intuitive finding because the ECB 's degree of actual procedural and operational transparency, as defined before, is relatively low.[13]

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[13] However, based on cross-country correlations, Demertzis and Hughes Hallett (2007) show that for economic outcomes these forms of transparency matter the most.

In regression 2 (in Table VI) we use a different way to construct the political, procedural and operational KI's than in the baseline regression. Now (I) both answering the ECB having its main target quantified and answering that it has not are judged to be correct, (II) both answering that the ECB's interest rate decisions are and are not made in a clear fashion are judged to be correct, and (III) both saying that the ECB does and does not provide information about its performance are judged to be correct. We find that (I) does not make a big difference, (II) leads actual procedural transparency knowledge to be even more negatively related to perceived transparency, and (III) results in a smaller link between actual operational transparency knowledge and transparency perceptions.

[insert Table VI here]

In regression 3 several control variables are added. The fit of the model slightly improves. The older respondents are, the less transparent they believe the ECB to be. People with a paid job have relatively lower transparency perceptions and transparency perceptions are negatively related to economic expertise (both daily work experience with economic, monetary or financial matters as well high self-assessed economic knowledge).

We performed a similar analysis with the results of the question that asked for people's satisfaction with the ECB's transparency. A share of 15% is satisfied, 22% is dissatisfied and the majority (64%) has no opinion. Of the dissatisfied people, the majority finds transparency too low (N=381). As only 11 people report that the ECB's transparency is too high, they could not be included in the probit analyses. The results, which are presented in Appendix B, are to a large extent similar to the above results. An important difference however is that although economic expertise is related to lower transparency perceptions it does not seem to be relevant for people's satisfaction with the ECB's transparency.

Overall, if the ECB wants to enhance (1) the extent to which it is perceived as being transparent and (2) people's satisfaction with transparency, it might benefit from focussing its communication on those aspects on which its transparency score is high: political, economic and policy transparency, but not emphasizing those aspects on which it is less transparent: procedural and operational transparency. To get more insight into transparency perceptions we investigate next whether perceptions are different for various aspects of transparency.

5.2 Detailed transparency perceptions

We asked survey participants to fill in their perceptions of the ECB's transparency on various aspects of monetary policy making (again on a scale from 1 to 5 plus the option "I don't know").[14] The share of people who report their transparency perceptions is larger than the share that report to have knowledge on the various aspects of transparency. Which means that some people form perceptions of transparency even without having actual knowledge about it. This confirms the idea that the formation of transparency perceptions is not obvious and depends on both psychological factors and

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[14]As one would expect, these transparency perceptions are positively related to different measures of transparency perceptions based on the amount of "yes, the ECB is transparent"-answers to the knowledge questions which we discus in Section 4.2.

individual characteristics. Figure IV shows the public's perceived transparency.[15]

[insert Figure IV here]

About half the people report no transparency perceptions. The share of people that view the ECB as (absolutely) not transparent ranges from 9% (economic transparency) to 17% (future policy transparency). This finding is in line with the group of people answering that the ECB is (very) transparent. The share of people choosing for this option is about the same (it varies between 9% and 20%), with the highest share going to economic transparency and the lowest share to future policy transparency. ECB transparency is perceived to be relatively high on economic, current policy and political aspects, whereas procedural, operational and future policy transparency is perceived to be relatively low. The ranking of these transparency aspects based on perceptions is roughly in line with the actual transparency practice of the ECB, although two observations are important. First, about half of the people do not have a view on transparency. Second, even on those aspects which the ECB emphasizes in its communication and on which it receives the maximum score based on the EG-index, a substantial amount of people still judge the ECB to be intransparent.

Targeted communication may reduce the transparency misalignment by raising the transparency knowledge (reducing incomplete and incorrect knowledge) but to the extent that psychological factors cause misaligned perceptions, a revised communication policy will not be helpful because people are unaware of these biases. Before taking action it is important to know whether misaligned transparency perceptions matter, which we will discuss next.

6   The relevance of transparency perceptions

Based on our survey data we conclude that a mismatch between the actual and the perceived transparency of the ECB exists. But to what extent is such a mismatch relevant? Central banks have an accountability obligation to the public and fulfill it by using transparency as an instrument. To do this as best as possible good knowledge about central bank transparency is welcomed. In addition to a possible democratic incentive of the central bank as a public institution to improve the transparency knowledge of the public, and thereby bringing the transparency perceptions more in line with reality, there might be some economic arguments. We first analyze the relationship between transparency perceptions and trust in the ECB (Subsection 6.1). Thereafter we make a link to inflation perceptions and expectations (Subsection 6.2).

6.1   Trust in the European Central Bank

Survey participants have more trust in the Dutch central bank compared to the ECB, which may be explained by the presence of a familiarity bias: people have more trust in institutions they know better and that are less distant. Possible answers and the percentage of people responding it are (in case of the ECB): "absolutely no trust" (1%), "little trust" (10%), "neutral" (36%), "quite a lot"

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[15] We make a distinction between current and future monetary policy transparency as the degree of transparency of the ECB is high on the former but low on the latter because forward-looking transparency is more difficult. The findings are also summarized in Table AIV of Appendix A, which includes a ranking.

(29%), "a lot" (7%) and "no opinion" (18%).[16] We investigated the role of transparency perceptions in explaining people's trust in the ECB by estimating ordered probit regressions, see Table VII.

In our analysis we include both a direct (Table VII, model 1a and 1b) and an indirect measure of trust (model 2). We observe that central bank transparency perceptions are indeed related to the direct measure of trust in the ECB. The higher the perceptions of the ECB's transparency, the higher the trust in the ECB.[17] This result highlights the importance of high transparency perceptions as central banks are interested in keeping up people's trust. It eases their policy making and increases their effectiveness. Other factors are also relevant in explaining trust. From the probit regression, holding other factors constant, trust in the ECB is higher the higher educated and more optimistic people are and the higher their self-assessed transparency knowledge is. Trust in the ECB is higher for those respondents that reported to know the ECB before we explained to them what the ECB is and does.

[insert Table VII here]

Model 1b includes transparency perceptions in an indirect manner by including transparency knowledge indices instead.[18] Political, economic and policy transparency knowledge (aspects of transparency on which the ECB scores relatively high) are significantly positively related to trust whereas operational transparency knowledge (an aspect on which the ECB degree of transparency is low) is negatively related to trust. As transparency knowledge is only one of the determinants of perceived transparency, model 1b has less explanatory power than model 1a. Therefore we prefer to include transparency perceptions in a direct way.

In addition to the direct measure of respondents' trust in the ECB, we have used an indirect measure of trust. Respondents were asked the extent to which they feel the ECB is safeguarding price stability. Quite a lot of people say they don't know (42%). A neutral standpoint is taken by 26% of people. Of the remaining, a share of 2/3 says the ECB is safeguarding price stability well while a share of 1/3 is dissatisfied. We explain this alternative measure of trust with an ordered probit model of which the results are presented in Table VII model 2. The results confirm our earlier finding that, ceteris paribus, the higher respondents' transparency perceptions are, the more trust they have in the ECB.[19]

6.2 Inflation gap and credibility gap

What matters then is if trust is indeed related to inflation perceptions and inflation expectations. Note that although both matter for the financial behavior of households, inflation expectations are key for current decisions with future consequences, such as saving and investment. When judging current inflation, opinions are almost symmetrically distributed around neutral. This is not in line

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[16]The results for the trust in the Dutch Central Bank are: "absolutely no trust" (0%), "little trust" (4%), "neutral" (23%), "quite a lot" (41%), "a lot" (20%) and "no opinion" (12%).

[17]Including detailed transparency perceptions instead of overall transparency perceptions reveals that political, current policy and operational transparency perceptions are significant positively related to the degree of trust. A significant relationship between economic, operational and future policy perceptions and trust was however absent. Because of a better fit we show the regressions with the overall transparency perceptions included.

[18]It is for this reason that we could include less observations in model 1b compared to model 1a.

[19]It should be noted that we cannot be sure whether and to what extent the relationship between trust and transparency perceptions is in the other direction.

with the picture we obtain when we ask survey participants to quantify their transparency perceptions and expectations. Participants were asked to report their perceptions of current consumer price inflation, which we compare to current inflation, and their expectations of future inflation (in 2 years time), which we compare to the inflation goal of the ECB. The responses to both inflation questions show a peak around 2% and are skewed upwards, which is in line with previous research of Christensen et al. (2006). Responses vary a lot as is shown in Appendix C. Some people probably do not understand the concept of percentages as one would find it hard to believe that they really perceive and expect inflation to be over 50%. Respondents judge future inflation (in 2 years time) higher than current inflation and inflation expectations deviate from the inflation goal of the ECB. To measure to what extent trust is related to inflation perceptions (π^p) and inflation expectations (π^e), we construct two variables: (1) the "inflation gap" and (2) the "credibility gap". We define the inflation gap as the absolute difference between respondents' perceptions of current inflation, at the time they filled in the questionnaire, and actual inflation. As a measure of actual inflation we take the consumer price index of May (1.8%). Because we held the questionnaire in the *first* weekend of June relating the inflation perceptions to June would mean linking them to future inflation, which is something we do with respondents' inflation expectations when constructing the credibility gap. The credibility gap is the absolute difference between respondents' expected inflation two years from now and the current inflation goal of the ECB. The larger the gap between inflation expectations and the inflation goal of the ECB is, the lower the ECB's degree of credibility is.

The regression results of the inflation gap and the credibility gap are in column (1) and (2) of Table VIII, based on 1143 versus 1112 observations. We observe that trust matters: ceteris paribus, the higher the respondent's trust in the ECB is, the lower the gaps. Several personal characteristics are significantly related to the inflation and credibility gap. Inflation perceptions and expectations are more likely to be better aligned when one is older, male, has a paid job, belongs to a higher social class and knows the ECB.

[insert Table VIII here]

Alternatively, we perform probit regressions explaining the correctness of inflation perceptions and expectations of which the results are in column (3) and (4). The sample size is now larger because those people who respond "I don't know" are included in the analysis (they belong to the group with incorrect transparency perceptions). We judge inflation *perceptions* to be correct if they are within a small range around the actual inflation rate. In the baseline case this range is: $\pi^p \in [1.5\%, 2.1\%]$, but as a robustness check we vary this range.[20] Based on this definition 1 out of 3 respondents possess correct inflation perceptions. We define inflation expectations to be "correct" when they are in line with the medium term inflation goal of the ECB which is two keep inflation close to but below 2%. As the exact meaning of "close to but below two percent" is not perfectly clear (is it 0.01%-point or a few %-points below 2%?) we use a small range ($\pi^e \in [1.8\%, 2\%]$). 19% of the respondents have inflation expectations that are in line with the inflation goal of the ECB. As before, we find that trust matters for inflation perceptions and inflation expectations. The higher a respondent's degree

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[20]The significant trust effect remains when the perceptions band is reduced to $\pi^p \in [1.6\%, 2\%]$ but it is absent in case of an even smaller width: $\pi^p \in [1.7\%, 1.9\%]$ (note that reducing the bandwidth leads to fewer observations in the "correct"-group, which complicates it to perform a useful analysis). In contrast, when we include transparency perceptions instead of trust as an explanatory variable the significant effect remains for both alternative bandwidths.

of trust is in the ECB, the larger the probability is that his inflation perceptions and expectations are correct. In addition to the characteristics that are significant in regression 1 and 2, we find indication that inflation perceptions and expectations are more likely to be correct for those people that have a higher degree of self-assessed economic knowledge.

To summarize, trust seems to be both a relevant factor for keeping inflation perceptions low and in line with reality and for anchoring inflation expectations around the central bank's target.[21] Though to the extent that transparency perceptions matter for trust, they are relevant based on economic arguments as well. Our results are robust to the inclusion of transparency perceptions in a direct way in the correctness of inflation perceptions and expectations regressions (see Appendix C, Table CI). However, the explanatory power of the models is lower as trust in the ECB depends on more factors than only transparency perceptions. The main way to raise and keep trust is by earning it with good monetary policy.

7   Conclusion

The main contribution of our research is that it provides more insight into transparency perceptions, which is likely to be helpful for central banks when assessing an appropriate communication strategy. We argue that a mismatch between the actual degree of transparency of a central bank and its degree of transparency as perceived by the public is likely to exist and that it matters. Transparency perceptions are based on two factors: (1) actual knowledge of transparency, and (2) psychological factors.

Regarding determinant (1), based on a survey among Dutch households we show that actual knowledge on the ECB's transparency is lacking or even incorrect, which is a first indication that a mismatch between actual and perceived transparency is likely to exist. We find strong indications that this lack of depth and correctness of transparency knowledge is not only present for the public at large, but also for those agents whom the central bank is more keen on influencing: economic experts. Both expert definitions we use (having an economic job and having a very high self-assessed economic knowledge) confirm this viewpoint. Future research is needed to shed more light on (the possible lack of) transparency knowledge of parties that are of direct importance for the monetary policy transmission (financial intermediaries, the financial press, companies and labor unions).

Depending on which aspect of transparency we look at, 46%-72% of the respondents report that they have no knowledge about the current transparency practice of the ECB. This finding confirms the general idea that monetary policy making is a difficult to explain area of expertise and does not interest everybody, which is something all central banks have to cope with. Our findings indicate that for central bankers there is a huge challenge to improve the monetary policy knowledge of the public at large.

A majority of the respondents that do report to have knowledge possess the correct knowledge, whereas the rest has incorrect transparency knowledge. Transparency knowledge depends on which aspect one looks at. Dutch households know more about, for example, the goals of the central bank and the economic information it provides (aspects on which the ECB is relatively transparent) than about whether minutes are published and forecast errors are made public (aspects on which the ECB

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[21]We should note, however, that it is unclear whether and to what extent the relationship between inflation perceptions and trust moves in two directions.

is relatively less transparent). When we correct for the fact that we have a slight overrepresentation of males, highly educated people, older people and higher income households, transparency knowledge is even a bit worse in practice. Our findings on individuals' relative degree of knowledge on various subaspects of transparency are likely to differ between central banks because they depend on the specific communication strategy and monetary policy at practice.

Regarding determinant (2), psychological factors seem to matter in the formation of transparency perceptions. It turns out that transparency perceptions only to a small extent depend on transparency knowledge. Psychological processes therefore seem to be more important. For example, optimistic people are more inclined to judge ECB's transparency to be high. The share of people reporting transparency perceptions is larger than the share of people reporting to have knowledge about transparency. So even without transparency knowledge people form transparency perceptions. The finding that transparency perceptions do not only depend on actual transparency knowledge complicates it for central banks to align transparency perceptions with their actual transparency practice. Future research may shed more light on the exact psychological processes that cause transparency perceptions to deviate from actual transparency.

Transparency perceptions matter as they are significantly positively related to the amount of trust in the ECB. Central banks are interested in keeping up people's trust because it facilitates their policy making and increases their effectiveness. We find that when households' trust in the ECB is higher inflation perceptions are more in line with actual inflation and inflation expectations are better anchored around the inflation target of the ECB, which facilitates policy making. For the moment, the indirect transmission channel analyzed in this paper (from transparency perceptions to inflation perceptions and expectations) seems to be relevant for part of the population. It is, however, absent for most people, which leaves room for the ECB to create transparency perceptions in the future, but less so for those with relatively high economic expertise in whom the ECB might have more interest.

Central banks have an accountability obligation to the public and fulfill it by using transparency as an instrument. To do this as best as possible good knowledge about central bank transparency is welcomed, which would also result in a smaller mismatch between actual and perceived central bank transparency. However, some central banks might also feel an incentive to keep transparency perceptions misaligned. When their perceived degree of transparency is higher than their actual degree of transparency, central banks benefit from more trust, better aligned inflation perceptions and expectations. To benefit from higher transparency perceptions a central bank might feel tempted to stress its transparency strengths (in case of the ECB: political, economic and policy transparency) but de-emphasize its transparency weaknesses (e.g. procedural and operational transparency for the ECB). An alternative way for central banks to increase transparency perceptions might be to improve its actual disclosure practices. Which of these two ways a central bank will prefer is likely to depend on the accompanied difficulties and costs of implementation, which is dependent on the group of interest (laymen versus experts). Note that the first strategy will be easier to implement effectively on persons with a relatively low degree of transparency knowledge.

It might not be so easy to develop a single effective communication strategy because the manner in which perceptions are being formed is likely to differ between agents and perceptions not only depend on transparency knowledge but also on psychological factors. Another complicating factor is that the public's opinion is largely affected by the news in newspapers, on the internet and on the radio,

which is more difficult to steer than direct communication by the central bank itself. For central banks it will be useful to keep these findings in mind when designing an effective communication strategy.

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A   Description of the data

The CentER panel

CentERdata is specialized in performing internet-based surveys. It is made sure that the members of the CentERpanel are representative of Dutch society. CentERdata selects new members by phone. Those who do not have internet access yet can participate as well. By using their television screen as a monitor and using a set-top box which they in case of no internet access receive they can answer the questions. The CentERpanel consists of over 2000 Dutch households, which remain panel members for longer periods. Some of these households participate with more than one member, each with an own ID-number. Questionnaires on various topics are set out throughout the weekend (from Friday afternoon until Tuesday night). More details on the CentERpanel can be found on http://www.uvt.nl/center data/en/.

Asking questions through an internet survey has several advantages. For example, people can answer the questions anonymously which prevents a bias towards socially desirable answers. Survey participants can decide themselves when they have enough time to fill in the questionnaires and questions are asked in the same way to all participants. If desirable, it is possible to repeat surveys by asking the same persons again. Last, respondents do not need to answer background questions every time they fill in a questionnaire. One disadvantage compared to phone surveys is that there is less room to tailor questions to the specific respondent. Another potential disadvantage is that, before answering knowledge questions, survey participants might browse the internet to collect more information. Presuming that some respondents did this, it would imply that the lack of transparency knowledge is even worse. However, it is unlikely that respondents took the time to do so. First, a direct incentive is lacking because participant are not rewarded for a higher score. Second, nobody actually obtained the maximum KI_total score.

The age of the respondents in our sample is on average 49.6, with the youngest participant being 16 and the oldest 92. With a share of 53.6%, males are in the majority. On average the respondents' households earn a monthly after tax income of 2554 Euro. 34.5% of the respondents have had a high degree of education (either a higher vocational education or an university education) and 11% deals every day with financial, economic, or monetary matters during working hours. Possible implications of the slight overrepresentation of males, highly educated people, older people, and higher income households are discussed in the last section of this paper.

The next five tables provide more information on the variables used in our analyses.

[insert Table AI here]
[insert Table AII here]
[insert Table AIII here]
[insert Table AIV here]
[insert Table AV here]

B   Satisfaction with the ECB's transparency

[insert Table BI here]

C   Inflation perceptions and expectations

[insert Figure CI here]
[insert Figure CII here]
[insert Table CI here]
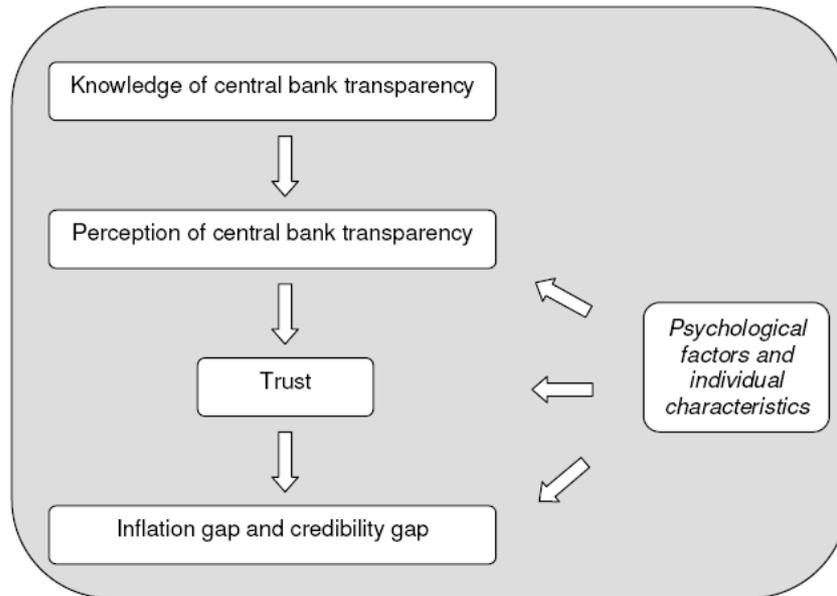
Figure I: Perceived central bank transparency

Note: Transparency knowledge influences transparency perceptions, which matter because through trust they affect the inflation gap and the credibility gap. Psychological and individual characteristics (e.g. degree of optimism, overconfidence, sampling memories) are relevant too in explaining the formation and the effects of transparency perceptions.
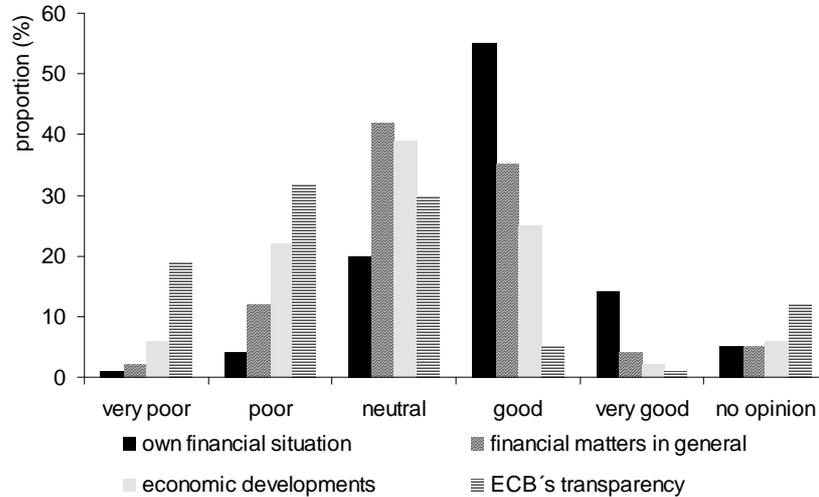
Figure II: Respondents' self-assessed knowledge
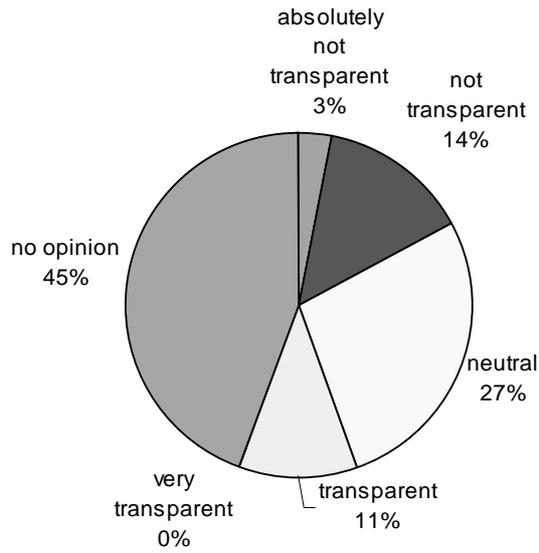
Figure III: ECB's perceived transparency
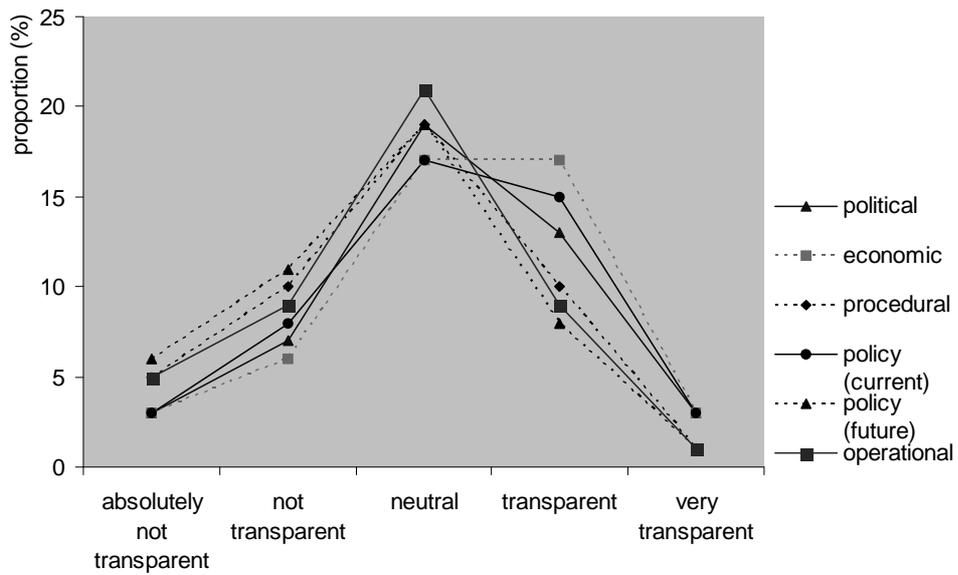
Figure IV: Detailed transparency perceptions

Note: The share of people that did not have a view on the ECB's monetary policy transparency is for all aspects about 55%.
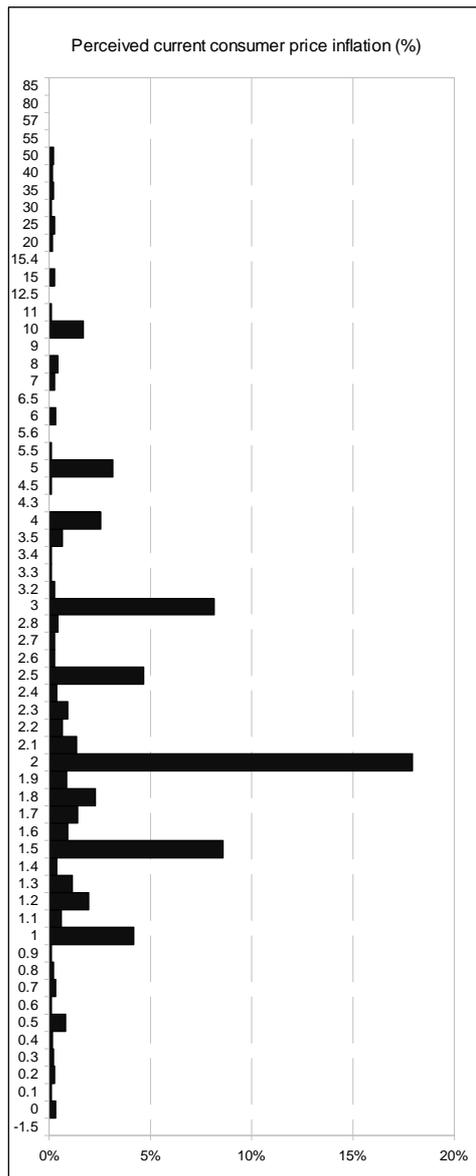
Figure CI: Perceived inflation

Note: The vertical axes contains all the different answers given to the question: "How high do you judge yearly inflation (the average percentage increase of the consumer price compared to a year ago) in The Netherlands at the moment?". On the horizontal axis, the percentage of people choosing a particular inflation rate is reported.
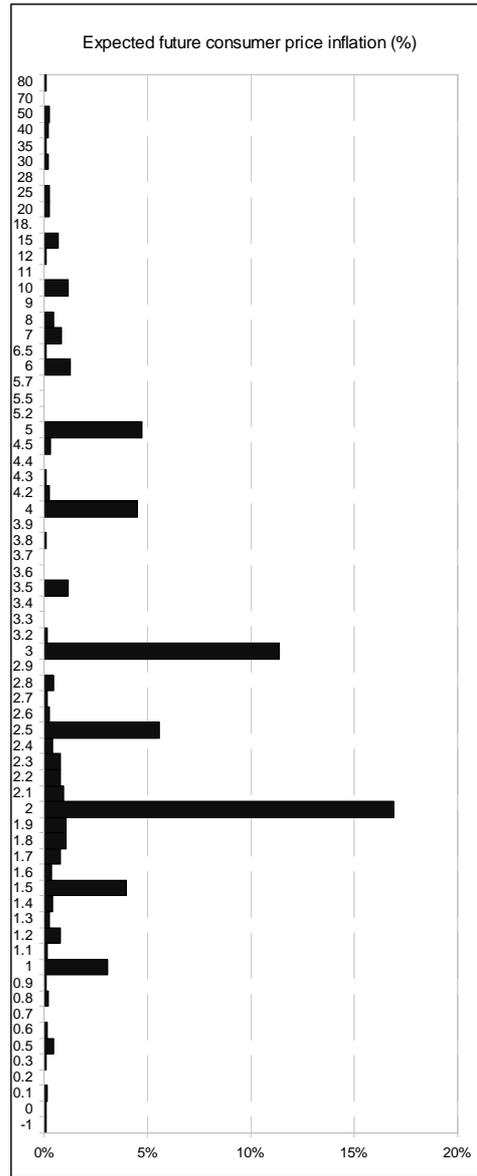
Figure CII: Expected inflation

Note: The vertical axes contains all the different answers given to the question: "How high do you judge yearly inflation (the average percentage increase of the consumer price compared to a year ago) in The Netherlands in the medium term (2 years from now)?". On the horizontal axis, the percentage of people choosing a particular inflation rate is reported.

Table I. A transparency mismatch

Transparency ranking	Actual transparency	Perceived transparency
1	Bank of England	US Federal Reserve
2	European Central Bank	Deutsche Bundesbank
3	US Federal Reserve	European Central Bank
4	Deutsche Bundesbank	Bank of England

Note: Central banks are ranked according to their degree of transparency. The "actual transparency" column is based on the disclosure indicator of De Haan and Amtenbrink in De Haan et al. (2005, Table 4.2: 101). The "perceived transparency" column is based on De Haan et al. (2005, Table 4.4: 102).

Table II. Actual knowledge about the ECB's transparency (N=1800)

Response shares

|	yes		no			I don't know
Political transparency						
ECB's goals laid down	44%	✓	2%		**	54%
ECB's main task is supporting the economy	32%		20%	✓	**	47%
ECB's main task is supporting price stability	46%	✓	8%		**	46%
ECB's main goal expressed by a number	10%	✓	19%		**	71%
ECB is independent	35%	✓	16%		**	49%
Economic transparency						
ECB provides economic data	38%	✓	5%		**	56%
ECB provides economic forecasts	39%	✓	6%		**	55%
ECB provides economic models	24%	✓	11%		**	65%
Procedural transparency						
ECB's interest rate decisions are made in a clear fashion	17%	✓	25%		**	58%
ECB provides comprehensive minutes	10%		18%	✓	**	72%
ECB provides voting records	4%		28%	✓	**	68%
Policy transparency						
ECB announces interest rate decisions immediately	33%	✓	11%		**	57%
ECB immediately explains the interest rate decision	31%	✓	9%		**	60%
ECB tells future policy preferences	12%		20%	✓	**	68%
Operational transparency						
ECB provides information about relevant economic shocks	16%	✓	14%			70%
ECB provides information about forecasting errors	7%		23%	✓	**	70%
ECB provides information about its performance	23%		11%	✓	**	65%

Note: The table shows the share of respondents answering "yes", "no" or "I don't know" to the various questions on the ECB's transparency. The check mark (✓) indicates which answer is correct according to EG(2006). *´s are added when there is a significant difference between the "yes and "no" response shares (Chi^2-test) (**=significant at a 1%-level).

Table III. Actual knowledge about the ECB's transparency: OLS (N=1519)

	(1)		(2)	
	KI_total		KI_total_alt	
Constant	.02	(0.98)	.07	(0.94)
Age	.01*	(0.05)	.01	(0.10)
Gender	.24	(0.24)	.31	(0.18)
Education	-.27	(0.19)	-.33	(0.16)
Income	.13**	(0.00)	.14**	(0.01)
Job	-.20	(0.36)	-.23	(0.36)
Social class	.17*	(0.06)	.19*	(0.07)
Urbanization	-.02	(0.73)	-.02	(0.76)
Region	-.45**	(0.01)	-.48**	(0.02)
Optimist	-.05	(0.67)	-.05	(0.71)
ECB known	1.58**	(0.00)	1.76**	(0.00)
Economic job	.86**	(0.00)	1.02**	(0.00)
Economic expert	-.12	(0.70)	-.27	(0.44)
Economic knowledge (SA)	.97**	(0.00)	1.12**	(0.00)
Specific financial knowledge (SA)	.21	(0.13)	.26	(0.10)
General financial knowledge (SA)	-.08	(0.62)	-.07	(0.71)
Transparency knowledge (SA)	.75**	(0.00)	.83**	(0.00)
R^2	0.32		0.31	

Note: P-values between brackets. *=significant at a 10%-level. **=significant at a 5%-level. SA=self-assessed. See appendix A for the definitions of the explanatory variables and the construction of KI_total and KI_total_alt.

Table IV. Actual knowledge about the ECB's transparency and self-assessed economic expertise

Response shares of those survey participants judging their own knowledge about economic developments to be "very good" (N=36).

	yes		no			I don't know
Political transparency						
ECB's goals laid down	89%	✓	3%		**	8%
ECB's main task is supporting the economy	44%		53%	✓		3%
ECB's main task is supporting price stability	86%	✓	14%		**	0%
ECB's main goal expressed by a number	31%	✓	44%			25%
ECB is independent	89%	✓	3%		**	8%
Economic transparency						
ECB provides economic data	75%	✓	8%		**	17%
ECB provides economic forecasts	72%	✓	11%		**	17%
ECB provides economic models	53%	✓	22%		*	25%
Procedural transparency						
ECB's interest rate decisions are made in a clear fashion	56%	✓	39%			6%
ECB provides comprehensive minutes	36%		39%	✓		25%
ECB provides voting records	8%		72%	✓	**	19%
Policy transparency						
ECB announces interest rate decisions immediately	58%	✓	33%			8%
ECB immediately explains the interest rate decision	72%	✓	17%		**	11%
ECB tells future policy preferences	28%		47%	✓		25%
Operational transparency						
ECB provides information about relevant economic shocks	22%	✓	56%		*	22%
ECB provides information about forecasting errors	8%		64%	✓	**	28%
ECB provides information about its performance	50%		33%	✓		17%

Note: Respondents were asked to judge their own knowledge about economic developments, like price changes, economic growth and unemployment. Possible answers were: "very poor", "poor", "neutral", "good", "very good" and "I don't know". This table presents the response shares of the "very good"-group, which consists of only 2% of the respondents. The check mark (✓) indicates which answer is correct according to EG(2006). *´s are added when there is a significant difference between the "yes and "no" response shares (Chi^2-test) (**=significant at a 1%-level, *=significant at a 5%-level).

Table V. Actual knowledge about the ECB's transparency and on the job economic expertise

Response shares of those survey participants confronted daily in their work with economic, financial or monetary affairs (N=197).

	yes		no			I don't know
Political transparency						
ECB's goals laid down	66%	✓	4%		**	29%
ECB's main task is supporting the economy	32%		39%	✓		28%
ECB's main task is supporting price stability	57%	✓	15%		**	28%
ECB's main goal expressed by a number	18%	✓	22%			60%
ECB is independent	50%	✓	21%		**	29%
Economic transparency						
ECB provides economic data	56%	✓	8%		**	36%
ECB provides economic forecasts	58%	✓	8%		**	34%
ECB provides economic models	37%	✓	20%		**	43%
Procedural transparency						
ECB's interest rate decisions are made in a clear fashion	31%	✓	32%			37%
ECB provides comprehensive minutes	11%		26%	✓	**	63%
ECB provides voting records	7%		42%	✓	**	51%
Policy transparency						
ECB announces interest rate decisions immediately	48%	✓	15%		**	37%
ECB immediately explains the interest rate decision	45%	✓	16%		**	39%
ECB tells future policy preferences	24%		28%	✓		47%
Operational transparency						
ECB provides information about relevant economic shocks	24%	✓	25%			51%
ECB provides information about forecasting errors	10%		40%	✓	**	50%
ECB provides information about its performance	35%		22%	✓	*	43%

Note: Survey participants were asked whether they have on the job experience with economic, financial or monetary matters. Possible answers: "yes, daily", "yes, but not daily" and "no". This table presents the responses of the first group (N=197). The check mark (✓) indicates which answer is correct according to EG(2006).*'s are added when there is a significant difference between the "yes and "no" response shares (Chi^2-test) (**=significant at a 1%-level, *=significant at a 5%-level).

Table VI. Perceived ECB transparency: ordered probit analyses

	(1)		(2)		(3)	
Optimist	.15**	(0.00)	.14**	(0.00)	.16**	(0.00)
Transparency knowledge (SA)	.43**	(0.00)	.44**	(0.00)	.51**	(0.00)
KI_political	.09**	(0.00)				
KI_economic	.10**	(0.00)	.11**	(0.00)	.11**	(0.00)
KI_procedural	-.09*	(0.06)				
KI_policy	.18**	(0.00)	.21**	(0.00)	.24**	(0.00)
KI_operational	-.16**	(0.00)				
KI_political_alt			.10**	(0.00)	.11**	(0.00)
KI_procedural_alt			-.21**	(0.00)	-.20**	(0.00)
KI_operational_alt			-.06	(0.18)	-.08*	(0.08)
Age					-.01**	(0.00)
Gender					-.05	(0.55)
Education					-.05	(0.61)
Income					.02	(0.21)
Job					-.17*	(0.09)
Social class					.02	(0.61)
Urbanization					.03	(0.30)
Region					-.13	(0.11)
ECB known					-.08	(0.40)
Economic job					.03	(0.72)
Economic expert					-.20*	(0.09)
Economic knowledge (SA)					-.09*	(0.10)
Log likelihood	-1056		-1048		-1017	
Pseudo R^2	0.09		0.10		0.11	
N	960		960		940	

Note: P-values between brackets. *=significant at a 10%-level. **=significant at a 5%-level. SA=self-assessed. Perceptions of the ECB's transparency are measured on a scale from 1 to 5 (1="absolutely not transparent", 2="not transparent", 3="neutral", 4="transparent", 5="very transparent"). The respondents with "no opinion" (N=799) are not included in the analysis. The definitions of the explanatory variables are in Appendix A. The number of observations (N) is lower in model 3 because respondents who did not report information on the additional control variables, e.g. their self-assessed "economic knowledge", could not be included in the analysis.

Table VII. Trust in the ECB: ordered probit analyses

	Direct measure of trust				Indirect measure of trust	
	(1a)		(1b)		(2)	
Age	.00	(0.17)	-.00	(0.80)	-.00	(0.16)
Gender	.03	(0.77)	-.01	(0.84)	.06	(0.55)
Education	.16*	(0.06)	.16**	(0.03)	.06	(0.50)
Income	.03	(0.12)	.04**	(0.02)	.01	(0.46)
Job	.11	(0.25)	-.05	(0.54)	-.20*	(0.07)
Social class	.02	(0.67)	.04	(0.22)	.04	(0.36)
Urbanization	-.03	(0.34)	-.02	(0.42)	-.02	(0.56)
Region	-.11	(0.15)	-.18**	(0.00)	-.11	(0.18)
Optimist	.18**	(0.00)	.20**	(0.00)	.12**	(0.02)
ECB known	.33**	(0.00)	.23**	(0.00)	.08	(0.48)
Economic job	-.07	(0.41)	-.18**	(0.02)	-.03	(0.79)
Economic expert	.10	(0.37)	.15	(0.13)	.08	(0.54)
Economic knowledge (SA)	.08*	(0.09)	.05	(0.19)	.13**	(0.02)
Transparency perceptions	.57**	(0.00)			.49**	(0.00)
KI_political			.11**	(0.00)		
KI_economic			.08**	(0.00)		
KI_procedural			-.02	(0.59)		
KI_policy			.11**	(0.01)		
KI_operational			-.19**	(0.00)		
Log likelihood	-1082		-1670		-878	
Pseudo R^2	0.10		0.06		0.08	
N	936		1414		806	

Note: P-values are between brackets. *=significant at a 10%-level. **=significant at a 5%-level. SA=self-assessed. A description of the explanatory variables can be found in Appendix A. Model 1a and 1b use a direct measure of trust in the ECB. The scale of this measure of trust ranges from 1 to 5 (1="absolutely no trust", 2="little trust", 3="neutral", 4="quite a lot" and 5="a lot"). Model 2 uses an indirect measure of trust: the extent to which people feel the ECB is safeguarding price stability (1="not" (1%), 2="not very good" (10%), 3="neutral" (26%), 4="good" (20%) and 5="very good" (0%)).

Table VIII. Alignment of inflation perceptions and inflation expectations

	(1) inflation gap		(2) credibility gap		(3) correctness of π^p		(4) correctness of π^e	
Constant	4.36**	(0.01)	5.29**	(0.00)	-1.27**	(0.00)	-1.65**	(0.00)
Age	-.04**	(0.00)	-.03**	(0.04)	.01**	(0.02)	.01	(0.11)
Gender	-.93**	(0.02)	-.67	(0.11)	.21**	(0.01)	.14	(0.12)
Education	-.26	(0.53)	-.18	(0.68)	-.07	(0.41)	-.01	(0.94)
Income	-.07	(0.40)	-.09	(0.31)	.02	(0.21)	.01	(0.69)
Job	-1.21**	(0.01)	-.95*	(0.05)	.25**	(0.01)	-.04	(0.69)
Social class	-.35*	(0.07)	-.57**	(0.00)	.08**	(0.03)	.02	(0.68)
Urbanization	.08	(0.56)	.17	(0.23)	.03	(0.35)	.01	(0.65)
Region	-.55	(0.14)	-.55	(0.16)	.03	(0.68)	-.03	(0.71)
Optimist	-.33	(0.15)	-.29	(0.22)	-.02	(0.62)	-.08	(0.15)
ECB known	-1.45**	(0.00)	-1.02**	(0.03)	.37**	(0.00)	0.21**	(0.04)
Economic job	.45	(0.29)	.71	(0.10)	.09	(0.33)	.01	(0.95)
Economic expert	-.37	(0.51)	.24	(0.68)	.04	(0.77)	.11	(0.41)
Economic knowledge (SA)	.24	(0.27)	-.05	(0.82)	.10**	(0.03)	.11**	(0.03)
Trust	-.34*	(0.10)	-.43**	(0.04)	.22**	(0.00)	.21**	(0.00)
Model	OLS		OLS		probit		probit	
R^2	0.06		0.05					
Pseudo R^2					0.08		0.05	
Log likelihood					-859		-696	
N	1143		1112		1414		1414	

Note: P-values between brackets. *=significant at a 10%-level. **=significant at a 5%-level. SA=self-assessed. See Appendix A for an explanation of the independent variables. Explanation of the dependent variables:

(1) the inflation gap: $abs(\pi^p - \pi^a)$. The absolute difference between $\pi^p (=$perceived current inflation (percentage)) and $\pi^a (=$ actual current inflation, which equals 1.8% (Consumer Price Index of May 2007));

(2) the credibility gap: $abs(\pi^e - \pi^T)$. The absolute difference between $\pi^e (=$ expected inflation two years from now (percentage)) and $\pi^T (=$ the ECB's medium term inflation target, which is set at 1.9%);

(3) correctness of inflation perceptions: 1 if $\pi^p \in [1.5\%, 2.1\%]$, 0 otherwise (including the "I don't know" responses).

(4) correctness of inflation expectations: 1 if $\pi^e \in [1.8\%, 2\%]$, 0 otherwise (including the "I don't know" responses).

Table AI. Various explanatory variables

Variable	Measurement
Age	2007-year of birth
Gender	1=male; 0=female
Education	1=higher vocational education or university education; 0=primary education/preparatory intermediate vocational education/secondary pre-university education or intermediate vocational education
Income	12 classes from gross monthly income of less than € 500 to more than € 7500
Job status	1=paid job; 0=other
Social class	scale from 1 to 5 (1=low; 5=high)
Urbanization	scale from 1 to 5 (1=not urbanised; 5=very strong urbanisation)
Region	0=North (Groningen, Friesland and Drenthe), East (Overijssel, Flevoland and Gelderland), and South (Noord-Brabant and Limburg); 1=West (Utrecht, Noord-Holland, Zuid-Holland and Zeeland).
Optimist	self-assessment, scale from 1 to 5 (1= very pessimistic; 5= very optimistic)
Economic knowledge (SA)	self-assessed knowledge about economic developments like price changes, economic growth and unemployment, scale from 1 to 5 (1=very poor; 2=poor; 3=neutral; 4=good; 5=very good)
Specific financial knowledge (SA)	self-assessed knowledge about their own financial situation, scale from 1 to 5 (1=very poor; 2=poor; 3=neutral; 4=good; 5=very good)
General financial knowledge (SA)	self-assessed knowledge about financial matters in general, scale from 1 to 5 (1=very poor; 2=poor; 3=neutral; 4=good; 5=very good)
Transparency knowledge (SA)	self-assessed knowledge about the transparency of the ECB, scale from 1 to 5 (1=very poor; 2=poor; 3=neutral; 4=good; 5=very good)
ECB known	1=ECB is known; 0=ECB is not known (before giving a definition to the respondents)
Economic job	job experience with monetary, financial or monetary matters (0=no; 1=yes)
Economic expert	daily job experience with monetary, financial or monetary matters (0=not daily or not at all; 1=yes, daily)

Note: Multicollinearity is not a problem. The mean Variance Inflation Factor (VIF) is 1.58 (the minimum is 1.03 and the maximum is 2.37 with N=1519). As a rule of thumb a VIF smaller than 10 is fine.

Table AII. Knowledge Indicators (KI)

| | | possible answers and the scores attached to them | | |
		yes	no	I don't know
Political				
KI1a	ECB's goals laid down	1	0	0
KI1b	ECB's main task is supporting the economy	0	1	0
KI1c	ECB's main task is supporting price stability	1	0	0
KI1d	ECB's main goal expressed by a number	1	0	0
KI1dalt	ECB's main goal expressed by a number	1	1	0
KI1e	ECB is independent	1	0	0
Economic				
KI2a	ECB provides economic data	1	0	0
KI2b	ECB provides economic forecasts	1	0	0
KI2c	ECB provides economic models	1	0	0
Procedural				
KI3a	ECB's interest rate decisions are made in a clear fashion	1	0	0
KI3aalt	ECB's interest rate decisions are made in a clear fashion	1	1	0
KI3b	ECB provides comprehensive minutes	0	1	0
KI3c	ECB provides voting records	0	1	0
Policy				
KI4a	ECB announces interest rate decisions immediately	1	0	0
KI4b	ECB immediately explains the interest rate decision	1	0	0
KI4c	ECB tells future policy preferences	0	1	0
Operational				
KI5a	ECB provides information about relevant economic shocks	1	0	0
KI5b	ECB provides information about forecasting errors	0	1	0
KI5c	ECB provides information about its performance	0	1	0
KI5calt	ECB provides information about its performance	1	1	0

Table AIII. Transparency knowledge indices

Variable	Description	Range
KI_political	knowledge index about the ECB's policital transparency	from 0 (all questions wrong) to 5 (all questions good)
KI_economic	knowledge index about the ECB's economic transparency	from 0 (all questions wrong) to 3 (all questions good)
KI_procedural	knowledge index about the ECB's procedural transparency	from 0 (all questions wrong) to 3 (all questions good)
KI_policy	knowledge index about the ECB's policy transparency	from 0 (all questions wrong) to 3 (all questions good)
KI_operational	knowledge index about the ECB's operational transparency	from 0 (all questions wrong) to 3 (all questions good)
KI_political_alt	alternative knowledge index about the ECB's policital transparency	from 0 (all questions wrong) to 5 (all questions good)
KI_procedural_alt	alternative knowledge index about the ECB's procedural transparency	from 0 (all questions wrong) to 3 (all questions good)
KI_operational_alt	alternative knowledge index about the ECB's operational transparency	from 0 (all questions wrong) to 3 (all questions good)
KI_total*	aggregate knowledge index = 0.6*KI_political + KI_economic + KI_procedural + KI_policy + KI_operational	from 0 (all questions wrong) to 15 (all questions good)
KI_total_alt*	alternative aggregate knowledge index = 0.6*KI_political_alt + KI_economic + KI_procedural_alt + KI_policy + KI_operational_alt	from 0 (all questions wrong) to 15 (all questions good)

Note: *The factor 0.6 on KI_political ensures that all subindices receive equal weight.

Table AIV. Perceived ECB transparency on various aspects

	"absolutely not transparent" and "not transparent"		"transparent" and "very transparent"	ranking
economic	9%	<	20%	1
policy (current)	11%	<	18%	2
political	10%	<	16%	3
procedural	15%	>	11%	4
operational	14%	>	10%	4
policy (future)	17%	>	9%	6

Note: About 55% of the people did not have a view on this issue and the rest (around 20%) has responded "neutral".

Table AV. Overlap between economic job and economic knowledge
Share of respondent (in %)

I \ II	very poor	poor	neutral	good	very good	I don't know
yes, daily	2%	7%	34%	52%	6%	0%
yes, but not daily	2%	9%	42%	42%	4%	1%
no	8%	28%	39%	16%	1%	8%

Note: I) Job experience with economic, financial or monetary matters. II) self-assessed economic knowledge.

Table BI. Satisfaction with the ECB's transparency: probit analyses

	(1)		(2)		(3)	
Optimist	.19**	(0.01)	.17**	(0.02)	.20**	(0.01)
Transparency knowledge (SA)	.50**	(0.00)	.51**	(0.00)	.46**	(0.00)
KI_political	.14**	(0.00)				
KI_economic	.10*	(0.05)	.12**	(0.03)	.10*	(0.06)
KI_procedural	-.19**	(0.00)				
KI_policy	.22**	(0.00)	.26**	(0.00)	.24**	(0.00)
KI_operational	-.26**	(0.00)				
KI_political_alt			.17**	(0.00)	.18**	(0.00)
KI_procedural_alt			-.38**	(0.00)	-.34**	(0.00)
KI_operational_alt			-.13*	(0.06)	-.10	(0.13)
Age					-.00	(0.94)
Gender					-.09	(0.52)
Education					.05	(0.67)
Income					.04	(0.13)
Job					.17	(0.24)
Social class					.06	(0.30)
Urbanization					-.09**	(0.04)
Region					-.06	(0.62)
ECB known					-.32	(0.06)
Economic job					-.09	(0.47)
Economic expert					.15	(0.34)
Economic knowledge (SA)					-.10	(0.23)
Log likelihood	-366		-355		-395	
Pseudo R^2	0.15		0.18		0.16	
N	637		637		636	

Note: P-values are between brackets. *=significant at a 10%-level. **=significant at a 5%-level. SA=self-assessed. Satisfaction with the transparency of the ECB is measured as follows: 1="yes, satisfied" (N=264); 0="no, not enough transparency" (N=381). "No opinion" (N=1144) and "too much transparency" (N=11) are not included in the analyses, although the results are robust to making 1="all dissatisfied people". The definitions of the explanatory variables are in Appendix A.

Table CI. Correctness of inflation perceptions and expectations: Including transparency perceptions directly

	(1) correctness of π^p		(2) correctness of π^e	
Constant	-.70*	(0.10)	-1.75**	(0.00)
Age	.01	(0.12)	.01**	(0.01)
Gender	.15	(0.14)	.24**	(0.04)
Education	.01	(0.92)	.09	(0.40)
Income	.02	(0.32)	-.02	(0.35)
Job	.20*	(0.08)	-.01	(0.97)
Social class	.08*	(0.09)	.02	(0.75)
Urbanization	.03	(0.44)	-.04	(0.34)
Region	-.00	(1.00)	-.06	(0.58)
Optimist	-.01	(0.85)	-.02	(0.75)
ECB known	.41**	(0.00)	.29**	(0.03)
Economic job	.00	(0.99)	-.03	(0.78)
Economic expert	.08	(0.56)	.12	(0.41)
Economic knowledge (SA)	.09	(0.12)	.10*	(0.10)
Transparency perceptions	.13**	(0.01)	.12**	(0.03)
Model	probit		probit	
Pseudo R^2	0.05		0.04	
Log likelihood	-625		-502	
N	964		964	

Note: P-values between brackets. *=significant at a 10%-level. **=significant at a 5%-level. SA=self-assessed. See Appendix A for an explanation of the independent variables. Explanation of the dependent variables:

(1) correctness of inflation perceptions: 1 if $\pi^p \in [1.5\%, 2.1\%]$, 0 otherwise (including the "I don't know" responses).

(2) correctness of inflation expectations: 1 if $\pi^e \in [1.8\%, 2\%]$, 0 otherwise (including the "I don't know" responses).