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CENTRAL BANK TRANSPARENCY:
THE CASE OF THE EUROPEAN
CENTRAL BANK**

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ABSTRACT

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

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 central bank transparency is often lacking. However, as perceptions are crucial for the actions of economic agents this distinction matters. A discrepancy between actual and perceived transparency may exist because of incomplete or incorrect transparency knowledge and other (psychological) factors. Even financial experts, the most important channel through which the central bank can influence the economy, might suffer from misaligned perceptions. We investigate the mismatch between actual and perceived transparency and its relevance by analyzing data of a Dutch household survey on the European Central Bank's transparency. To benefit from higher transparency perceptions the European Central Bank might feel tempted to stress its transparency strengths, but hide its transparency weaknesses.

JEL Classification: D80, E52 and E58

Keywords: behavioural economics, CentERpanel, central bank transparency, perceptions and survey

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1 Introduction

A worldwide trend amongst central banks is the increasing degree of transparency about their monetary policy making process. Central bank transparency is important because it holds independent central banks accountable for their actions. In addition, there are likely to be economic effects from central bank transparency.¹ For example, through improved credibility more transparency could lead to better anchored inflation expectations. This might for example 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.

The distinction between *actual* and *perceived* transparency is not often made in the central bank transparency literature. However such a division is important in case of a difference between these two measures of transparency. Some first empirical proof of the existence of such a discrepancy is given by De Haan et al. (2005).

It is important to analyze the manner in which transparency perceptions are being formed. First, misaligned transparency perceptions, through their effect on the actions of economic agents, could lead to suboptimal economic outcomes. For example, when people's transparency perceptions are lower than the actual transparency practice of the central bank anchoring of inflation expectations might be worse than in case of aligned perceptions. Second, independent central banks need to be transparent to be accountable for their actions. Bringing transparency perceptions in line with reality improves the degree to which the central bank can be accountable.

There are two reasons for a mismatch 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 could be resolved relatively easily. The central bank would only need to improve its communication on those aspects of transparency on which incomplete or incorrect knowledge exists. However, psychological factors (e.g. belief perseverance, sampling memories) are complicating the link between transparency knowledge and perceptions. This second cause for misaligned perceptions is not that simply resolved.

In the central bank transparency literature not enough attention has been paid to the causes and consequences of misaligned transparency perceptions. 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 collect micro data

¹An overview of the central bank transparency literature is provided by van der Cruysen and Eijffinger (2007).

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, it is investigated to what extent knowledge about the ECB's monetary policy transparency is relevant for people's transparency perceptions and to what extent other factors might play a role in the formation of transparency perceptions. Furthermore, the relevance of transparency perceptions from an economic viewpoint is tested empirically.

A visual summary of the expected causes and consequences of perceived central bank transparency is provided by Figure 1.

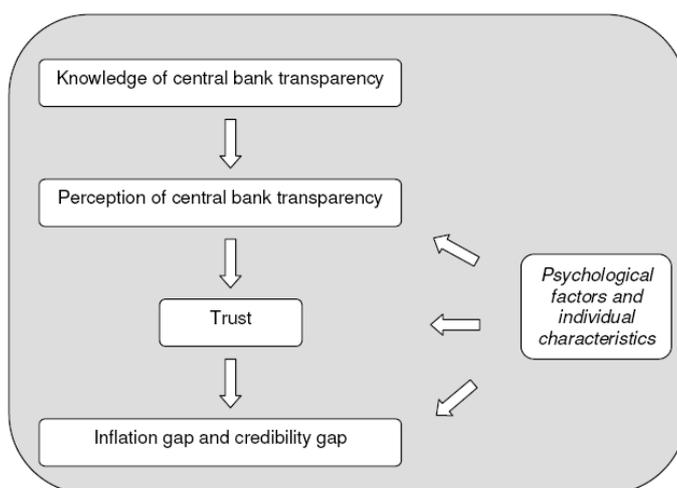


Figure 1: The causes and consequences of perceived central bank transparency

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.

Knowledge of central bank transparency is a determinant of transparency perceptions, but other (psychological) factors influence transparency perceptions as well. Transparency perceptions in their turn 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), through their effect on people's trust in the ECB.² More specific this

²We define trust as "...one's belief and expectation about the likelihood of having a desirable action performed by the trustee." (Das and Teng, 1998, p.494). Here the

transmission channel works as follows. Higher central bank transparency is one of the possible ways in which a central bank might improve its credibility. People have more trust in the monetary policy of a relatively credible central bank. The lower inflation perceptions and expectations that might result would lead to a lower inflation and credibility gap. Psychological insights might be helpful in explaining the transmission from perceptions to other variables.

We start the remainder of this paper by theoretically explaining Figure 1 (Section 2). It is clarified into more detail why a disparity between actual and perceived central bank transparency might exist, the possible channels through which it impacts the economy and whether learning makes a difference. Then we try to test empirically for the hypothesized relationships by reading down Figure 1 from top to bottom. The data and survey methodology are discussed in Section 3. 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 1: "Knowledge of central bank transparency") before looking into the perceived ECB transparency in Section 5 (the second box in Figure 1: "Perception of central bank transparency"). Then, in Section 6, the relevance of investigating transparency perceptions is analyzed by looking at its relationship with the inflation gap and credibility gap via trust (boxes "trust" and "inflation gap and credibility gap" in Figure 1). Last, we conclude (Section 7).

2 Theory

If one assumes that agents are rational, their transparency perceptions should be in line with the actual transparency practice of the central bank. But in reality agents might not behave rationally, in the sense of knowing everything and processing information "correctly". Psychological insights are helpful to get a feeling why a mismatch between actual and perceived central bank transparency 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, p.11)

In the literature on central bank transparency it is often assumed that by giving more public information about the central bank's monetary policy the degree of *actual* central bank transparency is enhanced. This assumption holds as long as one views central bank transparency as something that is measurable, for example by constructing indices that measure facts like whether relevant economic data is published or not. There is however 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 on which the central bank could be transparent about. Throughout the paper we abstain

trustee is the European Central Bank. We use this definition of trust throughout the paper.

from measurement problems and assume that measures of actual central bank transparency are correct. It is shown that even then, transparency *perceptions* might not be in line with the actual degree of central bank transparency. Not only lack of transparency knowledge and incorrect transparency knowledge, but also psychological factors can explain misaligned transparency perceptions.

2.1 Reasons for misaligned transparency perceptions

The assumption that economic agents are rational, in the sense of knowing all the information provided and processing all the information in similar ways, is in our view too strong. A mismatch between actual and perceived transparency may exist because of two reasons. First, a lack of knowledge or even incorrect knowledge about something as specific as the transparency of the central bank is probably present. Second, people process and edit the information that does reach them, in different ways. Psychological factors may play a role explaining misaligned transparency perceptions and why perceptions differ between people. The insights of several behavioral economics papers can be used to support this standpoint.

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 believes 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.

Second, people might even suffer from what is called in psychology a *confirmation bias*, which causes some anchoring of beliefs. Now new information is misinterpreted in such a way that it confirms prior beliefs. This *belief perseverance* might worsen a central bank's possibility to build up credibility through becoming more transparent. It will be difficult to teach people something new that is not in line with their previous beliefs. As Babcock and Loewenstein (1997) point out, the self-serving bias is present when people view the environment differently. Although the central bank provides the same information to everyone, economic agents interpret information differently because of their dissimilar views on the environment. Although heuristics make it easier to perform complex tasks, they may lead people to make large mistakes (Tversky and Kahneman, 1974).

Third, *sampling memories* may be relevant here as well. Camerer (p.595) with good reason says the following.

"...much evidence suggests that human perception deviates systematically from the camera benchmark and memory deviates from the computer benchmark." (Camerer, 2003, p.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. Some experiences are easier retrievable from memory than others.

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 relatively more attention. The public will 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.

Last, *individual characteristics* may be relevant. Psychological research (e.g. Babcock and Loewenstein, 1997 and Malmendier and Tate, 2005) has shown that people are *overconfident* in what they believe and this overconfidence is pervasive. For example, people might get overconfident about their belief that the central bank is intransparent, which makes it more difficult to change these perceptions. As people vary in their degree of confidence, the ease by which perceptions can be changed varies for each person. 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, whereas pessimists are more prone to have a bad opinion about the central bank's transparency.

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. 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.

Perceptions of the central bank's transparency are important as they might affect the economy. For example, when people's perceived transparency rises, the central bank's credibility might improve, people's trust in the monetary policy of the central bank might rise and as a result inflation expectations may become better anchored. 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 personal circumstances, like unemployment, also have an impact on trust in the central bank (Hudson, 2006).

Second, people's *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. Happiness research has revealed that inflation has a sizeable effect on people's happiness (Frey and Stutzer, 2002). 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, 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.

To summarize, transparency perceptions are expected to affect inflation perceptions and expectations through their impact on trust in the central bank but other (psychological) factors cloud this effect. In case transparency perceptions are lower than actual transparency, the central bank might want to raise transparency perceptions if it believes that it improves people's trust in the central bank, and thereby reduces the inflation gap and the credibility gap. However, if transparency perceptions were to be higher than the actual transparency practice of a central bank it might not be itching to change matters (and this is rational behavior for the central bank). As a public institution the central bank has an obligation to the public to take care that perceptions are in line with reality. However there might be a *moral hazard* problem. Possible economic gains from misaligned perceptions (e.g. lower inflation expectations, which increases the central bank's effectiveness) might hold the central bank back from clarifying matters. The central bank might face a perverse incentive to not be too transparent about its transparency practices.

Next, we analyze to what extent learning can eliminate the mismatch between actual and perceived transparency.

2.3 Financial experts and learning

One could argue that misaligned perceptions are not so relevant for two reasons. First, by learning people will eventually form the correct perceptions. So the issue of misaligned perceptions is only a temporary problem. Second, economic

experts are the most important economic actors and they will get things right. Let us first take a look at learning. Central bank transparency and learning are related to each other in dual ways. On the one hand, 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. For the central bank this complicates it to get perceptions in line with their actual transparency practice. The fact that people process information in different ways makes it even more difficult to construct a beneficial communication policy. When people are unaware of the bias in their perceptions, learning will not be of much help.

On the other hand, transparency itself is likely to influence learning. One relatively new strand in the theoretical transparency literature looks at the effects of increased transparency within learning models. Because of criticism on rational expectations (every economic agent behaves rationally and uses the same model of the economy) models that include learning agents were constructed. Agents are provided with learning algorithms which they update based on new information (Evans and Honkapohja, 2005). For example, the private sector could be learning about the model that the central bank uses in conducting monetary policy, whereas both the central bank and the public may have to learn about the way the economy works. Svensson (2003) puts forward the idea that transparency may have a large impact on learning by the private sector to form the right expectations about the economy and inflation. Overall, the learning papers find that central bank transparency can be a helpful tool to improve private sector learning and thereby the decisions that it makes (e.g. Orphanides and Williams, 2005).

Financial 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 possess misaligned transparency perceptions, this does not hold for financial experts. In that case the impact of misaligned perceptions might not be so big. This idea can be dismissed based on psychological findings. Although learning might "improve" perceptions, psychological evidence shows us that even experts suffer from biases and their beliefs might depart from reality as well (e.g. Babcock and Loewenstein, 1997).

By combining some of the findings of De Haan et al. (2005), we can illustrate that this train of thought seems to hold for transparency perceptions too (see Table 1). Financial experts were asked to rank central banks according to their level of transparency. The results show that the US Fed is 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 is the most transparent one. This finding indicates that even financial experts might suffer from misaligned perceptions. 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. As

Babcock and Loewenstein (1997) show, trained professionals are not immune to the confirmation bias. In addition, it is more likely that people are overconfident when they regard themselves experts in a particular field.

Table 1. 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, p.101). The “perceived transparency” column is based on De Haan et al. (2005, Table 4.4, p.102).

For central bankers it is important to know whether the perceptions of those people with economic jobs are misaligned because their decision-making has a huge influence on the economy. Economic experts influence the way in which public’s perceptions are being formed. For example, financial journalists are likely to impact the transparency perceptions of the public through their newspapers articles. It is less likely that the public will collect its information directly from the central bank’s publications and website. As economic experts are making (and influencing) a large part of economic decision-making, the harmony between their transparency perceptions and the actual practice of the central bank is of special interest to the central bank.

In order to test whether such a gap between actual and perceived transparency exists in practice, we have performed a questionnaire amongst Dutch households on the transparency of the ECB. The data is especially rich in providing information about the presence and the strength of the indirect transmission channel we look at throughout this paper (affecting the economy through transparency perceptions) of households. But the data provide also some indications of the relevance of this indirect transmission channel via financial experts. The data and survey methodology will be discussed in the next section.

3 Data and survey methodology

The data for this research project was obtained by setting out an internet-based survey through the CentERpanel, which is a more or less continuous panel. This panel is run by CentERdata, which is a research institute belonging to the CentER group at Tilburg University. CentERdata is specialized in performing internet-based surveys.

It is made sure that the members of the CentERpanel are representative of the 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.³ Questionnaires on various topics are set out throughout the weekend (from Friday afternoon until Tuesday night).

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 persons. 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. 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. They can decide themselves when they have enough time to fill in the questionnaires. Questions are asked in the same way to all participants. And, if desirable, it is possible to repeat surveys by asking the same persons again to obtain longitudinal data. Last, respondents don't need to answer background questions every time they fill in a questionnaire.⁴

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 income of 2554 Euro. Of the respondents 34.5% has 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 will be discussed in the last section of this paper.

The questions in the survey, which were pretested 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 effects of transparency perceptions. Perceived transparency may be misaligned for two reasons: 1) incomplete or incorrect transparency knowledge, and 2) psychological factors, which disturb the transmission from knowledge to perceptions.

Section 4 deals with the questions that measured people's knowledge of the transparency of the ECB. In Section 5 it is analyzed to what extent knowledge of the ECB's transparency translates into perceptions of transparency and which role other factors play in the formation of transparency perceptions. In Section 6 we use the responses to questions on trust, inflation expectations and inflation perceptions to discuss the relevance of misaligned transparency perceptions for economic outcomes.

³Some of these households participate with more than one member, each with their own ID-number.

⁴More details on the CentERpanel can be found on <http://www.uvt.nl/centerdata/en/>.

4 Knowledge of central bank transparency

We have used several ways to measure Dutch households' knowledge about the ECB's transparency. First, they were asked to make a self-assessment of their knowledge about the ECB's transparency (Section 4.1). Second, the depth and correctness of their transparency knowledge has been measured by asking questions about the actual transparency practice of the ECB (Section 4.2). A mismatch between the actual and perceived transparency by the main economic actors is of special interest as these economic agents determine to a large extent economic outcomes. 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 (De Nederlandsche Bank): 9 out of 10 people. Throughout the questionnaire people could respond "I don't know" to all the questions regarding the ECB, such that guessing the correct answers is prevented and a clear picture of the lack of knowledge is achieved.

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 2 provides an overview of the responses.

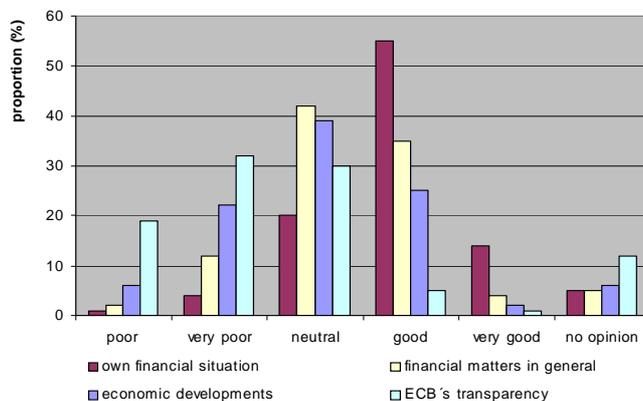


Figure 2: Respondents' self-assessed knowledge

Not surprisingly, as it is a more specialized topic, survey participants judge

their knowledge of the ECB's transparency as being the worst. The majority of respondents report to have bad or very bad transparency knowledge (32% and 19%), 30% gives as answer "neutral", whereas there are some people who judge themselves as having a high knowledge (5%) or even a very high knowledge (1%).

Table 2 gives an overview of the degree to which various judgements of knowledge are related. Knowledge about the transparency of the ECB has the strongest, positive, correlation with assessed knowledge about economic developments in general (0.54), closely followed by the correlation with assessed knowledge about financial matters in general (0.47). The correlation with the assessed knowledge of people's own financial situation is only about half as strong.

Table 2. Correlation of the various knowledge assessments

Knowledge about...	(A)	(B)	(C)	(D)
(A) economic developments	1.00	-	-	-
(B) own financial situation	0.49	1.00	-	-
(C) financial matters in general	0.66	0.62	1.00	-
(D) transparency of the ECB	0.54	0.26	0.47	1.00

Note: Respondents' self-assessed knowledge, scale from 1 to 5 (1=very poor, 2=poor, 3=neutral, 4=good, 5=very good). The "I don't know"-responses are not included in this correlation calculation.

We have investigated what explains the knowledge about the ECB's transparency. Table 3 column 1 contains the results based on 1525 observations ("no opinion"-respondents are excluded from the analysis).⁵ Not surprisingly, knowing of the existence of the ECB is relevant. In addition, *ceteris paribus*, self-assessed transparency knowledge is significantly higher for those who are older, male, not having a job, living in less urbanized regions and being more optimistic. Education, income, social class and region are insignificant. A quite intuitive finding is that transparency knowledge increases with age and assessed optimism. The gender effect may be explained by the higher degree of overconfidence of males (e.g. Barber and Odean, 2001) and them fulfilling economic jobs more often. People with a job may assess their transparency knowledge lower because they might make a more realistic, lower judgement of their transparency knowledge or because they have had less time to invest in this type of knowledge.

⁵Appendix A contains a description of all the explanatory variables used throughout the paper.

Table 3. Self-assessed knowledge about the ECB's transparency: ordered probit analyses

	(1)	(2)
Age	.01** (0.00)	.01** (0.00)
Gender	.23** (0.00)	-.01 (0.89)
Education	.02 (0.83)	.03 (0.68)
Income	.02 (0.14)	-.02 (0.31)
Job	-.17** (0.02)	-.22** (0.00)
Social class	.01 (0.82)	-.05 (0.12)
Urbanization	-.06** (0.01)	-.09** (0.00)
Region	.10 (0.11)	.17** (0.01)
Optimist	.11** (0.00)	.04 (0.28)
ECB known	.53** (0.00)	.35** (0.00)
Economic job		-.01 (0.89)
Economic expert		.32** (0.00)
Economic knowledge (SA)		.78** (0.00)
Log likelihood	-1856	-1617
Pseudo R2	0.04	0.17
N	1525	1522

Note: P-values between brackets. * = significant at a 10%-level. ** = significant at a 5%-level. SA = self-assessed. The explained variable is a person's self-assessed knowledge about the ECB's transparency, scaled from 1 to 5 (1 = very poor, 2 = poor, 3 = neutral, 4 = good, 5 = very good). See appendix A for the definitions of the explanatory variables. The number of observations (N) is lower in model 2 because persons who did not report their self-assessed "economic knowledge" could not be included in the analysis.

Table 3 column 2 contains an extended regressions that includes indicators of economic expertise. The explanatory power of the model rises a lot. Having an "economic job" in the sense of being confronted with financial, monetary and economic matters during working hours is not relevant per se for people's assessed transparency knowledge. What is needed is "economic expertise": economic work experience on a *daily* basis. Despite being broadly defined, economic expertise is significantly related to higher self-assessed transparency knowledge. Another variable we add is people's self-assessed economic knowledge. Those respondents with a relatively high degree of self-assessed economic knowledge assess their transparency knowledge to be relatively high as well. This might to some extent be caused by people's degree of optimism which might be relevant for both their self-assessed transparency knowledge (the dependent variable) as well as their self-assessed economic knowledge (an explanatory variable). This explains the insignificance of the optimist variable in model 2. Another variable which is now not significant anymore is gender. One explanation is that economic jobs and education have traditionally been and still are men-dominated and by correcting for differences in economic knowledge and jobs, the difference between men and woman disappears. In model 2 the region dummy is signif-

icant. Holding other factors constant, those people living in the West of the Netherlands assess their transparency knowledge to be relatively high.

4.2 Actual transparency knowledge

The knowledge of the ECB's transparency is analyzed in more detail as well. We gave survey participants various questions about the ECB's transparency practice. To prevent guessing and to disentangle those persons that lack knowledge from those persons who have either 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 distinguished by Eijffinger and Geraats (2006) (abbreviated by EG). Table 4 summarizes the responses to the transparency questions.

Table 4. 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).

The check mark (✓) indicates which answer is correct according to EG(2006). 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.

4.2.1 Political transparency

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 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 think to 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 asking instead whether "price stability is the ECB's main goal" more people respond and of those respondents a huge majority answers "yes".

Only few people think to know whether price stability is quantified. Of these persons 2/3 say the ECB's main goal is not quantified, while 1/3 says 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 regarded as an important aspect of the monetary policy framework, only half of the people thinks it knows whether the ECB can act independently or not. But of these persons 30% actually questions the independence of the ECB. As independence is often regarded as an important tool to build up credibility, communication to increase and improve knowledge about it might be beneficial.

4.2.2 Economic transparency

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 a bit less 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 by a higher

⁶Protocol 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.

amount of "I don't know"-answers as well as a higher amount of incorrect knowledge.

4.2.3 Procedural transparency

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 (and therefore the maximum EG-index score is obtained), it is obvious that the survey respondents feel interest rate decisions are not made in such a clear fashion. Actually this response is in line with reality, as it is difficult to know what weights these two pillars get in reality, 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, pp.16-25). Therefore the answer "no" can be judged to be correct as well.

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 relatively intransparent.

4.2.4 Policy transparency

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 lack knowledge about policy transparency (57-68%), especially about transparency about future policy preferences. Policy transparency knowledge is not only missing depth but also correctness. Unfortunately, of the persons 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 its monetary policy actions. 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. 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 A2 and A3. The total KI ranges between 0 and 15. Based on a sample of 1519 persons the degree of transparency knowledge is explained, see Table 5.

Table 5. 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	
Adjusted R ²	0.31		0.30	

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.

Transparency knowledge is better for those respondents who are relatively old, earning a relatively high income, belonging to a higher social class, not living in

the West of the Netherlands (which is in contrast to their self-assessments) and who know the ECB exists (before receiving a definition of the ECB). Economic expertise is relevant in explaining actual transparency knowledge (as it was in explaining assessed 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.⁷ However data inspection reveals that even those respondents who assess their transparency knowledge to be very good possess some lack of or even 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 5 shows the results based on an alternative KI, which is a bit less stringent regarding those aspects of transparency on which the right answer is debatable.

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

4.3 Transparency knowledge and learning

One might argue that a perceptions mismatch is not present for economic experts. These economic experts would not have lacking or even incorrect knowledge and not be subject to psychological biases. Based on the survey results, we looked whether this is likely to be the case in practice. Both the depth and correctness of the transparency knowledge of the economic "experts" among the people in the household survey is tested. 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.⁸

4.3.1 Economic expertise based on self-assessment

To get more feeling for the relevance of learning, Table 6 shows the results of a comparison of the responses of two groups of people: the ones that perceive to have good economic knowledge (25% of the respondents) and the ones who assess their knowledge to be poor (22% of the respondents). A much lower share of the people belonging to the good economic knowledge group answered "I don't know" (between 30 and 50%-points less). The majority of the extra "I

⁷This is in line with van Rooij, Lusardi and Alessie (2007) who find that respondents own assessments of their degree of financial literacy are a good proxy for their actual degree of financial literacy.

⁸See Appendix B, Table B1 for an overview of the overlap between these two expert-definitions.

do know" answers of this group is correct but unfortunately not all of the extra responses.⁹ Although performing the best compared to groups with a lower degree of economic knowledge, even the "economic experts" (people who judge their economic knowledge to be "very good") suffer from missing and incorrect transparency knowledge. An overview of their responses is given in Appendix B, Table B2.

Table 6. Actual knowledge about the ECB's transparency and self-assessed economic expertise

Difference in response shares of those people judging their own knowledge about economic developments to be "good" (N=453) and those judging it to be "poor" (N=404).

	yes		no		I don't know
Political transparency					
ECB's goals laid down	40%	✓	2%		-43%
ECB's main task is supporting the economy	13%		29%	✓	-42%
ECB's main task is supporting price stability	32%	✓	10%		-42%
ECB's main goal expressed by a number	11%	✓	19%		-30%
ECB is independent	34%	✓	7%		-41%
Economic transparency					
ECB provides economic data	36%	✓	6%		-42%
ECB provides economic forecasts	38%	✓	5%		-43%
ECB provides economic models	27%	✓	13%		-40%
Procedural transparency					
ECB's interest rate decisions are made in a clear fashion	23%	✓	23%		-46%
ECB provides comprehensive minutes	11%		24%	✓	-35%
ECB provides voting records	-4%		34%	✓	-38%
Policy transparency					
ECB announces interest rate decisions immediately	34%	✓	12%		-47%
ECB immediately explains the interest rate decision	36%	✓	14%		-50%
ECB tells future policy preferences	17%		26%	✓	-43%
Operational transparency					
ECB provides information about relevant economic shocks	17%	✓	16%		-33%
ECB provides information about forecasting errors	10%		25%	✓	-35%
ECB provides information about its performance	27%		12%	✓	-39%

Note: The share of people in the "good" group is 25% and the share of people in the "poor" group is 22%. The check mark (✓) indicates which answer is correct according to EG(2006).

⁹A higher degree of optimism might both lead people to assess their economic knowledge to be better as well as make them feel more confident about their transparency knowledge.

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 to the ones that in their day-to-day work are confronted with economic, monetary or financial matters. 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%).

Table 7. Actual knowledge about the ECB's transparency and on the job economic expertise

Response shares of those people 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: People were asked whether they have on the job experience with economic, financial or monetary matters. Possible answers were: "yes, daily", "yes, but not daily" and "no". This table presents the responses of the "yes, daily"-group, to which 11% (N=197) of the respondents belongs. The check mark (✓) indicates which answer is correct according to EG(2006).

Taking a look at the 197 people in the "yes, every day" group (so belonging to a still broadly defined expert group, from administrators to managers), of which the responses are presented in Table 7, several observations can be made. The category "I don't know" varies for different statement about transparency. Take for example the questions that measure knowledge about political transparency. 71% of the respondents thinks they know whether the ECB can act independently of governments, while only 40% reports 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 quantitative or not). Roughly speaking, of those people responding the majority gives the correct answer. This does not hold for categories for which the correct answer is disputable, as we saw before.

Detailed inspection of the data confirms the findings in the previous section based on assessed economic knowledge. 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 correct answers is higher.¹⁰

To summarize, experts have better transparency knowledge but it is far from perfect. 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

Perceptions of the ECB's transparency are measured in two ways. First, Dutch households were asked questions to measure their perceptions of the ECB's monetary policy transparency in general (Section 5.1). Second, transparency perceptions about the various aspects on which the ECB could be transparent are measured as well (Section 5.2).

5.1 General transparency perceptions

Perceived transparency may be misaligned because of two reasons: 1) knowledge is incomplete or incorrect, and 2) psychological factors disturb the transmission from knowledge to perceptions. Figure 3 gives an overview of the perceptions persons 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"). In addition there is an option "no opinion". 4 out of 10 people do not report a view on the ECB's monetary policy transparency, but the

¹⁰The 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. To get more feelings for the results a comparison of the "yes, every day"-group and the "no"-group is presented in Table B3 of Appendix B.

ones that do report their perceptions have transparency perceptions which are slightly biased on the side of intransparency.

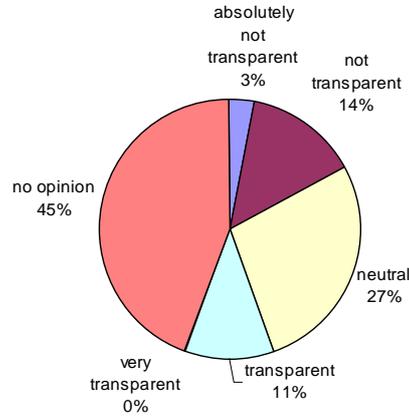


Figure 3: ECB's perceived transparency

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 people have an opinion on this matter (37%), which means that for a substantial share of people the ECB cannot use the transmission channel looked at in this paper. Of the people that do report their transparency perceptions 40% is satisfied with the degree of transparency, almost 60% says the ECB's transparency is too low and only 3% thinks 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 people's actual transparency knowledge. A detailed description of the design of these KI's is presented in Appendix A, Table A2 and A3.

First, take a look at the regressions of the level of perceived ECB transparency of which the results are presented in Table 8 (regression 1 is the baseline model). 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 is relatively low.

Table 8. 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 can be found in Appendix A.

In regression 2 (in Table 8) we used 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 a direction for future policy are judged to be correct. We find that (I) does not make a big difference, (II) leads actual procedural transparency knowledge to push down perceived transparency even more, and (III) leads actual operational transparency knowledge to lower perceived transparency less.

In regression 3 we add several control variables. The fit of the model slightly improves. The higher the age is, the lower perceived ECB transparency is. People with a paid job have relatively lower transparency perceptions. An interesting finding is that 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 C, 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, when the ECB wants to (1) enhance the extent to which it is perceived as being transparent and (2) people's satisfaction with transparency, it should focus on communicating about those aspects on which its transparency score is high: political, economic and policy transparency. In contrast the ECB should not emphasize its lack of procedural and operational transparency. To get more insight into the perceived transparency, we investigated whether transparency perceptions differ across various aspects.

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"). When we combine the results of this part of the questionnaire with the results we found about the transparency knowledge of respondents we derive some useful insights. 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 individual

characteristics. Figure 3 shows the public's perceived transparency.¹¹

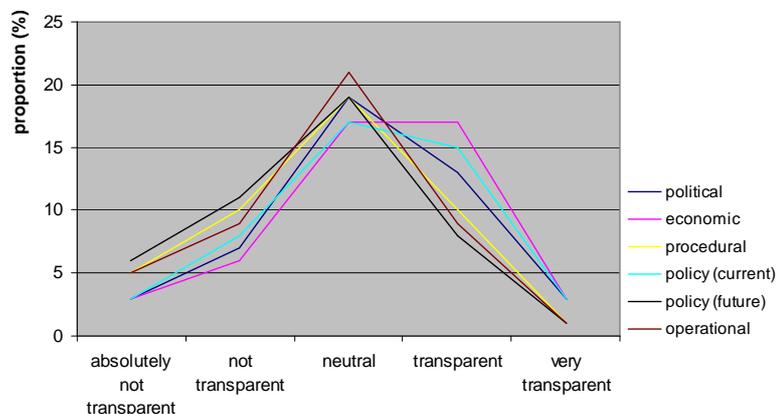


Figure 4: ECB's perceived transparency

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

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. As Table 9 shows 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 received the maximum score based on the EG-index, a substantial amount of people still judge the ECB to be intransparent.

¹¹We 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.

Table 9. 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".

Targeted communication may reduce the transparency misalignment by raising the transparency 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 coming into action however, it is important to know the degree to which misaligned transparency perceptions matter.

6 The relevance of transparency perceptions

Based on survey data on the ECB's transparency we can conclude that a mismatch between actual and perceived transparency exists. Next we investigate to what extent this mismatch is relevant. In addition to the "moral obligation" 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 gains related to it as well. To check whether this is indeed the case, we first look at the relationship between transparency perceptions and trust in the ECB in Subsection 6.1. Thereafter the link to inflation perceptions and expectations is made in Subsection 6.2.

6.1 Trust in the European Central Bank

Survey participants report to 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" (29%), "a lot" (7%), "no opinion" (18%). We investigated the role of transparency perceptions in explaining people's trust in the ECB by estimating an ordered probit regression.

In our analysis we include both a direct (Table 10, model 1a and 1b) as well as an indirect measure of trust (model 2). We observe that the direct measure of trust in the ECB is indeed related to central bank transparency perceptions. The higher the perceptions of the ECB's transparency, the higher the trust in

the ECB. This result highlights the importance of 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 relevant in explaining trust as well. 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.

Table 10. 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)	-.49** (0.00)	
Economic job	-.07 (0.41)	-.18** (0.02)	-.08 (0.48)	
Economic expert	.10 (0.37)	.15 (0.13)	-.03 (0.79)	
Economic knowledge (SA)	.08* (0.09)	.05 (0.19)	.08 (0.54)	
Transparency perceptions	.57** (0.00)		.13** (0.02)	
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 R2	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%)).

Model 1b includes transparency perceptions in an indirect manner by including

transparency knowledge indices.¹² 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 have no clue (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. The responses of those respondents that did report an opinion are explained with an ordered probit model of which the results are presented in Table 10 model 2. *Ceteris paribus*, people are more satisfied with the extent to which the ECB safeguards price stability when they have no paid job, are more optimistic, have higher transparency perceptions and know the ECB beforehand.

Overall, we find that transparency perceptions are significantly related to both the direct measure of trust in the ECB as well as to the indirect measure of trust (the extent to which the ECB is safeguarding price stability).¹³

6.2 Inflation gap and credibility gap

What matters then is if trust is indeed related to inflation perceptions and inflation expectations. When judging current inflation, opinions are nicely distributed around neutral. This is not in line with the picture we obtain when we ask survey participants to quantify their transparency perceptions and expectations. Persons were asked to report their perceptions of current consumer price inflation and their expectations of future inflation (in the medium term: 2 years). The responses show a peak around 2% but are skewed upwards, which is in line with previous research of Christensen et al. (2006). 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%. Responses vary a lot as is shown in Appendix D. Respondents judge future inflation (in 2 years time) higher than current inflation, which suggests that inflation expectations are not perfectly anchored.

To measure to what extent trust is related to inflation perceptions and expectations, we tried to explain the "inflation gap" and the "credibility gap". The inflation gap is defined as the difference between perceived and actual current inflation. As a measure of actual inflation we take the consumer price index

¹²It is for this reason that we could include less observations in model 1b compared to model 1a.

¹³It 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.

of May: 1.8%. Table 11 column 1 gives the regression results based on 1143 observations.

Table 11. Perceived inflation

	(1)	(2)	(3)
	$\pi_t^p - \pi_t^a$	$abs(\pi_t^p - \pi_t^a)$	correctness of π_t^p
Age	-.04** (0.01)	-.04** (0.00)	-.01** (0.02)
Gender	-.87** (0.04)	-.93** (0.02)	-.21** (0.01)
Education	-.25 (0.56)	-.26 (0.53)	.07 (0.41)
Income	-.06 (0.49)	-.07 (0.40)	-.02 (0.21)
Job	-1.20** (0.01)	-1.21** (0.01)	-.25** (0.01)
Social class	-.31 (0.11)	-.35* (0.07)	-.08** (0.03)
Urbanization	.08 (0.58)	.08 (0.56)	-.03 (0.35)
Region	-.55 (0.15)	-.55 (0.14)	-.03 (0.68)
Optimist	-.35 (0.14)	-.33 (0.15)	.02 (0.62)
ECB known	-1.29** (0.00)	-1.45** (0.00)	-.37** (0.00)
Economic job	.51 (0.24)	.45 (0.29)	-.09 (0.33)
Economic expert	-.32 (0.57)	-.37 (0.51)	-.04 (0.77)
Economic knowledge (SA)	.22 (0.33)	.24 (0.27)	-.10** (0.03)
Trust	-.37* (0.08)	-.34* (0.10)	-.22** (0.00)
Constant	4.35** (0.01)	4.36** (0.01)	1.27** (0.00)
Model type	OLS	OLS	probit
R ²	0.05	0.06	
Adjusted R ²	0.04	0.05	
Pseudo R ²			0.08
Log likelihood			-859
N	1143	1143	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: $\pi_t^p - \pi_t^a$. π_t^p = perceived current inflation (percentage), π_t^a = actual current inflation, which equals 1.8% (Consumer Price Index of May 2007);

(2) the absolute value of the inflation gap: $abs(\pi_t^p - \pi_t^a)$;

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

The inflation gap is more likely to be smaller or even negative (perceived inflation lower than actual inflation) when one is older, male, having a paid job, and when knowing the ECB and having more trust in it. The same factors plus the social class one belongs to significantly explain the absolute value of the inflation gap, a measure of the extent to which the given answer was close to actual inflation, no matter whether perceptions were too high or too low (see column 2 of Table 11). Column 3 shows the results of a probit regression used to explain the correctness of inflation perceptions. The sample size is now larger as those people who choose "I don't know" could now be included in the analysis

(belonging to those people with incorrect transparency perceptions). Inflation perceptions were judged to be correct if they were between 1.5% and 2.1%. In addition to the characteristics that matter in regression 1 and 2, economic knowledge now significantly relates to the correctness of inflation perceptions. Inflation perceptions are more in line with reality for those people that have a higher degree of self-assessed economic knowledge. The credibility gap is the difference between the inflation expected within two years and the inflation target of the ECB. The regression results are in Table 12.

Table 12. Expected inflation

	(1)		(2)		(3)	
	$\pi_{t+2}^e - \pi_{t+2}^T$		$abs(\pi_{t+2}^e - \pi_{t+2}^T)$		correctness of π_{t+2}^e	
Age	-.03*	(0.05)	-.03**	(0.04)	-.01	(0.11)
Gender	-.57	(0.19)	-.67	(0.11)	-.14	(0.12)
Education	-.17	(0.69)	-.18	(0.68)	.01	(0.94)
Income	-.11	(0.25)	-.09	(0.31)	-.01	(0.69)
Job	-.87*	(0.08)	-.95*	(0.05)	.04	(0.69)
Social class	-.50**	(0.01)	-.57**	(0.00)	-.02	(0.68)
Urbanization	.17	(0.25)	.17	(0.23)	-.01	(0.65)
Region	-.57	(0.15)	-.55	(0.16)	.03	(0.71)
Optimist	-.33	(0.17)	-.29	(0.22)	.08	(0.15)
ECB known	-.86*	(0.06)	-1.02**	(0.03)	-0.21**	(0.04)
Economic job	.78*	(0.08)	.71	(0.10)	-.01	(0.95)
Economic expert	.31	(0.60)	.24	(0.68)	-.11	(0.41)
Economic knowledge (SA)	-.07	(0.76)	-.05	(0.82)	-.11**	(0.03)
Trust	-.44**	(0.04)	-.43**	(0.04)	-.21**	(0.00)
Constant	5.42**	(0.00)	5.29**	(0.00)	1.65**	(0.00)
Model type	OLS		OLS		probit	
R ²	0.05		0.05			
Adjusted R ²	0.04		0.04			
Pseudo R ²					0.05	
Log likelihood					-696	
N	1112		1112		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 credibility gap: $\pi_{t+2}^e - \pi_{t+2}^T$. π_{t+2}^e = expected inflation two years from now (percentage), π_{t+2}^T = the ECB's medium term inflation target, which is set at 1.9%;
- (2) the absolute value of the inflation gap: $abs(\pi_{t+2}^e - \pi_{t+2}^T)$;
- (3) correctness of inflation expectations: 0 if $\pi_t^e \in [1.8, 2]$, 1 otherwise (including the "I don't know" responses).

In column 1 it is shown that the credibility gap is lower for those who are older, having a job, belonging to a higher social class, knowing the ECB and having

an economic job. Trust is a significant explanatory variable of the inflation gap. Similar factors play a role in explaining the absolute difference between inflation expectations and the inflation target of the ECB (column 2 of Table 12). The last column of Table 12 explains the "correctness" of respondents' inflation expectations in the sense of being in line with the inflation target of the ECB. Self-assessed economic knowledge, knowing the ECB and trust play a significant role in explaining the correctness of respondents' inflation expectations.

To summarize, trust is both a relevant factor for both keeping inflation perceptions low and in line with reality and for anchoring inflation expectations around the central bank's target.¹⁴ Though to the extent that transparency perceptions matter for trust, they are relevant based on economic arguments too. Transparency perceptions are significant too when included in a direct manner in the correctness of inflation perceptions and expectations regressions instead of trust (see Appendix D). However the explanatory power of the models is lower as trust in the ECB depends on more factors than only transparency perceptions. Therefore other ways in which to improve trust in the ECB will be helpful as well.

7 Conclusion

In this paper it is argued 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 on the ECB's transparency it is shown that actual knowledge is lacking or even incorrect, which is a first evidence for a mismatch between actual and perceived transparency. 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: financial experts. Both expert definitions we use (having an economic job and having a very high self-assessed economic knowledge) confirm this viewpoint. Depending on which aspect of transparency it is looked at 46%-72% of the respondents report that they have no idea about the current transparency practice of the ECB. A majority of the respondents that do report to have knowledge possess the correct knowledge, whereas the rest has incorrect transparency knowledge. About some aspects of transparency knowledge is higher than on others. 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 is relatively intransparent). When we correct

¹⁴We should note however that it is unclear whether and to what extent the relationship between inflation perceptions and trust moves in two directions.

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.

Regarding determinant (2), psychological factors seem to matter in the formation of transparency perceptions. 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 exact knowledge people form perceptions about the ECB's transparency. The finding that transparency perceptions do not only depends on actual transparency knowledge complicates it for central banks to align transparency perceptions with their actual transparency practice.

Transparency perceptions matter as they are significantly positively related to the amount of trust in the ECB. This results highlights the importance of transparency perceptions as central banks are interested in keeping up people's trust. It eases 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 eases policy-making. The indirect transmission channel analyzed in this paper (from transparency perceptions to the economic outcomes) though seems to be relevant. It is however absent for the majority of the population, but less so for people with relatively high economic "expertise" in whom the ECB is interested the most.

The central bank has an accountability obligation to the public and fulfills it by being transparent. In order to do this as best as possible a closer match between the actual and perceived degree of transparency is welcomed. Despite this "moral" obligation to bring transparency perceptions in line with the ECB's practice, the central bank might feel a perverse incentive to keep transparency perceptions misaligned in case they are higher than its actual transparency practice. To benefit from higher transparency perceptions the ECB might feel tempted to stress its transparency strengths (political, economic and policy transparency), but de-emphasize its transparency weaknesses (procedural and operational transparency).¹⁵ However, it might not be so easy to develop one communication strategy that works because the manner in which perceptions are being formed is likely to differ between agents and perceptions not only depend on transparency knowledge but on psychological factors as well.

¹⁵An alternative would be to improve its actual procedural and operational transparency but this might be much more difficult and costly to achieve.

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A Description of the explanatory variables

Table A1. 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 situations, 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
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 (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 A2. 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 A3. Transparency knowledge indices

Variable	Description	Range
KI_political	knowledge index about the ECB's political 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 political 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)

B Expertise and knowledge about the ECB's transparency

Table B1. 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 B2. Actual knowledge about the ECB's transparency and self-assessed economic expertise

Response shares of those people 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	88%	✓	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: People 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", "I don't know". This table presents the response shares of the group "very good", which contains only 2% of the respondents, answering "yes", "no" and "I don't know" on the transparency questions. The check mark (✓) indicates which answer is correct according to EG(2006).

Table B3. Actual knowledge about the ECB's transparency and on the job economic expertise

Difference in response shares of those people confronted daily in their work with economic, financial or monetary affairs (N=197), and those never faced with these matters (N=1264).

	yes		no		I don't know
Political transparency					
ECB's goals laid down	31%	✓	2%		-33%
ECB's main task is supporting the economy	2%		25%	✓	-27%
ECB's main task is supporting price stability	17%	✓	8%		-26%
ECB's main goal expressed by a number	10%	✓	6%		-15%
ECB is independent	22%	✓	5%		-28%
Economic transparency					
ECB provides economic data	25%	✓	3%		-28%
ECB provides economic forecasts	26%	✓	3%		-29%
ECB provides economic models	17%	✓	11%		-29%
Procedural transparency					
ECB's interest rate decisions are made in a clear fashion	18%	✓	11%		-30%
ECB provides comprehensive minutes	2%		11%	✓	-14%
ECB provides voting records	4%		20%	✓	-24%
Policy transparency					
ECB announces interest rate decisions immediately	22%	✓	6%		-28%
ECB immediately explains the interest rate decision	21%	✓	9%		-30%
ECB tells future policy preferences	15%		13%	✓	-29%
Operational transparency					
ECB provides information about relevant economic shocks	11%	✓	15%		-25%
ECB provides information about forecasting errors	4%		22%	✓	-26%
ECB provides information about its performance	17%		13%	✓	-30%

Note: The share of people in the "yes, daily" group is 11% and the share of people in the "no" group is 70% (the rest answered "yes, but not daily"). The check mark (✓) indicates which answer is correct according to EG(2006).

C Satisfaction with the ECB's transparency

Table C1. 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 can be found in Appendix A.

D Inflation perceptions and expectations

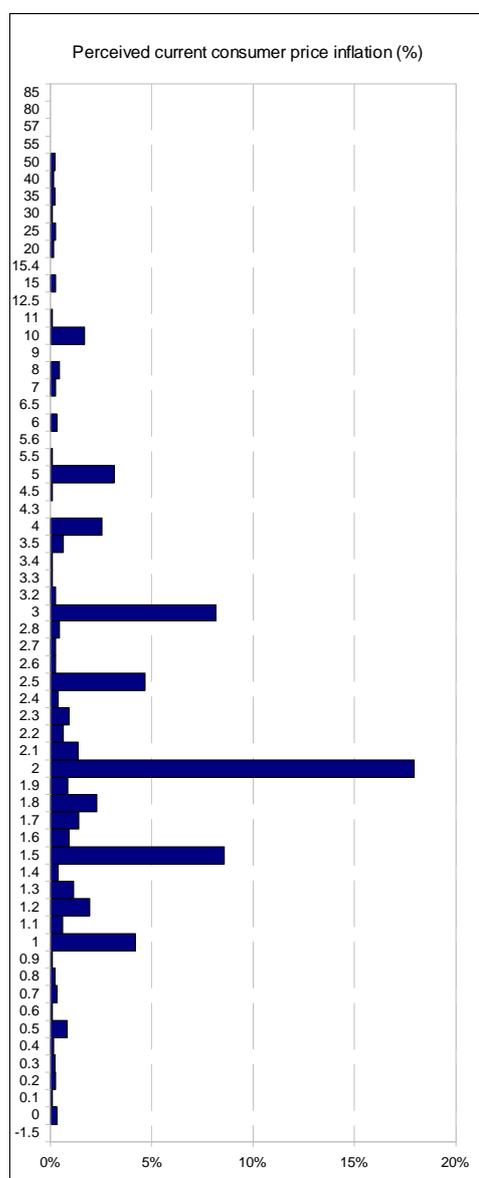


Figure 5: Perceived inflation

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.

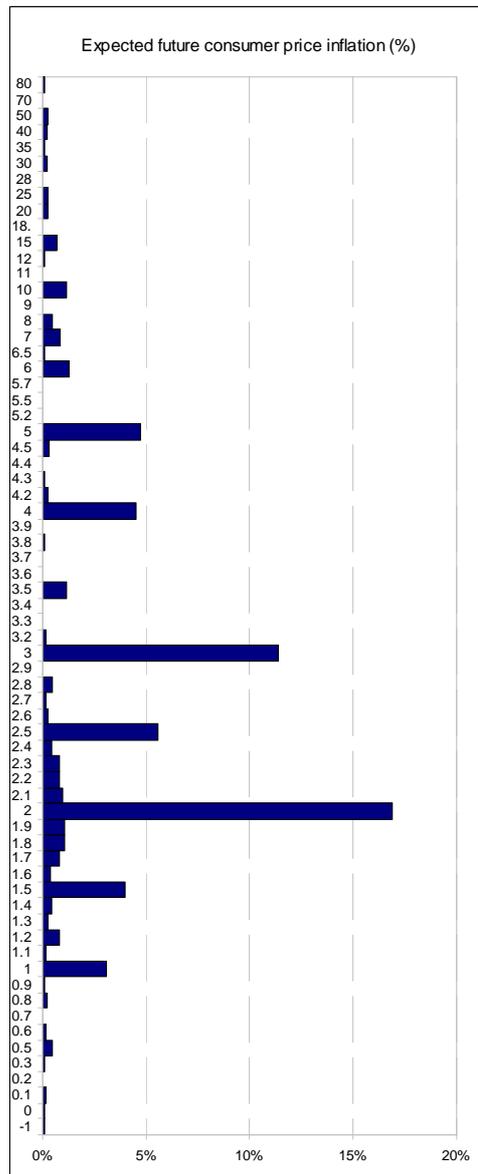


Figure 6: Expected inflation

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 D1. Correctness of inflation perceptions and expectations:
Including transparency perceptions directly**

	(1)		(2)	
	correctness of π_t^p		correctness of π_{t+2}^e	
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)
Constant	.70*	(0.10)	1.75**	(0.00)
Model type	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: 0 if $\pi_t^p \in [1.5, 2.1]$, 1 otherwise (including the "I don't know" responses).

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