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### **Transparency and Trust: The Case of the European Central Bank**

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## **Abstract**

We examine how the transparency of the European Central Bank's monetary policy affects the amount of trust that the citizens of the European Union have in this institution. We use nearly half a million individual responses from the European Commission's Eurobarometer survey from 2000-2011 and estimate probit regressions with sample selection. We find that transparency exerts a non-linear effect on trust. Transparency increases trust, but only up to a certain point; too much transparency harms trust. This result is robust to controlling for a number of macroeconomic conditions, financial stability transparency measures, and economic and socio-demographic characteristics of respondents, including examining respondents in European Union countries that do not use the euro and addressing clustering issues.

*JEL-Classification:* E52, E58

*Keywords:* European Central Bank, trust, transparency, survey

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## 1 Introduction

Monetary policy transparency has increased dramatically during last the two decades. Central banks have started publishing detailed information about how they make monetary policy decisions. The effects of this increased transparency have been extensively examined. For example, researchers have studied whether greater transparency improves the predictability of monetary policy for financial markets, whether transparency plays a coordinating role for professional forecasters and whether transparency improves financial stability (see, for example, Gerlach-Kristen (2004), Crowe (2010), Ehrmann et al. (2012), and Horváth et al. (2012), among many others). As a result, we have relatively extensive knowledge about the interactions between transparency and financial market participants.

However, we know much less about how the general public perceives the transparency of central banks, including the European Central Bank (ECB), and especially whether transparency affects the amount of trust that the public has in central banks (van der Cruysen and Eijffinger, 2010). This situation is somewhat paradoxical given that trust is likely to improve central bank credibility and as such help to anchor inflation expectations and improve monetary policy efficiency in general. Public trust may also be important to central bank independence and a lack of political pressure (Ehrmann and Fratzscher, 2011). Finally, public trust is likely to be an important factor influencing the decisions of European Union countries to join the euro area and transfer their monetary policy to the ECB. Nevertheless, there are only handful of studies that examine trust in the European Central Bank or in central banks in general (see Ehrmann et al. (2013), Hayo and Neuenkirch (2014)). In addition, the transparency of the ECB has recently been a topic of intense policy discussion (Belke (2014), Issing (2014)).

In this paper, we bridge this gap and examine how the transparency of the ECB's monetary policy affects the amount of trust that European citizens have in this institution. According to Dincer and Eichengreen (2014), the ECB increased its transparency during the 2000s, and on a global level, it is one of the most highly transparent central banks but still below the central banks in the Czech Republic, Great Britain, Hungary, New Zealand or Sweden.<sup>1</sup> As a result of the European Commission's Eurobarometer survey, we have a very detailed individual-level dataset that includes responses to the question *"Please tell me if you tend to trust the European Central Bank or tend not to trust it"* and a comprehensive set of economic and socio-demographic characteristics of respondents. We extend the previous literature on the determinants of trust in the ECB, including studies by Ehrmann et al. (2013) and Hayo and Neuenkirch (2014). Their research shows that the macroeconomic environment and the characteristics of respondents matter to the degree of trust in the ECB. We examine the effect of transparency on trust while controlling for the factors that prior studies have found to be important to shaping the level of trust. We also cover the period of the global financial crisis, during which, according to the Eurobarometer surveys, the degree of trust in the European Central Bank decreased markedly.

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<sup>1</sup> Monetary policy transparency index has been originally developed by Eijffinger and Geraats (2006). The index consists of five components: political, economical, procedural, policy and operational transparency.

To our knowledge, the effect of actual monetary policy transparency on trust has not yet been examined. Using data from a Dutch household survey, van der Crujsen and Eijffinger (2010) examine the effect of perceived transparency on citizens' trust in the ECB. They find that higher perceived transparency is positively associated with trust, but they also show that the link between perceived and actual transparency is rather weak. Another stream of literature examines the effect of monetary policy transparency on trust indirectly but documenting that higher transparency contributes more better anchored inflation expectations (van der Crujsen and Demertzis, 2007).

We examine how actual transparency affects trust and whether this effect is non-linear. We hypothesize that greater transparency is likely to increase trust but that too much transparency does not necessarily have to be conducive for trust, which corresponds with the notion of limits to transparency (Cukierman (2010), Issing (2014)) and theoretical literature such as studies by Walsh (2007), van der Crujsen et al. (2010) and Baeriswyl (2011) that suggest that an optimal level of central bank transparency exists. In line with this literature our supposition is that once central bank communicates all uncertainties surrounding its forecasts and explains the potential disruptions in monetary policy transmission mechanism and policy errors, this high level of transparency may eventually decrease the trust the citizens have in this institution.

We use probit regressions with sample selection to address the fact that some respondents chose not to respond to the question about trust in the ECB and that this choice might be non-random. Our results suggest that transparency exerts a non-linear effect on trust. Transparency increases trust up to a certain point; however, once the central bank becomes too transparent, transparency harms trust.

This paper is structured as follows. Section 2 provides a short survey of the related literature. Section 3 describes the data and empirical methodology. We present the results in section 4. We provide concluding remarks in section 5. An appendix with additional results follows.



## **2 Related Literature – Trust in Central Banks**

In this section, we discuss the literature examining the determinants of trust in the European Central Bank, especially those studies that use individual-level data. Blinder et al. (2008) provide a comprehensive overview of the literature on central bank communication. Reis (2013) discusses central bank governance issues.

Ehrmann et al. (2013) examine the determinants of trust in the ECB using individual responses from the Eurobarometer survey over the period from 1999-2010. They focus on the period of the global financial crisis to investigate the reasons behind the decline in trust in the ECB. Ehrmann et al. (2013) argue that the decline may be caused by three factors: 1) the deterioration of economic conditions, 2) the inability of European policy makers to solve the financial crisis and 3) the instability of the financial sector (especially banks for which the ECB could have been wrongly accused of supervisory and regulatory failures given its lack of supervisory and regulatory powers at that time). Ehrmann et al. (2013) find that the decline in trust in the ECB is a combination of these factors. In addition, they also find that individual characteristics matter. More educated respondents tend to trust the ECB more. Similarly, married respondents trust the ECB more. However, females and left-leaning voters exhibit less trust in the ECB. Finally, the authors' results also suggest that knowledge about the ECB is crucial for trust.

Hayo and Neuenkirch (2014) use a unique public opinion survey from 2011 on German households that was conducted to examine how knowledge about the ECB influences the degree of trust in this institution. The richness of the dataset allows the author to examine hypotheses that have not been addressed before. Using this dataset, the researcher finds that knowledge – both subjective and factual – improves trust. Additionally, respondents who are more interested in learning about the ECB tend to trust it more. Interestingly, media coverage has a negative effect on trust. Respondents who read newspaper articles about the ECB trust it less.

Wälti (2012) investigates the determinants of net trust in the ECB. Net trust is defined as the difference between trust and distrust using the Eurobarometer survey. Unlike Ehrmann et al. (2013) and our paper, which use individual-level data, the study works with aggregated data and estimates various panel data regressions. Wälti (2012) finds that decreases in net trust in the ECB are more pronounced in countries that suffered more strongly from the financial crisis. This result suggests the importance of country developments for trust in the European-wide institution.

Fischer and Hahn (2008) also examine the determinants of trust in the ECB using aggregated data. The authors examine the period between 1999 and 2004 and include only macroeconomic variables as regressors. The authors focus on the role of inflation, national income, unemployment and automatic stabilizers (namely, labor market policies). The results indicate that higher inflation reduces trust in the ECB. Interestingly, the authors fail to find that unemployment matters for trust. Active labor policies are negatively correlated with the level of trust, but government spending on unemployment benefits and higher government spending is positively associated with trust.

Albinowski et al. (2013) also employ data from the Eurobarometer survey. The authors focus on the impact of the crisis on trust in the ECB. More specifically, the study analyzes households' perceptions of the level of ECB responsibility for the crisis and its impacts. The study shows that interest rate cuts are associated with less trust. Roth et al. (2012) analyzes how macroeconomic conditions affect trust in the ECB before and during the crisis. The author finds that GDP growth is a significant determinant of trust before the crisis outbreak. However, the unemployment rate and inflation rate appear to be significant determinants during the crisis.

Arnold et al. (2012) examine trust in European institutions, including trust in the ECB. The perception of corruption at the country level helps to explain the differences between the amount of trust in domestic and European institutions. Interestingly, the study shows that the respondents tend to consider European institutions as a single entity in terms of trust in these institutions and that political trust matters to trust in European institutions.

Finally, Berggren et al. (2014) examine the effect of trust on central bank independence. Although our focus is on examining the effect of transparency on trust, Berggren et al. (2014)'s study is important to ours because it shows that there is a link between central bank governance issues and trust and that this link can be non-linear. Berggren et al. (2014) find that the relationship between social trust and central bank independence is U-shaped. The central banks in countries where the citizens have high or low levels of social trust exhibit a high degree of independence, while this is not the case in countries with intermediate levels of trust. The authors rationalize this finding by examining the need and ability to carry out reforms. High trusting societies have the ability to grant independence to central banks, while the low trusting societies have a need to reform their central banks to become more independent.

### 3 Data and Empirical Methodology

#### 3.1 Data

We use individual-level data from the Eurobarometer survey<sup>2</sup>, which includes responses on trust in the ECB. The survey is conducted twice per year, and we use the data from 2000 to 2011. Our dataset covers all European Union countries (approximately 1000 respondents for each country), which are sorted into two groups: euro area countries and non-euro area countries. The survey asks the respondents dozens of questions related to European Union issues, including whether they trust the ECB, the European Commission, the European Parliament, their national parliament, their national government and whether they have heard of the ECB or the European Parliament. The respondents are also asked to disclose various economic and socio-demographic characteristics such as age, marital status, education and employment.

The respondents can choose not to answer. Because non-responses do not have to be random (it may be that respondents who do not trust the ECB are more likely to not express their opinion), this selection issue must be addressed by our econometric model (please see the following subsection). Relatedly, the respondents are also asked whether they heard about the ECB. Since many of them express their opinion about the trust in the ECB, we control for this issue and estimate selected regressions for those respondents, which already heard about ECB (approximately forth fifth of the respondents heard about the ECB.) In every survey round, different respondents are approached. As a result, our data matrix has the form of a repeated cross-section. Consequently, as in Ehrmann et al. (2013), we cannot control for unobserved heterogeneity, but we can address clustering issues by generating standard errors clustered by country.

Our macroeconomic data on inflation, inflation perceptions and unemployment are taken from the Eurostat.<sup>3</sup> Our financial data, including total stock returns and excess returns of bank stocks, are taken from Datastream.<sup>4</sup> We use the ECB monetary policy transparency index developed by Dincer and Eichengreen (2014), which is available from 2000 to 2010 and is updated up to 2011 by Horváth and Vaško (2013). In addition, we also use the financial stability transparency index developed by Horváth and Vaško (2013) for individual central banks in the European Union to examine whether central bank transparency about financial stability issues at the country level influences trust in the Europe-wide institution.

The variables used are summarized in Table 1, and the descriptive statistics are provided in Table 2.

The ECB increased its level of monetary policy transparency several times during our sample period 2000–2011. According to Dincer and Eichengreen (2014), the value of transparency index in 2000 was 8.5. It was increased to 10 in 2001 and to 10.5 in 2002. In 2004, the index further increased to 11 and remained at this value until 2010.

<sup>2</sup> The dataset is available at: <https://dbk.gesis.org/dbksearch/GDESC2.asp?no=0008&DB=E>

<sup>3</sup> The dataset is available at: <http://ec.europa.eu/eurostat/data/statistics-a-z/abc>

<sup>4</sup> The dataset is available at: <http://eikon.thomsonreuters.com/web>

**Table 1: Coding of variables**

Trust in ECB	1 if answered "tend to trust", 0 if answered "tend not to trust", missing if answered "don't know"
Gender	1 if female, 0 otherwise
Age	Age in years
Married	1 if married, 0 otherwise
Educational attainment	1 if education ended before age 16, 2 if ended between 16 and 19, 3 if ended after 19
Employed	1 if employed, 0 otherwise
Retired	1 if retired, 0 otherwise
Political orientation	-1 if relatively left wing, +1 if relatively right wing, 0 otherwise
Total stock returns	National total stock returns, 6-month average prior to the survey fieldwork
HICP inflation	National HICP inflation in percentage points, 6-month average prior to the survey fieldwork
Inflation perceptions	Balance statistic that represents the difference between the weighted proportion of respondents stating that prices have increased over the past twelve months and the weighted proportion of respondents stating that prices have decreased or remained unchanged over the same period, 6-month average prior to the survey fieldwork
Unemployment rate	National unemployment in percentage points, 6-month average prior to the survey fieldwork
Heard of ECB	1 if have heard of ECB, 0 otherwise
Excess return of bank stocks	Difference between national bank stock returns and national total stock returns, 6-month average prior to the survey fieldwork
Monetary policy transparency index	0 for the least transparent and 15 for the most transparent
Financial stability transparency index	Transparency in communications of central bank concerning the financial stability of the economy, 0 for the least transparent and 12 for the most transparent

**Table 2: Descriptive Statistics**

Variable	Mean	Std. Dev.	Mean	Std. Dev.
	Euro area countries		Non-euro area countries	
Heard of ECB	0.830	0.375	0.743	0.437
Trust ECB	0.625	0.484	0.616	0.486
Marital status	0.541	0.498	0.506	0.5
Education	2.039	0.755	2.149	0.72
Gender	0.543	0.498	0.552	0.497
Age	47.162	18.191	47.935	18.53
Employed	0.592	0.492	0.51	0.50
Retired	0.251	0.434	0.313	0.464
Political orientation	-0.067	0.759	-0.016	0.783
Total stock returns	0.001	0.038	0.007	0.037
HICP inflation	0.036	0.035	0.058	0.053
Inflation perceptions	35.145	23.576	25.147	31.668
Unemployment	8.552	4.187	8.455	3.385
Excess return on bank stocks	-0.002	0.037	0.003	0.031
Mon. policy transparency	10.449	1.24	10.449	1.24
Financial stab. transparency	4.013	2.632	5.87	2.338
Trust ECB answer	0.802	0.398	0.721	0.449

Horváth and Vaško (2013) update the monetary policy transparency index for 2011 and find that the level of ECB transparency did not change in 2011.

### 3.2 Empirical Methodology

We use a probit model with sample selection (Van de Ven and Van Praag, 1981) for our repeated cross-sectional data:

$$y_j^* = x_j\beta + \varepsilon_{1j} \quad (1)$$

such that we observe the dependent variable only if the respondent is willing to answer the question about trust in the ECB.

$$y_j^a = (y_j^* > 0) \quad (2)$$

We observe the dependent variable for observation  $j$  if

$$y_j^b = (z_j\mu + \varepsilon_{2j} > 0) \quad (3)$$

where  $\varepsilon_{1j} \sim N(0, 1)$ ,  $\varepsilon_{2j} \sim N(0, 1)$  and  $\text{corr}(\varepsilon_{1j}, \varepsilon_{2j}) = \rho$ .  $x$  captures the explanatory variables (see Table 1), which consist of two types: individual-specific variables such as gender or age and country-specific variables such as transparency or HICP inflation.

Equation (2) is typically called the selection equation, and in line with Ehrmann et al. (2013), we assume that the probability of a response to the question on trust in the ECB depends on whether the respondent provides an answer to the question whether she or he trusts the European Parliament. We expect that the availability of an answer to the question on trust in the European Parliament is not related to our dependent variable – trust in the ECB. In fact, the simple correlation coefficient between these two questions is smaller than 0.01 in absolute terms. Conversely, the correlation between the availability of answers to the questions on trust in the ECB and in the European Parliament is very high, with a value of 0.63. A probit model with sample selection has also been applied by Ehrmann et al. (2013).

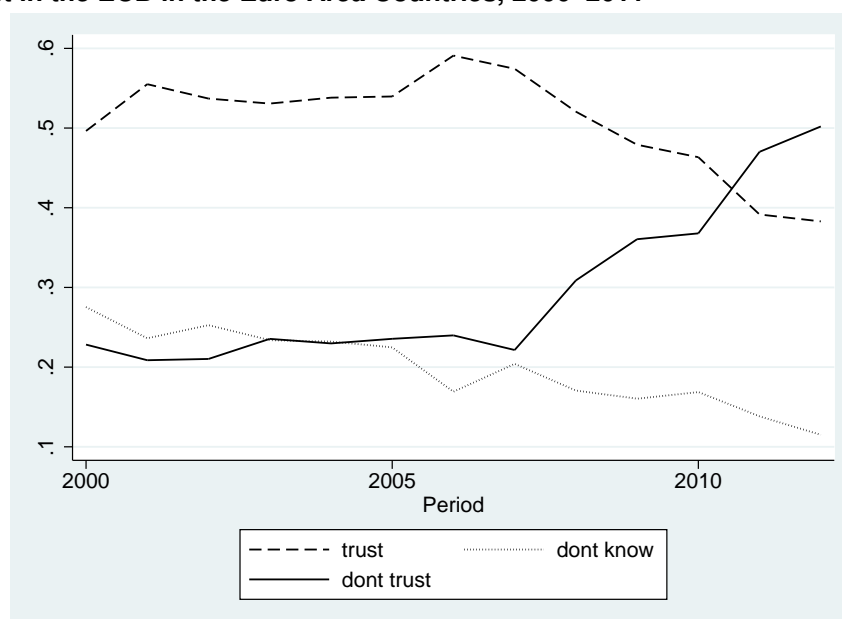
## 4 Results

### 4.1 Trust in the ECB over time

The degree of trust in the ECB was relatively stable before the crisis but then decreased markedly. Figure 1 shows the development of trust in the European Central Bank from 2000-2011 for the euro area countries. Our measure of trust is a binary variable that takes a value of 0 or 1. Trust in the ECB has decreased from 50-60% before the crisis to less than 40% at the end of our sample period. Figure 1 also shows that mistrust in the ECB increased during the crisis, and more respondents expressed an opinion about the ECB. The figure largely corresponds to Figure 1 in Ehrmann et al. (2013). In comparison to that study, we also cover the period from 2011-2011.

Interestingly, trust in the ECB remained largely stable during the crisis in the non-euro area countries. The level of trust exceeded 40% in most periods. The level of mistrust was high at the beginning of our sample, reaching approximately 34% in spring 2000 and declining sharply to approximately 10% in spring 2004. However, the level of mistrust steadily increased since then, reaching nearly 40% during the crisis.

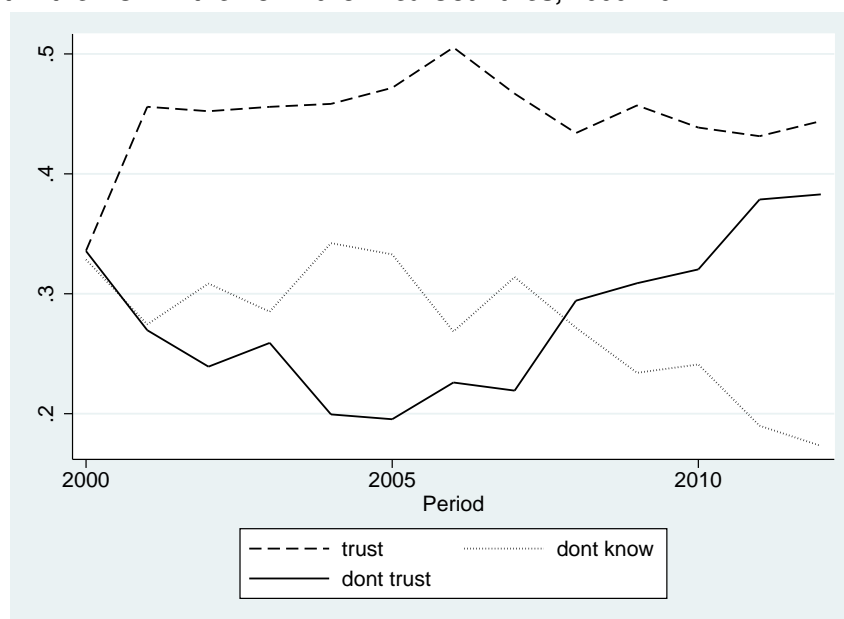
**Figure 1: Trust in the ECB in the Euro Area Countries, 2000–2011**



*Note: The figure presents the fraction of respondents in the euro area countries, who trust, don't trust or don't know whether to trust the ECB.*

The level of trust and distrust varies somewhat across the euro area countries. Figures A1 and A2 in the Appendix show the average trust and distrust in the euro area countries. Respondents in the Netherlands, Finland and Luxembourg exhibit the highest level of trust in the ECB, while we observe a lower level of trust in France, Spain, Greece and Cyprus. With regard to the non-euro area countries (see Figures A3 and A4 in the Appendix), citizens in Denmark and Sweden tend to trust the ECB the most, while citizens in the United Kingdom exhibit by far the least amount of trust.

**Figure 2: Trust in the ECB in the non-Euro Area Countries, 2000–2011**



*The figure presents the fraction of respondents in the non-euro area countries, who trust, don't trust or don't know whether to trust the ECB.*

The level of distrust is also very high in Croatia, which is interesting given the high degree of euroization in this country.



## 4.2 Baseline Results

In this subsection, we provide the results for the probit estimation with sample selection. First, we provide the results for the euro area countries and second for the non-euro area countries. Robustness checks are available in the following sub-section.

We present the results on the determinants of trust in the ECB in the euro area countries in Table 3. We present four different regression specifications. The columns (1)-(3) differ according to the explanatory variables we add, while the column (4) is estimated only for those respondents, who heard about the ECB.

We find that the ECB's monetary policy transparency exerts an inverted U-shaped effect on citizens' trust. Transparency improves trust, but only up to a certain point. Therefore, our results broadly correspond to the notion of *"Not maximum, but rather some kind of optimum of transparency should be the final stage to strive for"* (Issing, 2014) as well as to a number of theoretical contributions that show that there is an optimal degree of central bank transparency, such as the studies by Walsh (2007), van der Cruysen et al. (2010) and Baeriswyl (2011). This result suggests that the public can eventually become flooded with too much information about how monetary policy is conducted and that too much transparency may also expose the central bank's uncertainty about the optimal monetary policy. More specifically, the central banks forecast may turn out inaccurate or central bank may transparently refer to its policy errors.

Next, we find that certain economic and socio-demographic characteristics matter for citizens' trust in the ECB. Married, more educated and employed respondents exhibit higher trust. Women tend to trust the ECB less than men. Political orientation also matters. Respondents who are associated with right-wing parties tend to trust the ECB more. With regard to macroeconomic conditions, higher aggregate unemployment and lower inflation are associated with less trust. However, we fail to find evidence that inflation perceptions and the financial stability transparency of individual central banks in Europe affect trust in the ECB. These results broadly correspond to those of Ehrmann et al. (2013), as most of the variables exert the same signs of the coefficients as well as statistical significance. The exception is HICP inflation, which is either insignificant or negatively significant in Ehrmann et al. (2013) but positive and significant in our regressions. We hypothesize that because we cover the crisis period more extensively, citizens could interpret very low inflation as a sign of economic difficulty and an inability of the ECB to combat the crisis. All these results hold even if we estimate the regression for the restricted sample of those respondents, which heard about the ECB.

We provide the results on the determinants of trust in the ECB in the non-euro area countries in Table 4. Again, the columns (1)-(3) differ according to the explanatory variables we add, while the column (4) is estimated only for those respondents, who heard about the ECB. Our results largely correspond to those for the euro area in Table 3. Therefore, we note only the main differences. We find that retired respondents trust the ECB less in the non-euro area countries. Unlike for the euro area, trust decreases when HICP inflation increases. Again, our results for these variables are broadly in line with those of Ehrmann et al. (2013). Our results also suggest that the financial stability transparency of central banks in Europe matters to a certain extent.

**Table 3: The Determinants of Trust in the ECB: Euro Area countries**

	(1)	(2)	(3)	(4)
Transparency	0.061 ** (2.27)	0.064 (1.44)	0.077 * (1.69)	0.111 ** (2.26)
Transparency – sqr.	–0.004 ***	–0.005 **	–0.006 **	–0.008 ***
Marital status		0.036 *** (5.78)	0.036 *** (5.82)	0.028 *** (4.37)
Education		0.072 *** (17.56)	0.071 *** (17.39)	0.057 *** (13.63)
Gender		–0.043 ***	–0.043 ***	–0.029 ***
Age		0.000 02 (0.07)	0.000 01 (0.03)	–0.000 01
Employed		0.021 ** (2.34)	0.021 ** (2.37)	0.021 ** (2.23)
Retired		0.020 (1.52)	0.020 (1.49)	0.022 (1.59)
Political orientation		0.023 *** (6.10)	0.024 *** (6.16)	0.028 *** (7.03)
HICP inflation		0.314 *** (3.08)	0.281 *** (2.72)	0.317 *** (2.98)
Unemployment		–0.013 ***	–0.013 ***	–0.013 ***
Inflation perceptions		–0.0002*	–0.0001	–0.0001
Fin. stab. transparency			0.007 (1.41)	0.004 (0.74)
Fin. stab. transparency - sqr.			–0.001	–0.0004
Selection equation: EP Trust Answer	2.197 *** ( 120.12)	2.221 *** ( 107.45)	2.221 *** ( 107.45)	2.291 *** (93.69)
rho	0.07 ** (2.54)	0.03 (0.98)	0.03 (0.95)	0.02 (0.45)
N	324 405	217 146	217 146	193 122

Note: *t* statistics in parentheses, marginal effects reported. Constants not reported.Rho - test for indep. equations. \**p* < 0.10, \*\**p* < 0.05, \*\*\**p* < 0.01.

### 4.3 Robustness checks

We follow Ehrmann et al. (2013) and re-estimate our regressions for the restricted sample, where we keep only those respondents who do not express the same opinion about their trust in the ECB, the European Parliament and the European Commission. The motivation for this exercise is that these three questions about trust in European institutions are next to each other in the survey questionnaire, and there is a chance that the respondents may be rationally inattentive and automatically provide a collective answer to all of the trust questions. As a result, our sample size is substantially reduced. Overall, our results are largely in line with our baseline regressions and support the notion that transparency exerts a non-linear effect on trust.

Next, we exclude the countries from our sample that were not already part of the euro area in 1999 to account for the changing composition of the euro area members.<sup>5</sup> We also estimate the regressions while ignoring sample selection issues. Again, our results in both of these robustness checks are largely in line with our baseline regressions. Next, we estimate the regression with weights that adjust each national sample in proportion to its share of the total population age 15 and above. Finally, we add financial variables such as total stock returns and excess returns of bank stock to address the fact that financial stability deteriorated considerably in many European countries during the crisis. However, we do not find these financial variables to be significant.<sup>6</sup> All of the robustness checks are available upon request.

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<sup>5</sup> It would also be interesting to divide our sample into crisis and non-crisis periods and re-estimate the regressions to assess whether transparency exerts a non-linear effect on trust during both good and bad times. However, this exercise is not feasible because ECB transparency does not change frequently.

<sup>6</sup> We also try to address the clustering issues via biased-reduced linearization because of the so-called Moulton problem. Consider our repeated cross-sectional dataset, which consists of two types of explanatory variables. The first type of explanatory variables are individual-specific, including such variables as marital status or education. The second type of explanatory variables have a grouped structure, i.e. every respondent in country  $i$  (at time  $t$ ) faces the same aggregate unemployment rate. Moulton (1986) shows that the standard error of explanatory variables that have a grouped structure can be biased downward. Bell and McCaffrey (2002) provide a procedure to correct the standard errors. Unfortunately, the procedure is very computationally intensive, and we had to choose a random sample of approximately 5 percent of the full sample, and even in this case, we faced problems with convergence. In addition, the procedure is available only for the logit model and ignores the sample selection issues.

**Table 4: The Determinants of Trust in the ECB: Non-Euro Area countries**

	(1)	(2)	(3)	(4)
Transparency	0.006 *** (4.14)	0.005 ** (2.45)	0.010 *** (3.60)	0.038 *** (10.70)
Transparency – sqr.	–0.001 ***	–0.001 ***	–0.001 ***	–0.003 ***
Marital status		0.027 *** (10.42)	0.027 *** (10.32)	0.021 *** (6.54)
Education		0.013 *** (7.85)	0.013 *** (7.55)	0.007 *** (3.10)
Gender		–0.011 ***	–0.011 ***	–0.004
Age		–0.0002*	–0.0001	–0.0002
Employed		–0.001	–0.002	–0.001 *
Retired		–0.029 ***	–0.028 ***	–0.024 ***
Political orientation		0.027 *** (17.58)	0.026 *** (17.52)	0.038 *** (19.61)
HICP inflation		–0.333 ***	–0.362 ***	–0.430 ***
Unemployment		–0.011 ***	–0.012 ***	–0.015 ***
Inflation perceptions		–0.001 ***	–0.001 ***	–0.001 ***
Fin. stab. transparency			0.008 ** (2.52)	–0.002
Fin. stab. transparency - sqr.			–0.002 ***	–0.001 **
Selection equation:				
Trust EP Answer	0.601 *** (79.46)	0.670 *** (74.59)	0.672 *** (74.85)	0.563 *** (42.48)
rho	–0.98 ***	–0.99 ***	–0.99 ***	–0.99 ***
N	166 225	94 329	94 329	67 090

Note: *t* statistics in parentheses, marginal effects reported. Constants not reported.Rho - test for indep. equations. \**p* < 0.10, \*\**p* < 0.05, \*\*\**p* < 0.01.

## **5 Concluding Remarks**

We examine the effect of the ECB's monetary policy transparency on citizens' trust in the ECB. We use individual-level data from 2000-2011 from the Eurobarometer survey conducted by the European Commission in European Union countries twice per year. The survey contains responses to dozens of questions regarding European issues, including trust in the ECB. The survey also collects a number of economic and socio-demographic characteristics of the respondents.

We apply a probit model with sample selection. Using this model, we account for the binary nature of our dependent variable (trust in the ECB) and for the sample selection arising from the fact that some respondents were not willing to express an opinion about trust in the ECB. We find that transparency exerts a non-linear effect on trust. Greater transparency improves citizens' trust, but only up to a certain point; too much transparency is not conducive to trust. This finding about an optimal degree of central bank transparency is in line with the arguments of Issing (2014) and Cukierman (2010) as well as with theoretical contributions, such as those by Walsh (2007), van der Cruijsen et al. (2010) and Baeriswyl (2011). The result about the effect of actual monetary policy transparency on trust is novel. The previous literature either examines macroeconomic or socio-demographic determinants of trust in the ECB or examines the effect of perceived transparency on trust (and, in addition, finds that there is a very weak relationship between perceived and actual transparency).

In terms of future research, it would be interesting to know whether the transparency–trust nexus holds also for other central banks and also to know more about the interplay of trust, transparency and independence of central banks.

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## Appendix

Figure A1: Trust in the ECB in individual Euro Area countries

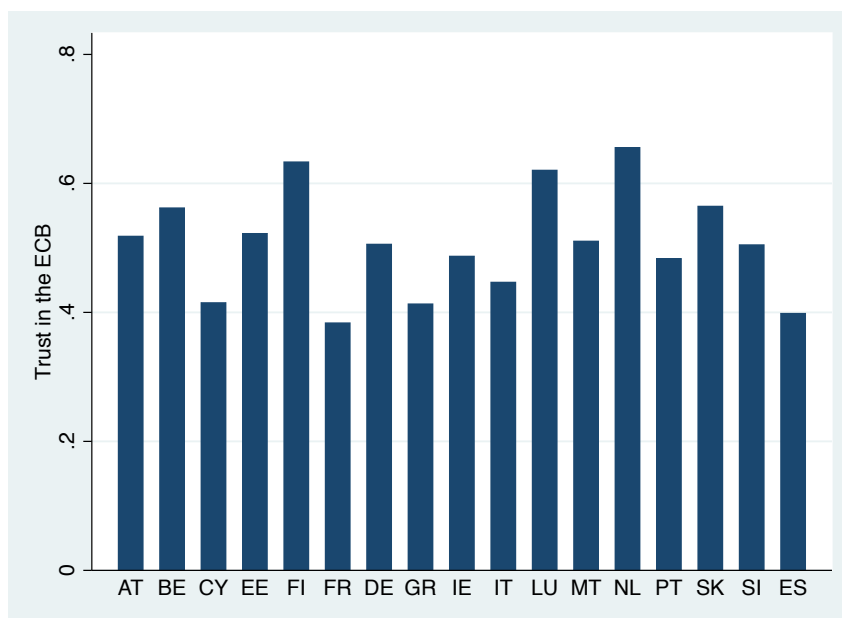
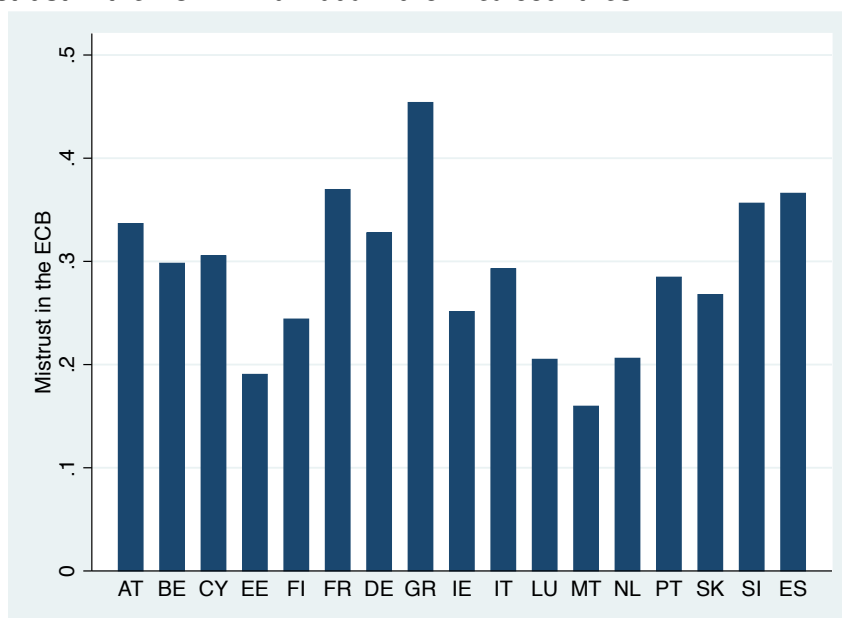
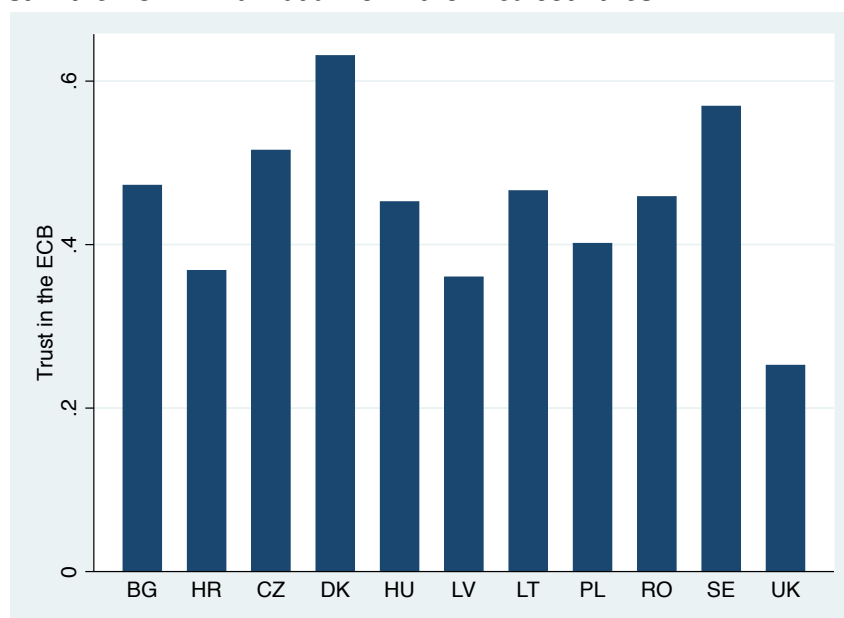


Figure A2: Mistrust in the ECB in individual Euro Area countries





**Figure A3: Trust in the ECB in individual non-Euro Area countries**



**Figure A4: Mistrust in the ECB in individual non-Euro Area countries**

