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# **The financial crisis and citizens' trust in the European Central Bank**

Daniel Gros and Felix Roth \*

## **Abstract:**

Trust in the ECB, as measured by the standard Eurobarometer (and other) surveys has fallen to an unprecedented low – especially in the larger euro area countries. The authors find that up to the start of the recession in 2008, trust in the ECB was little affected by business cycle variables such as growth and inflation. This changed radically with the recession, with trust in the ECB becoming correlated quite closely with growth. However, even the recovery of growth in 2009 was not sufficient to restore trust in the ECB to previous levels. This finding implies that European citizens seem to have placed a heavy share of the blame on the European Central Bank for the real economic downturn caused by the financial crisis.

**Keywords:** Financial Crisis, Trust, European Central Bank

**JEL-Classification:** E58, G21, Z13

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## Introduction

A number of recent surveys show that citizens' trust in the European Central Bank has reached historical lows in the aftermath of the financial crisis (Gros & Roth, 2009; Roth, 2009a, 2009b). The decrease in trust in the three largest European economies within the euro area: Germany, France and Italy has been especially severe with two thirds of French people stating in January-February 2009 that they mistrusted the ECB.<sup>1</sup> A slight rebound occurred in late 2009, but it remains to be seen whether the renewed financial market turbulence has had a further negative impact.<sup>2</sup> Although the all-time low point in trust in the ECB was clearly triggered by the financial crisis, it is now crucial to determine the precise factors driving this development and to provide European Central Bankers with policy responses to rebuild that trust in the institution.

### 1. Theoretical links

There are various theoretical reasons why it is important to closely monitor citizens' trust in the ECB.

Firstly, since the ECB is not a democratically elected institution it needs to sustain high levels of trust to be able to legitimatise and secure its independence. See also Fischer & Hahn (2008), on this point who refer to the classic sources, such as Kydland & Prescott (1977) and Barro & Gordon (1983).

The "primacy of politics" could be leading to suboptimal choices, as was the case in the lost decade in Japan (Eichengreen, 2009).

Secondly, although the formal independence of the ECB is much more strongly protected than that of its foreign counterparts (such as the Federal Reserve) because it is enshrined in the Treaty that can only be changed with the consent of all 27 member states of the Union, the loss of trust in the ECB should still be a cause for concern because there is a widespread feeling that EU institutions already lack democratic accountability. In reality, the EU and its institutions ultimately depend on the support of the people. A monetary union whose central institution does not have the trust of its citizens is bound to run into political problems sooner or later. The ECB has recognised this fact and has emphasised the need to maintain trust in its third strategic intent<sup>3</sup> (ECB, 2010). This need to maintain credibility even when using unorthodox measures was emphasised recently in Tabellini (2010).

### 2. Previous findings

Empirical investigations into the determinants of trust in the ECB are scarce. The only work focusing on the determinants of citizens' trust in the ECB is a work by Fischer & Hahn (2008). The authors work with averaged yearly data from 1999 – 2004, focusing on the 12 countries from the euro area. Applying this kind of research design enabled the authors to work with 72

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<sup>1</sup> When analysing the smaller European economies one can observe that in particular Belgium, Ireland and Portugal have faced severe losses in net trust in the ECB.

<sup>2</sup> The most recent Standard Eurobarometer 72 (2009d) points out that the restoration of trust has come to a halt. As predicted in Roth (2009b) the financial crisis seems to have created a new equilibrium in European citizens' trust in the ECB. The level of trust has evened out at a significantly lower level than before the financial crisis.

<sup>3</sup> Within their mission statement the ECB highlights four strategic intents: The third 'strategic intent' is described as: "Accountability, credibility and trust. Closeness to the citizens of Europe". It states that: "The Eurosystem attaches utmost importance to credibility, trust, transparency and accountability". Although not directly specified we would conclude that citizen trust in the ECB can be subsumed under that wording.

observations<sup>4</sup> for their empirical analysis. The authors' decision to use yearly data does unfortunately exclude a range of information and does not make use of the bi-annual data from the Standard Eurobarometer surveys (their paper matches an average of two bi-annual Eurobarometer observations with yearly data from the national accounts). And by only using data up to 2004 the authors miss important observations in their analysis. Nevertheless, they arrive at some interesting first results. Using a fixed-effects GLS estimator, the analysis of Fischer and Hahn concludes that higher inflation rates reduce trust. Next to inflation the national income also has a strong impact. The authors conclude that this poses a dilemma for the ECB as it is not able to increase economic growth in the long term. The authors report that unemployment does not have a significant impact on trust in the ECB, while unemployment spending exerts a trust-building effect.

Contrary to the approach of Fischer and Hahn (2008), the current paper matches the bi-annual Eurobarometer with quarterly data from the national accounts and is thus able to account for the full variance of the observations. Furthermore, the paper works with most recent observations up to 2009, thus including the direct aftermath of the financial crisis – and allowing for tests for structural breaks. The variance in all series is extraordinarily high in the direct aftermath of the financial crisis (2008-2009), which might yield additional insights.

Using such research design allows us to run estimations for 272 observations<sup>5</sup> (approximately four times as many observations as Fischer and Hahn).

### 3. Data and Measurement

#### 3.1 Operationalisation

Trust in the European Central Bank was measured by asking citizens the following question: *“For each of the following European bodies, please tell me if you tend to trust it or not to trust it”*. The respondent was then presented with a range of European institutions,<sup>6</sup> one of which was the European Central Bank. Next to the answer “Tend to trust it” and “Tend not to trust it”, the third category “Don't know (DK)” was also given to the respondent.<sup>7</sup> The best measure of trust seems to be ‘net trust’, which is obtained by subtracting the percentage of those who trust from those who do not trust the institution.<sup>8</sup> The net trust value then varied from -21 percentage points in France in January-February 2009 to 69.9 in the Netherlands in spring 2008 (as can be seen in Annex 1).

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<sup>4</sup> With 6 consecutive years and 12 country observations the authors obtain 72 observations.

<sup>5</sup> Twenty-three semesters\* in 12 euro countries would give a balance of 276 observations. As Greece's cases for GDP in 1999 and 2000 are missing the analysis will be based on 272 observations. The population measure was interpolated in 11 cases (in Germany, France, Ireland, Luxembourg and the Netherlands).

<sup>6</sup> Next to the ECB a range of other European institutions such as the European Commission and the European Parliament are included in the Eurobarometer's trust item battery.

<sup>7</sup> ‘DK’ answers can easily reach values of 20 percentage points and more. Furthermore, the DK answers fluctuate over time.

<sup>8</sup> This approach is used in public opinion research in particular and is able to control for the fluctuations in the DK answers. The same approach of using net trust in the ECB was also chosen by Gros & Roth 2009, Roth 2009a and Roth 2009b.

### 3.2 Model specification

We chose a slightly different model specification to Fischer & Hahn (2008). However, the model includes the classical macro economic variables as specified in the popularity function literature (Paldam, 1993).<sup>9</sup> In the baseline model with an unbalanced panel, net trust in the ECB is estimated as a function of inflation, growth of GDP per capita, unemployment and important control variables. The baseline growth model for the fixed-effects estimation is as follows:

$$ECB\ Trust_{i,t} = \alpha_i + \beta Inflation_{i,t-1} + \gamma Growth_{i,t-1} + \mu Unemployment_{i,t-1} + \psi Z_{i,t-1} + w_{i,t}$$

where  $i$  represents each country and  $t$  represents each time period;  $ECB\ Trust_{i,t}$  is the net trust amount for country  $i$  during period  $t$ ;  $Inflation_{i,t-1}$ ,  $Growth_{i,t-1}$ ,  $Unemployment_{i,t-1}$  and  $Z_{i,t-1}$  are, respectively, Inflation, Growth of GDP per capita, Unemployment and important control variables as for instance, public expenditure, the debt level of GDP and the exchange rate USdollar/euro for country  $i$  during period  $t-1$ ;  $\alpha_i$  represents a group-specific constant term and  $w_{i,t}$  is the error term.

### 3.3 Measurement of data

Data on trust in the ECB are based upon the bi-annual Eurobarometer survey.<sup>10</sup> The first available observation dates from spring 1999, the year of construction of the ECB, in the Standard Eurobarometer 51. From there onwards Standard Eurobarometer data up to EB72 is taken. Furthermore, to precisely measure the effect of the financial crisis on net trust in the ECB, the observation from the Special Eurobarometer 71.1 in January-February 2009 is taken into consideration.

- Data on GDP are taken from Eurostat's quarterly data.<sup>11</sup> As the Eurobarometer fieldwork normally takes place around April-May and October-November,<sup>12</sup> we constructed GDP semester data by adding the two previous quarters (e.g. April to September 1998 (2<sup>nd</sup> + 3<sup>rd</sup> quarter 2008) + October 1998 to March 1999 (4<sup>th</sup> 2008 and 1<sup>st</sup> quarter 2009) to match it with the Standard Eurobarometer observation in May 1999). As in 2009, we had three

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<sup>9</sup> The popularity function literature normally additionally includes political variables (Paldam, 1993, p. 218). As our analysis focuses specifically on the financial and economic crisis in September 2008, we did not see the relevance of including political variables.

<sup>10</sup> Raw data available on CD-ROM from Gesis ZA Data Service for Standard Eurobarometers 51-62 (Gesis 2005a, 2005b) and sent on request by Gesis ZA Data Service for Standard Eurobarometers 63-69 (<http://www.gesis.org/en/services/data/survey-data/eurobarometer-data-service/data-access/>). Data for the Standard Eurobarometer 70 were taken from Eurobarometer (2008, 2009a). Data for the Special Eurobarometer 71.1 were taken from Eurobarometer (2009b). Data from the Eurobarometer 71 were taken from Eurobarometer (2009c). Data from Eurobarometer 72 were taken from Eurobarometer (72).

<sup>11</sup> Chain-linking is a methodology to calculate GDP values at constant prices. In particular the previous year is used as a base year instead of a single fixed year, which is moved every five years. The year 2000 is used as a reference year for which the deflators are expressed as equal to 100.

<sup>12</sup> The fieldwork most often takes place in April-May or October-November. However, although this fluctuates and as it is not possible to change the research design throughout the dataset it was assumed that the Standard Eurobarometer in spring was polled in April-May and the one in autumn polled in October-November. More precisely, the polling for the Standard Eurobarometers took place in the following months: 05/99, 11/99, 05/2000, 12/2000, 05/2001, 11/2001, 05/2002, 11/2002, 4/2003, 11/2003, 03/2004, 10/2004, 05/2005, 10/2005, 04/2006, 09/2006, 04/2007, 10/2007, 4/2008, 11/2008, 2/2009, 6/2009 and 10/2009.

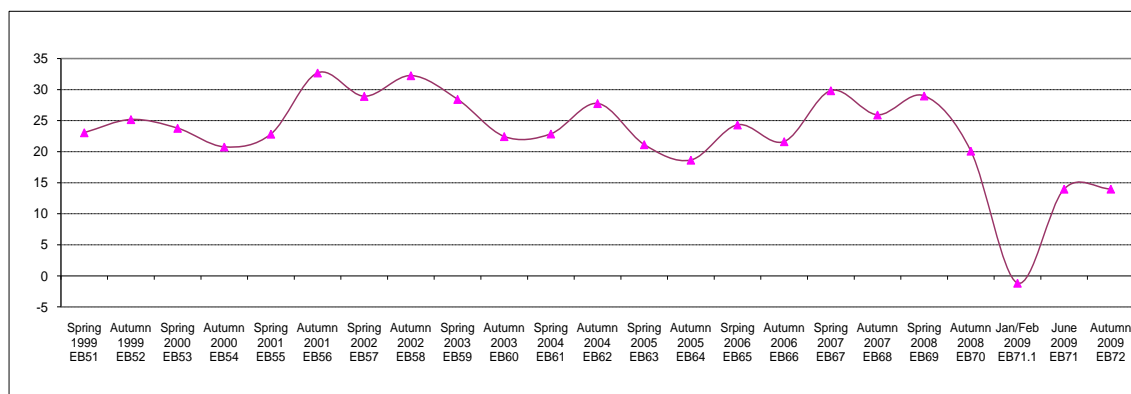
observations for net confidence trust in the ECB the Standard Eurobarometer 71, conducted in June 2009, which was exceptionally matched with 1<sup>st</sup> and 2<sup>nd</sup> quarter of GDP in 2009.

- Data on inflation rates are based on Eurostat's monthly HCIP indicator. Semester data were constructed by averaging monthly data, in accordance with the construction of GDP, from March to September and from October to the end of February. As discussed above, the Standard Eurobarometer 71, conducted in June 2009, was exceptionally matched with 1<sup>st</sup> and 2<sup>nd</sup> quarter of GDP in 2009.
- Data on population, unemployment, government debt, final consumption expenditure, and on the exchange rate between US-dollar/euro are retrieved from Eurostat. Semester data were constructed in a similar manner to that of GDP and inflation.

#### 4. Descriptive statistics

Figure 1 shows the time trend in net levels of trust in the European Central Bank for the 12 member states of the euro area as measured by the twice-annual Eurobarometer (EB) surveys.<sup>13</sup>

Figure 1. Net trust in the ECB EA12, 1999-2009



Source: Eurobarometer: Standard EB Nos. 51-72 and Special EB 71.1.

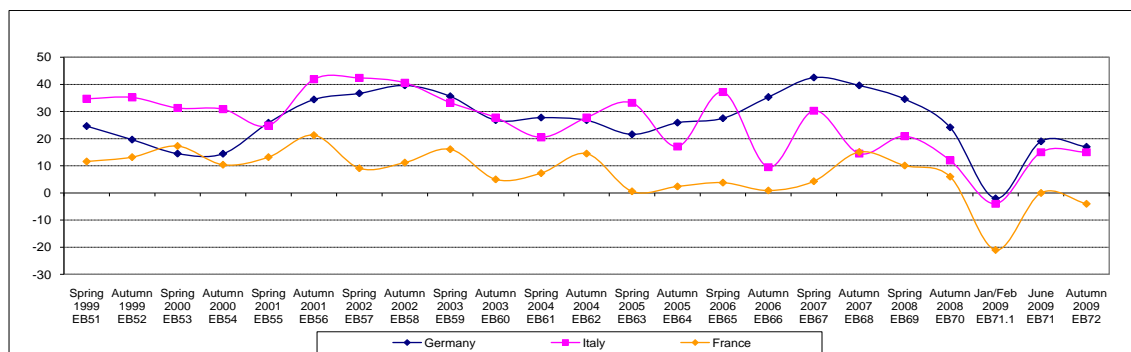
It is immediately apparent that trust in the ECB dramatically decreased in the direct aftermath of the financial crisis<sup>14</sup> with a significant recovery nine months later. However, the loss of trust in the ECB does not seem to be due to an overreaction to the immediate impact of the crisis, because in the October-November 2008 poll, close to the peak of the crisis, the confidence level in the ECB was still within its historical range (albeit at the lower bound). However, by January-February 2009, confidence in the ECB reached an all-time low, recording an unprecedented fall. For the first time since the start of EMU, more European citizens mistrusted the ECB than trusted it at that point. The drop between autumn 2008 and January-February 2009 was equivalent to over seven times the standard deviation observed over the previous period. Statistically this has a probability of occurring once every million years. Similarly startling is the relatively strong recovery of citizens' trust nine months later in July back to a net trust amount of approximately 15 percentage points. As predicted in Roth (2009b) the change of net

<sup>13</sup> The four new countries Slovenia, Cyprus, Malta and Slovakia that joined the euro area recently have not been included in constructing the average.

<sup>14</sup> One should note here that not only the ECB faced such a stark loss in trust, but also the other two central banks: the Federal Reserve (FED) and the Bank of England also faced severe decreases in trust (see here Gros & Roth, 2009), although compared to the ECB, the loss of trust in the Bank of England and the FED was less pronounced.

confidence seems to have come to a halt in October-November 2009, establishing itself at significantly lower levels than before the financial crisis.<sup>15</sup> The only consolation for the ECB is the fact that the actual confidence level in the ECB is still higher than the confidence levels in national governments and parliaments, which were already low before the crisis. National governments and parliaments usually face gaps of 24% to 27% (see Roth, 2009a). However, trust in national political institutions, while remaining at a low level, actually increased slightly in the direct aftermath in January-February 2009 to fall to a historical low point in June 2009.

Figure 2. Net trust in the ECB among the European G3, 1999-2009



Source: Eurobarometer: Standard EB Nos. 51-72 and Special EB 71.1.

The fall in trust in the ECB occurred in almost all euro area countries. However, as one would expect, the level remains significantly higher in the eight smallest euro area countries (including Ireland) than the three largest (Germany, France and Italy), which account for about two-thirds of the population (Figure 2). In the three large euro area countries, more people mistrust the ECB than trust it, whereas the opposite is true in all but one of the smaller euro area member countries. This relatively high level of trust in the ECB is what one would expect in view of the experience of Iceland (and that of the Baltic states), which has shown the potential benefits of belonging to the euro area. But there are also interesting differences among the three largest economies – Germany, France and Italy. It is apparent that trust in the ECB was always at its lowest in France, but it was still usually in positive territory. However, between October-November 2008 and January-February 2009, it fell from 6% to -21%. Trust in the ECB used to be highest in Italy (close to +40% at the start of EMU) but even there it is now negative, as it is in Germany. Although there was a recovery in June 2009 with net trust increasing in Germany back to 20 percentage points, the data also indicate that despite the recovery, one-half of French citizens still mistrusted the ECB at that point.<sup>16</sup> Starting with a net trust value of 30% in spring 2007, almost 50% of Italian citizens mistrusted the ECB, with a net trust level of around 17% in June 2009.

As there has been considerable cross-country variation in the fall in trust, the question arises as to which factors were responsible for the significant fall in net trust in the ECB. Growth seems to be key, as illustrated in Figure 3, which shows the partial regression between growth of GDP and net trust in the ECB, controlling for country-specific effects, between autumn 2008 and January-February 2009 and from January-February 2009 to July 2009 in ten countries from the

<sup>15</sup> In France one can once again detect a decrease of 4% in citizens' net confidence.

<sup>16</sup> According to the Standard Eurobarometer 72, which was polled in October-November 2009, a majority of French citizens still mistrusted the ECB.

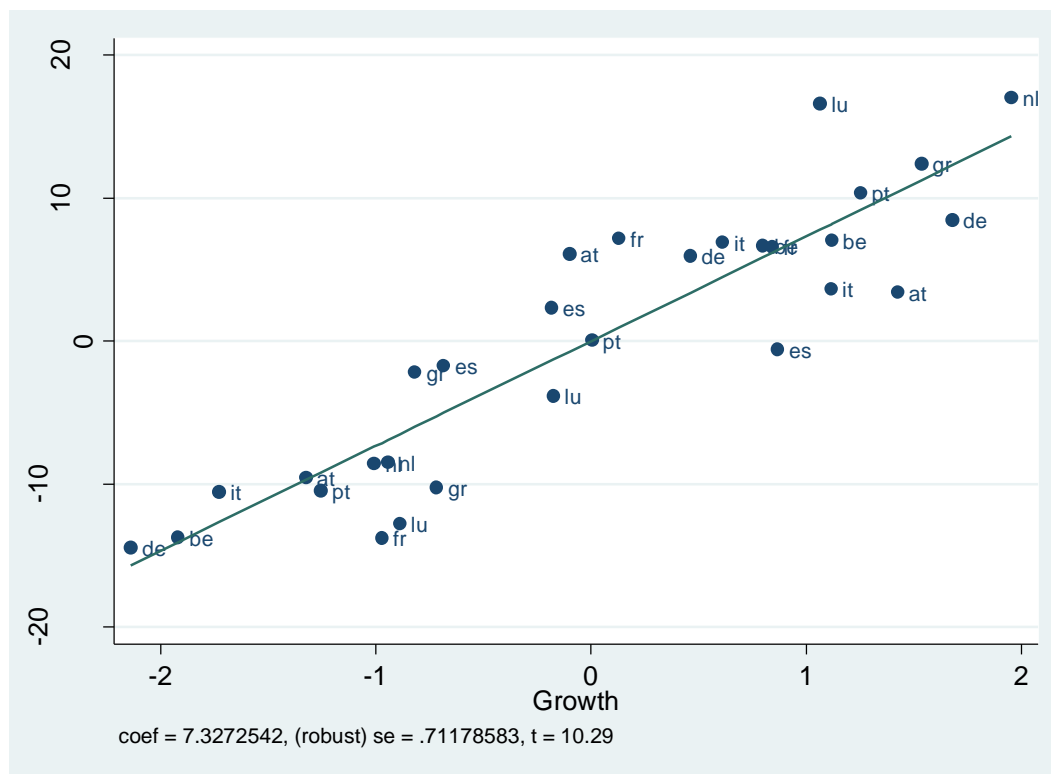
euro area.<sup>17</sup> It is apparent that changes in growth are very closely associated with the change in net trust in the ECB. The partial regression plot suggests that trust in the ECB is not based mainly on its policy to keep inflation steady. Rather, it seems that citizens also hold the ECB responsible for financial stability and they perceive that the ECB was able to prevent the extraordinary financial crisis that led to the unprecedented fall in output in 2008/9.

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<sup>17</sup> Finland and Ireland were excluded as both follow a slightly different trend. Here in particular Finland, the only country in which net trust in the ECB actually increased in the direct aftermath of the financial crisis. When including them in the partial regression plot the t-statistics decrease slightly to 6.20 and 3.30. The significance at the 99% level however is not altered.



Figure 3. Partial Regression Plot between Growth and Net Trust in the ECB  
(autumn 2008 – spring 2009)



Source: Eurobarometer: Standard EB Nos. 70, 71 and Special EB 71.1.

## 5. Econometric Analysis

To analyse the determinants of net trust in the ECB over a longer time horizon, regression 1 in Table 1 uses a fixed-effects model<sup>18</sup> using all available observations. When analysing the sample over the entire observation period (1999-2009), growth of GDP per capita is highly

<sup>18</sup> A Prais-Winsten corrected standard errors methodology for panel models including country dummies was chosen. This is equivalent to a fixed-effects estimator with standard errors corrected for heteroscedasticity (and autocorrelation). We test for autocorrelation (Drukker, 2003) and within-group heteroscedasticity (Greene, 2000, p. 598). We cannot reject the null hypothesis of no autocorrelation but reject the null hypothesis of no heteroscedasticity. Thus we specify the error structure with within-group heteroscedasticity. When facing heteroscedasticity a Prais-Winsten corrected standard errors estimator which controls for heteroscedasticity achieves more efficient estimates than a simple OLS regressor without changing the point estimates of the coefficients. Differently to Fischer & Hahn (2008), a fixed-effects GLS estimator was rejected as it might result in biased coefficients. The GLS methodology affects the point estimators whereas the Prais-Winsten methodology yields the same coefficients as the OLS fixed-effects estimator when clustering for the country specific error term, but calculates more efficient standard error estimates.

significant.<sup>19</sup> These results are in accordance with the results of Fischer and Hahn (2008), who emphasise the importance of growth of GDP as one of their key explanatory variables.

Table 1. Determinants of Net Trust in the ECB – Fixed-Effects Estimation<sup>20</sup>

	(1)	(2)	(3)	(4)	(5)	(6)
	trust	trust	trust	trust	trust	trust
<i>Inflation</i>	-0.0826 (0.0838)	-1.714*** (0.290)	0.0386 (0.0831)	-1.304*** (0.279)	-0.155 (1.077)	0.553 (1.831)
<i>Growth</i>	1.993*** (0.433)	-0.338 (0.573)	-0.380 (0.537)	0.660 (0.654)	3.605*** (0.603)	-0.264 (1.005)
<i>Unemployment</i>	-0.466 (0.379)	0.348 (0.355)	0.647 (0.489)	0.982** (0.477)	-2.456*** (0.349)	-1.720*** (0.663)
Time effects	no	yes	no	yes	no	yes
Observations	272	272	212	212	60	60
R-squared	0.66	0.78	0.71	0.79	0.87	0.92
R-squared <sup>1</sup>	0.13	0.44	0.01	0.29	0.55	0.70
Number of countr	12	12	12	12	12	12

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

<sup>1</sup> We report the within R-squared to measure the explanatory power without the country dummy variables.

However, the two other variables, inflation and unemployment, do not have a significant impact on net trust in the ECB. One should note that when utilising this kind of specification, overall, the model is only able to explain 13% of the within variation.<sup>21</sup> Regression 2 includes time dummies in the regression in order to control for time-fixed effects (variables that change over time) such as the incidence of the financial crisis. Interestingly, the coefficient for growth of GDP loses its significance. The result indicates that the coefficient of growth of GDP per capita in regression 1 is driven by the incidence of the financial crisis.

Although inflation is significant when controlling for time-specific effects the result cannot be considered robust, as can be seen in Table A2 and will be argued later on. To further verify the finding that the post-crisis event drives the significant coefficient of growth of GDP per capita, regressions 3-6 split the sample into a pre-crisis and a post-crisis sample. When analysing the pre-crisis sample from 1999-2008 (Standard EB51 to Standard EB68) with 212 observations in regression 3 and 4, growth of GDP per capita loses its significance, whereas inflation remains significant at the 1% level when controlling for time-fixed effects in regression 4.<sup>22</sup>

<sup>19</sup> Controlling for other variables such as public debt, the public expenditure per GDP does not alter the results.

<sup>20</sup> We also ran a regression for the whole sample including an indicator grouping the observations in 'before' and 'after' the crisis and interaction terms between the indicator and the variables of interest. The results confirm our findings in Table 1.

<sup>21</sup> The model is able to explain 29% after the inclusion of government debt to GDP.

<sup>22</sup> The negative relationship between inflation and net trust in the ECB in regressions 2 and 4 however is not robust and seems to be spurious. As the estimated panel consists of larger T than N stationarity might be a problem. Testing the variables net trust in the ECB, inflation, unemployment and GDP growth for

Furthermore, the R-Squared value of only 1% in regression 3 highlights<sup>23</sup> the fact that up to the start of the recession in 2008 trust in the ECB was little affected by business cycle variables such as growth and inflation.<sup>24</sup> Testing for a structural break between a pre-crisis sample from 1999-2008 (Standard EB's 51 to 68) and the post-crisis sample from 2008 to 2009 (Standard EB's 69 to 72) with a chow test yields a highly significant result.<sup>25</sup>

Table 2. Model when taking First Differences

	(1)	(2)	(3)	(4)	(5)	(6)
	d.trust	d.trust	d.trust	d.trust	d.trust	d.trust
<i>D.Inflation</i>	0.626 (0.860)	-1.241 (1.219)	-0.680 (1.177)	-2.265 (1.459)	0.621 (1.559)	-0.673 (2.840)
<i>D.Growth</i>	1.949*** (0.405)	-0.269 (0.497)	-0.535 (0.483)	-0.120 (0.536)	3.798*** (0.672)	-0.805 (1.175)
<i>D.Unemployment</i>	-1.812 (1.175)	-1.251 (1.254)	-0.718 (1.571)	-0.249 (1.973)	-0.315 (3.193)	1.099 (3.228)
Time effects	no	yes	no	yes	no	yes
Observations	260	260	212	212	48	48
R-squared	0.10	0.40	0.01	0.22	0.51	0.72
R-squared <sup>1</sup>	0.10	0.40	0.01	0.21	0.48	0.71
Number of countrycod	12	12	12	12	12	12

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

<sup>1</sup> We report the within R-squared to measure the explanatory power without the country dummy variables.

stationarity using a panel unit root test developed by Im, Pesaran and Shin (Im, Pesaran, Shin (2003): Testing for Unit Roots in Heterogeneous Panels) provides evidence that the variables are not stationary. A panel cointegration test (Westerlund, 2007) rejects the possibility of cointegration. First differencing the four variables renders them stationary. Table 2 shows the results for our model when using first differences. Taking a model with first differences to tackle stationarity problems is also well-placed in the literature on popularity functions (Paldam, 1994, p. 218). Once addressing the problem of stationarity in Table 2 the negative relationship between inflation and net trust in the ECB seems to have been spurious, as does the negative relationship between unemployment and net trust in the ECB in the aftermath of the financial crisis. The negative relationship between unemployment and net trust in the ECB were mainly driven by Spain and Ireland; in all other countries the relationship is non-existent. The positive relationship between growth of GDP per capita and net trust in the ECB has not been altered. Furthermore, as it is the main aim of the paper to estimate the effects of growth on net trust in the ECB after the financial crisis, as in this sample N>T with 12 countries and 5 time series, regressions 5 and 6 can still be interpreted in levels. Thus the sensitivity analysis in Table 2 uses Equation 5 in Table 1.

<sup>23</sup> When including country dummies the R-Squared results increases to 66%.

<sup>24</sup> Once including time dummies, in regression 4 the coefficient for inflation remains high and significant.

<sup>25</sup> We have tested whether the impact of growth differs before and after the crisis (structural break) with a Chow test (Chow, 1960). Our test statistic, which is chi-square distributed, of 26.14 rejects the null hypothesis indicating that there is a significant structural break. Growth affects trust significantly more positively after the crisis.

As discussed above, we are particularly interested in determining the factors behind the significant loss of trust in the ECB in the direct aftermath of the financial crisis. This is addressed in regressions 5 and 6 in Table 1. Regression 5 only analyses the model taking the timeframe from spring 2008 (Standard EB 69) to autumn 2009 (Standard EB 72) into consideration. As could be expected from the descriptive results in Figure 3, inflation is not significant whereas both growth and unemployment are strongly related to net trust in the ECB.<sup>26</sup> Growth remains highly significant. The model is now able to explain 55% of the variance in trust in the ECB which took place after the financial crisis (67% when only analysing the direct aftermath of the financial crisis between Standard EB's 70-71 and Special EB 71.1 as can be seen in regression 10 in Table 2). This result disappears when including time dummies in regression 6 and thus controlling for the incidence of the financial crisis.<sup>27</sup> However, in this case we would argue that it does not make sense to include time dummies, which in a panel with such a short observation period 'absorb' most of the interesting variance in the explanatory variables.

*Table 3. Sensitivity analysis for Growth of GDP (Equation 5 – Table 1) – Fixed Effects Estimation*

Row	Specification Change	Coefficient on Growth of GDP	Standard Errors	Countries	Observations	R-squared	R-squared (within)
1.	None	3.605***	(0.603)	12	60	0.872	0.551
<i>Country Samples</i>							
2.	Four Big Economies	5.592***	(0.681)	4	20	0.915	0.871
3.	Eight Small Economies	3.114***	(0.688)	8	40	0.846	0.437
4.	Mediterranean	6.285***	(0.857)	4	20	0.889	0.781
<i>Specifications</i>							
5.	Public Expenditure	3.448***	(0.633)	12	60	0.873	0.555
6.	Exchange Rate	3.656***	(0.622)	12	60	0.872	0.552
7.	Net Trust in the European Commission	1.940***	(0.597)	12	60	0.915	0.7013
8.	Net Trust in the European Parliament	2.028***	(0.665)	12	60	0.909	0.6797
<i>Restructuring of the data</i>							
9.	1999-2007	-0.380	(0.537)	12	212	0.705	0.011
10.	1999-2002	-2.527***	(0.706)	12	80	0.839	0.204
11.	2008-2009	3.979***	(0.925)	12	36	0.890	0.671

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note : Numbers in parentheses are heteroskedasticity-adjusted *t*-ratios. We report the R-Squared and the within R-squared

<sup>26</sup> However, as can be seen from the results in Table A2 the association between unemployment and net trust in the ECB cannot be considered to be robust.

<sup>27</sup> Including time dummies smoothes out any temporal fluctuations and results of a regression with time dummies give evidence for a long-run relationship. We find no long-run relationship between growth and trust but do find a strong positive relationship during and directly after the crisis.

To test the sensitivity of the results of regression 5 in Table 1, Table 2 shows several specification tests including the alteration of case specifications, the inclusion of additional regressors and the restructuring of the data. The first row of Table 2 (labelled “none”) repeats the results, standard errors and regression coefficient taken from regression 5 in Table 1. Successive rows reflect the effects growth on net trust in the ECB when the indicated change is made. Rows 2-4 examine different country samples. The results in row 2 clarify that the relationship between growth and net trust in the ECB has been driven to a large extent by the four large economies, France, Germany, Italy and Spain. Using 20 observations from these countries one detects a strong and significant (at least economically significant, see here McCloskey & Ziliak, 1996) relationship with an R-Square value of 0.87 (once incorporating the country dummies the R-square increases to 0.92). Unlike the four large economies the eight small countries in row 3 have only a R-Squared value of 0.44 and a weaker relationship, whereas the Mediterranean country sample in row 4 countries behave similarly to the sample of large economies.

When including the three variables public expenditure, exchange rate and unemployment the relationship in rows 5-7 does not alter significantly.<sup>28</sup>

As one could suppose that the falling net trust in the ECB was similarly large in other European economic policy institutions, such as e.g. the European Commission or the European Parliament and that the ECB has just been affected in the same manner as those other institutions row 8 and 9 include the net trust in the European Commission and the net trust in the European Parliament into the regression. The significance between growth and net trust in the ECB is not altered in both specifications (although weakened), thus it seems that citizens’ have in particular blamed the ECB for the economic downfall during the financial crisis.

Rows 7, 8 and 9 show the result for different sub samples. As already shown above, in regression 3, Table 2, growth of GDP is not significant before the financial crisis. Interestingly, as can be seen in row 9, it even turns out to be negative and significant during the first years of EMU (row 9).<sup>29</sup>

## 6. Conclusion

This paper examined the trends and determinants of net trust in the ECB, focusing in particular on growth as the key factor responsible for the significant loss in trust in the aftermath of the financial crisis. Three findings emerge.

First, the fall in net trust in the ECB in the aftermath of the crisis was unprecedented. In January-February 2009, for the first time ever, more euro area citizens tended to mistrust the

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<sup>28</sup> One should note that unemployment is strongly and negatively associated with net trust in the ECB. This association is strongly driven by the cases of Spain and Ireland in which a large increase in the unemployment rate is associated with a significant drop in the net trust in the ECB. This finding indicates that the ECB is made to be responsible for a policy domain of which it is not in charge. The same is true for the relationship between the debt to GDP ratio and the net trust in the ECB. This relationship is strongly driven by the case of the Netherlands in which a strong increase in the debt-to-GDP ratio is associated with a drop in the net trust in the ECB. Interestingly, this finding highlights the fact that citizens seem to already presume that under the pressure of public debt the ECB might be in danger of giving up its independence (as one could observe most recently during the second financial crisis) and its primary task of tackling inflation.

<sup>29</sup> Similar results have been detected in ongoing research into the determinants concerning the popularity of the euro.

ECB than trust it. Although there was a slight recovery in July 2009, a new equilibrium has stabilised at a level significantly (several standard deviations) lower than before the financial crisis.

Second, when analysing the determining factors responsible for European citizens' loss of confidence, the sudden fall in GDP growth in 2008/9 seemed to have triggered citizens' mistrust in the ECB and the moderate increase in real GDP growth that followed later triggered only a partial slight recovery.

Third, before the crisis growth does not seem to have been a determining factor in trust in the ECB.

Overall, our finding implies that European citizens appear to hold the ECB responsible not only for price stability in the narrow sense in which the ECB has interpreted its mandate, but also for financial stability in a wider sense. In this latter respect the ECB did not succeed. Whether or not the ECB should be held responsible for this<sup>30</sup> is of course a different question, given that one could argue that it was not within its power to achieve financial stability. However, this seems to be irrelevant to European citizens, who appear to place a heavy share of blame on the European Central Bank for not having maintained financial stability or managed the economic downturn caused by the financial crisis.

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<sup>30</sup> See de Grauwe & Gros (2009) on this issue.

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## Appendix

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*Table A1. Summary statistics*

Variable	Year	Observations	Mean	Standard deviation	Minimum	Maximum
<i>Net Trust in the ECB</i>	1999-2009	272	29.3	15.7	-21	69.9
<i>Inflation</i>	1999-2009	272	98.0	7.73	78.9	112.3
<i>Income (semester)</i>	1999-2009	272	2.50	0.38	1.74	3.47
<i>Growth (semester)</i>	1999-2009	272	0.69	1.58	-6.84	4.74
<i>Unemployment</i>	1999-2009	272	7.2	2.8	1.85	18.4
<i>Public Expenditure</i>	1999-2009	272	19.3	2.8	13.3	26.3
<i>Government Debt to GDP</i>	1999-2009	256	62.9	29.3	5.6	119
<i>Exchange Rate</i>	1999-2009	260	1.17	0.19	0.9	1.5