

The Evolution of Trust in Central Banks during the Covid Crisis*

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This paper examines the evolution of trust in central banks during the Covid-19 pandemic in euro area countries, using the example of the European Central Bank. The study focuses on the effects of the pandemic, but also analyses the role of demographic, economic and political factors. We use a probit model with data from Eurobarometer and the Oxford COVID-19 Government Response Tracker. Our results show that the pandemic led to a decline in institutional trust, though this effect is not specific to central banks. There is a positive relationship between stricter government measures and trust in central banks. Extreme political views – both left-wing and right-wing views – are associated with lower trust in central banks. Our results highlight the co-movements of trust in particular institutions, and draw attention to the need for a deeper understanding of the trust dynamics within extremist groups.

Journal of Economic Literature (JEL) codes: E58, F33, Z13

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1. Introduction

Trust in central banks is essential for the long-term success and stability of institutions. In several countries, it has been shown that there is a correlation between the anchoring of inflation expectations and trust in the central bank: the more people trust the central bank, the more they expect inflation to be close to the level/range targeted by the central bank (Brouwer – de Haan 2022), and the inflation expectations of the public are critical for the success of monetary policy.

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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Analysis of trust in central banks is a relatively new field of research, with the study by *Ehrmann et al. (2013)* being one of the most influential contributions to the literature. However, trust in public institutions in the broader sense has a long history in political science (*Kiss 2018*).

Trust develops in the relationship between the principal (citizens) and the agent (central bank), where the principal trusts the agent to act in their interest, for example, in the case of central banks, by ensuring price stability (*Knack 2001*) or financial stability (*Borkó et al. 2020*). Trust in central banks depends not only on their direct performance but is also influenced by cultural and socio-economic contexts.

Various theories attempt to capture different aspects of the process of building trust in institutions (*Mishler – Rose 2001*). Cultural theories focus mainly on socialisation in the early years. The relationships formed in childhood affect the trust we have in others. This so-called interpersonal trust also has an impact on trust in institutions. By contrast, institutional theories argue that our trust in an institution is a rational reaction to the institution's performance: if an institution performs well, we trust it. Micro theories emphasise differences between individuals: our level of trust depends on our socio-economic background, personal characteristics and experiences, as opposed to macro theories which emphasise collective similarities.

Thus, trust in central banks is not only rational but may also be an automatic reaction, the result of subconscious learning processes (*Van der Cruysen et al. 2010*). The components of trust in a central bank include its commitment to the public good, its expertise and the efficiency of its instruments. In line with the literature, in our analysis of trust in the central bank, we take into account the fact that trust derives from multiple sources (*Brouwer – de Haan 2022*).

Understanding the concept of trust is particularly important in the context of major events such as the Covid-19 crisis. Trust in public institutions is not only a key factor in institutional integrity and efficiency but also a key driver of economic development and stability (*Brouwer – de Haan 2022*). The lack of or a decline in trust can prevent or limit the effective functioning of institutions, which can lead to financial instability or failure to achieve public policy goals. Conversely, when people trust institutions, less time and energy is needed to defend themselves against possible malfunctioning of institutions, and they can thus allocate more resources to productive activities. In this context, trust in public institutions promotes economic efficiency and increases social welfare (*Ehrmann et al. 2013*).

The role of central banks in the economy is unique, as their decisions and communication directly influence market expectations and economic stability, and trust in central banks helps to achieve economic-financial stability (*Van der*

Cruijsen et al. 2010). Central bank credibility and, relatedly, trust in the central bank are particularly important in times of crisis, when central banks need to take swift and decisive action. However, a lack of trust may not only undermine the success of central banks but also puts them at risk of political interference (*Ehrmann – Fratzscher 2011*). In such cases, central banks will be less able to take independent decisions, which could undermine the effectiveness of economic policy and long-term economic stability. Therefore, trust in central banks is a cornerstone not only for the success of the institution concerned but also for the stability of the whole economy. In summary, stronger trust leads to better-functioning institutions (*Ehrmann et al. 2013*).

The global crisis of 2008–2009 and the subsequent euro area debt problems posed significant communication and trust challenges for many central banks (*Farvaque et al. 2017*). These economic problems amplified the voices criticising the effectiveness of the models, forecasts, policies and communication strategies used by the monetary authorities (*Waller 1991*). According to *Farvaque et al. (2017)*, the loss of credibility of monetary policy brought about by these crises increased the discontent expressed not only by the public but also by politicians. Increasing public trust in central banks and developing a transparent and clear communication strategy are key to strengthening the credibility of monetary policy and institutional legitimacy. Regular, clear communication – including a detailed explanation of the central bank’s objectives, limitations, instruments and effects – may increase not only the intensity of dialogues between institutions but also gain increased public support. This is particularly important at times when the popularity of central bank policies may be declining.

From 2020, the global economy faced another major challenge in the form of the Covid-19 pandemic. The Covid-19 pandemic, like previous crises, hit the world unexpectedly and had a significant impact on the global economy. During the crisis, the European Central Bank (ECB) took a number of extraordinary measures to stabilise the financial system, support liquidity and stimulate economic growth, while keeping inflation targets in mind. These measures brought the issue of trust in central banks back into focus, as the Covid crisis created widespread uncertainty and the reactions of the public and market participants may also have depended on the extent to which they trusted the policies and communication developed by the central bank(s).

The aim of this study is therefore to examine public trust in central banks in the context of the Covid crisis in the euro area countries, using the example of the ECB. Although there have been studies on trust in central banks in the context of a crisis, to the best of our knowledge none of them have examined the impact of Covid-19. We take into account both macroeconomic and individual-specific factors. The study aims to contribute to a deeper understanding of trust processes, which may prove

particularly useful for decision-making institutions in possible future crises. The results may help to maintain institutional credibility and build public trust.

2. Literature review

In recent years, there has been increasing attention on trust in central banks. Several studies have examined the issue for the European Central Bank, as well as for other central banks such as the Bank of England, the Deutsche Bundesbank, the Reserve Bank of New Zealand, the Bank of Israel (*e.g. Bursian – Fürth 2015; Brouwer – de Haan 2022; Mellina – Schmidt 2018; Farrell et al. 2020; Hayo – Neumeier 2021*). *Baranyai et al. (2024)* also conducted an international study on the Magyar Nemzeti Bank (MNB), examining the factors of trust in the Hungarian central bank, including the green central bank orientation. The wide range of research shows that trust in central banks is a key issue not only from an academic but also from a practical point of view.

Our research draws on the literature, but it is worth highlighting the following:

- Most of the research looks at a single point in time, while the present study covers a time horizon of several years.
- Research often focuses on a single country, while this study looks at the euro area as a whole, also using country-specific macroeconomic indicators.
- The early stage of the literature often either concentrated on classical macroeconomic indicators concerning trust in the central bank, such as inflation, unemployment, real GDP growth and fiscal policies, or primarily focused on general social and demographic (individual-level) factors affecting trust. Our analysis includes both sets of variables.
- The study is also extended with a new Regulatory Stringency Index, which shows how stringent regulations were in the countries concerned during the Covid crisis.

Related early research by *Kaltenthaler – Anderson (2001)* analysed the popularity of European monetary policy in the pre-common currency period between 1994–1997. *Hudson's (2006)* article provides insights into the evolution of trust in central banks and finds that traditional socio-demographic variables have a significant impact on trust, but the data only cover 2001. The analysis by *Medve-Bálint and Boda (2014)* shows that the income situation and the impact of inequality in the countries of Central and Eastern Europe differ from Western European patterns. While the negative impact of social inequality can be observed in both regions, trust levels remain low in the CEE countries, even with relatively smaller income disparities. This may be attributed to the specific interaction between political-economic systems

and egalitarian attitudes, which is important when examining trust dynamics in the euro area.

Györfly's (2012) study examines the links between institutional trust and long-term decision-making, with a particular focus on how compliance with the rules and trust in institutions influence the plans and decisions of social actors. The study highlights that the presence or absence of trust is a fundamental determinant of compliance with the law, which is critical for long-term economic stability. These findings are particularly relevant for understanding the processes of trust in the central bank, as institutional stability and transparency are important prerequisites for maintaining trust. *Banducci et al. (2009)* studied the dynamics of trust in the euro, in particular how European citizens perceived the inflationary consequences of the introduction of the new currency. *Kaltenthaler et al. (2010)* investigated public distrust towards the ECB and found that distrust towards the ECB is stronger when people feel that the bank has too much autonomy to take into account the opinions and needs of ordinary people. Unlike these studies, we also use several survey waves and macroeconomic explanatory variables in our analysis.

Some articles examine the macroeconomic determinants of trust in the ECB at the country level. *Fischer – Hahn (2008)* concluded that a high level of inflation leads to a decline in trust in the ECB. *Boda's (2019)* study highlights that institutional trust depends not only on economic performance but also on the ethical and normative foundations of institutions, especially in the case of procedural fairness, which is a prerequisite not only for the credibility of the decision-maker but also for the willingness of the stakeholder to cooperate. *Wälti (2012)* and *Gros – Roth (2010)* focussed on the impact of the 2008 global economic crisis on ECB support. The articles found that the banking crises and fiscal problems had a negative impact on trust in the ECB. However, they did not take into account the socio-demographic determinants of ECB support and restricted their analysis exclusively to macroeconomic variables such as unemployment, inflation or GDP per capita (*Farvaque et al. 2017*).

Ehrmann et al. (2013) were the first to combine micro-level data and macroeconomic indicators in an analysis similar to the one we conduct, but they studied the period 2008–2010. Their empirical results showed that trust in all European institutions generally declined as macroeconomic conditions deteriorated, and that the decline in trust in the ECB also reflected the severity of the banking sector's problems, as the ECB was also perceived as responsible for the problems of the financial system (*Wälti 2012; Gros – Roth 2010*). The study by *Ehrmann et al. (2013)* provides an important basis for our research, both in terms of the topic (central bank trust dynamics during a crisis) and methodology.

3. Data

3.1. Data from Eurobarometer surveys

The Eurobarometer survey is a comprehensive survey conducted at the national and individual levels, carried out since 1973 at the request of the European Commission. The standard Eurobarometer surveys are carried out twice a year, in spring and autumn. In a typical survey, around 1,000 people are interviewed personally in each Member State (this number is around 2,000 in Germany and 600 in Luxembourg), so in total more than 27,000 people are interviewed across the European Union, allowing for an analysis of trust behaviour in different economic and financial contexts. It is important to note, however, that these surveys are not panel surveys, so the participants change each time, which prevents the analysis of individual fixed effects. The persons selected represent different groups of the population proportionally, taking into account aspects such as gender, age, employment status, education level and political orientation. The results of the Eurobarometer are public and can be found on the Gesis website.¹

In this paper, as in *Ehrmann et al. (2013)*, we use in particular individual-level data from the European Commission's Eurobarometer surveys to analyse the determining factors of trust in the ECB, both in normal and crisis periods. The analysis of crisis periods is particularly important for the euro area, as it also provides information on economic cooperation and heterogeneity between countries.

Of the Eurobarometer surveys, the data collections between 90.3 (November 2018) and 92.3 (November 2019) covered the period before Covid, while the surveys between 93.1 (August 2020) and 95.3 (June 2021) examined the period after Covid. The surveys chosen were selected because they cover relevant questions, including levels of trust in the ECB. A key criterion for the selection of the pre- and post-Covid-19 periods was that the spring 2020 survey was cancelled due to the spread of Covid-19 in Europe, and that all of the surveys included in the analysis cover all of the countries in the euro area.

Among other things, respondents were asked about their trust in the main European institutions (e.g. Eurobarometer question 92.3 QA12.3). The question was included in the survey as follows:

'QA12. Please tell us how much you trust and how much you do not trust the following European institutions.

QA12.3 The European Central Bank'

¹ <https://www.gesis.org/en/eurobarometer-data-service>

The responses were recorded in three ways: 1) 'Tend to trust', 2) 'Tend not to trust' and 3) 'I do not know'. In our research, we treat trust in the ECB as a binary variable, and do not include the category 'I do not know', as these respondents did not clearly express their opinion. The resulting binary variable will be our dependent variable. Nevertheless, the exclusion of 'I do not know' responses may be problematic, as the willingness to respond may not be independent of trust in the ECB. This will be handled in the manner described later.

Table 1 presents the descriptive statistics of the variables for the full time-horizon (between 2018 and 2021). Regarding trust in the ECB, 50 per cent of respondents said they trusted the ECB, 37 per cent said they did not trust the ECB and 12 per cent said they did not know. The gender distribution of participants shows that 54 per cent of respondents are women and 46 per cent are men. Regarding marital status, the majority of respondents, 53 per cent, were unmarried, while 47 per cent said they were married. In terms of education, the largest group of respondents, 39 per cent, completed their education between the ages of 16 and 19, while 37 per cent completed their studies over the age of 20. In terms of age, the largest group of respondents, 35 per cent, is over 60, with the rest of the age groups being more or less evenly distributed. In terms of political orientation, the largest group was from the centre with 38 per cent, while 5 per cent declared themselves extreme right and more than 7 per cent extreme left. The question on political orientation was included in the survey as follows, and was to be answered on a scale of 1 to 10:

'D1. On political issues, people talk about 'left' and 'right'. How would you place your views on this scale?'

Our study grouped the responses into 5 categories. The extreme left group was made up of respondents who gave a score of 1 or 2 on the scale, while the left-wingers chose scores of 3 or 4. Respondents from the centre gave themselves a score of 5 or 6, while the right-wingers gave the scores of 7 or 8. Finally, the extreme right category includes those who chose a score of 9 or 10 on the scale.

When it comes to satisfaction with life, the majority of respondents, 60 per cent, are satisfied, while only a small proportion, 3 per cent, are not satisfied. Of the respondents, 75 per cent are not retired, so the proportion of retired people is 25 per cent.

Table 1					
Descriptive statistics of variables for euro area countries and for the whole period					
Answers	N	(%)	Answers	N	(%)
Trust in the ECB			Trust in the Commission		
Tend to trust	58,376	50.12	Tend to trust	59,198	50.83
Tend not to trust	43,820	37.63	Tend not to trust	42,514	36.5
Do not know	14,269	12.25	Do not know	14,753	12.67
Total	116,465	100	Total	116,465	100
Gender			Married		
Male	53,485	45.92	Married	55,277	47.46
Female	62,945	54.05	Not married	61,178	52.53
No answer	35	0.03	Other	10	0.01
Total	116,465	100	Total	116,465	100
Employment			Educational attainment		
Working	43,919	37.71	At the age of 15	15,500	13.31
Contractor	8,402	7.21	Between 16 and 19 years	45,697	39.24
Not working	48,374	41.54	Over 20 years	42,851	36.79
Other	15,770	13.54	Other	12,417	10.66
Total	116,465	100	Total	116,465	100
Age			Political orientation		
<23	9,180	7.88	Extreme left	8,911	7.65
24–35	17,294	14.85	Left wing	22,693	19.48
35–45	17,809	15.29	Centre	43,698	37.52
45–59	29,038	24.93	Right wing	17,999	15.45
60<	40,669	34.92	Extreme right	6,334	5.44
No answer	2,475	2.13	Other	16,830	14.45
Total	116,465	100	Total	116,465	100
Satisfaction with life			Retired		
Very satisfied	25,921	22.26	Not retired	86,886	74.6
Satisfied	70,159	60.24	Retired	29,579	25.4
Not very satisfied	16,842	14.46	Total	116,465	100
Not satisfied at all	3,363	2.89			
Do not know	180	0.15			
Total	116,465	100			

Source: Based on individual-level data from Eurobarometer surveys

Table 2 summarises the responses of Eurobarometer surveys' respondents before and after the Covid-19 crisis in terms of their trust in the ECB, by different demographic groups. It can be observed that, following the start of the Covid-19

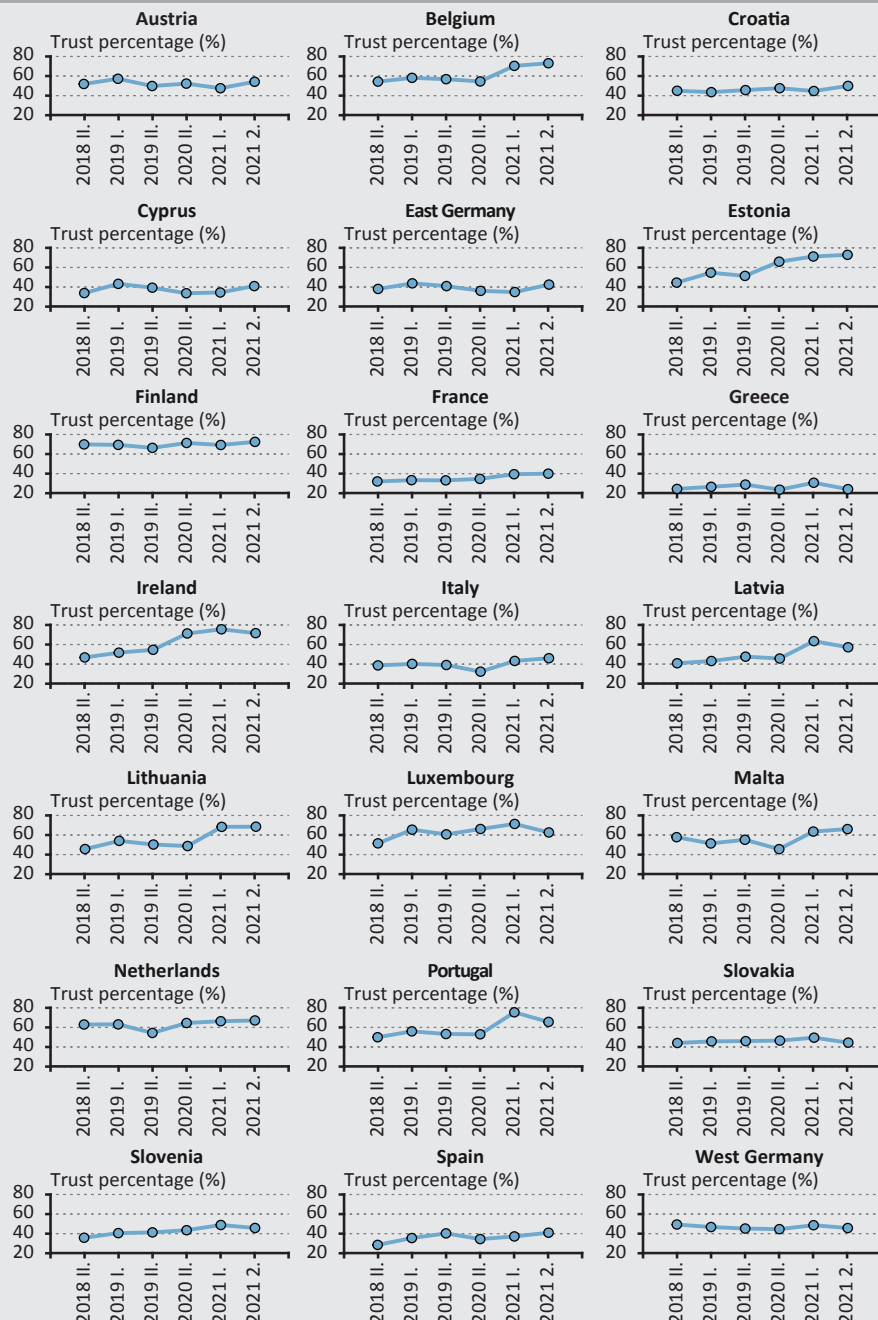
pandemic, trust in the ECB declined for a number of demographic groups, such as the youngest, 45–59-year-olds, the least educated and the non-right-wingers.

Variables		Before Covid				After Covid			
		Persons	Trust	Do not trust	Do not know	Persons	Trust	Do not trust	Do not know
Gender	Women	21,046	45.5	37.0	17.5	10,484	47.6	38.0	14.5
	Men	17,458	49.7	38.7	11.6	8,885	50.1	40.8	9.1
Age	<23	3,184	53.1	28.6	18.3	1,547	51.7	29.8	18.5
	24–35	5,528	48.7	38.4	12.9	2,796	50.2	40.2	9.6
	35–45	5,610	48.0	39.8	12.3	2,865	49.2	42.0	8.9
	45–59	9,285	47.8	40.2	12.0	4,908	47.0	43.3	9.7
	60<	14,897	46.8	35.1	18.2	7,254	48.5	37.1	14.4
Marital status	Married	20,103	48.4	38.9	12.7	10,039	50.5	39.2	10.3
	Not married	18,401	46.4	36.4	17.2	9,330	46.8	39.3	13.9
Educational attainment	<15	5,870	35.8	44.2	20.0	2,562	33.5	45.2	21.3
	16–19	16,226	44.4	40.1	16.0	7,776	44.4	43.0	12.6
	20<	13,018	56.6	31.9	11.5	7,038	58.0	34.6	7.3
Employed	Working	16,260	50.1	37.9	12.1	8,533	51.3	39.4	9.3
	Unemployed	22,244	45.0	37.1	17.9	10,836	46.4	38.4	15.2
Retired	Retired	12,501	45.1	36.8	18.1	5,692	47.8	37.5	14.7
	Not retired	26,003	48.6	38.2	13.2	13,677	49.1	40.0	10.9
Political orientation	Extreme left	3,234	46.6	41.8	11.6	1,382	45.5	43.7	10.8
	Left wing	7,270	53.0	35.5	11.5	4,003	52.7	37.1	10.3
	Centre	13,518	51.0	35.4	13.6	8,236	48.3	40.0	11.8
	Right wing	5,200	54.5	35.2	10.4	3,238	55.8	37.7	6.5
	Extreme right	2,167	48.9	38.9	12.2	1,032	49.2	41.0	10.2

Source: Based on Eurobarometer surveys

Figure 1 shows the changes in trust in the ECB in each euro area country from 2018 H2, including the emergence of the Covid-19 pandemic in 2020, to the middle of the pandemic period. The evolution of trust varies considerably between individual countries: In Cyprus, Malta and Italy, there was a noticeable drop in trust immediately after the outbreak, while in France, West Germany and Slovakia, trust remained stable or increased slightly. One possible assumption from the line charts is that the crisis negatively affected trust in the ECB in many countries, but the differences between countries may suggest that the impact of the crisis was heterogeneous across the euro area.

Figure 1
Evolution of trust in the ECB in individual euro area countries



Note: The figure shows the percentage of respondents who said they tend to trust, and not that they tend not to trust the ECB or do not know.

Source: Based on Eurobarometer surveys

3.2. Data from Eurobarometer surveys and macroeconomic data

The Oxford COVID-19 Government Response Tracker (OxCGRT)² provides a systematic, comparable database that gives a comprehensive picture of government responses to the Covid-19 pandemic in different countries. The database comprises data from 185 countries and includes data on school and workplace closures, restrictions on public gatherings, health policies, economic support measures, and information on vaccination priorities and requirements. A total of 25 different measure indicators are used to categorise government responses, which are also used to create indices for easy comparison. The database aims to help researchers, decision-makers and the public understand and evaluate the responses to Covid-19, thus helping to prepare for future epidemics and crisis management. The data are accessible and publicly available.

The stringency index is a key indicator used by OxCGRT to measure the stringency of government action during the Covid-19 pandemic. This index provides a quantified picture of how stringently different countries responded to the epidemic. The stringency index takes into account a range of government response measures, such as school and workplace closures, restrictions on public gatherings, traffic restrictions, curfews and travel restrictions. The index measures the stringency of the response measures on a scale from 0 to 100, with higher values indicating more stringent responses. For the calculation, the OxCGRT team assigns data to different response measures, which are then averaged to obtain a daily stringency index for countries or regions. The index allows researchers, decision-makers and citizens to monitor the extent to which countries' measures are changing as the pandemic intensifies and to compare their effectiveness.

It is important to note that the stringency index does not measure the quality of measures, the effectiveness of their implementation or their economic and social consequences. It merely provides information on how stringently countries tried to take steps to prevent the spread of the pandemic. When assessing the index, it is therefore important to take into account the different social, economic and political contexts of the countries (*Table 3*).

Macroeconomic data were taken from the Eurostat database. The data include the inflation rate based on the annual consumer price index and the unemployment rate (*Table 3*). The methodology followed by Eurostat involves the collection of data from the national statistical offices of the Member States, ensuring the comparability and reliability of the data.

² <https://www.bsg.ox.ac.uk/research/covid-19-government-response-tracker>

Table 3
Descriptive statistics: macroeconomy and stringency index

Variables	Before Covid			After Covid		
	Number	Mean	SD	Number	Mean	SD
Unemployment rate	42	7.040	3.808	42	7.250	3.181
Inflation	42	1.607	0.734	42	1.345	1.514
Stringency index	38,504			19,369	44.12	5.391

Note: The table summarises the data from the 2019 and 2020 Eurobarometer surveys in the form of descriptive statistics. The period before Covid-19 reflects 2018 and 2019 data, and the period after Covid-19 reflects 2020 and 2021 data. The stringency index was established in response to the Covid-19 outbreak, so data are only available for the follow-up period in that regard. Further details on the definition of variables and data sources are given in Table 6 in the Annex.

The strength of the association between each variable and trust in the ECB is shown in Tables 7 and 8 in the Annex.

4. The empirical model

In this study, we estimated the following probit model, also applied by *Ehrmann et al. (2013)*, at time t for individual i from country j :

$$trust_{it}^j = \alpha x_{it}^j + \beta z_{it}^j + \gamma crisis_t + \delta D^j + \varepsilon_{it}^j \quad (1)$$

Trust is a binary variable indicating trust in the ECB. x_{it}^j indicates individual-specific variables (e.g. gender, age, married, retired and political orientation vector). z_{it}^j are country-level variables such as inflation and unemployment rates. $crisis_t$ is the dummy for the Covid-19 crisis and, in another specification, the stringency index variable. D^j is the vector of country-specific dummy variables, which is one dummy for each euro area country except our reference country.

The need to deal with selection bias arose in the course of our research, requiring the use of the Heckman correction model based on *Ehrmann et al. (2013)*. On the one hand, the number of respondents who do not express an opinion on trust in the ECB – i.e. the ‘I do not know’ category – is not insignificant. This phenomenon may distort the results of the analysis if the non-response is not random. For example, the willingness to respond may be lower among those who lack trust in the central bank. If this is the case, we would overestimate the proportion of people who trust the ECB and find biased associations between trust in the ECB and other variables. On the other hand, the number of people who are willing to express their opinion on trust in the ECB changes in times of crisis: the proportion of ‘I do not know’ answers decreases. On average, the share of ‘I do not know’ answers decreased by 3 percentage points across countries, although with significant variations – for example, Estonia and Finland saw a decrease of 31 per cent and 12 per cent, respectively. Estimates from our standard probit model may be biased by

these changes in response willingness, as the group of survey respondents is not necessarily representative of the population as a whole. Interestingly, for the 2008 crisis *Ehrmann et al. (2013)* also found an increased willingness to voice opinions. Further research is needed to understand why exactly the willingness to voice opinions increases in these two crises, and whether this is true in general for periods of crisis.

The Heckman correction model aims to correct for selection bias using a two-step method. In the first step, a probit model is used to estimate the probability of being included in the sample (in this case, the respondents' decision whether to express an opinion on the ECB). In this step, we examine the relationship between those who express an opinion and those who do not. In the second step, we use the probit model to model opinions about the ECB, taking into account the estimates of the response probability of the survey respondents from the first step. Heckman's correction is based on the assumption that the selection equation includes a variable which affects selection (and, as a result, is positively and significantly related to trust in the ECB), beyond this channel, however, the instrument should have no effect on trust in the ECB.

In our selection strategy, we use an instrumental variable similar to the study by *Ehrmann et al. (2013)* the willingness to express an opinion on the issue of trust in the European Parliament. We assume that anyone who is willing to express an opinion on the European Parliament is likely to express an opinion on the ECB as well. However, it is also assumed that whether someone answers a question about the European Parliament is essentially independent of whether they trust the ECB. The results of the analysis show that this instrument is positively and significantly correlated with trust in the ECB (*Annex Table 9: European Parliament opinion variable – 0.686 – positive and statistically significant coefficient*).

5. Findings

Our findings show that the Covid-19 pandemic had an overall negative impact on trust in the ECB (*Table 4*, specifications 1–4), which is in line with the literature that trust in institutions often declines in times of crisis (*Ehrmann et al. 2013; Wälti 2012; Gros – Roth 2010*). Controlling for demographic and macroeconomic factors, the period of the Covid crisis reduces the probability of a 'tend to trust' response (*Table 4*, specifications 1–4, coefficients 0.04–0.06). The differences between the first four specifications (1–4) in *Table 4* are due to the variables they include as controls. The specifications with increasing sequence numbers include more and more demographic and economic variables, such as gender, age, marital status, education level, employment level and retirement status.

One question is whether the negative impact of Covid-19 on trust in the central bank is part of a loss of trust in institutions in a broader sense or whether it is more due to central bank-specific reasons. To answer this question, specifications 5 and 6 include a proxy for general institutional trust – trust in the European Commission. In these specifications we no longer see a statistically significant Covid dummy (at the 0.05 level) with a negative sign. The results, therefore, suggest that the loss of trust caused by the crisis is not specific to central banks but is part of a general change in trust in European Union institutions.

This may be because the crisis caused by the Covid-19 pandemic was primarily a public health crisis, although it also had significant economic consequences. Thus, it is different, for example, from the global economic crisis of 2008, which had its origins directly in the economic and financial system. It is possible that the public did not fully appreciate the (further) serious problems that could have arisen in the economic and financial system during the Covid-19 crisis if central banks and other institutions had not intervened. Given the nature of the crisis, it is therefore possible that people's perceptions were mainly about public health measures rather than about measures aimed at financial (or economic) stability, and this also affected the development of trust in individual European institutions.

The coefficient of trust in the European Commission is positive and significant in all three specifications where it is included (*Table 4* specifications 5 and 6 and *Table 5* specification 8). This means that trust in the Commission and the ECB moves together. The link between trust in the different institutions of the European Union is logical.

The effect of political orientation on trust in the ECB is statistically significant. Extremist views – whether extreme right or extreme left – are associated with lower central bank trust. Interestingly, in specifications controlling for general EU institutional trust, left-wing political orientation variables are statistically significant and negative, while right-wing ones are not. This is in line with the literature, which also found that left-wing respondents have less trust in the ECB. This phenomenon was linked to the fact that inflation is a relatively more important issue for right-wing parties, as their voter base would be worse off with high inflation than with some increase in unemployment (*Brouwer – de Haan 2022*). And the public follows the parties' positions.

Inflation is included in the model based on *Ehrmann et al. (2013)*, but in our case the period under consideration does not include the rise in inflation, as it ends before. Omitting inflation from the equations does not materially change the conclusions.

	(1)	(2)	(3)	(4)	(5)	(6)
Covid	-0.055***	-0.049***	-0.036***	-0.049***	0.003	0.008*
Gender: Women		0.056***	0.054***	0.052***	0.001	-0.000
Age		0.002***	0.002***	0.002***	0.001***	0.001***
Married		0.010*	0.013**	-0.010*	0.009**	0.004
Educational attainment		0.039***	0.039***	0.042***	0.014***	0.011***
Employment		0.030***	0.029***	0.031***	0.008*	0.007
Retired		0.040***	0.042***	0.040***	0.001	0.002
HICP inflation (annual)			-0.005	-0.010	0.011**	0.011**
Unemployment rate (annual)			-0.000	0.000	0.001	0.001*
Political orientation (basic group: centre):						
Extreme left		-0.087***		-0.089***	-0.047***	
Left wing		0.014*		0.014**	-0.010**	
Right wing		-0.009		-0.008	0.004	
Extreme right		-0.049***		-0.043***	-0.007	
Trust in the European Commission					0.642***	0.660***
Country dummy?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	115,755	88,938	102,485	85,571	83,221	96,922
Pseudo-R-squared	0.079	0.091	0.122	0.118	0.477	0.502
Rho	-1.269	-1.331	-1.187	-1.289	-0.673	-0.592
LR statistics	22,623	5,330	3,247	38,478	31,321	38,478
p-value	0	0	0	0	0	0
Inverse Mills ratio	-0.825	-0.838	-0.717	-0.788	-0.255	-0.219

*Note: In specifications 1–6, the effect of Covid-19 is modelled with a dummy variable. The significance levels are denoted as *** p<0.001, ** p<0.01, * p<0.05. All models use robust standard errors to handle heteroskedasticity. Censored observations mean that the censored data from the full sample cannot be fully observed in the model. The rho, LR statistics and the associated p-value provide information on the value of the correlation coefficient between the error terms in the selection and regression equation, rejecting the null hypothesis that this value is zero, thus justifying the need for the Heckman model.*

Table 5**Determinants of trust in the European Central Bank with a stringency index**

	(7)	(8)
Stringency index	0.028***	0.039***
Gender: Women	0.058***	0.004
Age	0.002***	0.001***
Married	0.009	0.008**
Educational attainment	0.034***	0.011***
Employment	0.030***	0.008*
Retired	0.044***	0.003
HICP inflation (annual)	-0.040***	-0.002
Unemployment rate (annual)	-0.000	0.001*
Political orientation:		
Extreme left	-0.089***	-0.048***
Left wing	0.012*	-0.010**
Right wing	-0.014*	0.001
Extreme right	-0.044***	-0.008
Trust in the European Commission		0.641***
Country dummy?	Yes	Yes
Number of observations	85,571	83,221
Pseudo-R-squared	0.118	0.477
Rho	-1.360	-0.757
LR statistics	4,408	29,701
p-value	0	0
Inverse Mills ratio	-0.871	-0.292

*Note: In specification 7, the impact of Covid-19 on the stringency of government measures during the pandemic is directly assessed using the stringency index, which ranges between 0 and 1. The significance levels are denoted as *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. All models use robust standard errors to handle heteroskedasticity. The rho, LR statistics and the associated p-value provide information on the value of the correlation coefficient between the error terms in the selection and regression equations, rejecting the null hypothesis that this value is zero, thus justifying the need for the Heckman model.*

The Covid dummy is replaced by the stringency index in specifications 7 and 8. The stringency index coefficient is statistically significant and positive. This means that a higher stringency index is associated with a higher level of trust in the central bank. This can be interpreted in several ways. It is possible that in countries where stricter measures were introduced to combat Covid-19, people's trust in the ECB increased – either because active, appropriate action is valued by the public, or

because stricter measures reflect a worse public health situation (higher infection levels, etc.) and there is greater support for action to tackle the worse situation. But it is also possible that higher institutional trust made it possible to announce more stringent Covid measures (i.e. causality is reversed). It is beyond the scope of this study to explore possible explanations.

Specification 8 expands specification 7 by general institutional trust (in the Commission). The results of specifications 8 and 6 also show that trust between the institutions of the European Union is correlated and that trust in the European Commission moves in conjunction with trust in central banks.

In *Tables 4 and 5*, we can see that the level of education is significantly positive across the models, suggesting that higher educational attainment is associated with higher levels of trust. The literature also tends to find a positive relationship in general (*Ehrmann et al. 2013; Mellina – Schmidt 2018*), which is often explained by the information channel: highly educated people are better informed. In addition, our results also show that higher age is associated with higher levels of trust. This is in line with the results of *Ehrmann et al. (2013)* and *Farvaque et al. (2017)*. As concluded by *Farvaque et al. (2017)*, there is also a positive correlation between employment and trust. In our sample, women's trust levels are higher than men's in most specifications, controlling for other factors. The literature is not consistent with respect to gender, with some studies documenting higher trust levels among women, while others find the opposite (*Ehrmann et al. 2013; Farvaque et al. 2017; Brouwer – de Haan 2022; Hayo – Neuenkirch 2014*). It is also interesting to note that some of the demographic variables are not significant as more and more variables are included in the model (specification 5–6), especially when controlling for general trust in EU institutions. This may suggest that some demographic variables are more relevant from the aspect of overall trust than central bank-specific trust. Similar to *Brouwer – de Haan's (2022)* study of Dutch data, we find that employment (unemployment) loses its statistical significance when controlling for overall (EU) institutional trust. However, the Hungarian data show that the gender variable behaves similarly, whereas in the Dutch sample of *Brouwer – de Haan (2022)*, gender becomes significant at the 0.05 level when EU trust is included.

The matrix describing goodness of fit shows that the model performs well in predicting 'trust', but does not perform well in identifying 'do not trust' (a value lower than 0.5 probability is assigned to the 'do not trust' category). Regardless of this, the study's analyses of the relationship between each variable and the greater likelihood of 'trust' are valid (*Annex Table 10*).

6. Conclusions

In this study, we examined the impact of the Covid-19 crisis on the trust of euro area residents in the central bank. We found that this effect is negative, which is in line with the literature that trust levels generally decline in times of crisis. However, the negative impact is not specific to the central bank but stems from a general decline in institutional trust.

Our results also highlight the relationship between trust in the individual European institutions. Trust in the ECB moves in conjunction with trust in the European Commission, for example. When taking measures, especially during crises, coordination between institutions that also reflects this aspect may be beneficial. Presumably, it is not only trust in individual European supranational institutions that is correlated but also the measures taken by individual governments may have a trust effect extending beyond governments. We find a positive correlation between stringent government measures during the crisis and public trust in the central bank.

Interestingly, among other factors, political orientation was also found to be a determinant of trust in the central bank. Those at both ends of the political orientation scale have less trust in the central bank, which for right-wing respondents is not related to the central bank but rather to general trust in the EU institutions. However, the lower level of trust among left-wing respondents is directly related to the central bank. Furthermore, in our sample, as in some of the literature, we find that the unemployed, the younger and the less educated are more likely to have lower levels of trust.

These results show that trust in central banks is a complex phenomenon that depends not only on the direct actions of the central bank but also on the general economic and political environment, the credibility of other institutions and demographic factors.

The results of the study highlight the complex nature of trust in central banks in times of crises such as Covid-19. However, the dynamics of trust can differ significantly in other types of crises, such as the 2008 financial and economic crisis, which affected the financial system itself more directly. Future research could be useful for comparative analysis of trust dynamics across crises, in order to better understand how trust-building strategies should be adapted to different crisis situations.

Looking ahead, it may be useful to analyse in more depth the spill-over effects of trust between institutions, for example by looking at the decisions taken in a crisis as a starting point. It may also be interesting to explore in more detail the trust dynamics of groups with extreme political orientations toward institutions, especially in times of crisis. Our results may contribute to a better understanding at central banks of changing trust levels, thus helping them to plan and implement crisis management measures more effectively.

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Annex

Table 6 Coding of variables		
Variables	Source	Coding
Countries	Eurobarometer survey	We used country dummy, the reference country being: Germany
Trust in the ECB	Eurobarometer survey	1 if the answer is 'Tend to trust', 0 if 'Tend not to trust', missing value for 'I do not know'
Gender: Women	Eurobarometer survey	1 if female, otherwise 0
Age	Eurobarometer survey	Age in years
Married	Eurobarometer survey	1 if married, otherwise 0
Educational attainment	Eurobarometer survey	1 if they completed their education before the age of 16, 2 if they completed it between the ages of 16 and 19, and 3 if they completed it after the age of 19
Employment	Eurobarometer survey	1 if employed, otherwise 0
Retired	Eurobarometer survey	1 if retired, otherwise 0
HICP inflation (annual)	Eurostat	The Harmonised Consumer Price Index (HICP) is the annual inflation rate Set as a dummy: 1 if annual inflation in the year and country is above 2.5 per cent (ECB inflation target), otherwise 0
Unemployment rate (annual)	Eurostat	Annual unemployment rate for the given year and country
Stringency index	Oxford Covid-19 Government Response Tracker (OxCGRT)	The average stringency index over the six months preceding the period in question was taken for each country
Overall satisfaction with life	Eurobarometer survey	1: very satisfied 2: quite satisfied 3: not very satisfied 4: not at all satisfied
Political orientation	Eurobarometer survey	Declared themselves to be 1: extreme left, 2: left, 3: right, 4: centre, 5: extreme right Set as dummy, the reference is centre (code 3)
Trust in the European Commission	Eurobarometer survey	1 if the answer is 'Tend to trust', 0 if 'Tend not to trust', missing value for 'I do not know'

Table 7
Strength of association between variables and trust in the ECB

Variables	Cramer's V
Gender: Women	0.0009
Married	0.1928
Educational attainment	0.1480
Employment	0.0265
Retired	0.0020
Political orientation	0.0616
Trust in the European Commission	0.6892

Table 8
Average inflation and unemployment rates by trust in the ECB

ECB trust	Inflation	Unemployment
Trust	1.76	6.81
Do not trust	1.54	7.85
I do not know	1.64	7.04

Table 9
Determinants of trust in the European Central Bank with Covid dummy – Selection equation of model (3)

	(3)
Covid	0.270***
Gives opinion on the European Parliament	0.686***
Gender: Women	−0.258***
Age	−0.001***
Married	0.101***
Educational attainment	0.201***
Employment	0.052***
Retired	−0.054**
HICP inflation (annual)	0.082***
Unemployment rate (annual)	−0.000
Country dummy?	Yes
Number of observations	102,485
Pseudo-R-squared	0.122

Table 10
The goodness of fit of the model

	Actual 0	Actual 1
Predicted 0	97	598
Predicted 1	12,400	83,827

Note: The table is based on specification (6).