Journal of Public Health
https://doi.org/10.1007/s10389-025-02413-4

ORIGINAL ARTICLE

The importance of generalized trust for mortality and economic activity during the COVID-19 pandemic in Europe

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Received: 28 August 2024 / Accepted: 21 January 2025
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Abstract

Aim This study investigates the role of trust in others with respect to mortality and economic activity during the COVID-19 pandemic.

Subject and methods The study analyses data among 42 European countries on mortality up to 30 April 2021. The study proposes a model in which trust affects COVID-19 mortality through two channels: (1) income per capita, which is associated with traits of society that are important for mortality, and (2) compliance with advice from experts and authorities.

Results The main result is that an increase in trust by one standard deviation corresponds to a reduction in the COVID-19 death rate by 43%. One standard deviation corresponds to the difference in trust between, for example, the United Kingdom and Switzerland or the Netherlands. The results show that compliance accounts for 60–90% of the total impact of trust on mortality, while the impact of trust through income per capita accounts for the rest. Epidemics are likely to reduce contact with others, including contact where economic activity takes place. The study estimates that 1000 COVID-19 deaths per million inhabitants resulted in a decrease in gross domestic product of 4.4% in European countries. For the UK, for example, this amounts to about 1.4 million GBP for each avoided COVID-19 death.

Conclusion The level of trust was an important determinant for mortality during the COVID-19 pandemic in European countries, and the major part of the impact can be attributed to compliance.

Keywords Trust · Social capital · COVID-19 · Mortality · Economic activity

Introduction

The consequences of the COVID-19 pandemic with regard to mortality and economic activity have varied substantially among different countries. It is of substantial interest to investigate and understand the factors behind the variation in COVID-19 mortality across countries, not least for evaluating various options in relation to responding to potential future pandemics.

A basic insight is that self-interested people during epidemics will try to avoid being infected by taking measures such as social distancing. However, if people only take into account their own chance of being infected and not other peoples' chances, the amount of social distancing becomes too small from a societal point of view. The epidemic becomes too severe under laissez-faire, and policy measures such as lock-downs of schools and workplaces have the potential to improve outcomes. Society obtains the social optimum when the marginal cost of further intervention equals the marginal gain of reduced infections (Alvarez et al. 2021; Giannitsarou et al. 2021). Farboodi et al. (2021) analyse the case where people reduce the risk of transmitting the disease, not just the chance of contracting it. The borderline cases are (1) when people fully internalize the costs of making other people sick, in which case the social optimum prevails, and (2) no internalization of the costs, which leads to the laissez-faire equilibrium.

This study investigates the role of trust in others (or generalized trust) for COVID-19-related outcomes. Trust is an element in the concept of social capital (Putman 2000), which in the present context can be understood as those persistent and shared beliefs and values that help a group overcome the free-rider problem in the pursuit of socially valuable activities (Guiso et al. (2011) use the name "civic capital" for this subcategory of social capital). It is socially

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Published online: 20 February 2025

valuable to reduce the chance of other people contracting COVID-19, and shared trust in society might be helpful for alleviating the consequences of the pandemic. Furthermore, trust and social capital might make it less necessary for governments to impose more drastic restrictions to prevent the spread of a pandemic.

Besley and Dray (2024) emphasize that state efficiency in alleviating the consequences of the COVID-19 pandemic relies on trust. Their analysis of the relation between government policy and trust (naturally) focuses on trust in government. However, in the case of compliance with COVID-19 rules of behaviour, it is plausible that citizens are more likely to follow such rules if they trust that other citizens will also adhere to the advice or rules (for example, Besley (2020) shows that confidence in government is positively correlated with a positive opinion of tax compliance, while this is not the case with interpersonal trust).

This study proposes and analyses two channels through which trust and social capital can affect COVID-19 mortality. One is through income per capita. High-trust countries are likely to have high productivity and consequently high incomes (Knack and Keefer 1997), and a high income level can have an impact on COVID-19 mortality through several channels. People in high-income countries might be healthier than people in low-income countries and thus less likely to be seriously affected by contracting COVID-19. High-income countries are also likely to spend more on health care systems, which might lead to more effective treatments for COVID-19 patients and fewer deaths. Furthermore, high-income countries have higher housing standards, making it less likely that more than one generation lives in the same house, which potentially diminishes the intergenerational spread of the pandemic.

A second channel through which trust and social capital can have an impact on COVID-19 mortality is the behaviour of the population during the pandemic. A high level of social capital might imply that people try to avoid making other people sick, and high trust in politicians and authorities, for example, could imply that the population is more likely to listen to and comply with recommendations about behaviour that are aimed at containing the pandemic. The study names this channel "compliance", which enters as a latent variable in the analysis, as it is not evident that such data exist for the countries in the sample.

Data come from the European Values Study (EVS 2022), which includes information on trust and other variables for the 42 countries in the present study. Another source is the Coronavirus Resource Center at Johns Hopkins University (Our World in Data 2023), which supplies the main outcome variable of the study, i.e., the accumulated number of COVID-19 deaths per one million inhabitants as of 30 April 2021. The object of the study is the initial phase of the pandemic, and the study does not consider the later developments of the pandemic, where, for example, the availability of vaccines in different countries has an impact on COVID-19 mortality rates.

A substantial number of studies have analysed the impact of trust and social capital on the COVID-19 pandemic. These include studies on mobility (Bargain and Aminjonov 2020; Brodeur et al. 2021), infections (Bartscher et al. 2021; Fraser et al. 2022), and mortality (Makridis and Wu 2021; Charron et al. 2023).

The present study makes four contributions to the literature. First, it proposes a model by which trust affects mortality through two channels: (1) income per capita and (2) compliance with advice and recommendations. Second, the study contributes to the literature estimating how much of the total impact of trust on COVID-19 mortality is due to compliance. Third, the study establishes a model-based framework for interpreting the empirical results of other studies on the impact of trust on mortality. Fourth, the study presents evidence for the importance of generalized trust for economic activity during the COVID-19 pandemic.

The main finding of the study is that an increase in trust by one standard deviation corresponds to a reduction in the COVID-19 death rate by 43%, or about 588 COVID-19 deaths per million inhabitants, when evaluated at the mean COVID-19 deaths per million inhabitants in Europe. For example, the United Kingdom has a trust level that is one standard deviation lower than the trust level in Switzerland and the Netherlands. As the UK has about 67 million inhabitants, the finding implies that the UK would have experienced about 40,000 fewer COVID-19 deaths by 30 April 2021 if it had a trust level comparable to the Netherlands and Switzerland. Moreover, the study assesses that compliance accounts for 60–90% of the total impact of trust on mortality, while the impact of trust through income per capita accounts for the rest.

The study also analyses the impact of the pandemic on economic activity during the initial phase of the pandemic, where people tend to reduce contact with others in order to reduce the risk of infection. I estimate that every 1000 COVID-19 deaths per million inhabitants resulted in a decrease of 4.4% in gross domestic product (GDP). For the UK, for example, this amounts to about 1.4 million GBP for each avoided COVID-19 death. This implies a total loss in economic activity in the UK of about 56 billion GBP as of 30 April 2021 compared with a situation where the UK had a trust level comparable to the Netherlands or Switzerland.

The paper is organized as follows. Section 2 reviews the literature and related work. Section 3 presents the data, and the model is presented in Sect. 4. Section 5 contains the results, and they are discussed in Sect. 6. Section 7 concludes.

Previous work on social capital and COVID-19

Following Putnam (2000), research reveals substantial evidence that trust and social capital have a number of positive effects of considerable importance. These include high gross national product and low levels of corruption and tax evasion (Tabellini 2008; Guiso et al. 2011).

Trust is often considered an element in social capital, which includes how members of the population interact with each other. Among other measures contributing to social capital considered in the literature are membership in organizations and voting in elections (Putnam 2000; Glaeser et al. 2002).

Several studies indicate that social capital was important for compliance during the COVID-19 pandemic. For the United States, studies show that mobility decreased more in counties with high social capital than in counties with low social capital (Borgonovi and Andrieu 2020; Ding et al. 2020; Brodeur et al. 2021; Goldstein and Wiedemann 2021; Bai et al. 2023). Similar evidence exists for Europe (Bargain and Aminjonov 2020; Barrios et al. 2021; Durante et al. 2021).

However, previous studies that have analysed the effect of trust and social capital on COVID-19 mortality do not yield unanimous results. One group of studies rely on survey data from the EVS or the World Value Survey (WVS) as the basis for measures of trust or social capital. For 84 countries in the WVS, Elgar et al. (2020) find that each of the four indices of social capital, including one for trust, increases mortality in bivariate regressions, while two measures increase and two measures decrease mortality in the joint estimation. Adamecz-Völgyi and Szabó-Morvai (2023) use the WVS for 75 countries and find that confidence in public institutions is the most important factor for reducing mortality, while an index for trust increases mortality in the preferred estimation. For 35 countries in the WVS, Casey (2023) finds that both trust in government and trust in others reduce mortality.

Another group of studies uses surveys other than the EVS or the WVS. Arachchi and Managi (2021) use a survey for 37 countries and find that social trust was associated with increased mortality. Murayama et al. (2021) use a survey and find that trust in government in different prefectures in Japan was associated with fewer COVID-19 deaths while trust in neighbours, neighbourhood ties and social participation was not related to COVID-19 deaths. Borgonovi et al. (2021) find that both an index for social connection and the county-specific response rate to the 2010 decennial census reduced mortality. Using answers from 25 countries in the European Social Survey, Oksanen et al. (2020) find that institutional trust reduced COVID-19 mortality. Makridis and Wu (2021) find that an index for social capital, including trust and community cohesion, reduced COVID-19 infections and mortality in US counties. Yanagisawa et al. (2021) find that an index for social and emotional support decreased infections and mortality in US counties, while voter turnout in presidential elections increased mortality. Charron et al. (2023) find that trust in others measured in a survey reduces mortality in 165 European regions.

A third group of studies uses indices for social capital constructed from various official statistics. Fraser et al. (2022) find mixed results for the impact of social capital on the COVID-19 spread in local areas in three US states and New York City. Bartscher et al. (2021) find that social capital decreases COVID-19 infections in regions in seven European countries, where voter turnout in the 2019 European Parliament election is used as an indicator for social capital.

The previous studies on the impact of trust and social capital on the spread of and mortality associated with the COVID-19 pandemic provide varying results even among studies that use the same data source, i.e., survey answers in the WVS and the EVS. Some studies find that measures of social capital reduce mortality, while other studies find that social capital increases mortality. Moreover, among the contributions that assign a positive role to social capital in containing the pandemic, the literature does not agree about the relative impact of various dimensions of social capital, for example, generalized trust, confidence in institutions and membership in organizations.

For the United States, the reaction of the population to the COVID-19 pandemic with respect to behaviour related to economic activity is analysed in several contributions. These studies reveal a decline in economic activity before any shutdowns were ordered and show that legal restrictions explain only a small part of the overall decline in economic activity (Cronin and Evans 2021; Goolsbee and Syverson 2021; Alexander and Karger 2023). Furthermore, activity reductions were more concentrated in services that require physical interaction (Cox et al. 2020; Chetty et al. 2024). Based on this information, a natural conjecture is that the decline in economic activity is more severe for localities more affected by the COVID-19 pandemic.

Data

Data for the study come from multiple sources. From the EVS (2022), I use the following: (1) Trust in others or generalized trust, measured by the answer to the question "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" There are two response categories: (a) "Most people can

be trusted" and (b) "Can't be too careful". (2) Confidence in public institutions is measured on a four-point scale. The study uses information on confidence in the following four institutions: government, civil service, courts, and police. (3) Membership in organizations (the scale is yes or no), where information on membership in the following eight organizations is included in the study: religious, cultural, labour union, political party, environmental, professional, sport and other. (4) Living with parents or parents-in-law (this variable falls under the name "housing" in the following). (5) Self-reported health measured on a five-point scale.

From EVS (2022), I calculate country averages for the variables using sample weights. The self-reported health variable in the study is the share of respondents that answer that they have poor or very poor health. The measure of confidence in public institutions in the study is the first principal component of the amount of confidence in the four public institutions mentioned above. The index of membership in organizations in the study is the first principal component of the eight types of organizations mentioned above. All explanatory variables that enter the regression analyses are normalized to have mean zero and standard deviation 1 (I normalize the indices for confidence in public institutions and for efficiency of the health care system such that a higher index indicates more confidence and more efficiency).

Variables that measure the accumulated number of COVID-19 deaths per one million inhabitants (as of 30/4 2021 and 31/12 2020), population density, the share of the population that is 65 years of age or older and GDP per capita are from the Coronavirus Resource Center at Johns Hopkins University (accessed via Our World in Data 2023). I use the term income per capita to characterize the GDP per capita variable.

Information about the average age-standardized mortality rate from "treatable" causes per 100,000 population across Organisation for Economic Co-operation and Development (OECD) countries is from the OECD (2021). The idea is that effective public health and health care systems should reduce this mortality rate, and that the figures can thus serve as an index of the efficiency of the health care system in different countries. Data for real GDP growth for 1999–2000 are from the International Monetary Fund (IMF 2023).

All countries with populations of more than one million inhabitants that were included in one of the last two waves of the EVS are included in the study, in total 42 countries. Six of the countries did not participate in the 2017 wave (wave 5), and for these countries the values for the 2008 wave (wave 4) are used. Wave 4 did not include the question on living with parents, so this variable is only available for 36 countries. The OECD measure of efficiency of health care systems is available for 25 of the 42 countries in the study and 21 of the 36 countries for which housing conditions are also present. The data for the trust regressions are displayed in Table 6 in the Appendix (the countries not included in wave 5 are identified from the missing values for the variable living with parents).

Methodology

The study assumes that the data follow a model that describes the way trust affects mortality during the COVID-19 pandemic. The model consists of a system of equations through which trust (T) determines mortality (M). Two exogenous variables are included in the analysis: population density and the share of elderly. This inclusion follows from the canonical SIR (susceptible, infected, resistant) model for the development of an epidemic (Kermack and McKendrick 1927), in which the population transitions from first being susceptible to being infected. It is plausible that higher population density leads to a higher transition rate, as higher population density might imply more contact between people. In the second part of the model, the infected transition to be resistant (that is, either immune or dead), and as the transition rate to death is higher for the elderly than for the young, the mortality rate is thus expected to be higher for higher shares of elderly in the population.

Trust affects mortality through two channels in the model: income per capita (Y) and compliance (C). Income per capita is an observed variable, while compliance enters the model as a latent (or unobservable) variable. The model assumes that trust does not directly influence mortality but it can affect income per capita, as high-trust countries tend to have higher income per capita; see Eq. (1). Income per capita in turn does not directly influence mortality, but it affects housing standards, which has consequences for the share of the population that lives with their parents (L), see Eq. (3). If a high share of parents and children live together, this might affect the intergenerational transmission of COVID-19 in the population and thus the mortality rate. Furthermore, a high income level in a country provides the means for high efficiency in the health care system (E), see Eq. (4). Better health care systems might reduce mortality among persons infected by COVID-19. High income might also be associated with better health of the population (H), see Eq. (5), which in turn might reduce the mortality rate of infected persons.

High trust in a country might imply that people are more likely to believe statements from experts and authorities about COVID-19 and comply (C) with advice aimed at limiting the impact of the pandemic, see Eq. (2). Compliance with advice has the potential to reduce mortality in the population. In the final Eq. (6), mortality is determined by housing standards, health care efficiency, population health and compliance. This equation also contains the two exogenous variables, population density (P) and the share of elderly in the population (S), that are assumed to have a direct impact on mortality.

The system is as follows, where index i denotes countries $i = 1 \ldots .N$.

$$Y_i = \alpha_1 + \beta_1 T_i + e_{1i}, \tag{1}$$

$$C_i = \alpha_2 + \beta_2 T_i + e_{2i}, \tag{2}$$

$$L_i = \alpha_3 + \beta_3 Y_i + e_{3i}, \tag{3}$$

$$E_i = \alpha_4 + \beta_4 Y_i + e_{4i}, \tag{4}$$

$$H_i = \alpha_5 + \beta_5 Y_i + e_{5i}, \tag{5}$$

$$M_i = \alpha_6 + \beta_{6L} L_i + \beta_{6E} E_i + \beta_{6H} H_i - C_i + \gamma P_i + \theta S_i + e_{6i}. \tag{6}$$

In Eq. (6), the unobservable variable, compliance, C, enters with a coefficient of -1 [which is a scale normalization; see e.g. Goldberger (1972) and Bollen (1989)].[1]

When Eq. (2) is substituted into Eq. (6), the following expression is obtained:

$$M_i = \alpha_7 + \beta_{6L} L_i + \beta_{6E} E_i + \beta_{6H} H_i - \beta_2 T_i + \gamma P_i + \theta S_i + e_{7i}, \tag{7}$$

where $\alpha_7 = \alpha_6 - \alpha_2$ and $e_{7i} = e_{6i} - e_{2i}$.

This is an estimatable equation in observables. According to the derivation of the equation, the coefficient on trust, T, measures the impact of compliance on mortality, conditional on the other variables in the equation. The coefficients on housing, L, health care system efficiency, E, and population health, H, measure the impact of these variables on mortality, which, according to the model, arises as an indirect effect of trust on income per capita, which determines L, E and H.

When Eqs. (3), (4) and (5) are substituted into (7), the following expressions are obtained:

$$M_i = \alpha_8 + \beta_8 Y_i - \beta_2 T_i + \gamma P_i + \theta S_i + e_{8i}, \tag{8}$$

where $\beta_8 = \beta_{6L}\beta_3 + \beta_{6E}\beta_4 + \beta_{6H}\beta_5$, $\alpha_8 = \alpha_7 + \beta_{6L}\alpha_3 + \beta_{6E}\alpha_4 + \beta_{6H}\alpha_5$ and $e_{8i} = e_{7i} + \beta_{6L}e_{3i} + \beta_{6E}e_{4i} + \beta_{6H}e_{5i}$.

Finally, when Eq. (1) is substituted into Eq. (8), the following expression is obtained:

$$M_i = \alpha_9 + \beta_9 T_i + \gamma P_i + \theta S_i + e_{9i}, \tag{9}$$

where $\beta_9 = \beta_8\beta_1 - \beta_2$, $\alpha_9 = \alpha_8 + \beta_8\alpha_1$ and $e_{9i} = e_{8i} + \beta_8 e_{1i}$.

In this reduced-form model, mortality is regressed on the three exogenous variables in the model, trust, population density and the share of elderly. The coefficient on trust (β_9) is the sum of two effects, the one on mortality through income per capita ($\beta_8\beta_1$) and the one through compliance ($-\beta_2$). The share of the impact of trust on mortality due to compliance thus becomes $-\beta_2/(\beta_8\beta_1 - \beta_2)$. Estimates of this share based on the parameter estimates obtained from estimating Eqs. (1), (3), (4), (5) and (7) are presented in Table 3.

According to the model, income per capita determines housing, health care system efficiency and population health. Given the validity of the model, one would thus expect these variables to be collinear, which implies that the coefficients on these variables in outcome Eq. (7) are not stable. One consequence of this is that, for example, a large coefficient on one of the variables will tend to decrease the coefficient on another variable. To deal with this issue, I present the result of a ridge regression, which results in more stable coefficients by minimizing the squared residuals in the regression subject to a constraint on the squared coefficients (see e.g. Hansen 2022). The study applies a procedure that estimates the parameter on the constraint by cross-validation. I follow the convention in the machine learning literature and do not report standard errors of the parameter estimates.

The methodology of the paper reflects the cross-sectional nature of the data (most of the literature on the effect of social capital on the outcomes of the COVID-19 pandemic relies on this type of data). This implies that it is conceivable that the results of the paper are more affected by confounding factors than analyses on types of data, which makes it possible to take the effects of unobserved characteristics into account.

Results

The results are presented in subsections, starting with reduced-form regressions of trust and social capital measures on COVID-19 mortality. This is followed by results from estimating the system of equations for mortality, including assessments of the share of the impact of trust on mortality that can be ascribed to compliance. The results section also includes an assessment of the impact of trust on economic activity during the pandemic. The final section contains specification checks of the model.

Trust, social capital and COVID-19 mortality

Several types of trust and social capital might have an impact on the fate of different counties during the COVID-19 pandemic. I thus begin with an analysis of the association between different measures of trust or social capital and COVID-19 mortality. The regressions presented in this section are variants of reduced-form estimation of (9) for alternative measures of trust and social capital.

[1] An alternative specification, where the coefficient on C is set to $+1$, would imply that C enters the system as non-compliance instead of compliance.

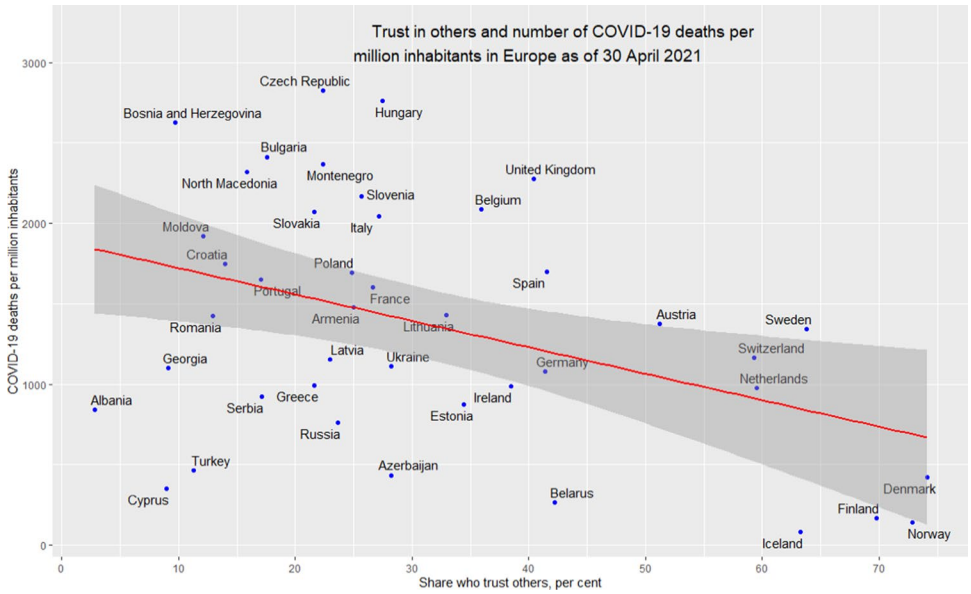


Fig. 1 Trust in others and number of COVID-19 deaths per million inhabitants in Europe as of 30 April 2021

Figure 1 contains a graphic exposition of the main relationship analysed here: the share of persons who trust others and the number of COVID-19 deaths per million inhabitants. The figure shows a clear negative relationship between the two variables: high levels of trust are associated with low mortality rates.

The regression results presented in Table 1 confirm the impression from the figure. The first column containing the results of regressing the logarithm of the COVID-19 mortality rate on the index of trust in others yields a highly significant negative coefficient.

The coefficient on trust is −0.56, which implies that an increase in trust by one standard deviation corresponds to a reduction in the death rate by 56 log points or 43% ($\exp(-0.56)-1=0.43$). Evaluated at the mean of 1371 COVID-19 deaths per million inhabitants in Europe, this percentage reduction implies that a one-standard-deviation increase in trust corresponds to a reduction of about 588 COVID-19 deaths per million inhabitants.

A change in trust of one standard deviation corresponds to the difference in trust between, for example, the United Kingdom and Switzerland or the Netherlands (see Table 6). As the UK has about 67 million inhabitants, the estimate implies that the UK would have experienced about 40,000 fewer COVID-19 deaths by 30 April 2021 if it had a trust level comparable to the Netherlands and Switzerland.

Table 1 Regressions for social capital measures and COVID-19 mortality (dependent variable: log mortality rate)

Explanatory variables:	(1)	(2)	(3)	(4)	(5)
Trust in others	−0.559***	–	−0.423**	–	−0.574***
	(0.120)		(0.166)		(0.148)
Trust in public institutions	–	−0.467***	−0.188	–	–
		(0.107)	(0.122)		
Membership in organizations	–	–	–	−0.415***	0.019
				(0.141)	(0.169)
Population density	0.244***	0.234*	0.247**	0.256**	0.242**
	(0.086)	(0.138)	(0.097)	(0.118)	(0.091)
Share 65 years or older	0.350***	0.127	0.287***	0.298***	0.349***
	(0.087)	(0.089)	(0.096)	(0.108)	(0.092)
Constant	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.094)	(0.101)	(0.091)	(0.109)	(0.095)
R-squared	0.518	0.425	0.544	0.339	0.519
RMSE	0.60	0.66	0.60	0.71	0.61
N	42	42	42	42	42

Notes: Robust standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%

RMSE root mean square error

Column (1) includes the exogenous variables population density and the share of elderly in the population. The coefficients on these variables have the expected sign and are large and highly significant (Figures S1 and S2 in the supplementary figures show population density and the share of elderly plotted against mortality).

More trust in public institutions implies a substantial reduction in COVID-19 mortality according to column (2). However, when both trust measures enter the regression in column (3), the coefficient on trust in public institutions becomes smaller and insignificant, while trust in others retains a high and significant value.

Higher membership in organizations is associated with smaller COVID-19 mortality rates according to column (4). When both trust in others and membership enter in column (5), the coefficient on membership decreases to close to zero, while trust in others retains a high and significant coefficient.

Taken together, the results of the reduced forms of the model in Table 1 indicate that trust in others, or generalized trust, has a more important role for COVID-19 mortality in Europe than trust in public institutions or membership in organizations. The remainder of the study applies trust in others as the measure used for analysing COVID-19 mortality.

Income and mortality

This section analyses how trust affects income, which in turn affects housing, health and health care. Table 2, column (1), contains the results for Eq. (1), where GDP per capita is regressed on trust in others (see Figure S3 for a depiction of the data). An increase in trust by one standard deviation for a country implies that the country moves up by 0.75 standard deviation in the country distribution of income per capita.

The next three columns in Table 2 show how income per capita affects housing standards, health and the efficiency of the health care system, that is, the results for Eqs. (3), (4) and (5) (the data for the regressions are depicted in Figures S4, S5 and S6). Table 2, column (2), shows that the share of the population with poor or very poor health is smaller in high-income countries, column (3) indicates that higher income reduces the share of the population that lives with parents, and column (4) shows that high-income countries have a more effective health care system. All three coefficients have substantial size and are highly significant.

The evidence thus indicates that higher trust implies higher income, which in turn leads to improvements in housing standards and the health of the population as well as to

Table 2 Regressions for the recursive model in observable variables: income per capita, self-reported health, housing conditions, health care efficiency and mortality

Dependent variable:	GDP per capita	Poor health, self-reported	Live with parents	Efficiency, health care	Log mortality	Log mortality	Log mortality
Explanatory variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trust in others	0.753***	–	–	–	–	–	–
	(0.091)						
GDP per capita	–	−0.679***	−0.815***	0.776***	–	–	–
		(0.118)	(0.137)	(0.245)			
Poor health, self-reported	–	–	–	–	0.271**	–	–
					(0.116)		
Housing	–	–	–	–	–	0.623***	–
						(0.161)	
Health care efficiency	–	–	–	–	–	–	−0.397**
							(0.161)
Population density	–	–	–	–	0.254	0.214	0.331*
					(0.152)	(0.127)	(0.174)
Share 65 years or older	–	–	–	–	0.219**	0.594***	0.403**
					(0.099)	(0.149)	(0.168)
Constant	0.000	0.000	−0.025	−0.462*	−0.000	−0.038	−0.298
	(0.103)	(0.115)	(0.105)	(0.254)	(0.119)	(0.118)	(0.186)
R-squared	0.567	0.461	0.596	0.375	0.217	0.422	0.397
RMSE	0.67	0.74	0.64	0.81	0.77	0.69	0.77
N	42	42	36	25	42	36	25

Notes: Robust standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%

RMSE root mean square error

a more efficient health care system. A remaining question is how much these improvements reduce COVID-19 mortality.

The last three columns in Table 2 indicate that population health, housing and efficiency of the health care system all play a role in the magnitude of COVID-19 mortality (the data for the regressions are depicted in Figures S7, S8 and S9). Each of the regressions in the table controls for both population density and the share of elderly in the population. Column (5) contains the results for health status, conditioned on the control variables, column (6) shows the result for housing conditions, and column (7) shows the result for the efficiency of the health care system. The coefficients for health, housing and efficiency are significant and have substantial size in each of the three regressions.

In summary, the results presented in Table 2 indicate that trust has an impact on COVID-19 mortality through income per capita. High income per capita improves population health, housing conditions and the efficiency of the health care system. Health status, housing conditions and the efficiency of the health care system all appear to have an impact on COVID-19 mortality when population density and the share of elderly are controlled for.

Compliance and mortality

While the previous section showed how trust affects income per capita and mortality through the impact of income per capita on population health, housing conditions and health care efficiency, this section puts these effects together with compliance. A major purpose is to assess how much of the effect of trust on mortality is due to compliance and how much is due to the impact of trust on income per capita.

The first column in Table 3 presents the results of an estimation where trust enters together with housing conditions and efficiency of the health care system but not population health. This column is a variant of Eq. (7), and the trust coefficient is close to the coefficient on trust in the reduced-form estimation; see Table 1, column (1). The coefficient on housing indicates that housing conditions have a sizeable impact on mortality, while the coefficient on health care efficiency is moderate (as an increase in health care efficiency by one standard deviation results in a moderate reduction in mortality by 1.7 log points).

Column (1) shows that a one-standard-deviation increase in trust leads to a substantial decrease in mortality of 76.9 log points (see row "Total impact"). This impact has two components. One component is the impact of trust through compliance, which is 55.5 log points according to the coefficient on trust. The other component is the impact of trust on housing conditions and health care efficiency through income per capita. The magnitude of this component is calculated from the coefficients on housing and health care efficiency in the first column in Table 3 and the coefficients in Table 2, rows (1), (3) and (4), using the expressions following Eq. (9) in the methodology section. The calculation yields the result that an increase in trust of one standard deviation decreases mortality by 21.4 log points through the income channel.

The share of compliance in the total impact of trust on mortality is 72.1% (55.5/76.9). According to these estimates, the effect of trust on compliance thus accounts for about three quarters of the total impact of trust on mortality, while the effect of trust on income per capita accounts for about one quarter.

In columns (2), (3) and (4), self-reported health enters first jointly with housing, then with health care efficiency, and finally with both housing and health care efficiency. In all three columns, the coefficients on the indicator of poor health are negative and large. I interpret these results as a consequence of collinearity between the regressors (it is very difficult to see how poor health should decrease mortality).

However, the negative and large coefficients on health imply inflated coefficients in absolute value on some or all of the other regressors. The implication of an inflated coefficient on trust in others is that compliance will be assigned too large a role in the reduction in mortality relative to the role of income per capita. Indeed, according to the figures reported in columns (2) and (3), compliance is responsible for all of the reduction in mortality.

One way to ameliorate the collinearity problem is to apply ridge regression, which results in more stable coefficients. Column (5) reports the results of this procedure for the model estimated with ordinary least squares (OLS) in column (4). The coefficient on health becomes much smaller in absolute value. The coefficients on trust, housing and health care also shrink, but to a more moderate degree. An implication of the magnitude of the coefficients from the ridge regression is that compliance is assessed to account for 59.6% of the total reduction in mortality.

Another way to deal with the collinearity problem is to enter an index of the collinear variables in the regressions at the level of the individual variable. Column (6) reports the result when the first principal components of self-reported health, housing and health care efficiency enter the regression. The result is that 91.2% of the total impact of trust on mortality can be ascribed to compliance.

Table 3, column (7), shows the result of estimating Eq. (8) in which income per capita enters in place of the three variables through which income affects mortality. The result is that compliance in this model constitutes 90.6% of the total impact of trust on mortality. The coefficients in this column are very close to the values of the coefficients in column (6), which used an index for the impact of income per capita on mortality as an explanatory variable. One quality of the regression in column (7) is that the data include all countries in the sample as opposed to the regressions in columns (1) to (6). In these regressions, the sample varies according to the availability of the explanatory variables. (This implies

Table 3 Regressions for impact of trust on COVID-19 mortality (dependent variable: log mortality rate)

Explanatory variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trust in others	−0.555***	−0.656***	−0.589***	−0.630***	−0.357	−0.627***	−0.511***
	(0.179)	(0.134)	(0.156)	(0.186)		(0.183)	(0.187)
Housing	0.333*	0.196	–	0.415	0.347	–	–
	(0.177)	(0.132)		(0.263)			
Health care efficiency	−0.017	–	−0.140	−0.108	−0.068	–	–
	(0.113)		(0.156)	(0.126)			
Poor health, self-reported	–	−0.258*	−0.148	−0.315	−0.021	–	–
		(0.139)	(0.237)	(0.279)			
Housing, health, efficiency	–	–	–	–	–	−0.080	–
						(0.180)	
GDP per capita	–	–	–	–	–	–	−0.070
							(0.184)
Population density	0.261**	0.216**	0.256**	0.240*	0.181	0.265*	0.254***
	(0.122)	(0.102)	(0.109)	(0.127)		(0.125)	(0.090)
Share 65 years or older	0.380	0.447***	0.432**	0.320	0.345	0.358	0.360***
	(0.403)	(0.141)	(0.156)	(0.421)		(0.402)	(0.096)
Impact, trust							
Share compliance	0.721	1.018	0.990	0.801	0.596	0.912	0.906
Total impact	−0.769	−0.644	−0.595	−0.787	−0.599	−0.687	−0.564
Estimation method	OLS	OLS	OLS	OLS	Ridge	OLS	OLS
Constant	0.203	0.051	−0.073	0.244	0.119	0.070	−0.000
	(0.275)	(0.084)	(0.152)	(0.297)		(0.340)	(0.094)
R-squared	0.704	0.666	0.653	0.723	–	0.685	0.521
RMSE	0.62	0.54	0.61	0.62	–	0.62	0.61
N	21	36	25	21	21	21	42

Notes: Robust standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%

OLS ordinary least squares, *RMSE* root mean square error

In the row "Housing, health, efficiency", the explanatory variable is the first principal component of these three variables. The total impact of trust is the sum of the coefficient in the first row of the table and the indirect effect of trust through income per capita. The indirect effect is calculated from the coefficients in the second, third and fourth rows in the table and the coefficients in Table 2 using the expressions following Eq. (9) in the methodology section. The share of compliance is the ratio of the coefficient on trust in the first row to the total impact of trust. The indirect effect through income per capita in column (6) is calculated using the coefficient of a regression of the first principal component of the housing, health and efficiency indices on GDP per capita, which takes a value of 1.118. The coefficients in column (5) are the outcome of a ridge regression using cross-validation to estimate the value of the Lagrangian multiplier in the constrained minimization problem

that changes in the parameter estimates across columns in Table 3 reflect not only the specification of the regression models but also differences in samples.)

In summary, the results for the role of compliance in this section indicate that compliance accounts for at least half of the impact of trust on COVID-19 mortality. The results in columns (2), (3) and (4), where self-reported health enter, are likely to yield too high estimates of the role of compliance due to collinearity of the regressors. The results in columns (1), (5) and (6) appear less likely to suffer from this problem. If the results from these equations are taken as the most reliable estimates, the conclusion becomes that compliance accounts for 60–90% of the total impact of trust on mortality, while the impact of trust through income per capita, and consequently on mortality through health, housing and health care efficiency, accounts for the rest.

Trust, COVID-19 mortality and economic activity

During epidemics, people reduce their contact with others in order to reduce the risk of infection. If the reduction in contact includes the type of contact where economic activity takes place, the COVID-19 pandemic also implies a reduction in economic activity. This can be seen in Fig. 2, which shows a clear negative relationship between the growth in real GDP from 2019 to 2020 and the number of COVID-19 deaths per million inhabitants in 2020 in the European countries. From Table 4, column (1), the slope of the regression

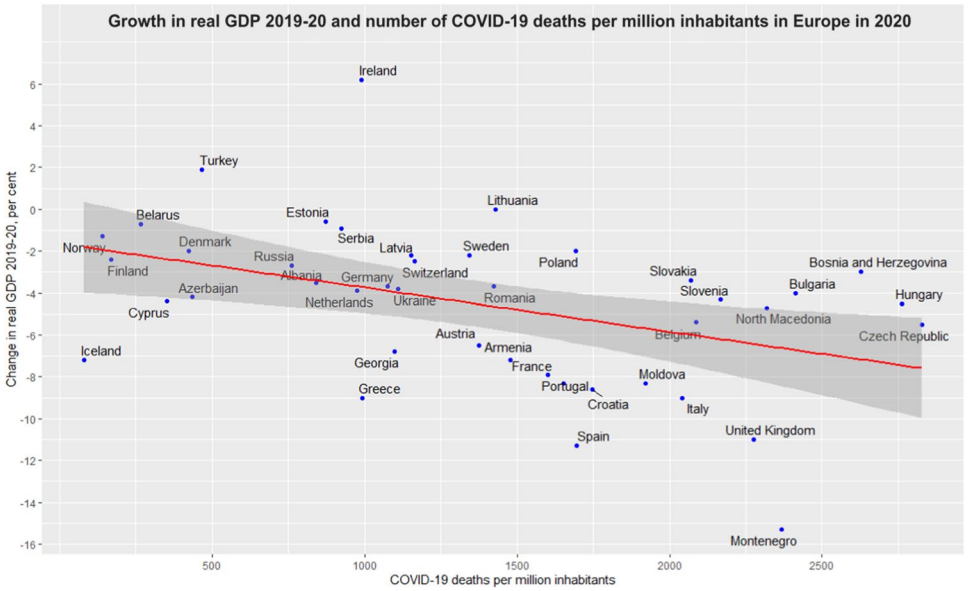


Fig. 2 Growth in real GDP 2019–2020 and the number of COVID-19 deaths per million inhabitants in Europe in 2020

Table 4 Regressions for COVID-19 mortality and growth (dependent variable: growth in real GDP year 2019-2020)

Explanatory variables:	(1)	(2)	(3)	(4)
Mortality rate	−4.419***	−4.390***	−4.141**	−4.655**
	(1.233)	(1.263)	(1.653)	(2.008)
Western Europe	–	−0.347	–	–
		(1.154)		
Constant	−1.399	−1.287	−1.457	−1.437
	(0.954)	(0.923)	(1.066)	(1.901)
Including:				
Eastern Europe	Yes	Yes	Yes	No
Western Europe	Yes	Yes	No	Yes
R-squared	0.238	0.240	0.210	0.263
RMSE	3.38	3.42	3.17	3.91
N	42	42	26	16

Notes: Robust standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%

The explanatory variable is the number of COVID-19 deaths per 1000 inhabitants as of 31 December 2020

RMSE root mean square error

line implies that 1000 more COVID-19 deaths per million inhabitants resulted in a fall in GDP of 4.4%. There appear to be only minor differences between Eastern and Western Europe with respect to the economic consequences of the COVID-19 pandemic, as measured by the impact on GDP.

I apply the estimate of a reduction in GDP of 4.4% as a consequence of 1000 more COVID-19 deaths per million inhabitants to calculate the impact for the UK. In 2019, 1% of the UK's GDP was around 22 billion GBP, and 4.4% thus amounts to about 96.8 billion GBP for 67 million inhabitants, that is, about 1.4 billion GBP per million inhabitants. But if more severe outbreaks during the pandemic yielded economic losses in the form of decreased economic activity, containing the pandemic must have yielded an economic gain. The evaluation on the available basis is thus that there has been an economic gain of about 1.4 million GBP for each avoided COVID-19 death in the UK.

The estimate of the economic gain from containing the pandemic is useful for assessing the economic consequences of cross-country differences in factors affecting the spread of COVID-19. As discussed in Sect. 5.1, the UK would have experienced about 40,000 fewer COVID-19 deaths by 30 April 2021 if it had a trust level comparable to the Netherlands and Switzerland. As each death is associated with a reduction in economic activity of 1.4 million GBP, the total loss in economic activity in the UK thus amounts to about 56 billion GBP as of April 2021 compared with a situation

where the UK had a generalized trust level comparable to the Netherlands or Switzerland.

Specification checks

As outlined in the methodology section, trust impacts housing conditions, self-reported health and the efficiency of the health care system through income per capita [Eqs. (3), (4) and (5)]. Once the impact of income per capita is controlled for, trust should have no influence on these three variables. This is a testable hypothesis.

In the columns in Table 5, poor health, housing and health care efficiency are regressed on both income per capita and trust in others. In all three equations, income per capita has a significant impact, while trust does not have a significant influence on the variables. This indicates that trust does not have any significant impact on these three variables beyond the impact it has on income per capita.

By the same reasoning, trust should not have an impact on mortality if the only way that trust influences mortality is through income per capita. This hypothesis is tested and rejected in the results reported in Table 3, where trust enters jointly with either income per capita or population health, housing and health care efficiency.

The results presented in Tables 3 and 5 are thus evidence for the validity of the model specification. Trust does not directly influence the observed determinants of mortality (population health, housing conditions and health care efficiency) beyond the impact of trust on income per capita, but trust has an impact on COVID-19 mortality beyond the observed determinants. This impact is the one this study models as a latent variable and labels compliance.

Table 5 Specification tests for COVID-19 mortality models

Dependent variable:	Poor health, self-reported	Live with parents	Efficiency, health care
Explanatory variables:	(1)	(2)	(3)
GDP per capita	−0.637***	−0.711**	0.599*
	(0.181)	(0.272)	(0.327)
Trust in others	−0.056	−0.117	0.194
	(0.155)	(0.203)	(0.190)
Constant	0.000	−0.012	−0.448
	(0.116)	(0.102)	(0.262)
R-squared	0.462	0.601	0.392
RMSE	0.75	0.65	0.81
N	42	36	25

Notes: Robust standard errors in parentheses. Significance levels: * 10%, ** 5%, *** 1%

RMSE root mean square error

Discussion

This study presents evidence for the importance of trust with respect to mortality during the COVID-19 pandemic. Countries with low levels of trust had high COVID-19 mortality rates, while many fewer people died because of COVID-19 in countries with high levels of trust. For the countries in the study, trust in others or generalized trust is more important for COVID-19 mortality than other measures of social capital, such as confidence in public institutions or membership in organizations.

The study proposes a model where the impact of trust on mortality occurs through two channels: (1) the impact of trust on income per capita, which in turn has an impact on factors of importance for the level of mortality, and (2) the impact of trust on the behaviour of the population during the pandemic, as trust in advice and recommendations from experts and authorities might lead to compliance with the advice and recommendations, which in turn might reduce COVID-19 mortality. Based on the model, the study estimates that compliance accounts for more than half of the reduction in COVID-19 mortality that can be ascribed to trust.

The data for the study cover all countries that are included in the two last waves of the European Value Survey (EVS 2022). The information for these countries is supplemented with data from the Coronavirus Resource Center at Johns Hopkins University (Our World in Data 2023) and data on the efficiency of the health care system from the OECD (2021).

Two points are worth noting in connection with the split of the total impact of trust on COVID-19 mortality into components. The amount due to the effect of trust on income per capita is contingent on the variables included in the data: self-reported health, housing and health care efficiency. Income per capita might affect COVID-19 mortality through other channels, and the inclusion of such channels is likely to increase the relative impact of income per capita and reduce the relative impact of compliance. The same would be the case if it were possible to include better measures of health, housing and health care efficiency in the analysis.

Another point is that the latent variable, compliance, actually measures all other ways that trust makes an impact on COVID-19 mortality except for the channel through income per capita. If there are ways that trust can make an impact on mortality other than through pandemic-reducing behaviour, then this effect is also included in the empirical measure that this study labels compliance. However, it is not obvious in what ways trust should have an impact on COVID-19 mortality other than through behaviour during the pandemic.

More generally, to the extent that unobserved variables correlated with trust have an impact on COVID-19 mortality, the precision of the estimates of the study can be affected. A standard remedy for alleviating the impact of time-invariant unobserved variables is to apply longitudinal data and assess the relationship between changes in variables

instead of levels (Hansen 2022). In the case of trust, a major challenge with this procedure is that the levels of trust in different groups and societies are often highly persistent even over very long periods of time. Examples include (1) European countries in recent decades (CBS 2024), (2) the relatively high trust levels of third-generation Scandinavians in the United States compared with other third-generation immigrants (Tabellini 2008) (see Fig. 1 for contemporary levels of trust), (3) the present high trust level in regions of Eastern European countries that were a part of the Habsburg Empire relative to the trust level in neighbouring regions that were not a part of the Empire (Becker et al. 2016), and (4) the relatively low present-day trust level among indigenous ethnic groups (tribes) in Africa that were sold and exported in the Transatlantic and Indian Ocean slave trade (Nunn and Wantchekon 2011). Moreover, even if the trust level in a country is exposed to a shock, it is highly likely that such a shock also affects other variables of importance for the spread of a pandemic (e.g. income). Analyses of individual data for countries and regions with varying trust levels are likely to increase precision (with respect to e.g. the role of housing) but are not likely to exhibit exogenous changes in trust levels for the individuals included in the data.

The model proposed in this study can be useful for interpreting the results of other studies of COVID-19 mortality. Some studies include a substantial number of variables and use statistical procedures such as machine learning to select the variables to be included in the study. If the estimation includes both social capital measures as trust and variables affected by income per capita such as population health, the coefficient on social capital can be interpreted as a measure of the impact of compliance on mortality. The same is true if social capital measures enter jointly with income per capita. In studies that include social capital variables but not income per capita or variables related to income per capita, the impact of social capital on mortality can be interpreted as estimates of the total impact of social capital on COVID-19 mortality, including both effects through compliance and effects through income per capita.

The evidence in this study suggests that countries with high levels of mortality faced substantial reductions in economic activity from 2019 to 2020. This is in line with the evidence from the United States on the relationship between economic activity and the severity of the pandemic, where Chetty et al. (2024) found that consumer spending (as measured by credit card transactions) dropped more from January to April 2020 in counties with higher levels of COVID-19 cases. After April 2020, US consumer spending recovered and reached the pre-COVID-19 level by the end of 2020. While Chetty et al. (2024) relate changes in consumer spending in US counties to the cumulative COVID-19 cases in the beginning of the pandemic, the present study relates changes in GDP in European countries from 2019 to 2020 to the cumulative COVID-19 mortality rate at the end of 2020. That the results are obtained using two different types of data for different geographical areas suggests that the negative relationship between economic activity and the severity of the COVID-19 pandemic is a more general phenomenon. According to the evidence from the literature (Goolsbee and Syverson 2021; Alexander and Karger 2023; Chetty et al. 2024), the decrease in economic activity during the COVID-19 pandemic was mainly due to health concerns in the population, and only a minor share was due to government interventions in the form of lock-downs, stay-at-home orders, etc.

Conclusion

This study investigates the role of generalized trust with respect to mortality and economic activity during the COVID-19 pandemic up to 30 April 2021 among 42 European countries. The main finding is that an increase in trust by one standard deviation corresponds to a 43% reduction in the COVID-19 death rate. Evaluated at the level of mean COVID-19 deaths per million inhabitants in Europe, this percentage reduction implies a reduction of about 588 COVID-19 deaths per million inhabitants.

A change in trust of one standard deviation corresponds to the difference in trust between, for example, the United Kingdom and the trust level in Switzerland or the Netherlands. As the UK has about 67 million inhabitants, this estimate implies that it would have experienced about 40,000 fewer COVID-19 deaths by 30 April 2021 if it had a trust level comparable to the Netherlands and Switzerland.

The study proposes a model by which trust affects COVID-19 mortality through two channels: (1) a high level of trust increases productivity and thus income per capita, which leads to better health in the population, less intergenerational sharing of housing and better health care systems; (2) a higher trust level implies that the population is more likely to follow advice and recommendations from experts and authorities with respect to behaviour aimed at reducing the pandemic and its impact. This channel is modelled as a latent variable and labelled compliance. Based on the estimates of the model, the study assesses that compliance accounts for 60–90% of the total impact of trust on mortality, while the impact of trust through income per capita accounts for the rest.

During epidemics, people reduce their contact with others in order to reduce the risk of infection, including contact where economic activity takes place. The study estimates that 1000 COVID-19 deaths per million inhabitants resulted in a decrease in GDP of 4.4% in Europe. For the UK, for example, this amounts to about 1.4 million GBP for each avoided COVID-19 death. This implies that the total loss in economic activity in the UK amounts to about 56 billion GBP as of 30 April 2021 compared with a situation where the UK had a generalized trust level comparable to the Netherlands or Switzerland.

Appendix

Table 6 Values of variables used in analyses of COVID-19 deaths and economic activity in Europe

Country	Dead April	Trust others	Pop dens	Age 65+	GDP per capita	Poor health	Live parents	Treat deaths	Dead Decemb	GDP growth
Albania	839	2.8	105	13.2	11,803	19.3	42.7	–	412	−3.5
Armenia	1477	25.0	103	11.2	8788	10.9	50.2	–	1015	−7.2
Austria	1374	51.2	107	19.2	45,437	5.9	12.7	55	825	−6.5
Azerbaijan	433	28.2	119	6.0	15,847	7.5	32.2	–	249	−4.2
Belarus	266	42.2	47	14.8	17,168	8.7	15.2	–	148	−0.7
Belgium	2088	35.9	376	18.6	42,659	6.0	–	54	1688	−5.4
Bosnia and Herzegovina	2627	9.7	68	16.6	11,714	10.0	24.3	–	1253	−3.0
Bulgaria	2413	17.5	65	20.8	18,563	16.6	18.0	–	1108	−4.0
Croatia	1747	14.0	74	19.7	22,670	14.7	22.9	–	958	−8.6
Cyprus	352	9.0	128	13.4	32,415	4.3	–	–	136	−4.4
Czech Republic	2828	22.4	137	19.0	32,606	7.4	16.5	90	1133	−5.5
Denmark	422	74.1	137	19.7	46,683	7.3	11.7	55	214	−2.0
Estonia	873	34.4	31	19.5	29,481	12.5	10.7	98	173	−0.6
Finland	168	69.8	18	21.2	40,586	6.2	7.9	54	106	−2.4
France	1602	26.6	123	19.7	38,606	10.5	6.4	48	990	−7.9
Georgia	1098	9.1	65	14.9	9745	17.3	37.0	–	669	−6.8
Germany	1076	41.4	237	21.5	45,229	9.2	12.7	62	605	−3.7
Greece	993	21.6	83	20.4	24,574	5.2	–	69	461	−9.0
Hungary	2763	27.4	108	18.6	26,778	15.5	23.4	131	957	−4.5
Iceland	80	63.3	3	14.4	46,483	6.5	8.1	45	80	−7.2
Ireland	989	38.5	70	13.9	67,335	2.4	–	65	451	6.2
Italy	2042	27.1	206	23.0	35,220	4.7	18.7	52	1247	−9.0
Latvia	1151	23.0	31	19.8	25,064	11.8	12.0	149	343	−2.2
Lithuania	1429	32.9	45	19.0	29,524	11.8	20.9	138	655	0.0
Moldova	1923	12.1	124	10.9	5190	20.8	–	–	950	−8.3
Montenegro	2368	22.4	46	14.8	16,409	6.2	26.2	–	1080	−15.3
Netherlands	975	59.5	509	18.8	48,473	4.7	8.2	49	643	−3.9
North Macedonia	2319	15.9	83	13.3	13,111	7.1	44.9	–	1196	−4.7
Norway	139	72.8	14	16.8	64,800	6.1	7.3	47	80	−1.3
Poland	1694	24.8	124	16.8	27,216	12.1	27.1	99	719	−2.0
Portugal	1652	17.0	112	21.5	27,937	10.2	17.2	64	666	−8.3
Romania	1423	12.9	85	17.9	23,313	9.0	24.5	–	793	−3.7

Table 6 (continued)

Country	Dead April	Trust others	Pop dens	Age 65+	GDP per capita	Poor health	Live parents	Treat deaths	Dead Decemb	GDP growth
Russia	761	23.6	9	14.2	24,766	12.8	17.4	–	394	−2.7
Serbia	922	17.2	80	17.4	14,049	14.5	31.8	–	460	−0.9
Slovakia	2070	21.6	113	15.1	30,155	7.7	22.7	–	379	−3.4
Slovenia	2167	25.7	103	19.1	31,401	12.9	24.3	54	1406	−4.3
Spain	1697	41.5	93	19.4	34,272	3.7	10.1	51	1145	−11.3
Sweden	1343	63.8	25	20.0	46,949	4.2	9.6	49	920	−2.2
Switzerland	1163	59.3	214	18.4	57,410	3.9	10.5	39	861	−2.5
Turkey	466	11.3	105	8.2	25,129	11.4	–	100	242	1.9
Ukraine	1110	28.2	77	16.5	7894	20.0	21.8	–	467	−3.8
United Kingdom	2275	40.4	273	18.5	39,753	8.2	10.2	69	1382	−11.0
Mean	1371	31.4	111	17.0	30,076	9.7	19.9	71	706	−4.5
SD	760	19.0	96	3.7	15,288	4.7	11.1	31	422	3.8

Notes. The names of the variables stand for the following:

Dead April: Number of COVID-19 deaths per one million inhabitants as of 30 April 2021

Trust others: Share who trust others, %

Pop dens: Number of inhabitants per square kilometre

Age 65+: Share of population aged 65 or older, %

GDP per capita: GDP per capita adjusted for purchasing power, US dollars

Poor health: Share of population with poor or very poor health, %

Live parents: Share of population that live with parents or parents-in-law, %

Treat deaths: Number of deaths from treatable causes per million inhabitants

Dead Decem: Number of COVID-19 deaths per one million inhabitants as of 31 December 2020

GDP growth: Growth in real GDP from 2019 to 2020, %

SD standard deviation

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10389-025-02413-4.

Acknowledgements Thanks to Stefan Bastholm Andrade and Frederik Thuesen for helpful comments on the article.

Funding Open access funding provided by The Danish Centre Of Applied Social Science. This work was supported by the Rockwool Foundation.

Data availability The data for the study are included in a table in the appendix.

Code availability The data in electronic form and the code for the study are placed in the repository https://github.com/karsten2020/Trust-COVID-19.

Declarations

Ethics approval Not applicable.

Conflicts of interest The author reports that there are no competing interests to declare.

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