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Asocial Capital: Civic Culture and Social Distancing during COVID-19

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Abstract

Social distancing can slow the spread of COVID-19 if citizens comply with it and internalize the cost of their mobility on others. We study how civic values mediate this process using data on mobility across Italian provinces between January and May 2020. We find that after the virus outbreak mobility declined, but significantly more in areas with higher civic capital, both before and after a mandatory national lockdown. The effect is not driven by differences in the risk of contagion, health-care capacity, geographic socioeconomic and demographic factors, or by a general North-South divide. Simulating a SIR model calibrated on Italy, we estimate that if all provinces had the same civic capital as those in top-quartile, COVID-related deaths would have been about 60% lower. We find consistent results for Germany where the incidence of the pandemic and restrictions to mobility were milder.

Keywords: Civic Capital, Culture, Externalities, Social Distancing, COVID-19.

JEL codes: Z1, D91.

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1. INTRODUCTION

The spread of COVID-19 has forced many countries to impose lockdowns and strict forms of social distancing in the attempt to "flatten the curve" and preserve hospital viability. In addition, many governments have launched vast media campaigns to alert citizens about the risk of contracting the virus and to persuade them to consider the negative impact of their own mobility on others in case of being asymptomatic carriers. Indeed, in the context of a pandemic, individual mobility creates a negative externality by increasing the chance that others may contract the disease, and every social distancing effort by one individual generates a public good that benefits the community at large.

Understanding whether and how cultural norms influence citizens' mobility choices is therefore important to determine what policies may be most effective against the pandemic. Given the limited capacity of the state to enforce lockdowns and the impossibility to maintain such extreme measures for long, citizens' voluntary compliance with social distancing rules is key to slow the spread of the virus and save lives (Greenstone and Nigam, 2020; Stock, 2020).

In this paper we investigate the impact of civic culture on social distancing behavior and, indirectly, on the spread of COVID-19. We test whether, following the start of the pandemic, areas with higher levels of civic capital reduced their mobility earlier and more than others. This hypothesis is motivated by previous research documenting the positive impact of civic capital on the ability of the members of a community to overcome collective action problems and cooperate for the efficient provision of public goods (e.g., Cooter, 2000; Herrmann et al., 2008).[1]

Our analysis focuses primarily on Italy, a country that has been severely hit by the pandemic and that is characterized by well-documented large differences in civic capital across provinces (Putnam, 1993; Guiso et al., 2004). We look at the period between January 1 and May 3 2020, which comprises several weeks before and after the beginning of the outbreak in Italy, and during which several policies were adopted to tackle it. To study the evolution of individual mobility over the pandemic cycle, we use data from phone location tracking records which allow us to precisely measure mobility in each

[1] Previous evidence suggests a positive link between civic capital and other health-related behavior such as vaccination. See, for example, Chan et al. (2014).

province on each day. We combine this information with three proxies of civic capital commonly used in the literature (blood donations, trust in others, and newspaper readership) which we aggregate via principal component analysis.

We examine the relationship between civic capital and the evolution of mobility around three critical dates. The first is February 21, when the first COVID-19 hotspot was identified near Codogno (a town in the region of Lombardy) and a "red zone" was established to restrict mobility into and from the area. This episode attracted massive media coverage and made the Italian public opinion suddenly aware of the immediate threat of a COVID-19 pandemic in the country. The second is March 9, when the national lockdown decided by the Italian government came into effect. The third is March 23, when the lockdown was further tightened with the closure of all non-essential economic activities.

From an empirical standpoint, isolating the effect of civic capital is challenging because local civic culture tends to be correlated with a variety of other characteristics that may have an independent effect on how mobility evolves during a pandemic. For example, if provinces with higher civic capital are also more urban, more educated, and richer than others, and if urban dwellers, wealthier people, and high-skilled workers are more likely to reduce their mobility in response to the pandemic, ignoring these variables would bias the estimate of the effect of civic capital. To address this issue one would not only need to control for local characteristics (at the pre-pandemic level), but also for their interaction with the relevant time variables, since the concern is precisely how each of these factors may affect the *change* in mobility above and beyond the effect of civic capital.

Our empirical strategy allows us to do just that. First, all our regressions include day fixed effects which capture the change in mobility in all provinces in different phases of the pandemic. Second, they include province fixed effects which control for all time-invariant characteristics (observable and unobservable) of a given province and their effect on mobility levels. Third, and most important, we control for the interaction between a very rich set of local geographic, demographic, and socio-economic controls and time variables (either dummies for the different phases of the pandemic or day fixed effects). Fourth, we control for the time-varying number of COVID-19 cases and deaths at the local level and for local hospital capacity, both of which may influence the perceived risk and cost of contracting the virus and, consequently, the individual incentive of social distancing.

Using this approach, we find that people reduced their own mobility *voluntarily* immediately after information about the outbreak became public and before any government policy was adopted. This is consistent with individuals engaging in social distancing to reduce their own risk of contagion, as emphasized by Cochrane (2020), Farboodi and Shimer (2020), and Toxvaerd (2020). Importantly, the decline in mobility over this period was more pronounced in provinces with higher civic capital than in the others. In provinces in the top quartile of the civic capital distribution mobility decreased by about 1/3 more than in the other provinces, opening a gap as large as 4% of the pre-pandemic average. Mobility decreased considerably in all provinces after March 9, when the national lockdown came into effect. Again, the decline was stronger in high-civic capital communities than in others. In fact, the gap between the two groups was even larger in this period than in the pre-lockdown one, reaching 10 to 13%. This is possibly due to greater abidance to the new rules compounding the effect of voluntary social distancing.

Crucially, we document that these results are not driven by the divide between the North and the South of the country both in the incidence of the virus and in civic culture, and hold even within these areas. To further validate our findings we test our hypothesis in the context of Germany, a country where the effect of the pandemic was less severe and the measures adopted by the government less invasive than in Italy, and which is also characterized by large and deeply-rooted within-country differences in local civic culture (Jacob, 2010). Using similar data and the same empirical approach, we find that, once news of the outbreak spread, mobility declined in all German districts, but significantly more in those with high civic capital. The gap further broadened once government restrictions came into effect.

Finally, to get a sense of the potential contribution of civic capital to the containment of the pandemic, we simulate a SIR model calibrated on Italy which allows for social distancing to depend on social norms. Our simulations indicate that if all Italian provinces had the level of civic capital of those in the top quartile, the number of cumulative excess deaths (relative to the previous five years) would have been 60% lower. Consistent with Greenstone and Nigam (2020) and Pei et al. (2020), this large effect is mainly due to civic capital favoring the early containment of the contagion and helping prevent the exponential growth in the number of cases.

Taken together, our results show that civic norms can significantly affect social distancing and the containment of the virus. Individuals adopt social distancing even before they are required to do so to avoid contracting the disease. However, more civic-minded ones do so even more either because they are concerned about transmitting the virus to others, or out of a sense of civic duty. They are also more responsive to government mandatory stay-at-home policies, thus allowing to manage the externalities associated with the spread of the virus more efficiently. Although voluntary social distancing driven by other-regarding considerations may not be enough to contain the pandemic, it may allow for lockdown policies that are less taxing on the economy and may be sustained for longer periods.

Our study contributes to a growing body of work on the link between cultural variables, social distancing, and the spread of COVID-19. Following an earlier version of this analysis (Durante et al., 2020), several contributions have explored the relationship between social distancing and social capital or trust attitudes with a particular focus on the U.S. (Barrios et al., 2021; Borgonovi and Andrieu, 2020; Brodeur et al., 2020). Our analysis differs from these studies in three ways. First, we explore how civic capital affects mobility both before and after legal restrictions are in place. Second, our empirical strategy allows us to include very granular spatial and time fixed effects and to precisely control for how a wide range of local geographic, demographic, and socioeconomic factors, potentially correlated with culture, affect the *change* in mobility and not just the level. This aspect, which other papers do not fully address, is crucial to confidently identify the causal effect of civic culture on mobility. Third, we present consistent evidence for two countries where the incidence of the pandemic and the measures adopted to cope with it were very different, which corroborates the generalizability of our findings.[2]

The remainder of the paper is organized as follows. Section 2 sketches our conceptual framework. Section 3 provides background information on the COVID-19 crisis in Italy and describes the data used in the analysis. Section 4 discusses the empirical strategy, our main results, and a number of robustness and validation exercises. Section 5 presents a simulation-based evaluation of the gains from civic capital in a pandemic. Section 6 concludes and discusses some policy implications of our

[2] Our work also relates to recent contributions by Egorov et al. (2020) on the relationship between ethnic diversity and mobility in Russia, and by Briscese et al. (2020) on the link between expectations and social distancing in Italy.

results.

2. A ROLE FOR CIVIC CAPITAL

Is there a role for civic culture in the spread of pandemics? The internalization of the negative externality created by personal mobility is likely to depend on citizens' capacity to contribute to the "public good", i.e., on their civic culture. Following Guiso et al. (2011), we refer to civic capital (or culture) as "those persistent and shared beliefs and values that help a group overcome the free-rider problem in the pursuit of socially valuable activities". Communities with higher civic capital are therefore more effective at acting collectively and providing public goods (Putnam, 1993; Herrmann et al., 2008; Cooter, 2000), with less need for costly regulation (Aghion et al., 2010).

In the context of a pandemic, a strong civic culture can induce voluntary social distancing at a very early stage, even in the absence of government interventions and persuasion campaigns. In addition, because more civic communities tend to be more law-abiding (Cooter, 2006), they are also more likely to conform to mandatory social distancing measures when these are adopted. Hence, the higher the stock of civic capital, the greater the adherence to social distancing, the slower the spread of the pandemic.

More formally, in the context of a standard SIR (Susceptible-Infected-Recovered) model, like the one in Jones et al. (2020), the number of infected, I, in a population of given size with a number of susceptible individuals S, evolves according to the following equation:

$$\Delta I_{t+1} = \beta S_t \times I_t - \gamma I_t \tag{1}$$

where β is the number of contacts per day of a susceptible person, and γ the rate at which infectiousness resolves, both constant parameters in a standard SIR model.

To account for individual social distancing responses, equation 1 can be modified as:

$$\Delta I_{t+1} = \beta (1 - d_t)^2 S_t \times I_t - \gamma I_t \tag{2}$$

where d_t is a social distancing index between 0 and 1 and we have assumed that susceptible and infected individuals adopt similar distancing behavior (a sensible assumption if the infected are largely asymptomatic). Its value depends positively on r_t, the perceived riskiness of the virus (which is influenced by information about the diffusion, infectiousness, and deadliness of the disease), and on p_t, which captures any policy response adopted over the course of the pandemic (e.g., lockdowns, stay-at-home campaigns). Their effect on distancing is mediated by the stock of civic capital, k, according to $d_t = d(k^\eta r_t, k^\nu p_t)$, where $\eta \geq 0$ and $\nu \geq 0$ measure the impact of civic capital on the internalization of the externality and on law-abidingness, respectively.

Members of civic communities ($k > 1$) distance more in response to information about the virus not only to reduce the risk of contracting the virus, but also out of concern of infecting others in case of being asymptomatic carriers. They also comply more to mandatory social distancing measures, reinforcing the effect of these policies. As a consequence, all else equal, in communities with higher civic capital social distancing will be higher and the speed of reproduction of the virus, $\beta(1-d_t)^2/\gamma$, will be lower.

Indeed, as shown by Farboodi and Shimer (2020), if individuals fully internalize the cost of their behavior on others, a decentralized equilibrium can reproduce the optimal social distancing policy that a social planner would have to impose if individuals only cared about their own health. In a realistic world with frictions where such optimal policy may be unattainable, civic culture could help to contain the virus. More generally, it can reduce the cost of lockdowns and other strict social distancing policies, and allow for the adoption of milder and more sustainable ones.

3. Background and data

3.1. COVID-19 in Italy

Italy has been the first Western country to be heavily hit by the COVID-19 pandemic and to implement large-scale measures to contain it. The first COVID-19 hotspot was identified on February 21 near the town of Codogno (Lombardy). The government responded by establishing a "red zone" around the town to restrict mobility into and from the area. This episode represented a turning point in Italians' perception of the threat of an epidemic in the country. National media, which until then had largely ignored the risk, provided extensive and alarming coverage of the outbreak. As shown in Appendix Figure A.1 - which reports the front pages of the main Italian newspapers in the days right before and after the outbreak - while no news of the virus was prominently featured on February 20 or 21, the issue dominated the news on the 22 and 23 and would do so in the following weeks. Following the further increase in the number of confirmed cases and the spread to other regions, on March 8 the government declared a national lockdown and announced the adoption of strict social distancing rules. The lockdown was further tightened on March 22 with the closure of all non-necessary economic activities. On April 26, the government announced the end of the lockdown and the gradual ease of mobility restrictions starting May 4.

Panel A of Figure A.2 shows the timeline of the events and the four periods our analysis focuses on: 1) pre-outbreak (i.e., before February 21); 2) post-outbreak pre-lockdown (February 22-March 8); 3) lockdown (March 9-March 21); 4) tighter lockdown (March 22-May 3).

3.2. DATA

Social distancing. To measure social distancing we use daily data on individual mobility in each Italian province (roughly the size of a US county) between January 1 and May 3 2020. There are currently 107 provinces in Italy aggregated into 20 regions (corresponding to NUTS level 3 and 2, respectively). Comprehensive data on mobility are available from Teralytics, and are based on phone location tracking records. They record the number of movements of each individual during the day from home (the place where an individual regularly spends the night) to work or to other places such as shops, bars, restaurants, gyms etc. and vice versa.[3] The data cover all current Italian provinces and metropolitan areas, except the former province of Gorizia.[4] For each province the data distinguish between trips that started and ended in the province (local movements), trips that started in the province and ended in other provinces (outgoing), and trips that ended in the province and started in other provinces (incoming). We use the total number of trips (local+incoming+outgoing) as the main

[3]Due to a change in the criteria used to identify and track individual displacements, data for the period after May 3 2020 are not fully comparable with those before this date.

[4]No province-level data is available for the four former provinces of the Friuli Venezia Giulia region, now abolished: Gorizia, Trieste, Pordenone, and Udine. For the last three we are able to impute to the province level of mobility of the corresponding capital cities for which data are available.

outcome, and the number of local movements for robustness.

Civic capital. To measure civic capital in Italian provinces we use three proxies commonly used in the literature: i) the number of blood donations (per 10,000 people), ii) a survey-based measure of trust in others, iii) a measure of newspaper readership. Data on the number of blood donations per province come from the Italian Association of Blood Donors (AVIS). These data are only available for 1995 and cover 92 of the then 95 Italian provinces.[5] The data refer to donations from regular donors who received no compensation and were not informed of the identity of the beneficiaries. This implies that donations were uniquely motivated by other-regarding preferences, and by the concern that insufficient donations will result in scarce blood supply for the community.

The second proxy of civic capital is a measure of generalized trust, a variable that has been extensively used in the economic literature on culture (e.g., Tabellini, 2010; Butler et al., 2016). We use data from the "Multipurpose Survey on Households: Aspects of Daily Life" conducted by the Italian National Statistical Institute (ISTAT) between 2010 and 2015 with a total sample of over 238,000 individuals. Specifically, we use the share of respondents in each province who report that most people can be trusted in response to the standard trust question: "Generally speaking would you say most people can be trusted or you can't be too careful?".

The third measure of civic capital is newspaper readership. In particular, we use the number of readers of paid daily newspapers, weighted by total adult population, available from ADS for the years 2005 through 2010. This variable, which has been extensively used in previous work on civic capital (Putnam, 2000; Guiso et al., 2004), is meant to capture the "public awareness" dimension of civic engagement and citizens' willingness to bear the private cost of acquiring information about their local community to improve the quality of collective decision-making.

Since each of these variables captures different facets of civic culture, we use the first principal component of the three as our main measure of civic capital.[6] We report results using each of the three variables in the appendix. Table A.3 reports the pairwise correlations of each of the three measures of civic capital with each other, as well as with their principal component.

[5]The provinces for which data on blood donations are not available are: Belluno, Isernia, and Aosta.

[6]The first principal component explains 58.5% of the variance.

Other variables. To separate the effect of civic capital from other factors, we include a range of controls. To account for the severity of the pandemic at the local level, we control for the number of new cases recorded in the province and for the number of new deaths recorded in the region on the previous day, available from the Italian department of civil protection. To capture the quality of the local health system, we use data on the number of hospital beds per capita in the region available from the Italian health ministry. We also control for two measures of vulnerability to the pandemic: the presence of an airport and the share of male population in the province.

We also control for a rich set of geographic, socio-demographic, and economic factors that potentially correlate with both mobility and civic capital. They include: area, average altitude of the municipalities in the province, share of coastal municipalities in the province, population density, share of urban municipalities in the province, share of the population with at least a high school diploma, number of firms per capita, average household financial wealth, income per capita. We also construct and control for a measure of the physical proximity to coworkers and customers and of the potential for remote work in the province, a likely determinant of work-related mobility. Finally, to control for the possibility that individuals in more civic areas may be generally more anxious about health risks, we control for the number of adult patients diagnosed with a state of anxiety or hypochondria by local health professionals in a province (per 10,000 inhabitants). These data are available from the Italian Ministry of Health and refer to the years 2001 to 2013.[7] The full set of controls, and the respective sources, are described in Appendix Table A.1. Descriptive statistics for all variables used in the analysis are reported in Appendix Table A.2.

4. Empirical strategy and results

4.1. Econometric model

To identify the effect of civic capital on social distancing we estimate the following equation:

$$m_{prt} = \beta_t CC_{pr} \times \varphi_t + \delta_1 Cases_{prt-1} + \delta_1 Deaths_{rt-1} + \gamma_t \mathbf{Z_{pr}} \times \varphi_t + d_t + f_p + u_{pt} \tag{3}$$

[7] We do not control for political variables because in Italy, unlike other countries, attitudes towards mask-wearing, lockdown, and other social distancing measures did not polarize along party lines. Hence this dimension does not seem relevant to explain changes in mobility.

m_{prt} represents a measure of mobility in province p in region r on day t. The first term on the right-hand side is the interaction between the level of civic capital, CC, in province p in region r and a vector of time dummies, φ_t, representing the various phases of the pandemic, with the pre-outbreak period as the excluded category. Hence, the vector of coefficients β_t captures the differential evolution of mobility in areas with different level of civic capital over the different phases. $Cases_{prt-1}$ and $Deaths_{rt-1}$ represent the number of new COVID-19 cases and COVID-19 deaths recorded respectively in the province and in the region on the previous day. $\mathbf{Z_{pr}} \times \varphi_t$ are the interactions between the dummies for the different phases and all the economic, geographic, and demographic provincial controls described above. Including these terms allows to effectively control for any differential *change* in mobility related to other provincial characteristics potentially correlated with civic capital.[8] Finally, the model includes a full set of province fixed effects, f_p and day fixed effects, d_t. The province dummies absorb any systematic difference in mobility *levels* across provinces due to time-invariant characteristics. The day fixed effects account for the common evolution of mobility in all provinces in any given day. In particular, they absorb the impact of any nation-wide information about the evolution of the pandemic, without the need to make any assumption about what specific information influences people perceived risk of contagion.

Hence, our identifying assumption is that, after controlling for any time-invariant province characteristic, nation-wide daily changes in mobility, and intensity of the pandemic at the local level, the *differential change* in mobility in high-civic capital areas is unrelated to factors other than the ones we explicitly control for ($\mathbf{Z_{pr}}$). One way to further strengthen the identification is to add to the specification regional fixed effects interacted with time dummies. This would take care of all those characteristics, common to all provinces in a region, that may correlate with civic capital and can affect changes in mobility during the unfolding of the pandemic. In what follows we discuss the robustness of our results to this more demanding approach.[9]

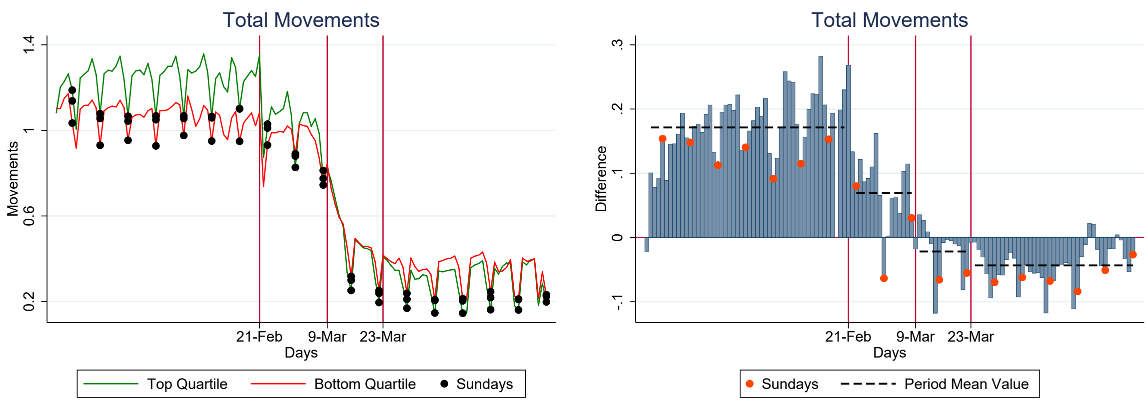
[8]Equation (3) can be generalized by replacing the dummies for the phases of the pandemic with dummies for each day. We will also discuss evidence based on this more flexible approach.

[9]One potential challenge to our identification assumption would emerge if people in provinces with high civic capital were also generally more anxious about health risks, and hence more likely to overreact to the possibility of contagion. To alleviate this concern, as explained above, in our empirical analysis we explicitly control for the incidence of anxiety and hypochondria in the local population. Results controlling for this variable are reported in Appendix Table A.6.

4.2. Baseline results

In Figure 1 we explore the relationship between mobility and civic capital using the raw data. As mentioned above, our main measure of civic capital is the principal component of trust, blood donation, and newspaper readership. The left panel shows the evolution of daily per capita movements in provinces in the top quartile of the civic capital distribution (in green) and in the other provinces (in red). The right panel shows how the difference between the two groups of provinces evolves over time, and the mean value of the difference for each phase.[10] The dots indicate Sundays, when work-related movements drop, while the vertical lines indicate the different phases in our sample period.

Figure 1: Daily movements during the spread of Covid-19 and civic capital



(a) Evolution of mobility

(b) Difference in mobility

The left panel shows raw data average daily movements in high (above 75th percentile) and low (below 75th percentile) civic capital provinces in Italy over the different phases of the pandemic. The right panel shows the difference in daily movements between high and low civic capital provinces.

In the weeks prior to the outbreak, provinces with high civic capital display greater mobility than other provinces. Over this period mobility is very regular from one week to the next. Right after the first hotspot is identified, and information spreads through the media, mobility starts to drop markedly in all provinces (by 17% overall). This is consistent with individuals deliberately reducing social interactions to protect themselves from the risk of infection. However, mobility declines much faster in high-civic capital provinces than in the others, halving the gap observed in the pre-outbreak period

[10] The pattern is very similar if we divide provinces into three groups according to the level of civic capital: top quartile, 25th-75th percentile, and bottom quartile (see Figure A.3).

(right panel). Hence, as soon as the threat of the virus became real, individuals in more civic-minded communities started to self-restraint *also* because they internalized the risk of infecting others in the case of being asymptomatic carriers. Once the first lockdown is in place, mobility falls dramatically in all provinces (by 60% overall, Figure 1). Again, the decline is stronger in areas with high-civic capital, so much so that the gap with the other provinces closes completely. The same holds for the period after the lockdown was tightened.

Table 1: MOBILITY AND CIVIC CAPITAL

	Dep. Var: Movement Per Capita (Province/Day)					
	Total Movements			Local Movements		
	(1)	(2)	(3)	(4)	(5)	(6)
Feb 21 - Mar 9 × Top 75th Civic Capital	-0.0719***	-0.0696***	-0.0487***	-0.0445***	-0.0435***	-0.0285***
	(0.0159)	(0.0154)	(0.0156)	(0.0106)	(0.0102)	(0.0099)
Mar 9 - Mar 23 × Top 75th Civic Capital	-0.1201***	-0.1091***	-0.1091***	-0.0769**	-0.0875**	-0.0774**
	(0.0355)	(0.0388)	(0.0354)	(0.0369)	(0.0389)	(0.0349)
Post Mar 23 × Top 75th Civic Capital	-0.1320***	-0.1317***	-0.1170**	-0.0873*	-0.1125**	-0.0896*
	(0.0464)	(0.0491)	(0.0504)	(0.0505)	(0.0514)	(0.0501)
Province FE	√	√	√	√	√	√
Day FE	√	√	√	√	√	√
Local Covid-19 New Cases and Deaths	×	√	√	×	√	√
Geographic Controls × Phase	×	×	√	×	×	√
Hospital Capacity × Phase	×	×	√	×	×	√
Economic Controls × Phase	×	×	√	×	×	√
Mean Dependent	0.79	0.79	0.79	0.60	0.60	0.60
Observations	12,342	12,342	12,342	12,342	12,342	12,342
R-Square	0.95	0.95	0.96	0.93	0.93	0.96

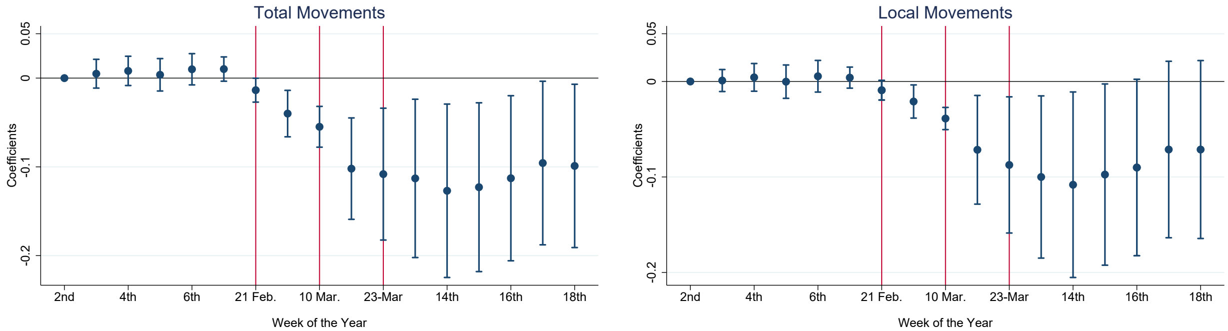
The table shows regressions corresponding to different specifications of equation (1). In the first three columns the dependent variable is total movements (in a province in a day); in the last three it is local movements. Standard errors clustered at the province level are reported in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

Yet, the pattern of Figure 1, which is based on raw data, could in principle be due to the fact that provinces with higher civic capital, which are more likely to be located in the North of the country, were hit earlier and harder by the pandemic. To test more formally for the casual effect of civic capital on mobility, in Table 1 we estimate our baseline specification using as dependent variable total movements (columns 1-3), and local movements (columns 4-6), respectively. In the first column we only control for province and day fixed effects. In the second we include the number of recent COVID-19 cases and deaths at the local level. In column 3 we include interactions between the dummies for the different phases and the full set of controls described above. In all specifications the interaction between high-civic capital and the dummy for period after the outbreak phase displays a negative and significant coefficient (at the 1% level). The point estimate decreases only somewhat when all controls are included but remains highly significant, both for total and local mobility. This confirms that β_t is truly capturing the effect of civic norms and not of other factors - including the quality of the health system - that are typically correlated with civic capital.

Regarding the magnitude of the effect, looking at the period after the outbreak and before the lockdown, the extra drop in mobility in provinces with high civic capital is about 7% of the average mobility over the sample period. The gap further increases after the first lockdown is adopted and, even more, after the lockdown is tightened, reaching 14% of the sample average in the last period. Figure 2 plots the coefficients of the interactions of high-civic capital with the dummy for each of the weeks with the respective confidence intervals for total and local mobility (left and right panel respectively). The pattern confirms that depicted in Figure 1: no significant difference in mobility between high- and low-civic capital provinces prior to the outbreak, once the data are demeaned and other factors are controlled for, but a strong additional negative effect of civic capital once the outbreak starts and even more during the lockdown.[11]

[11] In all regressions in Table 1 the daily dummies are highly statistically significant (F-test for joint significance is 294.71, p-value 0.0000). Interestingly, when daily dummies are included, the lagged number of cases and deaths in the province have no explanatory power (F-test for the joint significance 1.64, p-value 0.199). This indicates that, despite marked differences across regions in the incidence of the pandemic, people's mobility was primarily responding to information on the evolution of the pandemic at the national level. This is consistent with the fact that the bulk of the official communication about the COVID-19 situation was centered around a single press conference, held each day at 6 pm, broadcast by all national TV channels and widely watched by the public.

Figure 2: DIFFERENCE IN MOBILITY BETWEEN HIGH AND LOW CIVIC CAPITAL PROVINCES



(a) TOTAL MOVEMENTS (b) LOCAL MOVEMENTS

The figure plots the coefficients on the interaction terms between week fixed effects and a dummy variable for provinces in the top-quartile of the civic capital distribution. The coefficients in the left panel are estimated from the regression in column 3 of Table 1, using daily total movements as dependent variable. Those in the right panel are estimated from the regression in column 6 of Table 1 using daily local movements as dependent variable.

4.3. OWN PROTECTION VS. OTHER-REGARDING CONSIDERATIONS

To what extent does the drop in mobility occurring after the outbreak reflect voluntary social distancing? And what part of it is due to people trying to avoid contracting the virus themselves as opposed to their desire to protect others? To shed light on these questions, we zoom in on the days around February 21, when news about the outbreak in Lombardy became public but no measures were adopted in other regions. Specifically, we consider the seven days before and after February 21, and estimate the following variant of equation (3):

$$m_{prt} = \alpha PostFeb21 + \beta CC_{pr} \times PostFeb21 +$$
$$\delta DistCodogno_{pr} \times PostFeb21 + \gamma \mathbf{Z_{pr}} \times PostFeb21 + d_w + f_{pr} + u_{prt} \quad (4)$$

where $PostFeb21$ is a dummy for the days after February 21, $DistCodogno_{pr}$ represents the distance (in 1,000 km) of province p in region r from the location of the first hotspot, and d_w are day of the week dummies. α captures how the revelation of the outbreak affects mobility in all provinces, δ how the effect varies depending on the distance from the early epicenter of the pandemic, and β the extra reduction in mobility in high civic capital provinces after the information is out. Since following the outbreak the area around Codogno was sealed and residents of Lombardy were invited to stay home by the local authorities, we exclude Lombardy from the sample so as to capture changes in mobility due *only* to the behavioral reaction to information about the pandemic rather than to any legal restriction. In Table 2 we estimate equation (4) gradually expanding the set of controls and using total mobility as dependent variable (results are similar for local mobility). Looking at the specification with all the controls (column 3), we estimate α to be -0.15, corresponding to a drop in mobility of 13% in the week after the outbreak relative to the one before. The effect is smaller in provinces that are farther away from Codogno; being 250, 500, or 1,000 km away from the hotspot lowers the effect to 12%, 11% and 9% respectively. We estimate β to be -0.047 and highly statistically significant; this magnitude implies that more civic communities reduce mobility by an additional 4% of the pre-pandemic average, *ceteris paribus*. Based on these estimates, we calculate that civic norms account for as much as 32% of the reduction in mobility due to own-risk avoidance in provinces close to Codogno, a rather sizable effect. Finally, in the last column we use the first principal component of only blood donations and trust to measure civic capital, dropping newspaper readership. This is to ensure we are not capturing a mechanical difference in information about the presence of the virus due to exposure to news. The similarity of the effects is reassuring in this regard.

Table 2: THE VIRUS IS HERE. VOLUNTARY RESPONSE TO NEWS ABOUT THE VIRUS

Dep. Var:	Movement Per Capita (Province/Day)			
	(1)	(2)	(3)	(4)
Feb 21 - 27	-0.1679***	-0.1638***	-0.1476***	-0.1410***
	(0.0153)	(0.0141)	(0.0194)	(0.0205)
Feb 21 - 27 × Top 75th Civic Capital	-0.0384*	-0.0370*	-0.0466**	-0.0325*
	(0.0226)	(0.0214)	(0.0180)	(0.0188)
Feb 21 - 27 × Distance from Codogno	0.0725***	0.0683***	0.0417**	0.0413**
	(0.0170)	(0.0159)	(0.0169)	(0.0172)
Province FE	√	√	√	√
Day of the Week FE	√	√	√	√
Local Covid-19 New Cases and Deaths	×	√	√	√
Geographic Controls × Phase	×	×	√	√
Hospital Capacity × Phase	×	×	√	√
Economic Controls × Phase	×	×	√	√
Mean Dependent	1.12	1.12	1.12	1.12
Observations	1,170	1,170	1,170	1,170
R-Square	0.93	0.93	0.93	0.93

The table reports the results of regressions corresponding to different specification of equation (2) using total movements as dependent variable. The sample includes the days between February 14 and 28, and excludes provinces in Lombardy. In column 1-3 civic capital is measured as the first principal component of blood donation, trust, and newspaper readership; in column 4 as the first principal component of the first two variables only. Standard errors clustered at the province level are reported in parentheses. * significant at 1% or less; significant at 5%; * significant at 10%.

4.4. ROBUSTNESS AND EXTERNAL VALIDITY

In this section we present a number of robustness checks. First, it is key to rule out that our results do not merely reflect a general North-South divide. This is especially important because the outbreak started in the Northern regions of Lombardy and Veneto before spreading to other regions, and because of the well-documented differences in civic capital between the North and the South (Putnam, 1993; Guiso et al., 2016). To address this aspect in Table 3 we estimate our baseline specification separately on the sample of Northern and Southern provinces.[12] When doing so, we redefine the dummy for high social capital based on the distribution of the relevant sample, i.e., top quartile among Northern and Southern provinces, respectively. The maps in Appendix Figure A.4 illustrate the geographic

[12] We divide the provinces along the historical borders between the territories of the Holy Roman Empire and the Southern Kingdom of the Two Sicilies at a time that was key for the formation of Italy's civic traditions (see Guiso et al., 2016, Figure A1).

distribution of the high-civic capital variable for all the provinces in the sample (top), and separately for Northern and Southern provinces (bottom).

Table 3: MOBILITY AND CIVIC CAPITAL ALONG THE NORTH AND SOUTH DIVIDE

	Dep. Var: Movement Per Capita (Province/Day)			
	Center-North Regions		Center-South Regions	
	Total (1)	Local (2)	Total (3)	Local (4)
Feb 21 - Mar 9 × Top 75th Civic Capital	-0.0054	-0.0193	-0.0016	-0.0128
	(0.0235)	(0.0183)	(0.0132)	(0.0114)
Mar 9 - Mar 23 × Top 75th Civic Capital	-0.1432***	-0.1492***	-0.0385	-0.0812**
	(0.0451)	(0.0405)	(0.0432)	(0.0398)
Post Mar 23 × Top 75th Civic Capital	-0.1740***	-0.1830***	-0.0613	-0.1131*
	(0.0608)	(0.0566)	(0.0616)	(0.0581)
Province FE	√	√	√	√
Day FE	√	√	√	√
Local Covid-19 New Cases and Deaths	√	√	√	√
Geographic Controls × Phase	√	√	√	√
Hospital Capacity × Phase	√	√	√	√
Economic Controls × Phases	√	√	√	√
Mean Dependent	0.77	0.55	0.82	0.66
Observations	7,139	7,139	5,203	5,203
R-Square	0.97	0.96	0.97	0.97

The table reports the results of separate regressions estimated on the sample of provinces in the Center-North (columns 1 and 2) and in the Center-South of the country (columns 3 and 4). The dependent variable is total daily movements in columns 1 and 3, and daily local movements, in columns 2 and 4. The dummy variable for provinces in the top 75th percentile of civic capital is defined on the relevant sub-sample of provinces. Standard errors clustered at the province level are reported in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

We report results for both total and local mobility from a specification with all controls. Overall, our baseline results continue to hold when looking within North and within South. The results on local mobility are also significant. The lower precision of the estimates for total mobility in the Southern sample is arguably due to the important flow of people traveling from North to South following the announcement of cross-region mobility restrictions (Valsecchi et al., 2020). Indeed, because long-distance and passing-through displacements are also included in the count of total movements, in this case this measure is less informative. The fact that the effect of civic capital is stronger in the North than in the South, where civic capital is, on average, lower, is consistent with the effect of civic capital being non-linear and especially pronounced at the top of the distribution.

Additional robustness checks are reported in the Appendix. We first show that the results obtained using each of the three measures of social capital are qualitatively similar to those obtained using the principal component, though the latter are somewhat more precise (columns 1-3 of Table A.4). Results are also robust to controlling for a measure of physical proximity to co-workers and customers and of the potential for remote work (column 4). Our results remain similar when including region*week fixed effects (column 5), which, as discussed above, represents a rather compelling test; Figure A.5 shows how the effect estimated with this more saturated specification evolves over time. We also obtain consistent results when using the continuous measure of civic capital, rather than the dummy for top quartile (Table A.5), and when interacting high-civic capital with daily dummies, rather than with phase dummies (Figure A.6). To alleviate the concern that people in high-civic capital provinces may be generally more anxious about health risks, in Table A.6 we show that results are not affected by the inclusion of a measures of health-related concerns mentioned above (interacted with phase dummies).[13]

Last but not least, in Table A.7 we verify that all results go through when excluding the provinces of Lombardy, the region most affected by the pandemic.[14]

To test the validity of our hypothesis beyond the case of Italy, we also examine the relationship between civic capital and mobility during the COVID-19 emergency in Germany. We focus on Germany because, like Italy, it is a country characterized by large and deep-rooted within-country differences in civic capital (Reynolds, 1997). Furthermore, it is a country where the pandemic was less severe and the measures adopted by the government less invasive than in Italy. It hence represents an ideal context to study the role of civil culture when the perceived risk of contracting and transmitting the disease is milder, and individuals have more control over their mobility choices.

Based on a careful analysis of the events (summarized in Figure A.2), we identify three key dates of

[13] We obtain similar results using two alternative survey-based measures of health-concerns, i.e., the share of people reporting having a private health insurance and the share of respondents reporting having searched online for health-related information in the three previous months. These results are available upon request.

[14] When excluding the provinces of Lombardy from the sample, we redefine the dummies for top-quartile relative to the remaining provinces.

the evolution of the COVID-19 emergency in Germany: i) February 24, when pandemic plans were activated in all states, ii) March 9, when the first COVID-19 related death was recorded and the health ministry called for the cancellation of gatherings of more than 1,000 people, and iii) the week between March 16 and March 22, when schools were closed, border controls and travel ban to EU countries were introduced, and finally nation-wide mobility restrictions were adopted.

We use the same empirical strategy and comparable data as those used for Italy. Specifically, the data on mobility come from the same source and report the number of daily movements in each German district (*Kreise*). The data cover a somewhat shorter period - i.e., from January 22 to April 26 - and only report information on total trips. For civic capital we use three proxies analogous to those used for Italy: trust, blood donation, and interest in politics. All measures are based on survey data from four waves of the German Socio-Economic Panel (SOEP) conducted between 2010 and 2015.[15] Again, we use the first principal component of the three variables as our main measure of civic capital. The full set of controls, and the respective sources, are described in Appendix Table A.8. Descriptive statistics for all variables used in the analysis are reported in Appendix Table A.9.

The results, summarized in Appendix Table A.10, mirror those for Italy. Mobility declines quickly after the outbreak but especially in districts with high civic capital, consistent with civic culture favoring social distancing even in the absence of coercion. The effect becomes larger when more restrictive measures are adopted, in line with more civic-minded citizens being also more likely to abide by the new rules. Figure A6 illustrates the results graphically, plotting the coefficient of civic capital, and respective confidence intervals, for each week.

5. THE BENEFIT OF CIVIC CAPITAL IN A PANDEMIC

To get a sense of the benefits of the extra social distancing associated with higher civic capital, we have simulated the SIR model of optimal quarantine and testing proposed by Piguillem and Shi (2020) and calibrated on Italy. We simulate the model, which tracks the number of daily excess deaths (relative to the previous five years) as well as the cumulative number of excess deaths quite closely, under

[15] The trust variable is defined as the share of respondents in a district that report agreeing or fully agreeing with the statement "most people can be trusted”. For blood donation we consider the share of people that report having donated blood at least once in the previous five years. Finally, for interest in politics, we consider the share of respondents reporting being interested or very interested in politics.

two scenarios.[16] The first scenario is a benchmark economy in which the social distancing parameter in equation (2), $(1 - d_t)$, follows the evolution of mobility estimated in the third column of Table 1 based on the average level of civic capital across all provinces (standardizing mobility in January to 1). The second scenario is a high-civic capital economy, where social distancing follows the evolution of mobility estimated in the third column of Table 1 for the provinces in the highest quartile of the civic capital distribution. Crucially, the model includes a feedback loop by which current deaths affect agents' future behavior (e.g., more deaths discourage mobility) and, hence, subsequent deaths. The results indicate that while in the benchmark economy the cumulative number of excess deaths is estimated at 47,466 as of May 4, last day of lockdown (37,570 in the data), in the high-civic capital economy it is about 60% lower, i.e., 20,028. The number of new excess deaths at the peak of the pandemic (March 27) is 1,487 in the benchmark economy (1,649 in the data) compared to 725 in the high-civic capital economy (Figures A.8).[17]

This remarkable difference is arguably due to the fact that contagion grows exponentially, so that even small differences in reproduction rates at the beginning are magnified over time. In this regard, the fact the decline in mobility in more civic areas occurred since the very early stage of the pandemic - even before any containment action was put in place by the authorities - is key for the large impact in terms of lives saved.

6. Conclusion

We study the relationship between civic capital, social distancing and disease containment in the context of the COVID-19 pandemic in Italy. We document that Italians decreased their mobility first as a voluntary response to information about the presence of the virus in the country, and, second, in reaction to the social distancing measures adopted by the government. Crucially, both reactions were stronger in communities with high levels of civic capital arguably because more civic-minded individuals are both more likely to internalize the effect of their mobility on others - either due to

[16] As documented by Buonanno et al. (2020) in the context of Italy and by Weinberger et al. (2020) for the U.S., the number of excess deaths relative to the same months of the previous years provides a more precise estimate of the true death toll of the pandemic since many deaths caused by the virus were not recorded as such.

[17] The results of the simulation are qualitatively similar if we exclude Lombardy, the region were the highest number of Covid-19 deaths was recorded (available upon request).

other-regarding preferences or a sense of civic duty - and to abide by the new rules. These tendencies, our results suggest, contributed to the containment of the pandemic and limited its death toll.

While our findings refer to period before and during the national lockdown, civic culture is likely to play an even greater role as economies reopen and communities unavoidably have to learn to co-exist with the pandemic, possibly for a sustained period of time. As restrictions ease, social distancing will have to be achieved through a decentralized process based on individual responsibility. In this phase, communities with high civic capital will arguably face a less grim trade-off between the speed of economic recovery and the risk of new outbreaks and other, costly lockdowns.

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APPENDIX

Figure A.1: NEWSPAPER FRONT PAGES AROUND THE OUTBREAK

(a) FEBRUARY 20, 2020

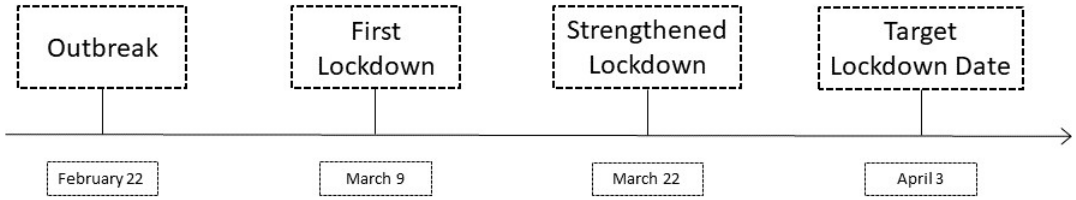
(b) FEBRUARY 21, 2020

(c) FEBRUARY 22, 2020

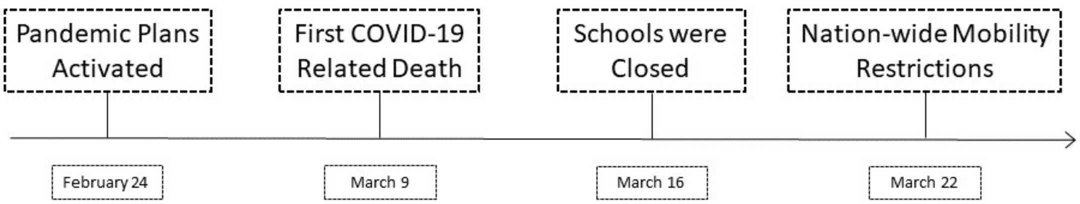
(d) FEBRUARY 23, 2020

The Figure shows the front pages of the three main Italian newspapers (*Corriere della Sera*, *La Republica*, and *Il Sole 24 Ore*) in the two days before and after the Covid-19 outbreak revealed on the night of February 21.

Figure A.2: TIME-LINE OF COVID-19 PANDEMIC IN ITALY AND GERMANY



(a) ITALY



(b) GERMANY

The table shows the timeline of the key events in the evolution of the Covid-19 pandemic in Italy and Germany.

Table A.1: DESCRIPTION OF THE MAIN VARIABLES AND DATA SOURCES (ITALY)

Mobility:

Total movements p.c.: total number of daily trips divided by resident population. The variable is available at the province level and includes three categories of trips: i) trips initiated and concluded within the province (local), ii) trips originating from other provinces and ending in the province (incoming), iii) trips originating from the province and ending in other province (outgoing).

Local movements p.c.: total number of daily trips divided by resident population. The variable is available at the province level and includes the number of trips initiated and concluded within the province.

Source: data are provided by Teralytics (https://www.teralytics.net/). They are based on phone location tracking records. They record the number of movements performed by each phone-owner during the day from home (i.e., the place where an individual regularly spends the night) to work or to other destinations such as shops, bars, restaurants, gyms etc. and vice versa.

Incidence of Covid-19:

Covid-19 new cases: daily number of new Covid-19 cases detected in a province; based on official reports by health authorities.

Covid-19 new Deaths: daily number of new Covid-19 deaths recorded in a region; based on official reports by health authorities.

Source: data from the Italian Department of Civil Protection (https://www.covidstat.it/)

Civic capital:

Blood donations: number of blood bags donated in a year (per 10,000 people). Data are available by province for the year 1995. Source: Italian Association of Blood Donors (AVIS)

Trust: share of respondents in each province who report that most people can be trusted in response to the question: "Generally speaking would you say most people can be trusted or you can't be too careful". Source: data from the "Multipurpose Survey on Households: Aspects of Daily Life" conducted by the Italian National Statistical Institute (ISTAT) between 2010 and 2015 on a sample of over 238,000 individuals.

Newspaper readership: number of readers of paid daily newspapers in a province divided by total adult resident population. Source: data available from ADS (Accertamenti Diffusione Stampa) for the years 2005-2010.

Civic capital: principal component of province-level measures of blood donations, trust, and newspaper readership.

Controls:

Area: total surface area of a province in Km sq.

Avg altitude: mean altitude of a province in meters.

Share coastal municipalities: share of total municipalities in the province with direct access to the coast.

Population density: number of inhabitants per square kilometer in a province.

Share of male population: number of male residents in the province divided by total population.

Airports: dummy variable equal to 1 if the province is home to a domestic or international airport, 0 otherwise.

Share of urban municipalities: share of municipalities in the province categorized as urban.

Number of firms p.c.: number of firms incorporated in the province divided by resident population.

Share HS or more: share of the population with high school or higher diploma.

Added value: median income per capita in the province.

Household financial wealth: median household financial wealth in the province.

Proximity: measure of physical proximity to co-workers and customers based on sector composition of economic activities in the province. Source: Indagine Campionaria sulle Professioni 2013, INAPP (Istituto Nazionale per l'Analisi delle Politiche Pubbliche).

ICU hospital beds: number of ICU hospital beds per 100.000 inhabitants in the region. Source: Italian Health Ministry.

Anxiety and Hypochondria: number of patients aged 18-40 diagnosed with a state of anxiety or hypochondria by local health professionals by province (per 10,000 inhabitants). Source: Italian Ministry of Health.

Table A.2: SUMMARY STATISTICS (ITALY)

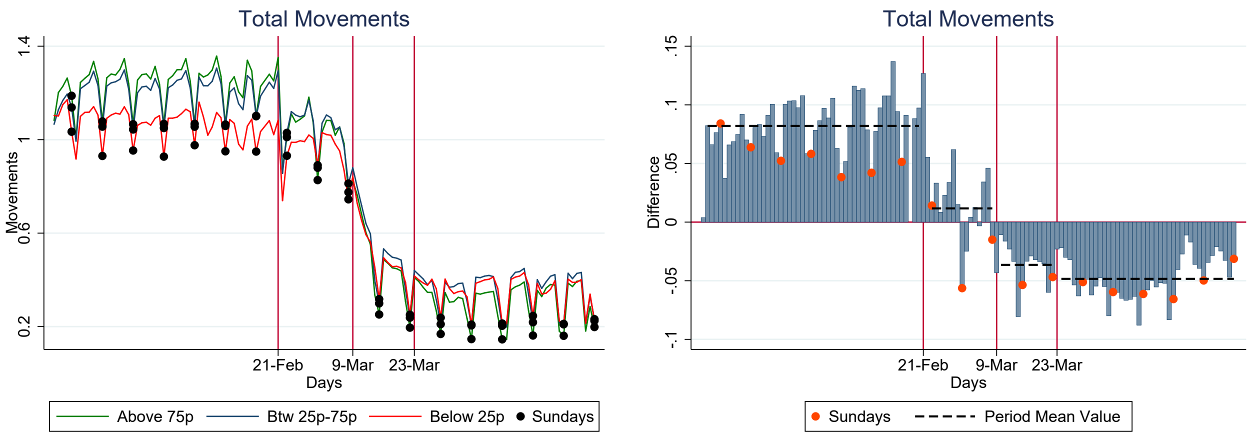
	N	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Total Movements pc	12,342	0.79	0.4	0.0	2.2
Local Movements pc	12,342	0.60	0.4	0.0	2.1
Local Covid-19 New Cases (Province)	12,342	16.56	47.8	0.0	868.0
Local Covid-19 New Deaths (Region)	12,342	21.76	64.6	0.0	546.0
Blood Donation (per 10,000 people)	12,342	0.03	0.0	0.0	0.1
Trust	12,342	0.21	0.0	0.1	0.4
Newspaper	12,342	0.28	0.1	0.1	0.7
Civic Capital	12,342	0.00	1.3	-2.2	4.3
Area (Km sq.)	12,342	2,792.74	1,606.1	212.5	7,398.4
Avg Altitude	12,342	309.58	175.9	5.1	849.7
Share Costal Municipality	12,342	0.13	0.2	0.0	0.8
Population Density	12,342	271.50	374.0	40.5	2,591.3
Share of Male Population	12,342	0.49	0.0	0.5	0.5
Airports	12,342	0.27	0.4	0.0	1.0
Proximity	12,342	0.39	0.1	0.3	0.7
ICU Bed Ospital per 100,000 Inhabitants	12,342	0.07	0.0	0.0	0.1
Share Urban Municipality	12,342	0.04	0.1	0.0	0.6
Numer of Firms pc	12,342	0.07	0.0	0.0	0.1
Share of Pop HS of more	12,342	0.41	0.0	0.3	0.5
Added Value pc	12,342	23,212.70	6,493.7	13,260.3	48,213.8
Household Financial Wealth	12,342	9,480.77	6,759.0	0.0	41,981.5
Anxiety and Hypochondria per 10,000 Inhabitants	12,342	1.72	0.93	0.44	5.23

Table A.3: CORRELATIONS BETWEEN THE VARIOUS MEASURES OF CIVIC CAPITAL

	Civic Capital	Blood Donations	Trust	Newspaper Readership
Civic Capital	1			
Blood Donations	0.5990	1		
Trust	0.8100	0.2139	1	
Newspaper Readership	0.8614	0.3261	0.5618	1

The table reports the pairwise correlations between the following variables at the province level (described in detail in the paper): blood donations, trust in others, newspaper readership, and the first principal component of former three.

Figure A.3: DAILY MOVEMENTS DURING THE SPREAD OF THE VIRUS AND CIVIC CAPITAL

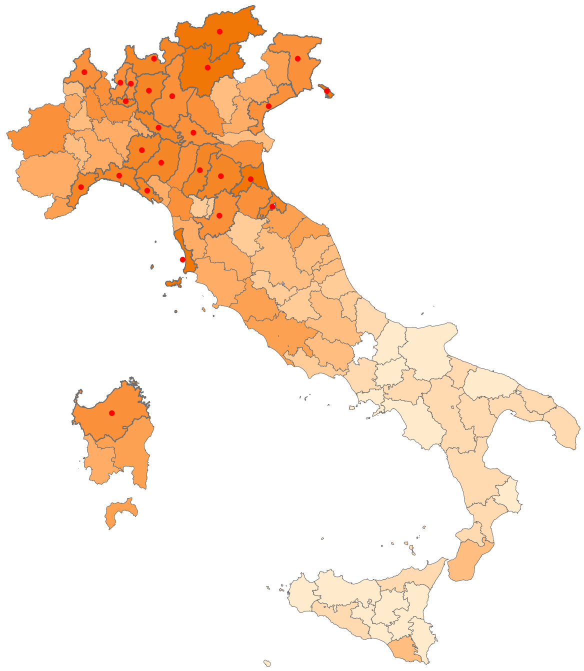


(a) EVOLUTION OF MOBILITY

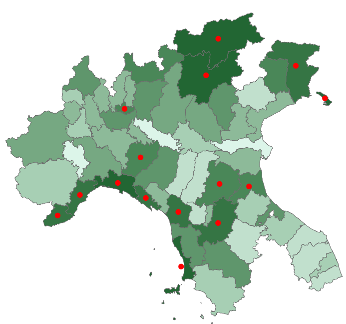
(b) DIFFERENCE IN MOBILITY

The figure depicts the evolution of average daily movements in high (above 75th percentile), middle (between the 75th and 25th percentile) and low (below 25th percentile) civic capital provinces in Italy over the different phases of the pandemic.

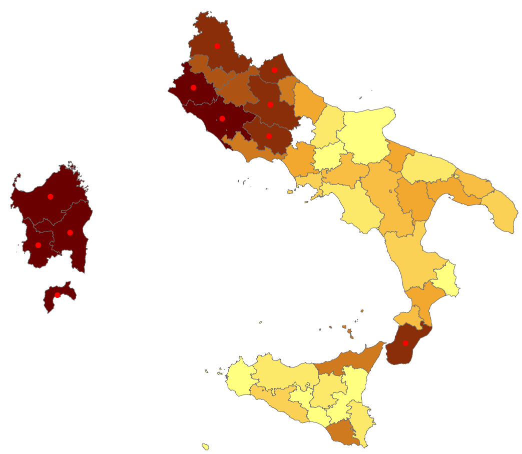
Figure A.4: GEOGRAPHIC DISTRIBUTION OF CIVIC CAPITAL IN ITALY



(a) FULL SAMPLE



(b) CENTER-NORTH



(c) CENTER-SOUTH

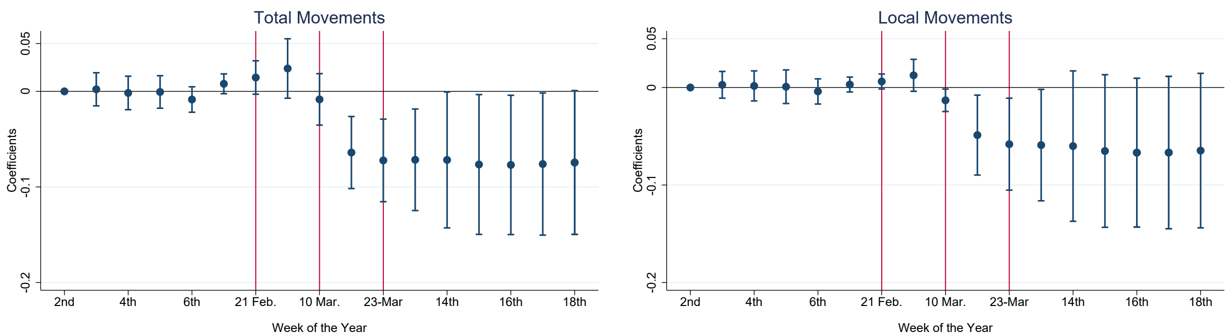
The figure illustrates the geographic distribution of our main civic capital measure across all the provinces in our sample (panel a), and separately for provinces in the Center-North (b) and Center-South (c). The red dots indicate provinces in the top quartile of the distribution of civic capital for the relevant sample.

Table A.4: MOBILITY AND CIVIC CAPITAL: ROBUSTNESS (1)

	Dep. Var: Total Movements Per Capita (Province/Day)				
	(1)	(2)	(3)	(4)	(5)
Feb 21 - Mar 9 × Top 75th Blood Donation	-0.0409**				
	(0.0164)				
Mar 9 - Mar 23 × Top 75th Blood Donation	-0.0713***				
	(0.0235)				
Post Mar 23 × Top 75th Blood Donation	-0.0721**				
	(0.0299)				
Feb 21 - Mar 9 × Top 75th Newspaper		-0.0413**			
		(0.0174)			
Mar 9 - Mar 23 × Top 75th Newspaper		-0.0860**			
		(0.0387)			
Post Mar 23 × Top 75th Newspaper		-0.0736			
		(0.0520)			
Feb 21 - Mar 9 × Top 75th Trust			0.0048		
			(0.0132)		
Mar 9 - Mar 23 × Top 75th Trust			-0.0623***		
			(0.0218)		
Post Mar 23 × Top 75th Trust			-0.0681**		
			(0.0323)		
Feb 21 - Mar 9 × Top 75th Civic Capital				-0.0491****	-0.0112
				(0.0155)	(0.0177)
Mar 9 - Mar 23 × Top 75th Civic Capital				-0.1096***	-0.0800***
				(0.0348)	(0.0249)
Post Mar 23 × Top 75th Civic Capital				-0.1171** *	-0.0891**
				(0.0501)	(0.0396)
Province FE	√	√	√	√	√
Day FE	√	√	√	√	√
Local Covid-19 New Cases and Deaths	√	√	√	√	√
Geographic Controls × Phase	√	√	√	√	√
Hospital Capacity × Phase	√	√	√	√	√
Economic Controls × Phase	√	√	√	√	√
Physical Proximity × Phase	×	×	×	√	×
Region FE × Week FE	×	×	×	×	√
Mean Dependent	0.79	0.79	0.79	0.79	0.79
Observations	12,342	12,342	12,342	12,342	12,342
R-Square	0.96	0.96	0.96	0.96	0.98

The table reports estimations of different version of equation (1). The dependent variable is blood donations (column 1), newspaper readership (column 2), trust (column 3), and the principal component of the three (columns 4-5). In column 4 we control for a measure of physical proximity to coworkers and customers based on sectorial composition of economic activities in the province. In column 6 we include the interaction between region and week fixed effects. Standard errors clustered at the province level are reported in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

Figure A.5: DIFFERENCE IN MOBILITY BETWEEN PROVINCES WITH HIGH AND LOW CIVIC CAPITAL (INCLUDING REGION × WEEK FIXED EFFECTS)



(a) TOTAL MOVEMENTS (b) LOCAL MOVEMENTS

The figures plots the coefficients on the interaction terms between week fixed effects and a dummy variable for provinces in the top-quartile of the civic capital distribution using as dependent variable total mobility (left panel) and local mobility (right panel), respectively. In both cases, the coefficients are estimated from an augmented version of our baseline specification which also includes region × week fixed effects.

Table A.5: MOBILITY AND CIVIC CAPITAL: ROBUSTNESS (2)

	Dep. Var: Movement Per Capita (Province/Day)					
	Total Movements			Local Movements		
	(1)	(2)	(3)	(4)	(5)	(6)
Feb 21 - Mar 9 × Civic Capital	-0.0402***	-0.0395***	-0.0172*	-0.0248***	-0.0244***	-0.0130*
	(0.0064)	(0.0062)	(0.0090)	(0.0036)	(0.0034)	(0.0069)
Mar 9 - Mar 23 × Civic Capital	-0.0731***	-0.0700***	-0.0513**	-0.0442***	-0.0477***	-0.0451**
	(0.0116)	(0.0124)	(0.0202)	(0.0134)	(0.0139)	(0.0200)
Post Mar 23 × Civic Capital	-0.0819***	-0.0812***	-0.0549*	-0.0512***	-0.0591***	-0.0535*
	(0.0154)	(0.0161)	(0.0305)	(0.0183)	(0.0185)	(0.0303)
Province FE	√	√	√	√	√	√
Day FE	√	√	√	√	√	√
Local Covid-19 New Cases and Deaths	×	√	√	×	√	√
Geographic Controls × Phase	×	×	√	×	×	√
Hospital Capacity × Phase	×	×	√	×	×	√
Economic Controls × Phase	×	×	√	×	×	√
Mean Dependent	0.79	0.79	0.79	0.79	0.79	0.79
Observations	12,342	12,342	12,342	12,342	12,342	12,342
R-Square	0.95	0.95	0.96	0.93	0.94	0.95

The table reports estimations of different version of equation (1) using the continuous measure of civic capital. The dependent variable is daily total movements per capita (columns 1-3), and daily local movements per capita (columns 4-6). Standard errors clustering by province are reported in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

Table A.6: MOBILITY AND CIVIC CAPITAL (CONTROLLING FOR HEALTH CONCERNS)

	Dep. Var: Movement Per Capita (Province/Day)			
	Total Movements		Local Movements	
	(1)	(2)	(3)	(4)
Feb 21 - Mar 9 × Top 75th Civic Capital	-0.0487***	-0.0453***	-0.0285***	-0.0270***
	(0.0156)	(0.0156)	(0.0099)	(0.0098)
Mar 9 - Mar 23 × Top 75th Civic Capital	-0.1091***	-0.1046***	-0.0774**	-0.0762**
	(0.0354)	(0.0341)	(0.0349)	(0.0341)
Post Mar 23 × Top 75th Civic Capital	-0.1170**	-0.1114**	-0.0896*	-0.0877*
	(0.0504)	(0.0486)	(0.0501)	(0.0490)
Province FE	√	√	√	√
Day FE	√	√	√	√
Local Covid-19 New Cases and Deaths	√	√	√	√
Geographic Controls × Phase	√	√	√	√
Hospital Capacity × Phase	√	√	√	√
Economic Controls × Phase	√	√	√	√
Anxiety and Hypochondria × Phase	×	√	×	√
Mean Dependent	0.79	0.79	0.60	0.60
Observations	12,342	12,342	12,342	12,342
R-Square	0.96	0.96	0.96	0.96

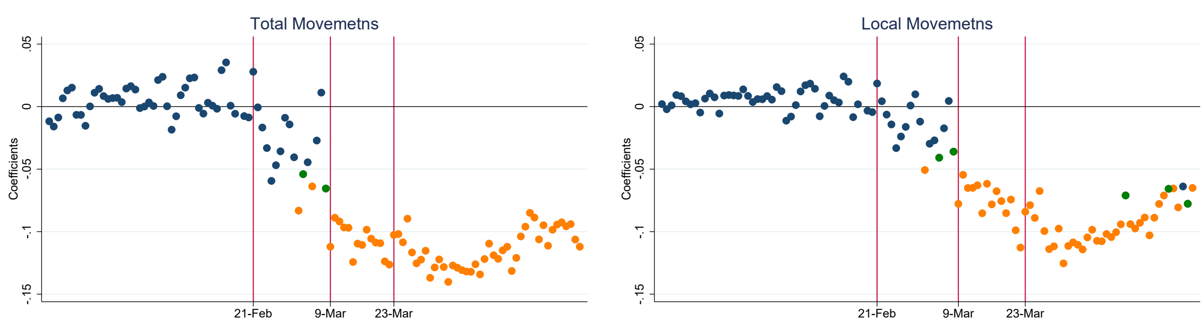
The table shows regressions corresponding to equation (1). Columns 1 and 3 reports the results of our baseline specification with all controls. In columns 2 and 4 we also control for the interaction between the number of adult patients diagnosed with a state of anxiety or hypochondria by local health professionals in a province (per 10,000 inhabitants) and phase dummies. The dependent variable is total movements in columns 1 and 2, and local movements in columns 3 and 4. Standard errors clustered at the province level are reported in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

Table A.7: MOBILITY AND CIVIC CAPITAL (WITHOUT LOMBARDY)

	Dep. Var: Movement Per Capita (Province/Day)					
	Total Movements			Local Movements		
	(1)	(2)	(3)	(4)	(5)	(6)
Feb 21 - Mar 9 × Top 75th Civic Capital	-0.0796***	-0.0780***	-0.0367***	-0.0580***	-0.0568***	-0.0356***
	(0.0158)	(0.0153)	(0.0130)	(0.0115)	(0.0114)	(0.0119)
Mar 9 - Mar 23 × Top 75th Civic Capital	-0.1476***	-0.1353***	-0.1143***	-0.1184***	-0.1210***	-0.1154***
	(0.0385)	(0.0437)	(0.0375)	(0.0387)	(0.0439)	(0.0397)
Post Mar 23 × Top 75th Civic Capital	-0.1608***	-0.1436**	-0.1299**	-0.1334**	-0.1375**	-0.1409**
	(0.0513)	(0.0594)	(0.0574)	(0.0546)	(0.0615)	(0.0600)
Province FE	√	√	√	√	√	√
Day FE	√	√	√	√	√	√
Local Covid-19 New Cases and Deaths	×	√	√	×	√	√
Geographic Controls × Phase	×	×	√	×	×	√
Hospital Capacity × Phase	×	×	√	×	×	√
Economic Controls × Phase	×	×	√	×	×	√
Mean Dependent	0.80	0.80	0.80	0.61	0.61	0.61
Observations	10,890	10,890	10,890	10,890	10,890	10,890
R-Square	0.95	0.95	0.97	0.93	0.94	0.96

The table shows regressions corresponding to different specifications of equation (1), excluding Lombardy region from the sample. In the first three columns the dependent variable is total movements (in a province in a day); in the last three it is local movements. Standard errors clustered at the province level are reported in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

Figure A.6: MOBILITY AND CIVIC CAPITAL: INTERACTIONS WITH DAILY DUMMIES



(a) TOTAL MOVEMENTS (b) LOCAL MOVEMENTS

The figure plots the coefficients of the interaction terms between a dummy for high-civic capital provinces (i.e., above 75th percentile) and daily dummies estimated in regressions equivalent to those in columns 3 and 6 of Table 1, respectively. The blue dots indicate coefficients that are not statistically significant, green dots coefficients that are statistically significant at the 10% level, and yellow dots coefficients that are statistically significant at the 5% level or less.

Table A.8: DESCRIPTION OF THE MAIN VARIABLES AND DATA SOURCES (GERMANY)

Mobility:

Total Movements p.c.: Total number of trips per capita per day in Germany. Data on the number of trips is defined at the district (*kreise*) level and represents the sum of trips that are made within a given district, those that are made from a given district to any other district and those that are incoming from any other district to a given district.

Source: This data was publicly made available on a Der Spiegel article relating efforts made by Teralytics to understand mobility patterns in Germany during the Covid-19 pandemic.

Incidence of Covid-19:

Local Covid-19 New Cases: Number of daily new Covid-19 cases detected within a district by public health authorities.

Local Covid-19 New Deaths: Number of daily new Covid-19 deaths reported within a district by public health authorities.

Source: Covid-19 cases and deaths were provided with daily updates on fusionbase.io. The database hosted on this data platform was collected through scraping efforts of local health authorities' webpages. During and after the crisis these health authorities reported, on a daily basis, key measures related to the Covid-19 pandemic.

Civic Capital:

Blood Donation: Share of a district's population who reports having donated blood between 2010 and 2015 (SOEP survey question asked in the 2015 SOEP Individual Questionnaire).

Trust: Share of a district's population who agree or strongly agree with the statement that "most people can be trusted" (SOEP survey question asked in the 2013 SOEP Individual Questionnaire).

Interest in Politics: Share of a district's population who report being interested or strongly interested in politics (SOEP survey question asked in the 2015 SOEP Individual Questionnaire).

Civic capital: The principal component of blood donation, trust, and interest in politics.

Source: Measures of civic capital were provided at the individual level using different waves of the SOEP Individual Questionnaire. Individual information was then aggregated at the district-level using the *SOEP Remote* server.

Controls:

Area (Km sq.): Total surface area of a district.

Avg Altitude: The mean altitude of a district expressed in meters.

Share of Forest: Share of a district's surface area composed of forests.

Population Density: Number of inhabitants per square kilometer in a district.

Share of Male Population: Share of male individuals in a district's population.

Airports: Dummy that equals 1 if the district is home to a domestic or international airport.

Number of Hospital Beds p.c.: Number of hospital beds per inhabitants.

Urban District: Dummy that equals 1 if the district is classified as urban district.

Number of Firms pc: Number of firms per inhabitants in a district.

Share of Leavers with Abitur: Share of high-school leavers that graduate with the *Abitur* diploma. The *Abitur* grants access to universities and higher education.

Disposable Income pc: Disposable income per inhabitant expressed in euros.

Source: Most of the district controls were collected on the Regional Atlas provided by DESTATIS, the German national statistics office. The mean altitude of districts was calculated by the authors using an altitude raster for Germany collected on the DIVA-GIS website and intersecting with an official district-level shapefile hosted on GADM using GIS software.

Table A.9: SUMMARY STATISTICS (GERMANY)

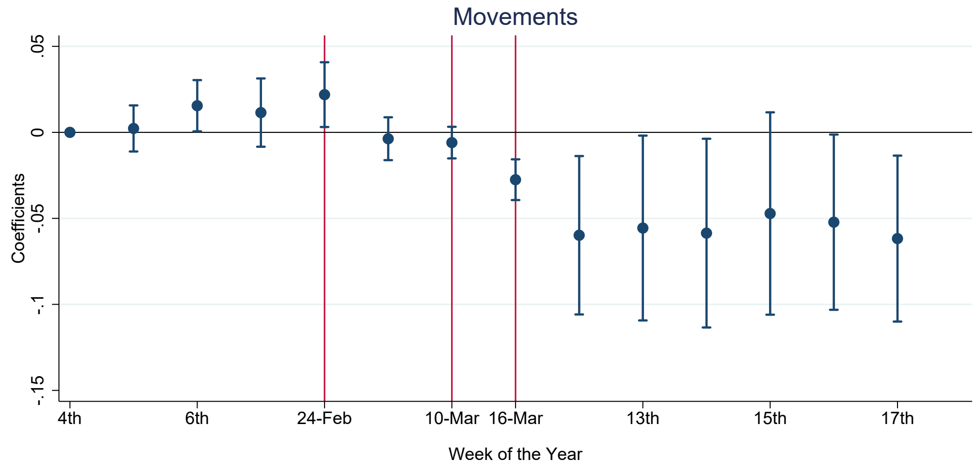
	N	Mean	Std. Dev.	Min.	Max.
Total Movements pc	37,412	2.46	0.8	0.4	6.5
Local Covid-19 New Cases	37,412	4.37	18.4	0.0	1,237.0
Local Covid-19 New Deaths	37,412	0.15	2.2	0.0	113.0
Blood Donation	37,412	0.12	0.1	0.0	0.7
Trust	37,412	0.66	0.2	0.0	1.0
Interest in Politics	37,412	0.37	0.1	0.0	1.0
Civic Capital	37,412	0.00	1.1	-5.0	6.0
Area (Km sq.)	37,412	893.58	722.6	35.7	5,495.7
Avg Altitude	37,412	275.51	211.8	-0.8	1,110.6
Share of Forest	37,412	0.29	0.1	0.0	0.6
Population Density	37,412	536.67	708.0	35.8	4,736.0
Share of Male Population	37,412	0.49	0.0	0.5	0.5
Airports	37,412	0.09	0.3	0.0	1.0
Number of Bed pc	37,412	0.01	0.0	0.0	0.0
Urban District	37,412	0.17	0.4	0.0	1.0
Numer of Firms pc	37,412	0.04	0.0	0.0	0.1
Share of Leavers with Abitur	37,412	0.33	0.1	0.0	0.6
Disposable Income pc	37,412	22,508.59	2,618.7	16,312.0	39,026.0

Table A.10: MOBILITY AND CIVIC CAPITAL IN GERMANY

Dep. Var:	Movement Per Capita (Province/Day)		
	(1)	(2)	(3)
Feb 24 - Mar 10 × Top 75th Civic Capital	-0.0359***	-0.0359***	-0.0119
	(0.0127)	(0.0127)	(0.0099)
Mar 10 - Mar 16 × Top 75th Civic Capital	-0.1358***	-0.1354***	-0.0590**
	(0.0412)	(0.0411)	(0.0278)
Post Mar 16 × Top 75th Civic Capital	-0.1479***	-0.1472***	-0.0660**
	(0.0448)	(0.0447)	(0.0313)
District FE	√	√	√
Day FE	√	√	√
Local Covid-19 New Cases and Deaths	×	√	√
Geographic Controls × Phase	×	×	√
Hospital Capacity × Phase	×	×	√
Economic Controls × Phase	×	×	√
Mean Dependent	2.46	2.46	2.46
Observations	37,412	37,412	37,412
R-Square	0.91	0.92	0.93

The table reports estimations of different specifications of equation (1) using data for Germany at the level fo the district (*Kreise*). The dependent variable in all columns in total movement per capita. Standard errors clustered by district are reprted in parentheses. *** significant at 1% or less; ** significant at 5%; * significant at 10%.

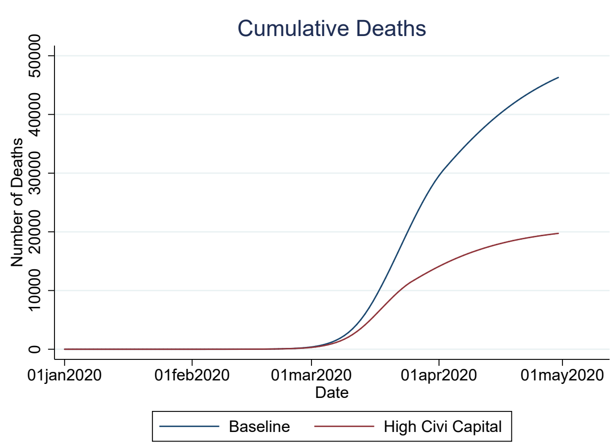
Figure A.7: DIFFERENCE IN MOBILITY BETWEEN HIGH AND LOW CIVIC CAPITAL DISTRICTS (GERMANY)



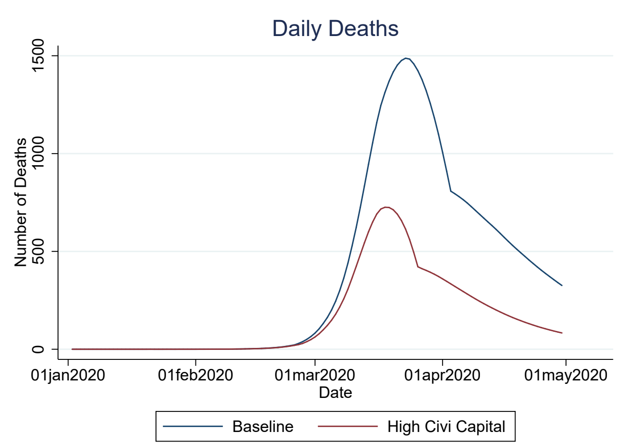
(a) TOTAL MOVEMENTS

The figure plots the coefficients of the interactions between a dummy for German districts with high civic capital (above 75th percentile) and week fixed effects from a regression analogous to that reported in column 3 of Table A8.

Figure A.8: EVOLUTION OF CUMULATIVE AND NEW DAILY DEATHS: ACTUAL VS. SIMULATED HIGH-CIVIC CAPITAL SCENARIO



(a) TOTAL DEATHS



(b) DAILY DEATHS

The figure shows the daily evolution of cumulative deaths (panel a) and new deaths (panel a) for a benchmark economy (blue) and for an economy with high civic capital (red). It is based on simulations using a SIR model of optimal quarantine and testing calibrated to Italy by Piguillem and Shi (2020). The benchmark case is based on the daily mobility/social distancing patterns estimated in Table 1 for the entire country using the average civic capital across provinces. The high-civic-capital scenario is based on the assumption that all provinces in the country have the same level of civic capital as those in top quartile of the distribution.