What does COVID-19 teach us about the role of national culture? Evidence from social distancing restrictions

Badar Nadeem Ashraf[*]
LSBU Business School, London South Bank University, London SE1 0AA, UK
badarfcma@gmail.com

Sadok El Ghoul
University of Alberta, Canada
elghoul@ualberta.ca

John W. Goodell
College of Business Administration, The University of Akron, Akron, Ohio, USA
johngoo@uakron.edu

Omrane Guedhami
Moore School of Business, University of South Carolina, Columbia South Carolina, USA
omrane.guedhami@moore.sc.edu

Abstract

In this paper, we exploit the immediacy, magnitude, and global extent of the COVID-19 shock to investigate the role of national culture in determining differences in publicly imposed social distancing restrictions. Employing the Stringency Index of the Oxford Covid-19 Government Response Tracker database for 85 countries, we find that countries with higher values of Hofstede's power distance adopted more stringent social distancing measures in response to COVID-19. In contrast, countries with higher individualism and long-term orientation implemented fewer such policies. Further, culture impacts the quickness to adopt social distancing policies. Results are robust for alternative measures of national culture, and to controlling for endogeneity. They are also robust to extending the sample to the end of June 2021, using daily observations. Results suggest that societies rich in the cultural qualities of individualism and long-term orientation, often seen as promoting economic cooperation and stability, are less effective at dealing with sudden and transformative public policy crises compared with those with high levels of power distance. Results confirm the potent role of national culture in impacting institutions.

Keywords: Covid-19; pandemic; social distancing polices; national culture

1. Introduction

We exploit the circumstances of the COVID-19 pandemic as a natural experiment to examine whether and how national culture explains cross-country differences in public policy institutions. Specifically, we investigate cross-national heterogeneity in government responses of social distancing measures in response to COVID-19. Results are robust for alternative measures of national culture, and to controlling for endogeneity.

Our study makes a key contribution to the institutional economics literature by exploiting the circumstances of COVID-19 to examine how national culture can shape institutional responses. Because this situation is unprecedented, such responses are new, and so are less likely to be predetermined by a long history of varied influences. Moreover, our results also suggest an interesting point. Societies that rank higher in the cultural qualities of individualism and long-term orientation, which are often associated with promoting economic cooperation and the stability of traditions, are less effective at dealing with sudden and transformative public policy crises. Societies that rank high in power distance and culture-driven hierarchy are more effective.

Several studies have shown links between cultures and formal institutions such as written laws, government quality, the rule of law, contract enforcement and governance (Cline and Williamson, 2017; Griffin et al., 2017; La Porta et al., 1999; Licht et al., 2005, 2007; Makrychoriti and Pasiouras, 2021; Stulz and Williamson, 2003). However, these studies have not clarified whether findings about the influence of national culture on institutions may be confounded by the historical evolution of institutions that themselves have shaped national cultures. As highlighted by Alesina and Giuliano (2015), culture and institutions are endogenous variables, determined by a number of factors and historical shocks, including geography, technology, epidemics, wars, etc. Consequently, identifying causal links between the two would necessitate examining slow evolutionary changes in institutions as an outcome of culture (e.g., Murrell and Schmidt, 2011). To isolate the effect of culture on formal institutions, we need to identify institutional changes that are reasonably exogenous to cultural evolution.

The magnitude and global extent of the COVID-19 shock provides a particularly valuable opportunity to further investigate the role of national culture in determining cross-national differences in institutional reactions to COVID-19. The primary form we explore here is publicly imposed social distancing restrictions. As noted by Ashraf (2020), Budhwar and Cumming (2020), Goodell (2020) and Guedhami et al. (2022), the COVID-19 pandemic was largely unanticipated, despite recent infectious disease outbreaks and research outlining the high probability of a future pandemic and its social and economic risks (Bloom et al., 2018; Bloom and Canning, 2004; Fan et al., 2018; Lewis, 2001; Madhav et al., 2017; Tam et al., 2016; Yach et al., 2006).

Institutional reactions to COVID-19 around the world were crafted extremely rapidly. Future research may posit that COVID-19 has been the source of great cultural change. On the other hand, we note that some societies with closer histories of epidemic outbreaks may have anticipated future pandemics to some extent and have instituted some informal structures. However, the reaction overall of nations' policies to COVID-19 can be reasonably viewed as culture-influencing institutions. Clearly, some societies, by nature of their respective politics, are predisposed to implementing uniform authoritarian actions more smoothly. Intuitively, the societies that are less dependent on debate and democratic consensus could establish strong responses more quickly (Liu et al., 2022), even if at an economic cost to their populace.

We consider that public resistance to economically costly social distancing measures is naturally shaped by the nature of one's politics, but also by cross-national differences in national culture. These differences are related to a culture's willingness to support national health as a public good (Weisbrod, 1975). COVID-19, as an unparalleled exogenous shock, presents a particularly useful, perhaps unique, opportunity to investigate institutional responses conditioned by culture. In support of this view, Barrios et al. (2021) investigate how "civic capital" impacts voluntary compliance with government interventions to impede the spread of COVID-19. Across counties in the U.S. and regions of Europe, they find that measures of civic mindedness are positively associated with greater voluntary compliance with mandated restrictions.

The growing research interest in the determinants of COVID-19 distancing measures is what motivates our study. More generally, we believe that studies like ours can provide greater contextual insight

into those interested in the cultural foundations of "civic capital" (Barrios et al., 2021), "social capital" (Putnam, 2000), or the ability of societies to undertake coordinated activity (North, 1990).

To date, few studies have investigated the specific role of national cultural dimensions, such as Hofstede's determinants or GLOBE dimensions, etc., in determining public policies that promote the public good (e.g., Aggarwal and Goodell, 2013; Husted, 2005). Some consider the tension between "social responsibility" and "economic individualism" (Bobo, 1991), while others explore religious, historical, or ethnic influence over support for public redistribution policies (e.g., Alesina and Fuchs-Schundeln, 2007; Alesina and Giuliano, 2011; Guiso et al., 2006; Luttmer and Singhal, 2011; Velladics et al., 2006). We believe our study contributes to these existing literature streams. Furthermore, by examining the role of national culture on the willingness of nations to undertake publicly directed measures against pandemics, we offer potential insights to researchers interested in how national culture dimensions connect to civic mindedness through control of corruption (López and Santos, 2014) or ethical orientation (Aggarwal et al., 2014; Volkema, 2004).

To examine the impact of national culture on government social distancing measures in a cross-national setting, we measure national cultures using the frameworks of Hofstede (1980, 2001; Hofstede et al., 2010). To represent government social distancing measures, we employ the Stringency Index from the Oxford Covid-19 Government Response Tracker database (Hale et al., 2021). The Stringency Index is formed by comparing government measures across countries with respect to closure of schools, workplaces, public transport, and parks, and restrictions on public gatherings and domestic and international travel.

We use the highest value from the Stringency Index, and study 85 countries over January 22–June 30, 2020. We find that countries with higher cultural values of Hofstede's power distance tended to adopt more stringent social distancing measures in response to COVID-19. In contrast, countries with higher values of Hofstede's individualism and long-term orientation implemented less stringent social distancing policies. In further analysis, we observe that cultures with higher uncertainty avoidance and higher power distance (individualism) were quicker (slower) to adopt social distancing policies.

Our results are generally robust to alternative measures of national culture and to controlling for other factors that may influence the adoption of social distancing measures (besides culture). They are also robust to using language pronoun drop as an instrument for cultural dimensions. Furthermore, when we extend the sample until June 2021 with daily observations and estimates of pooled panel ordinary least squares regressions, we continue to find that robustness holds.

Our study makes important contributions to the institutional economics literature. First, extant literature demonstrates that national culture shapes formal institutions such as the quality of government (La Porta et al., 1999), financial regulations (Stulz and Williamson, 2003), corporate governance codes (Licht et al., 2005), democratic accountability, corruption and the rule of law (Licht et al., 2007), and the extent of contract enforcement (Cline and Williamson, 2017). Extending this literature, we exploit the circumstances of COVID-19 and demonstrate how national culture shapes government social distancing policies. Second, though we examine the influence of cultural values on governments' adoption of social distancing policies, recent literature has also shown that cultural biases shaped individuals' behavior towards Covid-19 containment measures. Especially, individuals' tendency to practice social distancing, use facemasks, and the willingness to be vaccinated was lower in individualist cultures (Bazzi et al., 2021; Bian et al., 2022). Others have found that the growth in COVID-19 confirmed cases and mortalities was slower in societies with higher power distance and low individualism (Dheer et al., 2021; Kumar, 2021).

2. Motivation and hypotheses

Culture can impact formal governance institutions in many ways. For example, institutional economics views culture as "informal rules of the game" (North, 1990). Culture determines societal shared behaviors and outcomes (Greif and Laitin, 2004). As outlined by Sen (2004), culture matters as "a constituent part of development." It defines economic behavior and activities that are economically remunerative, influences political participation and social cohesion, and shapes value formation and recollection of heritage.

In the framework outlined by Williamson (2000), culture is a Level-One informal institution that imposes constraints on the development of formal institutions. Culture may be a constraint because of the

transaction costs of alternative sets of institutions. Therefore, institutions compatible with dominant cultural values are developed and implemented at lower social costs. Roland (2004) suggests that formal institutions must be consistent with informal ones in order to function most efficiently. Culture also serves to motivate and justify actions consistent with its values through its impact on individual actors (Schwartz, 2004). Building on these frameworks, we posit that culture will influence the extent of government social distancing policies implemented during COVID-19.

Next, we turn to individualism. Given that social distancing measures restrain individual rights and freedoms (e.g., movement and social gathering), we expect that more individualist societies will implement less stringent measures. Individualism is associated with the desire for self-control and self-monitoring. Individualist cultures are less likely to support public monitoring or government dictates (see, e.g., Chui and Kwok, 2008; Markus and Kitayama, 1998). Further, decisions in individualist societies are a product of an individual, motivated by overoptimism and overconfidence (Chui et al., 2010). We therefore expect people in more individualist countries to be more resistant to social distancing measures because they underestimate the risk and place personal freedom over concerns about the dangers of COVID-19. Individualism is associated with a desire to maintain self-concept and with increased self-monitoring. Individualism, according to Chui and Kwok (2008) and Markus and Kitayama (1998), leads to a more developed "independent construal of self." Individualistic cultures prioritize the self over others, preferring the freedom to self-monitor over compliance with public monitoring standards.

According to studies that apply cultural finance research to public policy, greater government involvement reflects greater collectivism. For instance, Chui and Kwok (2008) show that more individualistic societies consume more products such as life insurance. This is due to the belief that individuals in less collectivist cultures prefer to find individual solutions to personal needs rather than relying on, say, social welfare systems. In this sense, more individualistic societies are more likely to oppose public policy solutions. Boubakri et al. (2016) confirm this view. They show that governments' likelihood to retain control in privatized firms is higher in collectivist cultures. In the same vein, Aggarwal and Goodell (2013) suggest that national culture influences public support for wealth redistribution through public

pensions. They find that individualism is positively related to tying pension benefits to individual earnings history. De Jong and van Esch (2014) hypothesize that culture influences economic planners and their respective policy responses to emergency situations. Thus, we propose Hypothesis 1 as follows:

H1*: The national culture dimension of individualism is negatively associated with more stringent publicly imposed social distancing policies.*

Regarding power distance, this cultural quality involves the extent to which hierarchical power is tolerated in a society. A society that ranks higher in power distance exhibits generally higher acceptance for inequality and power differences and, consequently, has more respect for rank and authority. Because authority in these societies requires less justification, they will more readily implement stringent social distancing measures. On the other hand, societies with less power distance and a stronger sense of mutual obligation between members are more likely to share power down to the lowest levels. We expect those societies to allow individuals to follow social distancing measures on their own, rather than implementing a top-down approach (Hofstede, 2020). With greater power distance, as noted by Goodell (2020), we also expect to find acceptance of less information. Thus, we can state Hypothesis 2 as follows:

H2*: The national culture dimension power distance is positively associated with the stringency of publicly imposed social distancing policies.*

Uncertainty avoidance is the degree to which uncertainty and ambiguity are tolerated in a society. A society with higher uncertainty avoidance feels uncomfortable in uncertain, unstructured, or ambiguous situations. Among other things, these societies tend to minimize the impact of the unknown by implementing strict rules and regulations (Hofstede, 1980), or more formal policies and procedures (House et al., 2004). At the start of COVID-19's global spread, there was uncertainty regarding its level of contagion and severity. We consider policymakers in countries with higher uncertainty avoidance values more likely to use stringent social distancing policies to manage the uncertainty related to COVID-19. Our third hypothesis is therefore:

***H3**: The national culture dimension of uncertainty avoidance is positively associated with more stringent publicly imposed social distancing policies.*

In contrast, Aggarwal and Goodell (2013) find that societal support for reducing economic inequality through pension design and uncertainty avoidance are negatively associated. From an institutional theory perspective, we posit that uncertainty avoidance may lead to doubt on the part of citizens as to whether government-designed interventions can be effective. We next state the alternative Hypothesis 3a:

***H3a**: The national culture dimension of uncertainty avoidance is negatively associated with the stringency of publicly imposed social distancing policies.*

The cultural dimension of masculinity, in addition to measuring the level of separation of gender roles, also measures the degree of motivation toward competitive performance (Hofstede, 2003). Masculinity, like individualism, has been linked to a greater appetite for risk (e.g., Zheng et al., 2012). Individualism influences risk preferences by increasing self-confidence, whereas masculinity influences risk incentives by increasing the desire to outperform not considering the consequences (Goodell, 2020). Therefore, we posit that, when deciding how to implement social distancing measures, societies from countries with higher values of masculinity will opt for more stringent policies. We expect a positive association between masculinity and social distancing restrictions, as expressed in Hypothesis 4:

***H4**: The national culture dimension of masculinity is positively associated with more stringent publicly imposed social distancing policies.*

Long-term (versus short-term) orientation pertains to the degree that societies prefer decisions that will have lasting long-term results. Cultures with a short-term orientation will be more inclined to rapidly implement reactive measures to achieve quick short-term results. Long-term-oriented societies, on the other hand, may have invested in more forward-looking health systems. Long-term orientation is also associated with a greater sense of traditional order, which stems from a conceptional association with Confucianism

(Hofstede and Bond, 1988; Hofstede et al., 2010). According to Hofstede et al. (2010), long-term-oriented societies are also biased toward pragmatic virtues that offer future rewards. Hypothesis 5 is as follows:

H5*: The national culture dimension of long-term orientation is negatively associated with more stringent publicly imposed social distancing policies.*

Indulgence measures the extent to which societies allow their members to freely enjoy basic and natural human desires. More indulgent cultures allow relatively free gratification of basic and natural human drives related to enjoying life. Indulgence versus restraint thus refers to the degree that a respective society is comfortable with individuals' immediate gratification. In contrast, less indulgent cultures are likely to suppress immediate gratification through stricter social norms.

We posit that cultures with less indulgence and more restraint will more readily accept the sacrifices involved with implementing strict social distancing policies. Thus, we expect a negative association between indulgence and levels of social distancing measures. Hypothesis 6 can be stated as follows:

H6*: The national culture dimension of indulgence is negatively associated with more stringent publicly imposed social distancing policies.*

3. Methodology

To examine the impact of culture on the stringency of government-imposed social distancing measures in a cross-country setting, we follow previous studies on culture and institutions (e.g., La Porta et al., 1997; Licht et al., 2007; Tabellini, 2008). We therefore specify a cross-sectional ordinary least squares regression model for estimations as follows:

$$Y_c = \alpha_c + \beta_1(National\ culture_c) + \beta_2(Covid-19_c) + \sum_{k=1}^{k} \beta_k X_c^k + \varepsilon_c \qquad (1)$$

where the *c* subscript represents the country; α_c is a constant term; and the dependent variable, Y, represents government-imposed social distancing measures. National culture is the main explanatory variable of interest. We include several variables in addition to culture to control for factors that may have influenced governments' decisions about social distancing measures. Thus, Covid-19 and X_c^k are country-level control

variables and ε_c is an error term. Heteroscedastic-robust standard errors are used to estimate *p*-values in regressions.

We proxy for governmental social distancing measures by using the Stringency Index from the Oxford Covid-19 Government Response Tracker database (Hale et al., 2021). The Stringency Index codes eight underlying indicators: school closing, workplace closing, restrictions on gathering sizes, cancellation of public events, stay-at-home requirements, closing of public transport, restrictions on domestic travel, and restrictions on international travel. The index, a simple additive score of the eight indicators, is rescaled to range from 0 to 100. Higher values represent stricter government-imposed social distancing policies. Note that the values are meant to compare national responses, and do not necessarily represent the appropriateness or effectiveness of a country's measures (Hale et al., 2021). For our cross-sectional analysis, we choose the highest value of the Stringency Index for each country over the January 22–June 30, 2020 period.[1] The extent and severity of COVID-19 was quite uncertain during the early days. National-level response in the form of lockdowns during the first and second quarters of 2020 were not to control local outbreaks, but to keep coronavirus offshore. The highest values of stringency index reached during that period were a behavioral response to uncertainty and could be viewed as an upper boundary of the extent of a government response.

We represent national culture using Hofstede's six dimensions. Given that national social distancing policies and the number of COVID-19 infections may be correlated, the direction of this relationship is uncertain. Countries with more severe outbreaks may have implemented stricter policies to limit further spread of the disease. On the other hand, more severe outbreaks may be the result of more lenient initial social distancing measures. To control for this effect, we add a COVID-19 variable that equals the total confirmed COVID-19 cases in a country through the day of the highest Stringency Index value.

[1] In robustness tests, we also use the mean value of the Stringency Index over January 22–June 30, 2020 as the dependent variable in cross-sectional regressions. Moreover, we also employ an extended panel dataset over the period January 22, 2020–June 30, 2021 that uses daily values of the Stringency Index as the dependent variable.

Prior research has shown that cultural values have a strong influence on how public institutions manage democratic accountability (Klasing, 2013; Licht et al., 2007) and design for the public good (e.g., Aggarwal and Goodell, 2013). We follow previous studies (e.g., La Porta et al., 1997; Licht et al., 2007; Tabellini, 2008), and control for cross-national differences in politics, legal origin, and income per capita. Legal origin is a dummy variable that equals 1 if a country has a common law legal origin, and 0 otherwise. Income per capita is measured as the natural log of gross domestic product (GDP) per capita of each country in the year 2018.

We also include specific control variables that may have influenced the stringency of social distancing policies during the COVID-19 outbreak. For example, we add population density to control for the higher likelihood of the spread of contagion in densely populated nations. The extent of international tourism (based on annual arrivals) is included to control for the higher probability of importing COVID-19. Likewise, we add general government health expenditures as a percentage of GDP (health expenditures) to control for the capacity of healthcare systems. Countries with more developed healthcare systems may be more prepared to cope with an epidemic, and thus they may have adopted less stringent social distancing measures. The variable Woman Leader, which equals 1 if the head of a country is a female, and 0 otherwise, controls for the notion that countries with female leaders performed better during the pandemic (Garikipati and Kambhampati, 2021; Purkayastha et al., 2020; Ramos, 2020). Finally, we add internet usage to control for the impact of internet penetration on governments' choice of social distancing policies. See Table 2 for our variable sources.

(Insert Table 1 about here)

4. Empirical results

4.1 Summary statistics

Table 1 reports country-level values of the Stringency Index and cultural dimensions; Table 2 presents descriptive statistics. The summary statistics of the Stringency Index, with a minimum value of 46 and a maximum of 100, suggest that social distancing policies exhibited a great deal of variation around the

world. The mean is 84.64. These values suggest that the highest value varied between 46 and 100 for different countries. Data for Hofstede's dimensions are available for 85 countries.

(Insert Table 2 here)

Table 3 reports the matrix of Pearson pairwise correlations. The individualism and long-term orientation cultural dimensions have a strong negative correlation, while power distance has a strong positive correlation with the Stringency Index. This finding provides initial supports for H1, H2, and H4.

(Insert Table 3 here)

4.2 National culture and social distancing measures: Primary specifications

Table 4 reports our main results using Hofstede's dimensions of national culture as the main explanatory variables. Models 1–6 outline each of the six dimensions. Individualism, as expected, is significantly negative, consistent with more individualistic countries implementing less stringent social distancing policies. Power distance is positively significant, consistent with a higher cultural acceptance of the hierarchical order leading to stricter social distancing policies. Long-term orientation has a significantly negative association with stringency of social distancing. Uncertainty avoidance, masculinity, and indulgence are not statistically significant.

Model 7 adds all six dimensions. To avoid multicollinearity, we use cultural dimensions that are orthogonal to each other. To this end, we regress each dimension on the other five, and retain the residuals. The residuals are then used as cultural dimensions in Model 7. Individualism and long-term orientation are again significantly negative, while power distance is significantly positive.

For the control variables representing formal institutions, such as legal origin, we find they are negative. This is consistent with the notion that countries with a common-law legal origin will tend to implement less stringent social distancing measures. However, it is statistically insignificant. One reason for this may be the strong influence of culture, a particularly important variable during the early months of

the pandemic. When making unprecedented emergency decisions, policymakers were rooted more in informal than formal institutions.

In sum, the results show that countries with cultures higher in power distance adopted more stringent social distancing policies. In contrast, those with cultures higher in individualism and long-term orientation adopted less stringent social distancing policies.

(Insert Table 4 here)

4.3 Cultural dimensions and the early adoption of social distancing policies

In this section, we examine whether and how cultural dimensions impacted the timing of the adoption of social distancing measures. Uncertainty regarding the COVID-19 outbreak peaked during the first quarter of 2020. When the World Health Organization declared a pandemic on 11 March 2020, the disease had already spread to several countries. Some countries took early action and implemented some forms of social distancing; others waited. We expect cultural values to have influenced the timing of the decisions about social distancing measures. For example, cultures with higher power distance may have implemented measures more quickly because they tend to exhibit greater authoritarianism. This can allow for the rapid implementation of rules. However, we control for cross-national differences in policies. Overall, we expect to observe similar associations of culture with the speed of adoption of social distancing measures as we did with the levels of stringency.

For this analysis, we generate a dummy variable that equals 1 for countries that adopted any type of social distancing measure(s) before they had their first laboratory-confirmed COVID-19 case, and 0 for countries that implemented social distancing measures after the first confirmed case. We use this dummy variable as our dependent variable, and cultural dimensions, along with country-level controls, as our main independent variables. We estimate a cross-sectional logit regression model, with one observation per country. As Table 5 shows, as expected and as consistent with results for the association of culture and levels of stringency, individualism is significantly negative. Power distance and uncertainty avoidance are significantly positive. However, in contrast to our results for levels of stringency, long-term orientation

here is not significant. These results suggest culture influences not just the strictness of social distancing measures, but their timing as well.

(Insert Table 5 here)

4.4 Accounting for endogeneity

Endogeneity is a potential concern with the results obtained with cross-sectional ordinary least squares regressions. Endogeneity may arise due to reverse causality, measurement errors, or omitted variables (Roberts and Whited, 2013). We note that reverse causality should be less of a concern in our empirical setting. This is because governmental social distancing measures, as a response to the unprecedented COVID-19 outbreak, would not affect the dominant cultural values in place well before the pandemic. However, although we include a number of control variables, we do consider the possibility of omitted variable bias or measurement errors. To further address any endogeneity concerns, we perform robustness tests using instrumental variables analysis.

Following previous studies (Klasing, 2013; Licht et al., 2007; Tabellini, 2008), we use the language pronoun drop rule as an instrument for cultural dimensions. This follows from the Sapir–Whorf or Linguistic Relativity Hypothesis, which suggests language and culture are highly interconnected (Kashima and Kashima, 1998; Sapir, 1986; Whorf, 2012). The pronoun drop rule is based on classifying languages into two groups: those that use person-indexed pronouns (for example, in English, "I" and "you"), and those that permit dropping formal pronouns (for example, in Spanish, "yo"). Countries with languages that do not allow for dropped pronouns exhibit significant higher cultural individualism and lower power distance.[2] Davis and Abdurazokzoda (2016) update the linguistic data of Kashima and Kashima (1998). The pronoun drop rule, as an instrument for national culture, satisfies the conditions of relevance and exogeneity suggested by Roberts and Whited (2013). It is related only to cultural dimensions, not to decisions on social distancing measures.

[2] Kashima and Kashima (1998) find that only two of Hofstede's dimensions, individualism and power distance, have a robust association with the language pronoun drop rule.

Table 6 reports the results of instrumental variables analysis. In the first-stage regressions, two dimensions are regressed on the instrumental variable, pronoun drop, along with other control variables. Pronoun drop is significantly positively related to individualism, and significantly negatively to power distance. In the second-stage regressions, we use the predicted values of cultural dimensions from the first-stage regressions as our main variables. We observe that instrumented individualism is significantly negative, while instrumented power distance is significantly positive. These results are consistent with our main results, and further confirm that our findings are not biased due to endogeneity.

We use Kleibergen–Paap under-identification and Cragg–Donald weak-identification tests to evaluate the relevance of pronoun drop to both cultural dimensions. The under-identification test detects that excluded instrument, pronoun drop, is correlated with endogenous cultural dimensions, and weak-identification test identifies that pronoun drop is not a weak instrument. The *p*-values from Kleibergen–Paap rk LM statistic in Models 2 and 4 are zero rejecting the null hypothesis that pronoun drop is not correlated with power distance and individualism dimensions. Likewise, the values of Cragg–Donald Wald F statistic are 31.74 and 21.26, which are higher than 16.38 critical values of Stock–Yogo weak ID test at 10% level, suggesting the instrument is not weak. The results of both of these tests indicate that the pronoun drop is relevant.

(Insert Table 6 here)

4.5 Robustness tests

Next, we conduct several robustness tests to further confirm our baseline results. First, we use cultural dimensions from the GLOBE project, available for 45 sample countries, as alternative proxies for culture (see Appendix A for variable definitions). In Table 7, institutional collectivism, which is the opposite of individualism, enters positive and significant again, confirming that individualist cultures tended to implement less stringent social distancing. The GLOBE-equivalent power distance dimension is positive and significant. Future orientation, which is roughly analogous to Hofstede's long-term orientation, is insignificant. In addition, the human orientation dimension enters as significantly negative. This suggests that countries with more human-oriented cultural values tended to use less strict social distancing policies.

Overall, these findings are consistent with our results in the main specification of Table 2. Therefore, we believe our baseline results are not driven by our choice of cultural measurement.

(Insert Table 7 here)

Recall that, in the main cross-sectional analysis in Section 4.2, we use the highest value of the Stringency Index from each country for our sample period as the dependent variable. However, we are concerned that governmental social distancing policies may have evolved differently over time depending on the severity of local outbreaks. In other words, certain countries may have adopted more stringent policies over longer periods of time, while others may have opted for shorter periods of time. Therefore, we calculate the mean value of the Stringency Index over the January 22–June 30, 2020 period, and use it as the dependent variable in our cross-sectional analysis. As shown in Table 8, the results for cultural dimensions are qualitatively similar to those of earlier tests. One exception is long-term orientation, which is insignificant.

(Insert Table 8 here)

To further exploit the time dimension, we construct an extended panel dataset over the period of January 22–June 30, 2021, running the following pooled panel ordinary least squares regression model:

$$Y_{c,t} = \alpha_c + \beta_1(National\ culture_c) + \beta_2(Covid-19\ daily_{c,t}) + \sum_{k=1}^{k} \beta_k X_c^k + \sum_{t=1}^{T-1} \epsilon_t D_t + \varepsilon_{c,t} \quad (2)$$

where the c and *t* subscripts represent country and day, respectively; α_c is a constant term; and the dependent variable, Y, represents government social distancing policies and is measured with daily values of the Stringency Index. National culture is the main explanatory variable of interest. Covid-19 daily is measured as daily new confirmed cases in each country. All other control variables are the same as in Eq. (1). D_t is a set of day fixed-effects dummy variables to control for international trends and spillovers in stringency index. ε_c is an error term. Heteroscedastic-robust standard errors clustered at a country level are used in the regressions. As shown in Table 9, and consistent with our baseline results, individualism and long-term

orientation are significantly negatively associated with stringency, while power distance is positively associated with it.

(Insert Table 9 here)

5. Discussion

The key findings from this investigation of the impact of national culture on the stringency of social distancing restrictions are the positive significance of power distance, and the negative significance of individualism and long-term orientation. Our results invite comparison to other work. For example, Allik and Realo (2004) suggest that U.S. states with a high level of social capital (as captured by more engagement in political activity, more time spent with friends, and a greater belief that most people can be trusted) are also more individualistic. However, if we view individualism as consistent with heightened civic capital, then our results potentially differ from those of Barrios et al. (2021). They find that U.S. states with greater civic capital, based again in part on engagement in politics, are more willing to adopt social distancing restrictions. However, in contrast to Allik and Realo (2004), individualism and civic capital may not be positively associated. In this case, our results would not be inconsistent with those of Barrios et al. (2021). We offer indirect avenues for re-evaluation of how cultural dimensions are truly associated with social and civic capital.

Our finding that individualism is negatively associated with a willingness to adopt restrictions is consistent with our expectations, as individualism suggests a desire for more freedom of action. However, other literature finds that individualism is tied to lower observations of ethics (Vitell et al., 1993), increased confidence (Biais et al., 2005; Markus and Kitayama, 1998), lower loss aversion (Rieger et al., 2011), and greater risk taking (Campbell et al., 2004; Shao et al., 2013). Our results provide new information that could potentially update views about the role of individualism in establishing societal coordination. This has been a topic of great interest in financial economics at least since the publication of North (1990) (see also Putnam, 1993).

Similarly, power distance has been associated with less civic-mindedness and less social capital. Because power distance establishes hierarchies, social fractionalization may result, with a concomitant decrease in social trust (Bjørnskov, 2008). However, our results suggest a positive association of power distance with implementation of social distancing restrictions. This result is also somewhat intuitive because power distance allows for top-down actions that avoid the delays of shared governance. Note that, in our models, we control for cross-national differences in policies. Therefore, any explanations of the positive association of power distance and implementation of social distancing must extend past a top-down governance view. From the perspective of voluntary behavior, high power distance societies are expected not to question sudden impositions of new rules and social standards. Similar to our results for individualism, our results for power distance challenge existing notions of how social capital determines effective societal coordination regarding long-term orientation. This cultural dimension has been associated with more traditional values. The negative association of long-term orientation with implementation of anti-COVID measures is consistent with traditional values societies being less adaptable to new circumstances and challenges.

Overall, our results suggest that many of the societal characteristics that have been considered an advantage in an advanced economy, such as the ability to rapidly coordinate behavior and an abundance of private economic development, were not effective with respect to managing the challenge of COVID-19.

6. Conclusions

As noted by Alesina and Giuliano (2015), culture and institutions as endogenous variables are determined by a number of factors, including geography, technology shocks, wars, and epidemics. Consequently, identifying causal links between culture and institutions is inherently difficult, and it is typically necessary to examine slow evolutionary changes in institutions as an outcome of culture. To isolate the effect of formal institutions on culture, we need to identify institutional changes that are reasonably exogenous to cultural evolution.

From that perspective, the immediacy, magnitude, and global extent of the COVID-19 shock provides a particularly valuable opportunity. We can use this shock to investigate the role of national culture

in determining cross-national differences in institutional reactions, namely to COVID-19, in the form of publicly imposed social distancing prescriptions. As noted by Goodell (2020) and others, the COVID-19 pandemic was largely unanticipated. Furthermore, institutional reactions around the world necessarily developed very rapidly.

To examine the impact of national culture on government-imposed social distancing measures in a cross-national setting, we employ data from Hofstede's framework of national culture (Hofstede, 1980, 2001; Hofstede et al., 2010). Data on governmental social distancing measures come from the Stringency Index of the Oxford Covid-19 Government Response Tracker database (Hale et al., 2021). The Stringency Index is derived from government measures with respect to the closure of schools, workplaces, public transport, and parks, restrictions on public gatherings, and on domestic and international travel.

Using data from 85 countries for January 22–June 30, 2020, we find that countries with higher cultural values of Hofstede's power distance adopted more stringent social distancing measures in response to COVID-19. In contrast, those with higher cultural values of individualism and long-term orientation implemented less stringent social distancing policies. In further analysis, we observe that cultures with higher individualism cultural values were slower to adopt such policies; those with higher uncertainty avoidance, power distance, and masculinity adopted social distancing policies more quickly. Our results are generally robust to alternative measures of national culture, important control variables, using the language pronoun drop license as an instrument for cultural dimensions, and extending the sample through June 2021.

By exploiting the rapidity and global extent of the COVID-19 shock, we can explore the role of national culture in determining cross-national differences in institutional reactions. We find present compelling evidence of institutions being shaped by cross-national cultural differences. More specifically, our results point to the paradox of societies that are rich in the cultural qualities of individualism and long-term orientation (versus those that are high in power distance and culture-driven hierarchies) being less effective at dealing with sudden and transformative public policy crises. This is despite the fact they are typically viewed as promoting economic cooperation and the stability of traditions.

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Table 1: Country-level statistics of main variables

This table reports the country-level values of the main variables. The Stringency Index represents the severity of social distancing policies. Higher values represent more stringent social distancing policies. The highest value of stringency index for each country over the period January 22–June 30, 2020 is reported. Individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence are the Hofstede dimensions.

Sr. No.	Country	Stringency Index	Individualism	Power Distance	Uncertainty Avoidance	Masculinity	Long-term Orientation	Indulgence
1	Albania	90	20	90	70	80	61	15
2	Angola	91	18	83	60	20	15	83
3	Argentina	100	46	49	86	56	20	62
4	Australia	73	90	36	51	61	21	71
5	Austria	81	55	11	70	79	60	53
6	Bangladesh	94	20	80	60	55	47	20
7	Belgium	81	75	65	94	54	82	57
8	Bhutan	83	52	94	28	32	.	.
9	Brazil	81	38	69	76	49	44	59
10	Bulgaria	73	30	70	85	40	69	16
11	Burkina Faso	90	15	70	55	50	27	18
12	Canada	75	80	39	48	52	36	68
13	Chile	89	23	63	86	28	31	68
14	China	82	20	80	30	66	87	24
15	Colombia	91	13	67	80	64	13	83
16	Costa Rica	81	15	35	86	21	.	.
17	Croatia	96	33	73	80	40	58	33
18	Czech Republic	82	58	57	74	57	70	29
19	Denmark	72	74	18	23	16	35	70
20	Dominican Republic	100	30	65	45	65	13	54
21	Ecuador	94	8	78	67	63	.	.
22	El Salvador	100	19	66	94	40	20	89
23	Estonia	78	60	40	60	30	82	16
24	Ethiopia	81	20	70	55	65	.	46
25	Fiji	86	14	78	48	46	.	.
26	Finland	71	63	33	59	26	38	57
27	France	88	71	68	86	43	63	48
28	Germany	77	67	35	65	66	83	40
29	Greece	84	35	60	100	57	45	50
30	Guatemala	96	6	95	99	37	.	.
31	Honduras	100	20	80	50	40	.	.
32	Hungary	77	80	46	82	88	58	31
33	India	100	48	77	40	56	51	26
34	Indonesia	80	14	78	48	46	62	38
35	Ireland	91	70	28	35	68	24	65
36	Israel	94	54	13	81	47	38	.
37	Italy	94	76	50	75	70	61	30
38	Jamaica	87	39	45	13	68	.	.
39	Japan	47	46	54	92	95	88	42
40	Jordan	100	30	70	65	45	16	43
41	Kenya	89	25	70	50	60	25	.
42	Kuwait	100	25	90	80	40	.	.
43	Latvia	66	70	44	63	9	69	13
44	Lebanon	85	40	75	50	65	14	25
45	Lithuania	87	60	42	65	19	82	16
46	Luxembourg	80	60	40	70	50	64	56
47	Malawi	60	30	70	50	40	.	.
48	Malaysia	75	26	100	36	50	41	57
49	Mexico	82	30	81	82	69	24	97
50	Morocco	94	46	70	68	53	14	25
51	Mozambique	81	15	85	44	38	11	80
52	Namibia	73	30	65	45	40	35	.
53	Nepal	96	30	65	40	40	.	.
54	Netherlands	79	80	38	53	14	67	68
55	New Zealand	96	79	22	49	58	33	75
56	Norway	80	69	31	50	8	35	55
57	Panama	94	11	95	86	44	.	.
58	Peru	96	16	64	87	42	25	46
59	Philippines	100	32	94	44	64	27	42
60	Poland	83	60	68	93	64	38	29

Sr. No.	Country	Stringency Index	Individualism	Power Distance	Uncertainty Avoidance	Masculinity	Long-term Orientation	Indulgence
61	Portugal	88	27	63	99	31	28	33
62	Romania	87	30	90	90	42	52	20
63	Saudi Arabia	94	25	95	80	60	36	52
64	Senegal	78	25	70	55	45	25	.
65	Serbia	100	25	86	92	43	52	28
66	Sierra Leone	89	20	70	50	40	.	.
67	Singapore	82	20	74	8	48	72	46
68	Slovenia	90	27	71	88	19	49	48
69	South Africa	88	65	49	49	63	34	63
70	Spain	85	51	57	86	42	48	44
71	Sri Lanka	100	35	80	45	10	45	.
72	Suriname	94	47	85	92	37	.	.
73	Sweden	65	71	31	29	5	53	78
74	Switzerland	73	68	34	58	70	74	66
75	Tanzania	50	25	70	50	40	34	38
76	Thailand	77	20	64	64	34	32	45
77	Trinidad and Tobago	91	16	47	55	58	13	80
78	Turkey	78	37	66	85	45	46	49
79	Ukraine	89	25	92	95	27	86	14
80	United Arab Emirates	90	25	90	80	50	.	.
81	United Kingdom	80	89	35	35	66	51	69
82	United States	73	91	40	46	62	26	68
83	Uruguay	72	36	61	99	38	26	53
84	Vietnam	96	20	70	30	40	57	35
85	Zambia	71	35	60	50	40	30	42
	Mean	84.68	40.40	62.79	63.72	47.10	44.16	47.86

Table 2: Summary statistics

This table reports the sources and summary statistics for the main variables.

Variable	Countries/observations	Mean	S.D.	Min	Max	Source
Stringency Index	85	84.68	11.00	47.22	100.00	Oxford Covid-19 Government Response Tracker database (Hale et al., 2021)
Individualism	85	40.40	22.85	6.00	91.00	Hofstede
Power distance	85	62.79	21.18	11.00	100.00	Hofstede
Uncertainty avoidance	85	63.72	22.04	8.00	100.00	Hofstede
Masculinity	85	47.09	18.22	5.00	95.00	Hofstede
Long-term orientation	70	44.16	21.58	11.00	88.00	Hofstede
Indulgence	65	47.89	21.21	13	97	Hofstede
Covid-19	85	57.20	236.13	0.004	2092.95	Johns Hopkins University–Coronavirus Resource Center
Democracy	85	7.32	3.19	0.00	10.00	Polity V project dataset, Center for Systemic Peace
Legal origin	85	0.32	0.47	0.00	1.00	Andrei Shleifer Harvard web pages
GDP per capita	85	9.25	1.36	6.02	11.65	World Development Indicators
Population density	85	235.43	860.62	2.92	7915.73	World Development Indicators
International tourism	85	13.00	18.31	0.05	86.76	World Development Indicators
Health expenditure	85	12.53	4.85	2.99	26.91	World Development Indicators
Woman leader	85	0.15	0.36	0.00	1.00	UN Women, Women in Politics, 2020 www.unwomen.org
Internet usage	85	64.31	24.28	9.00	100.00	World Development Indicators

Table 3: Matrix of correlations

This table reports the Pearson correlation coefficients between each pair of variables. * indicates significance at the 5% level.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	Stringency Index	1.00															
(2)	Individualism	-0.31*	1.00														
(3)	Power distance	0.33*	-0.70*	1.00													
(4)	Uncertainty avoidance	0.13	-0.14	0.16	1.00												
(5)	Masculinity	0.03	0.08	-0.01	0.02	1.00											
(6)	Long-term orientation	-0.27*	0.25*	-0.09	0.09	0.01	1.00										
(7)	Indulgence	-0.07	0.15	-0.30*	-0.16	-0.01	-0.48*	1.00									
(8)	Covid-19	-0.13	0.28*	-0.13	-0.04	0.11	-0.06	0.15	1.00								
(9)	Democracy	-0.15	0.43*	-0.48*	0.15	0.02	0.11	0.16	0.05	1.00							
(10)	Legal origin	-0.07	0.07	-0.05	-0.50*	0.10	-0.23	0.20	0.10	-0.19	1.00						
(11)	GDP per capita	-0.17	0.63*	-0.55*	0.15	0.05	0.36*	0.25*	0.20	0.34*	-0.13	1.00					
(12)	Population density	0.01	-0.10	0.06	-0.29*	0.04	0.18	-0.04	-0.03	-0.21*	0.18	0.13	1.00				
(13)	International tourism	-0.14	0.34*	-0.11	0.09	0.25*	0.26*	0.02	0.50*	-0.00	-0.05	0.38*	0.00	1.00			
(14)	Health expenditures	-0.19	0.36*	-0.49*	0.21	0.05	0.04	0.37*	0.26*	0.48*	-0.15	0.60*	-0.03	0.24*	1.00		
(15)	Woman leader	-0.02	0.16	-0.21	-0.11	-0.08	0.22	-0.02	-0.06	0.04	-0.01	0.15	0.28*	-0.09	-0.01	1.00	
(16)	Internet usage	-0.14	0.58*	-0.48*	0.16	0.05	0.31*	0.15	0.16	0.30*	-0.19	0.92*	0.07	0.30*	0.56*	0.12	1.00

Table 4: National culture and social distancing policies during COVID-19: Main specifications

This table presents results regarding the impact of national culture on governmental social distancing policies during COVID-19. The dependent variable in all models is the Stringency Index, representing the severity of social distancing policies. Higher values represent more stringent social distancing policies. The highest value of the Stringency Index for each country over the period January 22–June 30, 2020 is used. Individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence are the Hofstede dimensions. Brief descriptions of these dimensions are provided in the text. Covid-19 is the cumulative total number of confirmed cases in a country until the day the stringency index stays at its highest value. Democracy ranges from 0 to10, with 0 representing autocratic and 10 representing democratic regimes. GDP per capita is the natural logarithm of gross domestic product per capita. Legal origin equals 1 if a country has roots in common law, and 0 otherwise. International tourism is annual arrivals. Population density is measured as the number of individuals per square kilometer. Health expenditures is government health expenditures as a percentage of GDP. Woman leader equals 1 if a country is headed by a woman, and 0 otherwise. Internet usage is the percentage population with an internet connection. In Model 7, all six cultural dimensions are orthogonal to each other to avoid multicollinearity. See Table 1 for variable sources. Results are estimated with cross-sectional ordinary least squares regression method using heteroscedasticity-robust standard errors. *p*-values are given in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Stringency Index						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individualism	-0.160**						-0.390*
	(0.014)						(0.080)
Power distance		0.179**					0.489*
		(0.017)					(0.078)
Uncertainty avoidance			0.095				0.042
			(0.105)				(0.564)
Masculinity				0.048			0.087
				(0.596)			(0.323)
Long term orientation					-0.174**		-0.331**
					(0.044)		(0.027)
Indulgence						0.040	0.020
						(0.587)	(0.855)
Covid-19	-0.000	-0.002	-0.001	-0.001	-0.005*	-0.002	-0.004
	(0.999)	(0.637)	(0.742)	(0.654)	(0.081)	(0.532)	(0.187)
Democracy	0.008	-0.057	-0.303	-0.369	-0.001	0.002	0.083
	(0.984)	(0.889)	(0.439)	(0.351)	(0.998)	(0.997)	(0.865)
Legal origin	-0.977	-1.173	-0.672	-2.919	-2.933	-2.579	-4.003
	(0.729)	(0.683)	(0.831)	(0.326)	(0.439)	(0.565)	(0.401)
GDP per capita	0.944	1.368	-0.547	-0.028	-0.104	-3.655	1.092
	(0.699)	(0.565)	(0.817)	(0.991)	(0.970)	(0.179)	(0.739)
Population density	-0.001	-0.000	0.001	0.000	0.001	0.001	0.001
	(0.527)	(0.556)	(0.372)	(0.840)	(0.290)	(0.436)	(0.645)
International tourism	-0.027	-0.069	-0.058	-0.071	0.049	0.022	0.029
	(0.707)	(0.287)	(0.358)	(0.309)	(0.402)	(0.729)	(0.615)
Health expenditure	-0.366	-0.104	-0.294	-0.245	-0.478	-0.278	-0.385
	(0.394)	(0.805)	(0.485)	(0.570)	(0.405)	(0.658)	(0.529)
Woman leader	0.381	0.919	-0.622	-0.826	1.553	1.429	3.593
	(0.905)	(0.772)	(0.839)	(0.802)	(0.695)	(0.702)	(0.338)
Internet use	0.018	-0.033	0.006	-0.014	-0.007	0.095	0.010
	(0.878)	(0.761)	(0.957)	(0.898)	(0.955)	(0.507)	(0.942)
Constant	86.518***	65.965***	90.146***	91.373***	98.947***	113.490***	77.073***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
Observations	85	85	85	85	70	65	65
R-squared	0.116	0.129	0.093	0.074	0.152	0.105	0.258

Table 5: National culture and early adoption of social distancing policies during COVID-19

This table presents results for the impact of national culture on the early adoption of governmental social distancing policies during the Covid-19 pandemic. The dependent variable in all models is early social distancing policies, which equals 1 for countries that adopted any kind of social distancing measure(s) before the day they had their first laboratory-confirmed Covid-19 case, and 0 for countries that started implementing social distancing measures after their first confirmed case. Individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence are from Hofstede. Democracy ranges from 0 to 10, with 0 representing autocratic and 10 representing democratic regimes. GDP per capita is the natural logarithm of gross domestic product per capita. Legal origin equals 1 if a country has roots in common law, and 0 otherwise. International tourism is annual arrivals. Population density is measured as the number of individuals per square kilometer. Health expenditures is government health expenditures as a percentage of GDP. Woman leader equals 1 if a country is headed by a woman, and 0 otherwise. Internet usage is the percentage population with an internet connection. Results are estimated using a cross-sectional logit regression model with heteroscedasticity-robust standard errors. *p*-values are given in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Early social distancing policies					
	(1)	(2)	(3)	(4)	(5)	(6)
Individualism	–0.056**					
	(0.015)					
Power distance		0.071***				
		(0.001)				
Uncertainty avoidance			0.085***			
			(0.000)			
Masculinity				0.029*		
				(0.091)		
Long term orientation					0.021	
					(0.199)	
Indulgence						–0.011
						(0.576)
Democracy	0.312**	0.274**	0.282*	0.150	0.247*	0.327**
	(0.033)	(0.025)	(0.064)	(0.176)	(0.062)	(0.026)
Legal origin	1.384*	1.030	2.935***	0.343	0.925	0.780
	(0.051)	(0.218)	(0.003)	(0.627)	(0.197)	(0.361)
GDP per capita	1.442	1.848*	0.687	1.056	0.769	0.652
	(0.148)	(0.060)	(0.450)	(0.179)	(0.335)	(0.419)
Population density	0.002	0.001	0.004	0.000	0.001	0.001
	(0.518)	(0.628)	(0.175)	(0.539)	(0.735)	(0.646)
International tourism	0.013	–0.008	–0.010	–0.008	0.007	0.016
	(0.477)	(0.724)	(0.605)	(0.697)	(0.727)	(0.474)
Health expenditure	–0.178	–0.057	–0.157	–0.106	–0.109	–0.171*
	(0.122)	(0.593)	(0.152)	(0.315)	(0.324)	(0.096)
Woman leader	0.471	0.767	1.239	0.148	0.142	0.354
	(0.616)	(0.382)	(0.338)	(0.872)	(0.891)	(0.720)
Internet use	–0.061	–0.094**	–0.062	–0.071**	–0.072*	–0.068
	(0.157)	(0.046)	(0.116)	(0.040)	(0.051)	(0.156)
Constant	–5.959	–15.050**	–7.255	–4.526	–2.650	–0.196
	(0.301)	(0.023)	(0.237)	(0.379)	(0.613)	(0.968)
Observations	84	84	84	84	69	65

Table 6: Instrumental variable analysis

This table presents results for the instrumental variable analysis regarding the impact of national culture on government social distancing policies during the Covid-19 pandemic. In the first-stage regressions (Models 1 and 3) dimensions of national culture are regressed on an instrumental variable together with other control variables. In the second-stage regressions (Models 2 and 4), Stringency Index is regressed on predicted values of cultural dimensions from the first stage regressions together with other control variables. Individualism and power distance are dimensions from the Hofstede framework of national culture and are dependent variables in Models 1 and 3, respectively. Stringency Index is the dependent variable in Models 2 and 4 and represents the severity of social distancing policies. The highest value of stringency index for each country over the period January 22–June 30, 2020 is employed. Higher values of this index represent more stringent social distancing policies. Pronoun drop is a dummy variable that equals 1 if a language does not allow for dropping pronouns, and 0 otherwise. This variable is included as an instrumental variable. Predicted_individualism and predicted_power distance are the fitted cultural variables from the first-stage regressions. Covid-19 is the cumulative total Covid-19 confirmed cases in a country until the day the stringency index stays at its highest value. Democracy ranges from 0 to 10, with 0 representing autocratic and 10 representing democratic regimes. GDP per capita is the natural logarithm of gross domestic product per capita. Legal origin equals 1 if a country has roots in common law, and 0 otherwise. International tourism is annual arrivals. Population density is measured as the number of individuals per square kilometer. Health expenditure is government health expenditure as percentage of GDP. Woman leader equals 1 if a country is headed by a woman, and 0 otherwise. Internet usage is the percentage population with an internet connection. See text and Table 2 for variable definitions and sources. Results are estimated with a cross-sectional ordinary least squares regression method using heteroscedasticity-robust standard errors. *p*-values are given in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	First stage	Second stage	First stage	Second stage
	Individualism	Stringency index	Power distance	Stringency index
	(1)	(2)	(3)	(4)
Pronoun drop	24.454***		-21.405***	
	(0.000)		(0.000)	
Predicted_individualism		-0.233*		
		(0.092)		
Predicted_power distance				0.267*
				(0.092)
Covid-19	0.008***	0.001	0.001	-0.002
	(0.007)	(0.824)	(0.737)	(0.669)
Democracy	1.536***	0.170	-1.023*	0.085
	(0.006)	(0.727)	(0.091)	(0.853)
Legal origin	5.198	-0.203	-3.657	-0.441
	(0.194)	(0.947)	(0.336)	(0.883)
GDP per capita	2.251	1.462	-4.468	2.128
	(0.492)	(0.566)	(0.232)	(0.436)
Population density	-0.003**	-0.001	0.002	-0.001
	(0.016)	(0.349)	(0.104)	(0.393)
International tourism	0.165*	-0.014	0.087	-0.075
	(0.069)	(0.863)	(0.472)	(0.277)
Health expenditure	-0.813**	-0.422	-0.735	-0.037
	(0.032)	(0.299)	(0.135)	(0.939)
Woman leader	3.323	1.007	-6.070	1.850
	(0.356)	(0.763)	(0.197)	(0.602)
Internet use	0.230	0.030	0.081	-0.046
	(0.190)	(0.781)	(0.659)	(0.683)
Constant	-6.795	82.989***	121.562***	52.162*
	(0.733)	(0.000)	(0.000)	(0.085)
Under-identification test				
Kleibergen–Paap rk LM statistic		16.68		16.119
p-value		0.000		0.000
Weak identification test				
Cragg–Donald Wald F statistic		31.746		21.263
Observations	85	85	85	85
R-squared	0.699	0.098	0.599	0.098

Table 7: Robustness tests with GLOBE dimensions

This table presents results for the impact of national culture on government social distancing policies during the Covid-19 pandemic. The dependent variable in all models is Stringency Index, representing the severity of social distancing policies. Higher values of this index represent more stringent social distancing policies. The highest value of the Stringency Index for each country over the period January 22–June 30, 2020 is used. In-group collectivism, institutional collectivism, power distance, uncertainty avoidance, assertiveness, future orientation, gender egalitarianism, human orientation and performance orientation are from the GLOBE Project. Brief descriptions of these dimensions are given in Appendix A. Covid-19 is the cumulative total Covid-19 confirmed cases in a country until the day the stringency index stays at its highest value. Democracy ranges from 0 to 10, with 0 representing autocratic and 10 representing democratic regimes. GDP per capita is the natural logarithm of gross domestic product per capita. Legal origin equals 1 if a country has roots in common law, and 0 otherwise. International tourism is annual arrivals. Population density is measured as the number of individuals per square kilometer. Health expenditures is government health expenditures as percentage of GDP. Woman leader equals 1 if a country is headed by a woman, and 0 otherwise. Internet usage is the percentage population with an internet connection. Table 2 gives the variable sources. Results are estimated with cross-sectional ordinary least squares regression method using heteroscedasticity-robust standard errors. *p*-values are given in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	**Stringency Index**
	(1)
In-group collectivism	6.727
	(0.299)
Institutional collectivism	14.747**
	(0.022)
Power distance (GLOBE)	10.888**
	(0.038)
Uncertainty avoidance (GLOBE)	0.562
	(0.912)
Assertiveness	0.254
	(0.952)
Gender egalitarianism	2.250
	(0.766)
Future orientation	-7.059
	(0.297)
Humane orientation	-19.611**
	(0.020)
Performance orientation	11.500
	(0.122)
Covid-19	-0.001
	(0.743)
Democracy	0.498
	(0.383)
Legal origin	2.237
	(0.669)
GDP per capita	-1.647
	(0.733)
Population density	0.003**
	(0.021)
International tourism	-0.004
	(0.969)
Health expenditure	-0.808
	(0.114)
Woman leader	-7.575*
	(0.091)
Internet use	0.128
	(0.541)
Constant	21.635
	(0.767)
Observations	45
R-squared	0.576

Table 8: National culture and social distancing policies during COVID-19: Robustness tests with mean Stringency Index

This table presents results for the impact of national culture on government social distancing policies during the Covid-19 pandemic. The dependent variable in all models is Stringency Index, representing the severity of social distancing policies. Higher values represent more stringent social distancing policies. The index is averaged over the period of January 22–June 30, 2020 for each country. Individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence are the dimensions of Hofstede. Brief descriptions of these dimensions are given in the text. Covid-19 is the accumulated total Covid-19 confirmed cases in a country till June 30, 2020. Democracy ranges from 0 to 10, with 0 representing autocratic and 10 democratic regimes. GDP per capita is the natural logarithm of gross domestic product per capita. Legal origin equals 1 if a country has roots in common law, and 0 otherwise. International tourism is annual arrivals. Population density is measured as the number of individuals per square kilometer. Health expenditure is government health expenditure as percentage of GDP. Woman leader equals 1 if a country is headed by a woman, and 0 otherwise. Internet usage is the percentage population with an internet connection. Table 2 gives the variable sources. Results are estimated with cross-sectional ordinary least squares regression method using heteroskedasticity robust standard errors. *p*-values are given in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Stringency Index						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individualism	-0.123***						-0.328**
	(0.008)						(0.047)
Power distance		0.153***					0.486**
		(0.006)					(0.011)
Uncertainty avoidance			0.002				-0.047
			(0.972)				(0.425)
Masculinity				0.080			0.117**
				(0.156)			(0.043)
Long term orientation					-0.096		-0.205**
					(0.108)		(0.043)
Indulgence						0.039	0.011
						(0.553)	(0.923)
Covid-19	0.000	-0.001	-0.001	-0.001	-0.003	-0.001	-0.002
	(0.864)	(0.751)	(0.730)	(0.826)	(0.255)	(0.569)	(0.345)
Democracy	-0.259	-0.285	-0.531	-0.570*	-0.409	-0.473	-0.375
	(0.469)	(0.428)	(0.144)	(0.099)	(0.365)	(0.308)	(0.343)
Legal origin	-0.287	-0.311	-1.554	-1.999	-1.945	-2.378	-4.891
	(0.896)	(0.883)	(0.560)	(0.390)	(0.499)	(0.477)	(0.161)
GDP per capita	0.029	0.486	-0.850	-0.576	0.238	-2.073	2.270
	(0.988)	(0.799)	(0.677)	(0.774)	(0.914)	(0.370)	(0.387)
Population density	-0.000	0.000	0.001	0.000	0.001	0.001	-0.000
	(0.991)	(0.998)	(0.454)	(0.475)	(0.256)	(0.282)	(0.788)
International tourism	0.082	0.049	0.060	0.035	0.129**	0.119**	0.089*
	(0.143)	(0.361)	(0.267)	(0.497)	(0.021)	(0.030)	(0.072)
Health expenditure	-0.078	0.135	0.017	0.011	-0.189	-0.077	0.002
	(0.800)	(0.660)	(0.957)	(0.972)	(0.658)	(0.867)	(0.997)
Woman leader	-1.365	-0.791	-2.413	-2.151	-2.191	-2.063	0.067
	(0.551)	(0.737)	(0.293)	(0.343)	(0.235)	(0.276)	(0.970)
Internet use	0.040	-0.001	0.021	0.010	-0.006	0.076	-0.027
	(0.688)	(0.990)	(0.837)	(0.923)	(0.958)	(0.538)	(0.822)
Constant	56.965***	38.762***	62.834***	58.157***	58.623***	67.827***	34.892*
	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)	(0.086)
Countries	85	85	85	85	70	65	65
R-squared	0.125	0.152	0.080	0.106	0.158	0.152	0.308

Table 9: Robustness tests with extended panel dataset

This table presents results for the impact of national culture on government social distancing policies during the Covid-19 pandemic, with extended panel dataset of daily observations over the period January 22–June 30, 2021. The dependent variable in all models is daily Stringency Index, representing the severity of social distancing policies. Higher values of this index represent more stringent social distancing policies. Individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence are the dimensions of Hofstede. Brief descriptions of these dimensions are given in the text. Covid-19 daily is daily new confirmed cases. Democracy ranges from 0 to 10, with 0 representing autocratic and 10 democratic regimes. GDP per capita is the natural logarithm of gross domestic product per capita. Legal origin equals 1 if a country has roots in common law, and 0 otherwise. International tourism is annual arrivals. Population density is measured as the number of individuals per square kilometer. Health expenditure is government health expenditure as percentage of GDP. Woman leader equals 1 if a country is headed by a woman, and 0 otherwise. Internet usage is the percentage population with an internet connection. Table 2 gives the variable sources. All models include day fixed-effects dummy variables. Results are estimated with pooled panel ordinary least squares regression method using heteroskedasticity robust standard errors clustered at country-level. *p*-values are given in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Stringency Index						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Individualism	-0.100*						-0.367**
	(0.054)						(0.018)
Power distance		0.129**					0.407**
		(0.017)					(0.019)
Uncertainty avoidance			-0.028				-0.041
			(0.545)				(0.441)
Masculinity				0.075			0.115**
				(0.200)			(0.045)
Long term orientation					-0.169***		-0.332***
					(0.005)		(0.001)
Indulgence						0.121*	0.144
						(0.058)	(0.126)
Covid-19 daily	0.146***	0.137***	0.137***	0.136***	0.128***	0.127***	0.131***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.008)	(0.003)	(0.005)
Democracy	-0.172	-0.181	-0.402	-0.424	-0.404	-0.396	-0.285
	(0.647)	(0.616)	(0.244)	(0.213)	(0.346)	(0.307)	(0.471)
Legal origin	-2.002	-2.029	-3.722	-3.467	-4.699	-4.617	-7.020*
	(0.437)	(0.425)	(0.199)	(0.201)	(0.148)	(0.240)	(0.073)
GDP per capita	0.837	1.260	0.238	0.366	1.751	-2.267	2.278
	(0.705)	(0.572)	(0.911)	(0.866)	(0.486)	(0.414)	(0.464)
Population density	-0.000	-0.000	0.000	0.000	0.001	0.001	-0.000
	(0.771)	(0.766)	(0.951)	(0.904)	(0.469)	(0.513)	(0.805)
International tourism	0.062	0.031	0.040	0.019	0.111**	0.104*	0.093*
	(0.161)	(0.481)	(0.354)	(0.669)	(0.037)	(0.065)	(0.066)
Health expenditure	-0.028	0.138	0.052	0.036	-0.362	-0.367	-0.430
	(0.924)	(0.638)	(0.862)	(0.909)	(0.373)	(0.371)	(0.267)
Woman leader	-2.933	-2.431	-3.920	-3.550	-3.561	-3.777	-1.617
	(0.365)	(0.461)	(0.252)	(0.280)	(0.356)	(0.338)	(0.666)
Internet use	0.023	-0.012	0.003	-0.003	0.024	0.167	0.081
	(0.840)	(0.912)	(0.979)	(0.979)	(0.844)	(0.266)	(0.561)
Day fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.616	-16.128	5.543	-0.132	-0.535	14.577	-16.165
	(0.963)	(0.340)	(0.675)	(0.992)	(0.972)	(0.354)	(0.426)
Observations	43,621	43,621	43,621	43,621	35,946	33,382	33,382
R-squared	0.562	0.565	0.558	0.561	0.574	0.572	0.597
Countries	85	85	85	85	70	65	65

Appendix A

Definitions of GLOBE Project dimensions of national culture

Dimension	Definition
In-group collectivism	Measures the extent to which members of a society express pride, loyalty, and cohesiveness in their organizations or families.
Institutional collectivism	Measures the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action.
Power distance	Measures the degree to which a society accepts and endorses authority, power differences, and status privileges.
Uncertainty avoidance	Measures the extent to which a society stresses orderliness and consistency and relies on rules and procedures to alleviate unpredictability of future events.
Assertiveness	Measures the degree to which members of a society are assertive, confrontational, and aggressive in their relationships with others.
Future orientation	Measures the level to which individuals engage in future-oriented behaviors, such as planning, delaying gratification, and investing in the future.
Gender egalitarianism	Measures the extent to which societies minimize gender inequality.
Human orientation	Measures the extent to which societies encourage and reward members for being fair, altruistic, generous, caring, and kind to others.
Performance orientation	Measures the degree to which societies encourage and reward performance, improvement, and excellence