CULTURE IN TIMES OF COVID-19: THE RELATIONSHIP BETWEEN INDIVIDUALISM AND COUNTRIES' RESPONSE TO THE CRISIS

by

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Abstract

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In this work, I explore the relationship between culture and the response of countries to the COVID-19 pandemic. The dependent variables range from the economic consequences of the COVID-19 (GDP growth and unemployment) to government response (indexes of stringency and economic support) and effectiveness of lockdown measures (Google mobility indicators). I investigate whether individualistic culture measured by the individualism index developed by Geert Hofstede has any influence on the abovementioned variables. I estimate regressions using ordinary least squares (OLS) and a fixed effect estimator on country-level annual and quarterly data. The results show that individualism is not significantly associated with economic outcomes and stringency of government-imposed social distancing measures. However, it moderates the effect of the latter on public's geographical mobility.

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LIST OF ABBREVIATIONS

IMF. International Monetary Fund.

OECD. Organisation for Economic Co-operation and Development.

OLS. Ordinary Least Squares.

Chapter 1

INTRODUCTION

In the beginning of 2020, the world was unexpectedly hit by the COVID-19 (or coronavirus) disease outbreak caused by a novel virus SARS-CoV-2. To control the spread of the highly contagious disease, governments were forced to intervene by imposing travel restrictions, school and workplace closures and other containment measures (Smith and Opatowski 2021). Despite these measures, millions of COVID-19 cases and deaths occurred and the numbers continue to grow (Ritchie et al. 2021). The so-called Great Lockdown caused a sharp decline in economic activity and led to massive disruptions in supply chains (International Trade Centre 2020). As a result, many economies have faced a deep recession. Governments responded to the economic downturn with fiscal countermeasures to support households and firms, to prevent bankruptcies and a further growth of unemployment (IMF 2020). Nevertheless, significant employment and output losses were inevitable. In 2020, the world's annual GDP fell by 3.4% and in Ukraine the GDP dropped by 4.02% (World Bank Open Data 2021). Thus, the COVID-19 outbreak has induced two major crises – health and economic ones.

By the end of 2020, the global economy has already started to rebound, but the path to full economic revival was still long and uncertain (IMF 2020). In 2021, the recovery continued, but it was weaker than expected. One of the reasons is the emergence of new highly contagious variants (IMF 2021). New coronavirus variants can lead to another surge in COVID-19 cases and deaths, especially in countries where vaccination coverage is not sufficient. Under such circumstances, the effects of the pandemic will continue to persist, and the full recovery will be delayed even further. Moreover, the recent (since May 2022) monkeypox

outbreak shows that the world is not secured against the possibility of other epidemics occurring and new challenges may be yet to come. Therefore, it is still relevant to study factors that can be useful for predicting severity of the crisis and the speed of recovery. In addition, a close examination of different aspects of the crisis can assist in building resilience not only in the current situation but to future shocks as well.

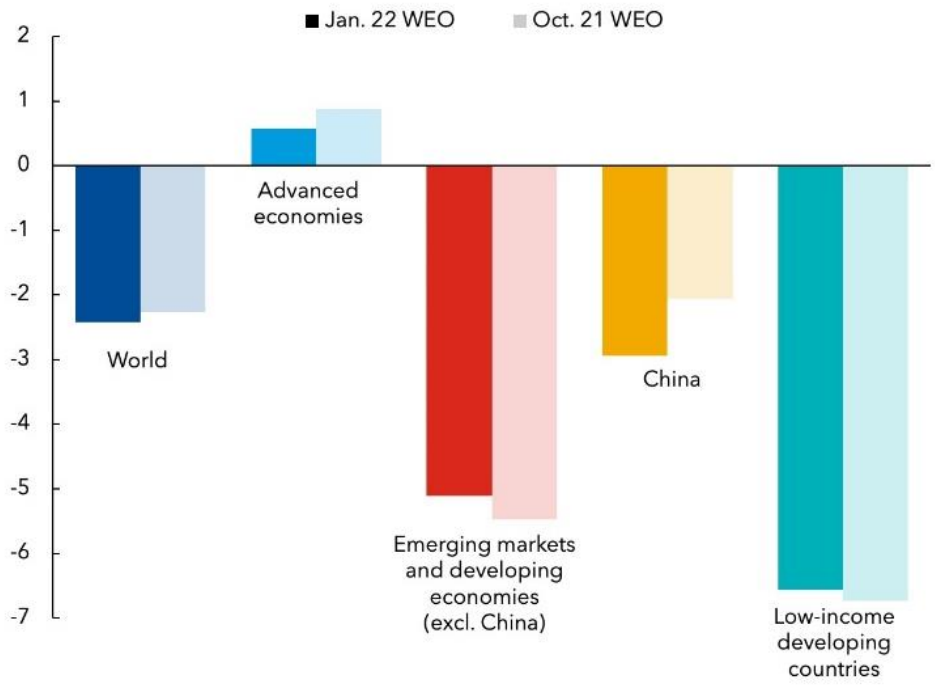

Figure 1. Estimated medium-term GDP losses in different economies, percent deviation from pre-crisis trend

Source: IMF

Economic prospects of countries in this crisis are diverging (IMF 2021). The impact of COVID-19 on the economy varies from country to country and across

the economies (Figure 1). Some experienced more severe losses of the economic output and/or population losses, while others suffered much less (Fernánde-Villaverde and Jones 2020, Chen et al. 2020, Eichengreen 2020). The outcomes of both economic and health crises differ in territorial dimension (OECD 2021). Moreover, the recovery path is uneven as well. Therefore, the question of why the degree of damage from the COVID-19 is heterogeneous across regions and countries is relevant.

When identifying what determined the depth of the crisis, some studies focus more on healthcare measures, fiscal capacities, and policy responses (e.g., OECD 2021). Nevertheless, there are studies that pay attention to more subtle factors that might have affected countries' socio-economic response to COVID-19, such as political aspects and cultural characteristics. For example, Eichengreen (2020) argues that political polarization can sharp the outcomes by affecting the effectiveness of containment measures. In case of strong polarization, members and supporters of one party are prone to disobey policies and recommendations of a rival party. The author also highlights another factor, which is the distinction between individualism and communitarianism. Individualists believe that the decision to follow mitigation measures belongs to each particular person, while communitarians recognize the importance of collective actions for the common good.

In this work I explore the role of individualistic types of cultures during the COVID-19 crisis, in particular its effect on economic outcomes, government response, and effectiveness of virus containment measures.

To define individualism and collectivism, I refer to the classic work by Triandis (1995). According to it, collectivists, who are more integrated into communities, "are mainly motivated by the norms and duties imposed by the collective entity". Individualists, on the contrary, are more concerned with preferences and needs

of their own compared to those of a group or society in general. As the measure of individualism, I use Hofstede's individualism-collectivism dimension, and the data is sourced from Hofstede's Insights. The Hofstede's score is widely used in the literature (Gorodnichenko and Roland 2011; Melton and Sinclair 2021; Frey, Chen and Presidente 2020; etc.) and it has an advantage in terms of data availability compared to other measures of individualism.

The aim of this research is to investigate whether individualistic and collectivist countries experience the current crisis in different ways. For this purpose, I examine if COVID-19 outcomes and response indicators are related to countries being either individualistic or collectivist. In addition, I assess if it has an effect of moderating the impact of other factors on the same outcome variables. Economic consequences are represented by GDP growth and unemployment, while government response to COVID-19 is measured by the index of economic support and stringency of lockdown. Actual social distancing reflects the effectiveness of the virus containment measures imposed by the government (stringency). It is proxied by changes in geographical movements of people and comes from Google Mobility data.

The main hypotheses are that individualistic countries have experienced a less severe COVID-19 economic shock compared to collectivist countries, their virus containment measures are less strict, and the effectiveness of these measures is weaker (Frey, Chen and Presidente 2020).

I contribute to the existing literature by using annual and quarterly data to estimate equations that represent both economic outcomes and government/public responses to the pandemic. As more recent data became available, it is possible to cover a more extended time period in this research, which is six quarters, while most currently existing studies cover only from two

to three quarters. In addition, many papers on similar topics use daily panel or cross-sectional data, and quarterly frequency is less common.

Chapter 2 of this thesis provides a literature review on the topic. Chapter 3 and Chapter 4 cover methodology and data description, respectively. The estimation results are presented in Chapter 5. Chapter 6 is the conclusions and discussion of the limitations of this study.

Chapter 2

LITERATURE REVIEW

Economic research has shown that cultural distinctions can influence economic outcomes across countries. Some of them focus on one of the cultural dimensions, which is the degree of individualism/collectivism. Triandis (1989) argues that this dimension is essential in defining cultural differences. Gorodnichenko and Roland (2011a) use data developed by Geert Hofstede, Shalom Schwartz, and the World Values Survey to compare different measures of culture and provide evidence that Hofstede's individualism-collectivism dimension has the most significant effect on long-run economic growth (GDP per capita).

Ball (2001) presents arguments for causality between individualism/collectivism and economic development running in both directions. Gorodnichenko and Roland (2011b) find that individualistic countries are associated with higher productivity and economic growth. They use the instrumental variable method to account for a possibility of reverse causality. In addition, they link productivity and output to culture through innovation rate and examine the relationship between culture and institutions. Taylor and Wilson (2012) find that individualism has a significant positive effect on innovation, but the results for collectivism are ambiguous. Kyriacou (2016) provides evidence that individualism leads to higher economic development because it promotes good governance. Thus, we can conclude that a connection between individualism and economic outcomes does exist.

The vast literature dedicated to COVID-19 includes studies on the impact of culture on people's behavior and the crisis outcomes. Some of them indicate that collectivism contributes to more effective COVID-19 containment, while individualism can be an obstacle in this situation. Marginson (2020) suggests that a

higher death toll in the UK and the US compared to East Asia can be attributed to higher degree of individualism and lower social responsibility. High individualization creates resistance to mitigation measures which are seen as limiting personal freedom. For instance, in the UK and the US the public was reluctant to follow such measures as wearing masks or close downs. The author concludes that different societies should learn from each other. What people in individualistic countries can learn is "to take individual responsibility for the effects on others, and to take collective responsibility for shared outcomes".

Rajkumar (2021) presents evidence that there is a positive correlation of individualism with COVID-19 prevalence and mortality. Both bivariate and partial correlation analyses show that is significant. In this study, individualism/collectivism measures are Hofstede, Suh and Gelfand's indices.

Ang and Dong (2021), on the contrary, suggest that higher individualism lowers the number of COVID-19 infection cases as individualistic people are less willing to engage in large social gatherings. Their estimation results confirm this hypothesis.

Lu, Jin and English (2021) use culture to explain the differences in mask use both across countries and within the U.S. (across the counties). The data for mask usage is drawn from two global COVID-related surveys – one conducted by YouGov and the Institute of Global Health Innovation, and the other by Facebook and Massachusetts Institute of Technology. To measure individualism the authors use Vandello and Cohen's index in their within-country analysis and Hofstede's index combined with the GLOBE in-group collectivism one in their cross-country analysis. They show that collectivism is positively associated with mask usage.

Frey, Chen and Presidente (2020) find that in collectivistic and democratic countries lockdown measures decreased geographic mobility more effectively. Autocracies responded to COVID-19 spread with more stringent lockdowns, but

they were less effective. Further the authors continue their research by focusing on the individualism-collectivism distinction and conducting analysis on different levels – across countries, the U.S. counties, and cities within China (Chen, Frey and Presidente 2021). As in their previous work, they use Google Mobility Report daily data for the dependent variable, i.e., geographic mobility. The authors regress changes in mobility on the interaction of the policy variable (stay-at-home index) with individualism using OLS. The results of estimation on all the levels (country, county, and city) show that in places with higher individualism people follow the lockdown rules less. In the cross-country analysis, the main measure of individualism is Hofstede's individualism index. The results are robust for different measures of individualism. The paper concludes that cultural factors can shape the outcomes and they should be taken into account when predicting the effectiveness of public policies. There are several other studies with similar methodologies and conclusions (Bazzi et al. 2021, Bian et al. 2021).

Wang (2021) too estimates the relationship between cultural traits, represented by Hofstede's dimensions, and social distancing, proxied by Google Mobility indices. Out of the six cultural variables only two, which are long-term orientation and indulgence, have a significant impact on social distancing. In general, the results of the estimation using country-level OLS in this paper show that strictness of government measures has a more significant effect on mobility compared to cultural dimensions.

To sum up, the literature mainly shows that individualism affects COVID-19 health outcomes by influencing public responses to the virus spread and corresponding mitigation measures. However, it lacks research on the relationship between culture and economic performance during this crisis. In addition, while the link between individualism and long-run economic outcomes has been widely studied, there is still a shortage of evidence of its importance for short-run changes. Hence, this thesis will contribute to the existing literature by investigating whether

the economic impact of COVID-19 is related to the difference in levels of individualism. In addition, I explore the association of individualism with governments and public' response to the pandemic.

Chapter 3

DATA

This chapter is divided into several subsections. The first one contains the description of the key explanatory variable, which is individualism. It is followed by three subsections, where I describe data with different frequencies: annual, quarterly, and daily data that was subsequently transformed into either quarterly or annual.

This study focuses on the differences among countries during the COVID-crisis, in particular individualistic and collectivist ones. Therefore, the data underlying the empirical analysis is country-level. Due to lack of data and unevenness in its availability across countries and different periods, the number of countries in the final samples was reduced. For the same reason, the number of countries in the panel dataset is twice smaller than in the cross-sectional one, where the number of countries and, accordingly, observations is 96. The panel dataset has generally more observations because it includes the data for several periods.

The description of variables and the sources of data (in the brackets) are presented in Table 1.

Table 1. Description of variables and data sources

Variable	Description and data sources
Individualism	Hofstede's individualism index, from 1 to 100, higher value means higher degree of individualism (Hofstede's Insights)
GDP growth 2020	GDP per capita growth, annual %, 2020 (World Bank)

Table 1 – Continued

Variable	Description and data sources
GDP growth_q[1]	Quarterly growth rate of real GDP, change over the same quarter, previous year, %, Q1 2020-Q2 2021 (OECD)
Unemployment_q	Quarterly unemployment rate, % of labor force, Q1 2020-Q2 2021 (OECD)
Economic Support Index_q	Composite index reflecting government economic aid to households, from 0 to 100, higher value corresponds to greater support (Hale et al. 2021)
Stringency(_q or _y)	Government Stringency Index, from 0 to 100, a higher score indicates a stricter government response; annual average, 2020 (Hale et al. 2021)
Mobility parks	Change in number of visitors to parks, % to the pre-pandemic baseline (Google COVID-19 Community Mobility Trends)
Mobility workplace	Change in number of visitors to workplaces, % to the pre-pandemic baseline (Google COVID-19 Community Mobility Trends)
Mobility average	Average of Google Mobility indicators, % (Google COVID-19 Community Mobility Trends)
Cases_permil(_q or _y)	Total of new COVID-19 cases per quarter or year (Our World in Data)
Deaths_permil(_q or _y)	Total of new COVID-19 deaths per quarter or year (Our World in Data)
GDP per capita 2019	GDP per capita (current US$), 2019
GDP growth trend	Average of GDP growth per capita for 2017-2019 (own calculations, based on World Bank data)

[1] Suffixes "_y" and "_q" in variables' names are used to distinguish between annual and quarterly data and stand for "year" and "quarter", respectively.

3.1. Individualism measure

As a cultural measure, I employ a widely used individualism score, developed by famous Dutch scholar Geert Hofstede. This score, along with some other cultural indexes, comes from a large multinational survey study, conducted by Hofstede. I use the data provided by Hofstede's Insights research center, which includes not only Hofstede's scores, but also the estimates for countries, for which the original scores are not available. The index value ranges from 0 to 100, and higher scores indicate higher levels of individualism. The United States is considered to be the most individualistic country and it has the value of 91. The country with the lowest score in the dataset is Guatemala, which has the index value equal to 6, so it is a highly collectivist country. Figure 2 shows individualism score across countries included in the study.

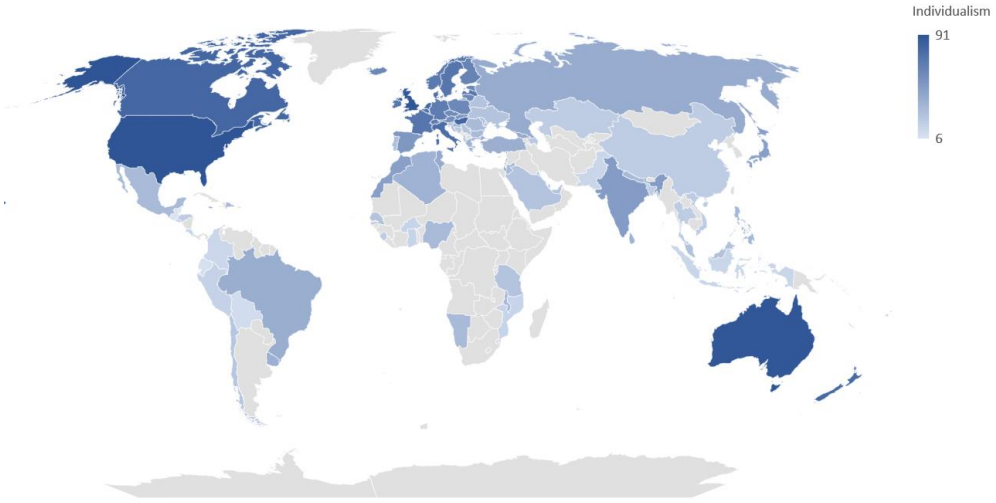

Figure 2. Individualism score across countries included in the study
Source: Hofstede Insights

In addition, for easiness of interpretation and to show the difference between individualistic and collectivist countries, rather than just countries varying in their degree of individualism, I also use a binary variable based on this index. In the panel dataset, the countries with individualism score above the median are considered to be individualistic, while countries, whose score is below the median, are collectivist. Welch two-sample t-test shows that the mean of individualism score is significantly lower for countries that were classified as collectivist compared to the means of individualistic countries ($t = -26.7$, p-value < 0.001). The descriptive statistics for individualism variables are presented in Table 2 and Table 3.

3.2. Annual data

The annual cross-sectional dataset consists of 96 countries. Although the data on individualism measure is available for 116 countries, the number of observations was reduced by missing values in other variables.

The data for socio-economic indicators, such as GDP in levels and in percentage changes, inflation, share of tourism, fertility rate, and rule of law, is sourced from the World Bank. For regional control variable, I use the UN regional classification, which is taken from UNICEF Data.

As a proxy for education, I use the share of intake in first grade of primary school, measured as a percentage of the corresponding age group. The data is taken from the World Bank database for 2018 and 2019, depending on data availability.

There is no variation of data across years and each variable contains data for a specific year or an average for several years. For example, one of the dependent variables is annual GDP growth rate and it is taken for the year 2020, while the data for control variables correspond to the preceding year or years, e.g., GDP per capita and fertility rate are for 2019.

Table 2. Descriptive statistics of annual data

Variable	N	Mean	Std. Dev.	Min	Max
Individualism dummy	96	0.48	0.50	0	1
Individualism	96	38.95	22.09	6	91
GDP growth 2020	96	-5.22	4.32	-25.58	4.78
Deaths_permil_y	96	421.69	462.77	0.31	2747.51
Cases_permil_y	96	21195.09	18486.56	7.97	73649.78
Stringency_y	96	58.24	10.79	25.59	86.94
GDP per capita 2019	96	21292.05	23592.83	506.82	113218.71
GDP growth trend	96	2.25	2.06	-3.32	6.31
Rule of law	96	0.34	0.93	-1.12	2.06
Education	96	5914977.63	16732611.95	26788.00	120064160.00
Fertility	96	2.10	0.92	0.92	5.32
Tourism	96	4.32	3.00	0.93	17.44
Inflation	96	3.25	4.86	-3.23	39.91
log(Population)	96	16.59	1.63	12.80	21.07
log(GDP per capita 2019)	96	9.27	1.30	6.23	11.64
log(Education)	96	14.07	1.75	10.20	18.60

For the 96 countries in the sample, the average GDP growth in 2020 is -5.2% (Table 2), which reflects the economic downturn caused by the pandemic. Lebanon experienced the most significant economic loss with the drop in GDP equal to 25.6%. While most countries had a negative annual change in GDP, some, like Ireland and China, maintained economic growth despite COVID-19.

For variables with large positive values and that have right-skewed distribution, such as Education, GDP per capita (Fig. 3), and Population, I take natural logarithm.

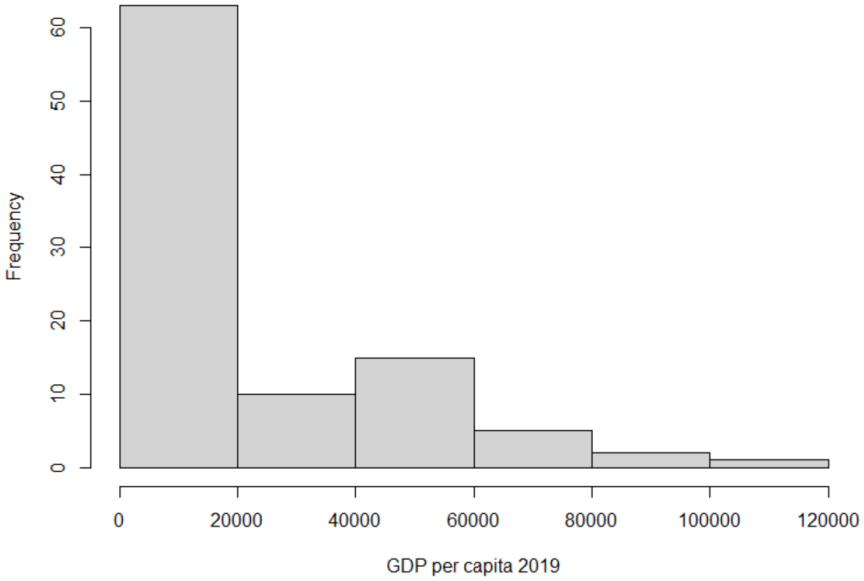

Figure 3. Distribution of annual GDP per capita for 2019
Source: The World Bank

3.3. Quarterly data

The quarterly data includes 49 countries, most of which are OECD members. The time covered is six periods – from Q1 (first quarter) 2020 to Q2 2021. The dataset is further combined with annual data.

The data on quarterly unemployment provided by OECD is available only for 38 countries. Therefore, it reduces the number of observations from 294 to 228.

Since the unemployment rate, measured as percentage of labor force, might not reflect the effect of COVID-19 on unemployment, I create a variable of its quarter-on-quarter change (Unemployment change_q). It is measured in percentages and shows the change in unemployment rather that its level.

3.4. Time-aggregated data

Google Mobility data, which is used for mobility (social distancing) variables, shows the change in the number of visitors in certain places, such as parks, stores, and workplaces, compared to the baseline, pre-pandemic, activity in January and February 2020. Negative values of mobility show that people reduced the frequency of visiting public places and reflect increased social distancing. Large positive values in some periods indicate that there was a quick rebound in geographical mobility.

The mobility data is available with daily frequency. Arellano, Bai and Mihalache (2021) use the mobility data averaged for each month. Similarly, by taking the mean I transform it into a more aggregated quarterly data.

Daily numbers of COVID-19 deaths and infection cases are summed by quarters and years, resulting in total values rather than averages.

Hale et al. (2021) collect data of government response to the pandemic and combine it into indexes. Among them are indicators of containment measures, or lockdown, and economic responses. Strictness of government measures against COVID-19 spread is reflected in the stringency index, which contains the daily data on the level of restrictions. I average it into quarterly and annual data. The index of economic support reflects the government's help to households in terms of income aid and debt relief.

Tables 2 and 3 are the descriptive statistics for annual and quarterly data, respectively. They also include the statistics for data that was aggregated from daily into quarterly or annual.

Table 3. Descriptive statistics of quarterly data

Variable	N	Mean	Std. Dev.	Min	Max
Individualism dummy	49	0.49	0.50	0	1
Individualism	49	53.37	21.76	13	91
GDP growth_q	294	-0.55	8.22	-23.00	24.49
Unemployment_q	228	7.36	4.06	1.87	23.87
Unemployment change_q	228	4.46	21.8	-31.88	241.23
Economic Support Index_q	294	56.97	29.08	0.00	100.00
Stringency_q	294	58.07	16.07	6.85	92.59
Mobility average	282	-9.31	13.19	-43.86	39.61
Mobility parks	282	16.89	52.15	-86.04	236.79
Mobility workplace	282	-23.00	9.62	-54.51	1
Cases_permil_q	294	10558.68	14132.02	0.70	82273.67
Deaths_permil_q	294	210.97	275.90	0.00	1401.34
GDP per capita 2019	49	33173.05	24463.55	2072.24	113218.71
GDP growth trend	49	2.24	1.82	-1.61	6.31
Fertility	49	1.68	0.34	0.92	3.01
Tourism	49	3.58	2.09	1.30	11.28
log(COVID-19 cases)	49	7.81	2.34	-0.35	11.32
log(GDP per capita 2019)	49	10.10	0.85	7.64	11.64
log(Education)	49	14.11	1.83	10.40	18.60

Chapter 4

METHODOLOGY

As mentioned in the previous chapter, the analysis can be divided into two parts: estimation using cross-sectional data and panel data. The empirical strategy includes estimating equations for the following dependent variables: GDP growth, stringency, unemployment change, Economic Support Index, and the mobility variables. In each of the equations, individualism, either the score itself or the dummy, will be included as the key explanatory variable. The goal is to see whether there is an effect of individualism on any of the dependent variables. Each of them represents either COVID-19 economic outcome, government response, or the actual social distancing during the pandemic. The variables and their groups are shown in more detail in Table 4.

Table 4. Dependent variables grouping

Data	Group	Dependent variable
Cross-sectional	Economic outcome	GDP growth 2020
	Government response	Stringency_y
Panel	Economic outcome	GDP growth_q
		Unemployment change_q
	Government response	Economic Support Index_q
		Stringency_q
	Social distancing and effectiveness of lockdown	Mobility average
		Mobility parks
		Mobility workplace

With respect to economic consequences of COVID-19, the hypothesis is that individualistic countries were more economically resilient and, hence, experienced less damage. Therefore, the association of individualism is expected to be positive with GDP growth and negative with unemployment.

According to the findings of Frey, Chen and Presidente (2020), mobility restrictions during the pandemic are stricter in authoritarian countries. Since autocracy is closely related to collectivism (Gorodnichenko and Roland 2021), I assume that in individualistic countries, on the contrary, the virus containment measures are less strict.

The general specification of the equations is the following:

$$Y_{i,t} = \beta_0 + \beta_1 \times Individualism_i + \beta_2 \times X_{i,t} + u_{i,t}, \quad (1)$$

where $Y_{i,t}$ is one of the dependent variables mentioned above, $Individualism_i$ is Hofstede's individualism score or the dummy, $X_{i,t}$ is a set of control variables.

In the equations, for mobility variables I add the interaction of stringency with individualism to examine if there is a moderation effect. Based on the findings in the literature (Frey, Chen and Presidente 2020; Bian et al. 2021), I hypothesize that individualism decreases the effectiveness of lockdown measures, leading to a smaller effect of stringency on social distancing in individualistic countries.

The equation has then the following form:

$$Mobility_{i,t} = \beta_0 + \beta_1 \times Individualism_i + \beta_1 \times Individualism_i \times Stringency_{i,t} + \beta_2 \times X_{i,t} + u_{i,t}, \quad (2)$$

In selecting control variables, I follow the work of Ashraf and Goodell (2021). They use pooled OLS on quarterly data in order to estimate the effect of stringency (and also lagged stringency) on GDP growth. The authors control for GDP per capita as its higher level is associated with lower growth. In addition, education,

rule of law, and longer life expectancy are believed to have a positive effect on growth, while fertility and inflation are expected to have a negative effect. The authors find that the lagged stringency is statistically significant, along with stringency itself. In their results, among the controls only GDP growth trend, inflation and rule of law variables are significant, and higher inflation turn out to have a positive association with short-term growth.

Similarly to Ashraf and Goodell (2021), König and Winkler (2021), I use pooled OLS to estimate the regression of quarterly GDP growth on stringency and COVID-19 fatalities. Pooling allows to increase the sample size when the number of cross-sectional units is small. In König and Winkler (2021), the number of countries is 42.

I use the same controls as Ashraf and Goodell (2021) not only in the models for economic growth, but others as well. The variables that are not significant and do not add any value or do not have enough theoretical reasoning are dropped in the process of estimation. I also add a regional categorical variable to control for region-specific effects.

All the regressions are estimated using the ordinary least squares method, or OLS (pooled OLS in case of panel data). The model with mobility as the dependent variable is additionally estimated using fixed effects estimator to control for unmeasured time-invariant factors. Due to the within transformation of data, time-constant variables are eliminated. Since in the data individualism does not change across periods, in such regressions we can estimate its effect only in the interaction terms.

It should be noted that the models only show the association between variables, and we cannot make any conclusions on the causal relationship.

Chapter 5

ESTIMATION RESULTS

This section presents the main estimation results for the models outlined in the methodology in Chapter 3. In subsection 5.1, I describe the results of the estimations on cross-sectional data with dependent variables representing economic outcomes and government policy response. Subsection 5.2 shows the results for panel data and is divided into three parts corresponding to each dependent variable group: economic consequences, government response, and social distancing (individuals' response to the pandemic and lockdown measures).

5.1. Cross-sectional data

The estimation results of OLS regressions on the cross-sectional data are reported in Table 5. The model with GDP growth as the dependent variable portrays the economic outcome of COVID-19 and its relationship with individualism while controlling for other factors. The regression of stringency reveals the association between government measures in response to COVID-19 and individualism.

5.1.1. Economic outcome

The results for annual GDP growth model show that individualism does have a statistically significant effect on the economic growth. Individualism is negatively associated with growth, meaning that in 2020 countries with higher degree of individualism, on average, experienced greater output losses. The increase in the score of individualism higher by 1 point is estimated to decrease GDP growth by 0.07 percentage points.

Table 5. Estimation results of OLS regressions on the cross-sectional data: economic and government response dependent variables

	Dependent variable:	
	GDP growth_2020	Stringency_y
	(1)	(2)
Individualism	-0.070**	0.044
	(0.030)	(0.085)
Stringency_y	-0.059	
	(0.042)	
log(cases_permil_y)	-0.837**	2.854***
	(0.342)	(0.917)
log(gdppercap_2019)	1.256	-0.018
	(0.801)	(2.349)
gdpgr_trend	1.215***	1.204**
	(0.212)	(0.596)
ruleoflaw_2019	0.373	-5.437*
	(1.014)	(2.855)
log(educ)	-1.065	5.213
	(1.539)	(4.098)
fertility_2019	0.377	
	(0.952)	
tourism_2019	-0.710***	
	(0.141)	
log(population_2019)	1.244	-4.395
	(1.544)	(4.205)
inflation_2019	0.270***	
	(0.073)	
Regional control	Yes	Yes
Constant	-6.909	35.909
	(10.403)	(27.265)
Observations	96	96
R^2	0.729	0.598
Adjusted R^2	0.610	0.454
Residual Std. Error	2.700 (df = 66)	7.977 (df = 70)
F Statistic	6.116*** (df = 29; 66)	4.157*** (df = 25; 70)
Note:		*p**p***p<0.01

The coefficient on stringency is statistically not different from zero, which supports the results of Lajunen et al. (2022), who found that the relationship between individualism and stringency is negative but insignificant. In this study, the caveat is the high level of aggregation. Stringency average for the whole year might not reflect the actual degree of strictness of containment measures.

The statistical significance individualism does not change when the individualism score is replaced with the dummy variable (Table 10 in Appendix).

5.1.2. Government response

In the regression of yearly average of stringency, the sign of the coefficient on individualism is positive. However, it is not statistically different from zero. As mentioned earlier, it can be related to averaging over a too long period of time. The effect of individualism on stringency being insignificant means that the strictness of mitigation measures imposed by government is not related to the degree of individualism in the country.

5.2. Panel data

This section includes the results of the estimations on the data that includes variables with quarterly frequency, along with those that do not variate across quarters (these are mostly annual). The results presented below are for the cases when we use individual dummy as an explanatory variable rather than the score of individualism level. Tables 6-8 present the results of OLS estimations and Table 9 is the results for the case of using fixed effects estimator.

Table 6. Estimation results of OLS regressions on the panel data: economic outcome dependent variables

	Dependent variable:	
	GDP growth_q	Unemployment change_q
	(3)	(4)
Individualism dummy	-0.343	-2.101
	(1.837)	(6.095)
log(newcases_permil_sum)	0.781***	-2.789***
	(0.290)	(1.071)
stringency	-0.238***	0.430***
	(0.035)	(0.121)
stringency_lag	0.100***	-0.135*
	(0.022)	(0.072)
log(gdppercap_2019)	3.532*	2.349
	(1.863)	(5.552)
gdpgr_trend	1.722***	0.770
	(0.414)	(1.522)
ruleoflaw_2019	-3.214**	1.050
	(1.566)	(5.575)
log(educ)	0.357	-0.385
	(0.427)	(1.353)
fertility_2019	-2.603	7.384
	(2.600)	(8.994)
tourism_2019	-0.295	0.354
	(0.319)	(1.099)
Region control	Yes	Yes
Constant	-28.068	36.391***
	(19.166)	(7.206)
Observations	294	228
R^2	0.261	0.132
Adjusted R^2	0.201	0.053
F Statistic	4.349*** (df = 22; 271)	1.669** (df = 19; 208)
Note:		*p**p***p<0.01

5.2.1. Economic outcome

Table 6 shows the estimation results for variables that represent economic indicators during the COVID-19 crisis. In the GDP growth equation, the coefficient on individualism is negative, meaning that individualistic countries on average experienced lower economic growth. When interpreting the results for unemployment, we should be cautious: a negative value means a positive outcome since it indicates a reduction in unemployment. The estimation results show that a country being individualistic is negatively associated with unemployment change, meaning that individualistic countries experienced lower increase in unemployment. However, the individualism binary variable is statistically insignificant in both the GDP growth and unemployment equations. So, there is no clear evidence of individualistic countries being more resilient during the crisis and having more capacity to keep the workforce.

On the other hand, the relationship of individualism with unemployment rate is significant (the estimation results are reported in Table 11 in Appendix). Individualistic countries are estimated to have unemployment lower on average by 1.7 percentage points as opposed to collectivist ones.

5.2.2. Government response

Regressing quarterly stringency on individualism variable does not reveal any significant relationship (Table 7), as it did not in the case of annual stringency average (Table 5). However, economic support index is estimated to be significantly lower in individualistic countries (Table 7). The reason can be that there was no need for a large financial support in these countries.

Table 7. Estimation results of OLS regressions on the panel data: government response dependent variables

	Dependent variable:	
	EconomicSupportIndex_q	Stringency_q
	(5)	(6)
Individualism dummy	-12.816**	0.533
	(5.952)	(3.218)
log(newcases_permil_sum)	7.017***	3.572***
	(0.733)	(0.397)
log(gdppercap_2019)	6.449	2.783
	(5.903)	(3.192)
gdpgr_trend	1.949	2.170***
	(1.258)	(0.680)
ruleoflaw_2019	-1.285	-2.871
	(5.087)	(2.750)
log(educ)	-1.503	2.759***
	(1.331)	(0.720)
Region control	Yes	Yes
Constant	-11.354	-34.964
	(60.098)	(32.495)
Observations	294	294
R^2	0.334	0.363
Adjusted R^2	0.291	0.321
F Statistic (df = 18; 275)	7.674***	8.688***
Note:		*p**p***p<0.01

5.2.3. Social distancing and effectiveness of lockdown

To assess the effectiveness of lockdown, I use Google mobility indicator. Greater decline in visits and activity of individuals in public places signifies greater responsiveness to the pandemic. The relationship of mobility with stringency shows public's reaction and compliance with government-imposed mitigation measures. In the regressions of mobility, I include individualism dummy in the

interaction term with the stringency variable to find if there is a difference in the effectiveness of lockdown across individualistic and collectivist countries.

In order to test for time-fixed effects, I run the Breusch-Pagan Lagrange multiplier test. The null hypothesis is that there are no time-fixed effects. The result for model (2) with mobility as the dependent variable is $\chi^2 = 173.84$ and p-value < 2.2e-16, hence, we reject the null and can conclude that time-fixed effects should be used. In addition, I use the Hausman test to compare fixed and random effects. The results (c2 = 116.53, p-value < 2.2e-16) indicate that we can reject the null hypothesis that the preferred model is random effects, which justifies using fixed effects for estimation.

The results of both OLS (Table 8) and fixed effects (Table 9) estimations show that the interaction is statistically significant in the equations for average mobility and mobility in parks, but not in workplaces. Individualism is not significant outside of interaction terms.

Table 8. Estimation results of OLS regressions on the panel data: social distancing dependent variables

	Dependent variable:					
	Mob_parks		Mob_workplace		Mob_average	
	(7)	(8)	(9)	(10)	(11)	(12)
Individualism dummy	12.669	5.593	2.015	-0.968	3.399*	1.409
	(8.077)	(20.708)	(1.618)	(4.178)	(2.057)	(5.283)
Stringency_q	-0.950***	-1.296***	-0.406***	-0.398***	-0.506***	-0.587***
	(0.158)	(0.226)	(0.032)	(0.046)	(0.040)	(0.058)
Stringency_q_lag	1.271***	1.250***	0.063***	0.064***	0.317***	0.312***
	(0.103)	(0.103)	(0.021)	(0.021)	(0.026)	(0.026)
log(newcases_permil_sum)	-9.823***	-7.945***	-0.133	-0.318	-1.832***	-1.412***
	(1.428)	(1.744)	(0.286)	(0.352)	(0.364)	(0.445)
log(gdppercap_2019)	-3.943	-4.348	-2.496**	-2.488**	-2.558*	-2.652*
	(5.851)	(5.821)	(1.172)	(1.175)	(1.490)	(1.485)

Table 8 – Continued

	Dependent variable:					
	Mob_parks		Mob_workplace		Mob_average	
	(7)	(8)	(9)	(10)	(11)	(12)
log(educ)	-4.249**	-4.783***	0.409	0.411	-0.410	-0.535
	(1.792)	(1.803)	(0.359)	(0.364)	(0.456)	(0.460)
tourism_2019	1.060	1.083	0.087	0.090	0.275	0.281
	(1.759)	(1.750)	(0.352)	(0.353)	(0.448)	(0.446)
Individualism dummy × stringency		0.672**		-0.018		0.156*
		(0.312)		(0.063)		(0.080)
Region control	Yes	Yes	Yes	Yes	Yes	Yes
Constant	104.294	117.664	24.784*	26.718*	36.174**	39.523**
	(71.823)	(73.129)	(14.384)	(14.756)	(18.292)	(18.658)
Observations	282	282	282	282	282	282
R^2	0.627	0.634	0.560	0.562	0.621	0.627
Adjusted R^2	0.599	0.604	0.528	0.526	0.594	0.597
Note:						*p**p***p<0.01

Stringency is estimated to have a negative effect on mobility, and such relationship is expected, as more restrictive lockdown measures are supposed to decrease people's activity in the locations outside home. The coefficient on the interaction has a positive sign, meaning that in individualistic countries the effect of stringency on mobility is smaller. We can consider it an evidence of containment measures being less effective in such countries. It is not surprising that the results are different for workplace mobility, since in most cases it is not an individual's choice whether to come to their workplace, but rather a decision made by the authorities or the employer.

Table 9. Estimation results of fixed effect regressions on the panel data: social distancing dependent variables

	Dependent variable:					
	Mob_parks		Mob_workplace		Mob_average	
	(13)	(14)	(15)	(16)	(17)	(18)
log(newcases_permil_sum)	-10.393***	-8.403***	0.064	-0.122	-1.875***	-1.369***
	(1.391)	(1.678)	(0.289)	(0.351)	(0.357)	(0.431)
Stringency_q	-0.854***	-1.239***	-0.426***	-0.432***	-0.496***	-0.595***
	(0.156)	(0.221)	(0.032)	(0.046)	(0.040)	(0.057)
Stringency_q_lag	1.299***	1.277***	0.055***	0.056***	0.319***	0.314***
	(0.096)	(0.095)	(0.020)	(0.020)	(0.025)	(0.024)
Individualism dummy × stringency		0.765**		0.005		0.197**
		(0.309)		(0.065)		(0.079)
Observations	282	282	282	282	282	282
R^2	0.469	0.483	0.476	0.481	0.569	0.581
Adjusted R^2	0.357	0.368	0.366	0.366	0.478	0.488
F Statistic	68.241*** (df = 3; 232)	42.978*** (df = 5; 230)	70.389*** (df = 3; 232)	42.597*** (df = 5; 230)	102.223*** (df = 3; 232)	63.745*** (df = 5; 230)
Note:						*p**p***p<0.01

Individualism decreases the negative effect of stringency on average mobility by 0.2 percentage points and on the mobility in parks by 0.8 p.p. (Table 9). The coefficients are statistically significant, but small in magnitude. The results are in line with Wang (2021), who finds that mobility is more influenced by government stringency than cultural traits of a nation.

Chapter 6

CONCLUSIONS

The aim of this work is to explore the relationship between individualism, as a cultural measure, and the response of countries to the COVID-19 pandemic. The dependent variables represent COVID-19 economic outcomes (GDP growth and unemployment), government policy response (indexes of stringency and economic support) and effectiveness of virus containment measures (Google mobility indicators) during the crisis caused by the pandemic. Individualism dimension, which is a key explanatory variable, is measured by Hofstede's individualism score. Additionally, I create a binary variable based on it, which categorizes countries as individualistic or collectivist. The purpose of it is to ease further interpretation of the results when using interaction terms, as well as to compare individualistic and collectivist countries in a more explicit way and to show differences between them.

The analysis is conducted on country level using two sets of data – cross-sectional one with annual frequency of data and panel one, where time-variable indicators have quarterly frequency. For all the models, the estimation was performed using OLS. The exception is the model with mobility as the dependent variable. In this regression, I interact stringency with individualism to check if there is a difference in the effectiveness of government lockdown measures across collectivist and individualistic countries. The model is estimated using both pooled OLS and the fixed effects estimator.

Individualism is significantly associated with the annual GDP growth rate for 2020. The increase in the score of individualism higher by 1 point is estimated to decrease GDP growth, on average, by 0.07 percentage points during the crisis. At the same time no significant relationship was found between quarterly, short-term, economic growth and individualism.

Individualistic countries are estimated to have unemployment rate on average lower by 1.7 percentage points compared to collectivist countries. It supports the hypothesis that individualistic countries have on average lower unemployment and better economic conditions, but rather in general than specifically during COVID-19 pandemic. When estimating the effect of individualism on the change in unemployment, it turns out to be insignificant. Hence, I find no evidence that short-term economic consequences of COVID-19 are related to countries being individualistic or collectivist.

The results show that the average stringency, both annual and quarterly, is not significantly associated with individualism, although it was hypothesized to be negatively impacted. Meanwhile, economic support is significantly lower in individualistic countries, indicating that governments provide greater help in collectivist ones.

This paper finds that, as expected, social distancing moderates the effect of stringency on government lockdown measures. It decreases the negative effect of stringency on average mobility by 0.2 percentage points, which is statistically significant but small in terms of economic significance.

This research has several limitations. First, lack of data significantly decreases the number of countries in the samples, and as the result the number of observations is small. Second, the Google mobility data is not a completely accurate measure of social distancing since it depends on smartphone usage, which can differ across countries (Wang 2021). There are also many constraints in terms of data availability. In addition, although this paper focuses on the differences between individualistic and collectivist countries, in general, using individualism dummy is not the most accurate way to measure a cultural trait.

To conclude, this study contributes to the existing literature by showing that there is no significant relationship between individualism and short-term economic

consequences of COVID-19, despite evidence of the long-term impact of individualism on economic outcomes. As for lockdown and its effectiveness, the findings show that individualism affects public's compliance more than it impacts the strictness of government measures. It proves that cultural characteristics do matter and should be taken into account when making policy decisions and evaluating their potential impact.

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APPENDIX

Table 10. OLS regressions on the cross-sectional data using individualism dummy

	Dependent variable:	
	GDP growth_2020	Stringency_y
	(1)	(2)
Individualism dummy	-1.749**	-1.861
	(0.864)	(2.293)
Stringency_y	-0.074*	
	(0.042)	
log(cases_permil_y)	-0.807**	2.974***
	(0.347)	(0.912)
log(gdppercap_2019)	1.161	0.130
	(0.804)	(2.336)
gdpgr_trend	1.208***	1.133*
	(0.214)	(0.598)
ruleoflaw_2019	-0.005	-4.919*
	(0.997)	(2.794)
log(educ)	-1.416	5.416
	(1.546)	(4.064)
fertility_2019	0.494	
	(0.968)	
tourism_2019	-0.689***	
	(0.147)	
log(population_2019)	1.472	-4.371
	(1.559)	(4.193)
inflation_2019	0.270***	
	(0.074)	
Region control	Yes	Yes
Constant	-7.933	35.097
	(10.566)	(27.211)
Observations	96	96
R^2	0.724	0.600
Adjusted R^2	0.603	0.457
Residual Std. Error	2.722 (df = 66)	7.955 (df = 70)
F Statistic	5.984*** (df = 29; 66)	4.195*** (df = 25; 70)

Table 11. Estimation results of OLS regressions on the panel data: unemployment

	Dependent variable:
	Unemployment_q
	(4)
Individualism dummy	-1.703**
	(0.766)
log(newcases_permil_sum)	0.055
	(0.135)
stringency	0.025
	(0.015)
stringency_lag	0.009
	(0.009)
log(gdppercap_2019)	-1.053
	(0.698)
gdpgr_trend	-0.195
	(0.191)
ruleoflaw_2019	-1.176*
	(0.701)
log(educ)	-0.332*
	(0.170)
fertility_2019	-7.378***
	(1.131)
tourism_2019	-0.091
	(0.138)
Region control	Yes
Constant	36.391***
	(7.206)
Observations	228
R^2	0.604
Adjusted R^2	0.568
F Statistic	16.729*** (df = 19; 208)