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RESEARCH ARTICLE

The analysis of the factors affecting the stringency index during COVID-19 pandemic

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Abstract

Coronavirus (COVID-19) pandemic, which started in China's Wuhan providence in the late 2019s, and then affected the entire world in a short time, causing high disease and death rates, was one of the most important unexpected crises of 21st century. In order to manage the risk the pandemic posed on public health and public order, and to control spread of the disease, governments implemented restriction policies, in which precautions such as limitation and closure were taken. This study aims to examine the factors affecting the stringency index, an indicator of the political measures taken by governments against the epidemic in the selected countries (the United Kingdom, Italy, France, Germany, Türkiye, Russia, Brazil, the United States of America, India) during COVID-19 pandemic. In the analysis, non-additive fixed effect panel quantile regression model with the instrumental variable was used. The data set covers the period between March 11, 2020 and June 29, 2021. The findings indicate that although the level of effects varied, an increase in the number of daily deaths has an increasing effect on the stringency index value in all the countries within the study. Meanwhile, it is observed that as the rate of people with age 65 and over increases, the stringency measures also increase in the countries implemented moderate and high-level restrictions.

Keywords: COVID-19, Pandemic, Stringency Index, Government Responses, Non-Additive Fixed Effect Panel Quantile Regression

JEL Codes: C31, C33, I18, J18, D81

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1. INTRODUCTION

A disease that has spread across a large region such as multiple countries and continents is called pandemic[1]. It is known that many pandemics in history caused deaths by affecting lives. Although the factors affecting these types of diseases that occur from time to time are different, they have caused significant challenges for countries and thus the whole world influencing hundreds of thousands of people and even millions of people.

In the last months of 2019, information regarding the cases of a disease that differed from other diseases in the city of Wuhan in the Hubei Province of China began to take place in the world press. After the cases of an unidentified disease, the health committee of Wuhan Municipality made an explanation on December 31, 2019 and announced that a disease with unknown origin was encountered. Upon the statement by experts that these diseases were caused by a new type of coronavirus, World Health Organization declared to the public that this outbreak was a pandemic on March 11, 2020 (Dashraath et al. 2020: 521). After this period, COVID-19 disease spread firstly to the other provinces of China, then to neighboring countries, and other parts of the world, influencing the whole world at last.

The coronavirus (COVID-19) outbreak has struck the whole world since the early days it emerged. The absence of a definitive treatment regarding the recovery process led to an increase in the number of cases, which has caused more burden on the healthcare system, prolonged treatment periods, and loss of lives. The uncertainty brought by the outbreak also negatively affected the economy in many industries and thus many countries. During this period, relevant public authorities have responded with several implementations both to prevent (protective) the emergence of the disease and also to treat the existing disease and hinder the spread of the disease. Public service ads, announcements and trainings about mask, distancing, and hygiene are the most basic practices for the prevention of the disease. As well as these basic precautions, some economic and social measures (such as isolation, distance-learning, flexible working, lockdowns) were also applied to reduce the spread risk of the disease.

With filiation works carried out against the disease, it was aimed to detect both the ill individual and those who had contact with the ill person and to treat these people by isolating them from healthy individuals through different isolation methods, preventing the spread of the disease. The lack of an effective treatment against coronavirus epidemic has made vaccination the most important fighting tool as well as other main means of prevention. At the early stages of the pandemic, there was no vaccination or medicine to be effectively used against this disease. Therefore, during the period many countries started to develop vaccines that could be effective for COVID-19 virus, some of which were proven to be effective through scientific trials were presented for use. Governments provided vaccination programs to their citizens by supplying different vaccines produced for this purpose. During the period, elderly people who were highly affected by the epidemic and healthcare professionals who were in intense contact with patients were prioritized in the vaccination programs. Gradually, many countries started to vaccinate their citizens. The introduction of new vaccines and their approval for use during this process were considered as positive developments in the fight against the pandemic.

However, the difficulties experienced in vaccine production and supply and the fact that all countries could not reach these vaccines equally have slowed down the fight against the epidemic. These problems in the vaccine supply with regard to world population and the appearance of new variants of the virus made the period of fight against the epidemic longer and the effects of the epidemic continue. In addition to the main measures mentioned above, social and economic many practices were implemented by governments in order to prevent the spread of the disease, continue life effectively, and overcome this period with the least harm.

Since the outbreak of this disease, although precautions were sometimes made flexible, the various mutations of the virus led to the continuation of the measures though in part.

Stringency Index is an index obtained by weighting nine different indicators during the COVID-19 disease. School closures, workplace closures, restrictions on public gatherings, cancellation of public events, stay-at-home requirements, closures of public transport, public information campaigns, restrictions on internal movements, and international travel controls; are the nine indicators that were used to calculate the Stringency Index. Stringency Index of a country is obtained according to the index score between 0-100 calculated based on these indicators. While 0 refers to no stringency, 100 refers to full restriction. While this index is calculated, the composite index

value is obtained by taking the average of sub-index scores collected by assessing each situation:

$$Stringency\ Index_i = \frac{1}{k}\sum_{j=1}^{k} I_j$$

k is the number of indicators in an index and I_j value is the sub-index value (Hale et al. 2020: 530, 536)

In this study, the factors affecting the stringency index, an indicator of the political measures taken by governments against the epidemic, will be analyzed for nine countries (the United Kingdom, Italy, France, Germany, Türkiye, Russia, Brazil, the United States of America, India) through the non-additive fixed effect panel quantile regression method with the instrumental variable. This method is preferred to use in the analysis in order to reveal the effect levels of included factors in countries that applied different levels of stringency measures. In this context, this study aims to contribute to the literature through the method used and the time period it examines.

2. LITERATURE

Since the early days of the coronavirus outbreak, it has been seen that many studies that examine the effects of the pandemic in started to take place in the literature in many areas. These studies examined the effects of the outbreak on health, society, psychology, and economics, and tried to contribute to the improvement of the process from different angles. This study analyzes the factors that had an impact on the restriction policies applied by the governments during the pandemic. When the previous studies in the literature are reviewed, it has been seen that there are quite a few studies on this topic. One of the fundamental studies in the field that contributed to the literature and was taken as a reference by later studies is made by Hale et al. (2020) from Oxford University. Hale et al. (2020) calculated the stringency level of the measures regarding limiting social mobility and lockdown applied by states to prevent COVID-19 by means of an index. In their study, they transformed 9 different data into a Stringency Index that takes values between 0 and 100.

Razzak (2020) analyzed the Stringency Indexes of New Zealand, Australia, Denmark, Sweden, and the US between the period of January 1, 2020 and April 23, 2020 with unrestricted Vector Auto Regressive model and continued the study by completing the data set until June 30, 2020, using dynamic stochastic baseline projections. In the first months of the pandemic, the policies of stringency measures implemented by the countries had a reducing effect on the number of cases in these countries except for the US. In addition, the daily number of new cases declined when these policies were tightened. Nevertheless, the study also found that the effect of the stringency policies varied between countries due to the time when these policies were put into practice.

Kaçak and Yıldız (2020) analyzed the effects of stringency measures policies on the course of the pandemic in countries by comparing the stringency policies in five European countries and Türkiye. According to the findings, it has been found that the application of early restriction measures influences the number of coronavirus cases and deaths.

Koç and Saraç (2020) examined factors affecting the number of coronavirus cases and deaths in OECD countries through multiple linear regression model in their study and they determined that the rate of healthcare expenditures, the rate of being overweight, the rate of people with diabetes, and the scores of stringency index had an impact on the number of coronavirus cases and deaths.

Tassinari et al. (2020) examined the factors that affected the restrictions against Coronavirus pandemic in different regions of Italy by creating a “regional stringency index”. It was found that the most effective factor on stringency index was “weight of exports on regional GDP”. The second most effective factor was GDP per capita.

Taşdoğan and Taşdoğan (2020) investigated the effect of the stringency index on the number of coronavirus cases in 13 countries that were mostly influenced by the epidemic through the panel quantile regression method. In the study it was found that, according to the Stringency Index scores, the countries that took strict measures in the first two and half months after the outbreak were more successful in the fight against the pandemic.

Fuller et al. (2021) examined the relationship between the time when 37 European countries put stringency measures into practice and the mortality as of June 30, 2020, through linear regression method. This study revealed that mortality in the countries that implemented stringency measures earlier was lower.

Based on online data collected from 547 employees in Türkiye, Yiğitol and Büyükmumcu (2021) analyzed the relationships between fear of COVID-19, personality traits, job performance, and turnover intention with the Structural Equation Model. This study discovered that the fear of COVID-19 had an impact on turnover intentions, but it did not affect job performance significantly. However, it was seen that the fear of COVID-19 was enhanced by personality traits like neuroticism and responsibility.

Prasad et al. (2021) analyzed the stringency measures, economic measures, social and public information policies enforced in India against coronavirus outbreak according to 21 indicators by means of AI-based predictive analytics tools. The results showed that there was a close and reverse relationship between the stringency level and the number of COVID-19 cases. In other words, there was a reverse relationship between the Government's Response Index and the total number of cases.

Piccinali et al. (2021) examined the relationships between the stringency measures applied in 34 countries from January 2020 to November 2021 and the levels of libertarian and authoritarian governance through bivariate, multivariate, and panel data regression analyses. According to the findings of this study, there was a reverse interaction between the stringency measures and libertarian governments, however, the stringency measures applied were seen to rise as the share of authoritarian governments increased. This study also revealed that the only exceptions were Italy and Ireland which gave different results.

Gökçen's study (2021) analyzed the economic effects of non-medical measures against COVID-19 outbreak on manufacturing and service industries and the role of supportive fiscal and monetary policies through panel data analysis. The findings showed that the stringency of applied restrictive measures had a higher impact on the PMI index of services, but it also affected the PMI index of the manufacturing industry. And it was asserted that the negative effects of these measures on the observed industries could be eliminated through public finance and monetary policies.

Chen et al. (2021) analyzed the measures taken by six countries selected from East and Southeast Asia (China, Japan, Singapore, South Korea, Taiwan, and Vietnam) against COVID-19 pandemic, applied between January 1 and May 30, 2020. Control measures were split into different categories — administrative, public health, and health system measures. Initial Response Index (IRI) and Modified Stringency Index (MSI) were formed to assess the stringency and the timeliness of the measures. Findings of this study put forward that early and timely measures, especially with regard to public health, had a significant role in controlling the outbreak optimally.

Çelik (2021) examined the data from 27 European Union (EU) countries regarding the period between January 2020 and March 2021 through spatial panel data analysis. According to the findings of this study, there was a positive spatial interaction among EU countries, and the COVID-19 measures negatively affected the economic growth of these countries. It was also found that the COVID-19 measures taken by neighbouring countries had a greater negative effect on the economic growth of the relevant country. From other control variables analyzed in the study, Exports and Imports had a positive impact on growth while Inflation had a negative impact. No statistically significant effect of Foreign Exchange Rate on growth was observed.

Violato et al. (2021) tested the lockdown measures in eight European countries (Austria, Belgium, France, Germany, Italy, the Netherlands, Spain, and the United Kingdom) on COVID-19 infection rates and mortality rates with Stepwise Multiple Regression, Factor Analysis and Latent Variable Path Analysis through the Structural Equation Modelling. The results showed that the Stringency Index scores had a high impact on COVID-19 infection and mortality rates.

3. METHODOLOGY

Quantile regression is a model in which regression models are estimated by minimizing the absolute deviation of error terms by taking different quantiles into consideration. Koenker and Bassett (1978) started to contribute to the literature with their article. The approach is a method based on the minimization of the absolute deviation of errors terms obtained from the estimated model of;

$$Y_t = X_t'\beta + u_t \tag{1}$$

$$\min_{\beta \in \mathbb{R}} \left[\sum_{t \in \{t:Y_t \geq X_t'\beta\}} \theta |Y_t - X_t'\beta| + \sum_{t \in \{t:Y_t < X_t'\beta\}} (1-\theta)|Y_t - X_t'\beta| \right] \tag{2}$$

θ, refers to different quantiles. Quantile regression is a method which is preferred especially when the error terms are not distributed normally and there are extreme values in the series and also which is less responsive to extreme values. This method is expanded to panel data with an article by Koenker (2004).

Non-additive fixed effect panel quantile model started to take place in the literature with a definition of quantile regression for panel data (QRPD) with Powel's (2016) study. In this method, the distribution of (Y_{it}/X_{it}) dependent variable and the heterogenous effects of the explanatory variables on the dependent variable can be observed. The model is estimated as below:

$$Y_{it} = X_{it}'\beta(U_{it}^*) \tag{3}$$

U_{it}^* in the model is defined as in Equation 4:

$$U_{it}^* = f(\alpha_i + U_{it}) \tag{4}$$

by taking the fixed effects into consideration. Y_{it} dependent variable is obtained by calculating the conditional probabilities for different quantiles (Powel 2016: 7; Baumparis, Milas, Panagiotidis, 2017: 44):

$$P(Y_{it} \leq X_{it}'\beta(\theta)/\, X_{it}) = \theta \tag{5}$$

Due to the endogeneity problem in variables, the approach has been extended with the instrumental variables approach. QRPD approach with instrumental variable, $Z_i = (Z_{i1}, \dots, Z_{iT})$, is shown:

$$E[1\big(Y_{it} \leq X_{it}'\beta(\theta)\big) - 1(Y_{is} \leq X_{it}'\beta(\theta)/\, Z_i)] = 0 \tag{6}$$

while showing instrumental variables set. In Powel's (2016) study, it is stated that QRPD approach provides asymptotically normal and consistent estimations even when the size of T is small (Powel 2016: 3).

4. DATA

In the study, the effects of different indicators obtained by the World Health Organization in the relevant period on the stringency index were examined. During and after the pandemic period, it is seen that there are studies in the literature (Tassinari et al. 2020; Vialato et al. 2021) examining whether there is a relationship between the number of deaths per day, population density, gross domestic product per capita and the stringency index variables. In addition to these variables, since the closure of workplaces and schools and the obligation to stay at home are included in the restriction measures, it is thought that variable of the rate of 65 years and over has an effect on the stringency index.

The model was estimated using the variables that were thought to affect the stringency index and were found to be significant. These variables are the number of deaths per day, the rate of people with age 65 and over, population density, and gross domestic product per capita. As it was thought that there could be an interrelationship between the stringency index and the number of deaths per day and population density, the variables of the number of cases per day, the number of tests per day, the rate of positive tests were determined as instrumental variables for the number of deaths per day, and population variable was determined as instrumental variable for population density.

Table 1. Identification of the Variables

Name of the Variable	Description of the Variable	Definition of Variable
SI	Stringency Index	Stringency index determined based on 9 indicators
DPD	The Number of Deaths Per Day	The number of deaths due to COVID-19 (per day)
ASAO	The Rate of People With Age 65 And Over	The rate of people with age 65 and over in the population
PD	Population Density	The number of people per square kilometer
GDP per Capita	Gross domestic product per capita	Gross domestic product per capita with 2011 fixed prices [according to purchasing power parity (PPP)]

Source: https://ourworldindata.org

In the study of Powel (2016), it was stated that the QRPD approach gives consistent estimates even if the T time dimension is small, and that T should be at least 2 in annual data. In this study, it was studied with daily data. The duration of the pandemic period and policy restrictions covered in the study is approximately 1.5-2 years for all countries. In the study, by using the data for the period from March 11, 2020 to June 29, 2021, the factors affecting the stringency index during the pandemic period were tried to be revealed.

In this section, the factors affecting the stringency index will be assessed for nine countries (the United Kingdom, Italy, France, Germany, Türkiye, Russia, Brazil, the United States of America, India) through the daily data for the period between March 11, 2020 and June 29, 2021 when the restrictions were effectively applied to fight against COVID-19 disease. Spain and China were excluded from this analysis due to lack of observations in the data structure.

The QRPD approach was preferred in this study to determine the distribution of the dependent variable and the heterogeneous effects of explanatory variables on the dependent variable. The possibility of making the estimation with instrumental variables in the study and the short time dimension on an annual basis also supported our purpose of choosing the QRPD method. In this study, non-additive fixed effect panel quantile regression model with the instrumental variable that can reflect the situations in various quantiles (10th, 25th, 50th, 75th, and 90th) will be used and the results will be interpreted.

5. EMPIRICAL RESULTS

In terms of revealing the distribution characteristics of the variables, descriptive statistics are given in the table below.

Table 2. Descriptive Statistics

	Mean	Median	Max.	Min.	Std. Deviation	Skewness	Kurtosis	Jarque-Bera Test (Prob.)
SI	67.31668	68.98	100	11.11	13.43083	-0.41202	3.130556	123.0921* (0.000)
DPD	510.6946	266	7374	0	726.1258	2.838865	12.96375	23162.7* (0.000)
ASAO	14.99933	15.413	23.021	5.989	5.880113	-0.21176	1.584549	389.6435* (0.000)
PD	162.5728	122.578	450.419	8.823	135.843	0.760339	2.689086	430.0292* (0.000)
GDP per Capita	31495.46	35220.08	54225.45	6426.674	14356.81	-0.2355	2.09333	186.3328* (0.000)

Note: * indicates the rejection of the null hypothesis that the distribution is normal according to 5%.

When looking at the table, the variables were found to be not distributed normally according to the Jarque-Bera test. The null hypothesis which states there is normal distribution at the 5% level is rejected. When the values in the table are interpreted, Stringency Index (SI) is found 67.32 on average. This value was found to be 11.11 at the lowest and 100 at the highest.

The average number of deaths per day was determined to be 510.69. This value varies from 0 to 7374. And the standard deviation is determined to be 726. The rate of people with age 65 and over was found to be 5.989 at the lowest and 23.021 at the highest, and the average value was determined to be 14.99933. According to the population density, the number of people per square kilometer was found to be 162.5728 and this value varied from 8.823 to 450.419. The average income per capita was determined to be 31495.46 and this value was seen as 6426.674 at the lowest and 54225.45 at the highest.

Quantile regression estimators can be used in situations where the distribution is not normal and there are extreme values. These estimators are less responsive to extreme values then least squares estimators. The quantile distributions of the Stringency Index of the countries are given in the Figure below. Due to the fact that there was not a normal distribution and because of the existence of extreme values as a result of the analyses of both descriptive statistics and quantile distributions, non-additive fixed effect panel quantile regression method with the instrumental variable was preferred for this study.

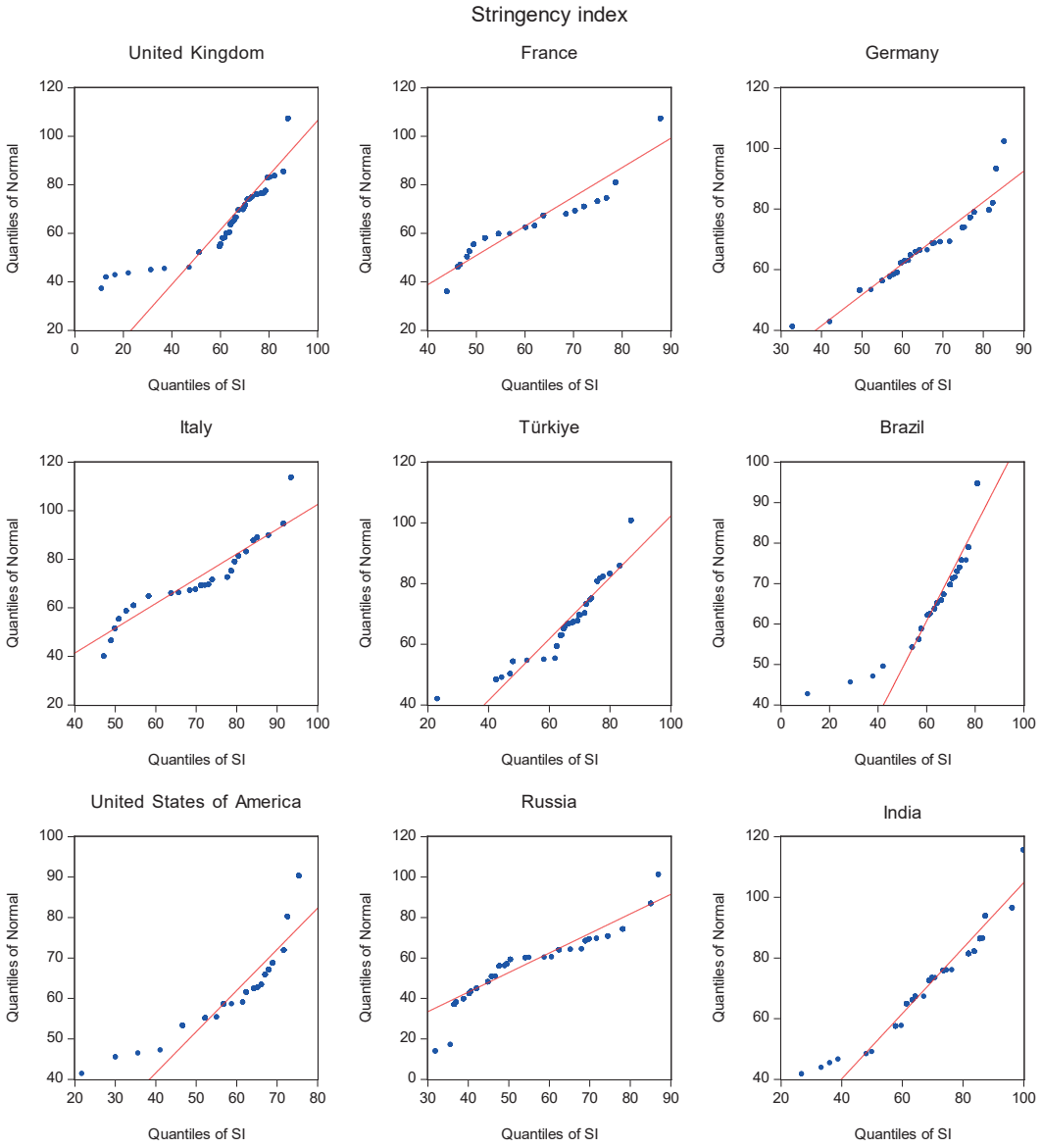

Figure 1. The Stringency Index Quantile Distribution of Countries

The estimated results in case of the application of the stringency index with 10th, 25th, 50th, 75th, and 90th quantile values (too low, low, moderate, high, and too high) in terms of revealing factors affecting the Stringency Index of the countries included in this study are presented in the table below. In the estimation stage of the panel quantile model, non-additive fixed effect panel quantile regression model with the instrumental variable, introduced by Powel (2016) to the literature, was applied. In this model estimation, Markov Chain Monte Carlo (MCMC) method was used, and the iteration number was taken as 10.000.

The existence of an endogeneity problem was analyze with Davidson-MacKinnon test and Davidson-MacKinnon test statistics was estimated to be 3.565385 (Prob=0.0591). As a result of the analysis, the null hypothesis claiming that the internality problem caused by the variables is not statistically significant was rejected at a 10% level. Therefore, models will be estimated by using instrumental variables. The factors affecting the stringency index were estimated through non-additive fixed effect panel quantile regression model with the instrumental variable for different quantiles (10th, 25th, 50th, 75th, and 90th) and the results are given in the table below:

Table 3. Results of the Panel Quantile Regression Model

Q. Quantile	SI	Coefficient	Standard Error	Z Test Statistics	Prob.
Q10	DPD	0.0049174	0.0000262	187.81*	0.000
	ASAO	-0.4223595	0.0035274	-119.74*	0.000
	PD	0.0475384	0.0001004	473.72*	0.000
	GDP per Capita	0.0003285	1.33e-06	247.61*	0.000
Q25	DPD	0.0029221	0.0000213	137.13*	0.000
	ASAO	-0.9565494	0.0064374	-148.59*	0.000
	PD	0.0441378	0.000101	436.97*	0.000
	GDP per Capita	0.0003885	1.92e-06	202.36*	0.000
Q50	DPD	0.0034836	1.30e-06	2685.82*	0.000
	ASAO	0.208152	0.0006141	338.98*	0.000
	PD	0.0294143	9.62e-06	3058.39*	0.000
	GDP per Capita	0.0000109	1.29e-07	84.66*	0.000
Q75	DPD	0.0022149	2.91e-06	761.35*	0.000
	ASAO	0.3940768	0.0001592	2475.93*	0.000
	PD	0.0278776	0.0000403	691.33*	0.000
	GDP per Capita	-0.0001936	1.62e-07	-1192.44*	0.000
Q90	DPD	0.0011216	3.46e-06	323.87*	0.000
	ASAO	0.6766029	0.0004752	1423.94*	0.000
	PD	0.0156704	0.0000177	883.35*	0.000
	GDP per Capita	-0.0003441	1.99e-07	-1726.32*	0.000

Note: a) * represents the statistical significance at the 1% level. b) Instrumental Variables: Number of new cases per day, Number of tests per day, Rate of positive tests, Population. c) The result of Davidson-MacKinnon Test Statistics: 3.565385 Prob. = 0.0591

The 10th quantile refers to the situations where governments applied less restrictions while the 90th quantile refers to the situation with strict restrictions. The 50th quantile indicates that restrictions were moderate.

When the estimation results of the model are examined, it is seen that the increase in the number of deaths increases the stringency index value at all quantile levels. Each increase in the number of deaths per day causes a unital increase of 0.0049174 in the 10th quantile; 0.0029221 in the 25th quantile; 0.0034836 in the 50th quantile; 0.0022149 in the 75th quantile; and 0.0011216 in the 90th quantile. As a high measure policy is applied in environments where higher restrictions are applied, the increase in the number of deaths had less impact on the stringency index than where low restrictions were applied. However, the increase in the number of deaths per day in low quantiles had more increasing impact on less stringency measures.

The population density variable showed a similar effect as the number of deaths per day variable. A one-unit increase in population density has less increasing effect on the stringency index as the quantiles rise (as more restrictions are applied) than in the less restrictive situations (compared to the lower quantiles). As a high stringency policy is applied in higher quantiles, the change in the population density has a less effect compared to the lower quantiles.

It is known that the measures applied on people with age 65 and over as per the stringency policies applied by countries with regard to COVID-19 measures had an impact on the restrictions. In this context, when the impact of the rate of people with age 65 and over variable is examined, a one-unit increase in the rate of people with age 65 and over at medium, high, and too high quantiles shows an increasing effect on the stringency index value. In other words, as the rate of people with age 65 and over increases, the stringency measures also increase. In situations where low restrictions are applied, the rate of people with age 65 and over is found to have a negative effect on stringency index.

When the effect of gross domestic product per capita on the stringency measures is analyzed, a one-unit increase in the GDP per capita variable has an increasing impact on the stringency index in situations where too low, low, and moderate stringency policies are applied. In situations where low-level stringency measures are applied, the increase in income increases the stringency index while a decrease in income decreases this index value. In situations where high and very high stringency policies are practiced, a one-unit increase in the GDP per capita variable affects the stringency measures negatively. As the value of GDP per capita increases, it can be said that stringency applications decrease (at 75th and 90th quantiles).

6. CONCLUSION

During Coronavirus (COVID-19) pandemic, governments have responded with several implementations and restrictions in order to manage the risk posed to the public health. Public authorities tried to control the spread of the disease by ensuring social isolation and maintain physical distance. In the fight against the epidemic, in addition to the basic principles of hygiene, mask and distancing, certain rules were determined to apply to all areas of daily life and measures were implemented.

In order to explain the stringency levels and the restriction policies implemented by countries during this unexpected pandemic, the stringency index, which was developed by a group of researchers in Oxford University was utilized. This index is created by taking into consideration whether or not the governments implemented nine different precautions that have the characteristics of limitation and closure.

This study examines factors that affect the stringency index, which is an indicator of the precaution policies implemented by countries and their extent during the fight against the COVID-19 pandemic through non-additive fixed affect panel quantile regression method with the instrumental variable. In this study, the daily data is used between March 11, 2020 and June 29, 2021.

There are various studies in the literature examining the factors that affect stringency index and the measures taken by countries during COVID-19 pandemic. In line with literature, in this study it was determined that the number of deaths per day, the population density, the rate of people with age 65 and over and gross domestic product per capita as the effective variables on policies implemented by countries.

According to the obtained results, it was found that the increase in the number of deaths per day raised the stringency index scores in all quantile levels during the pandemic — although the level of effects varied, in other words in all countries that implemented few or harsh restrictions. In this context, it seems that the number of deaths per day is one of the main indicators for the countries while putting measures and restrictions into practice during the pandemic.

In the study it has been seen that, the population density variable showed a similar effect as the daily number of deaths variable. The increase in population density is less effective on stringency index in high quantiles as harsh stringency policies are already applied. On the other hand, in the countries that take few stringency precautions, the increase in population density is more effective on stringency index.

Within the study when the effect of gross domestic product per capita on stringency measures is examined, it is revealed that as gross domestic product per capita increases, high and very high stringency applications decrease. It has been shown that the impact of economic factors on the stringency policies applied by the countries during the COVID-19 pandemic.

In the meantime, it is observed in this study that as the rate of people with age 65 and over increased stringency measures also went up in countries where mean and high restrictions were implemented. Therefore, due to the higher risk of diseases and the high number of deaths in this age group, while stringency measures are applied in societies where the population over 65 is more concentrated, the protection of this age group against pandemic diseases should be a priority.

This study is thought to contribute to the literature since the method used enables to obtain the stringency index results for different quantiles rather than results of a single model. Thus, the model results give detailed information about the stringency index in the study. In addition to this, it refers to the revelation that measures regarding only public health is not enough to fight against the pandemics, there is also a need for multidimensional policies that are demographical, sociological and economical.

The coronavirus pandemic has brought social and economic risks in addition to the public health crisis. This crisis has been assessed in three different scales as on individuals, countries, and the whole world, and it has revealed the need for developing fiscal policies and insurance measures to mitigate the financial effects of unexpected similar incidents and risks. As a result, it can be said that applying multidimensional policies and measures to deal with unexpected crises serves to mitigate the potential risks and to ensure that the countries overcome the process with less damage.

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Conflict of Interest

The authors declare that they have no conflicts of interest.

Submission Declaration Statement

We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere

Endnotes

1 https://covid19.saglik.gov.tr/TR-66493/p.html

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