

# Influences of seasonal and demographic factors on the COVID-19 pandemic dynamics

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## Abstract

**INTRODUCTION:** The number of COVID-19 cases per capita (accumulated (CC) and daily (DCC)) are important characteristics of the pandemic dynamics indicating the effectiveness of quarantine, testing, and vaccination. They also indicate the appearance of new waves (e.g., caused by new coronavirus strains) and may be the result of various demographic and seasonal factors.

**OBJECTIVES:** We investigate the influence of the volume and the density of population and the urbanisation level on the CC values accumulated in European countries and regions of Ukraine at the end of June 2021 and the impact of seasonal factors on the DCC values by comparing their dynamics in the spring and summer of 2020 and 2021 for northern and southern regions.

**METHODS:** The influence of demographic factors on CC values was investigated with the use of linear regression. Since DCC values are very random and demonstrate some weekly period, we have used the 7-days smoothing proposed before. The second year of the pandemic allows us to compare its dynamics in the spring and the summer of 2020 with the same period in 2021 and investigate the influence of seasonal factors. We have chosen some northern countries and regions: Ukraine, EU, the UK, USA and some countries located in the tropical zone and Southern Hemisphere: India, Brazil, South Africa and Argentina. The dynamics in these regions was compared with the global one.

**RESULTS:** The accumulated number of cases per capita CC does not depend on the demographic factors used for analysis, although it may differ by about 4 times for different regions of Ukraine and more than 9 times for different European countries. The number of COVID-19 per capita registered in Ukraine is comparable with the same characteristic in other European countries but much higher than in China, South Korea and Japan. Some seasonal similarities are visible for global dynamics, EU and South Africa. Before July 2020, the southern countries demonstrated exponential growth, but northern regions showed some stabilization trends.

**CONCLUSION:** The CC values in Europe do not show any visible dependence on the volume of population, its density and the urbanization level. More or less similar seasonal behaviour of DCC values are visible for global dynamics in July and August. Unfortunately, we cannot conclude where the quarantine restrictions were the most effective since the dynamics of the pandemic are influenced by many other factors not considered in this study, in particular, the emergence of new strains and the large number of unreported cases.

**Keywords:** COVID-19 pandemic, epidemic dynamics in Europe, epidemic dynamics in Ukraine, mathematical modeling of infectious diseases, statistical methods.

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## 1. Introduction

The accumulated number of COVID-19 cases per capita (CC) and the daily number of new cases per capita (DCC) may indicate the effectiveness of quarantine, testing, vaccination, and characterizes the virulence of coronavirus strains circulating in a particular region. The CC values increase monotonically over time, so it is important to fix the appropriate time and compare these values for different countries and regions. In this study we take the end of June 2021, when the CC growth rate in Ukraine and most European countries was small. The CC and DCC numbers are regularly reported by the World Health Organization (WHO) [1] and COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU) [2].

The impact of some eco-demographic factors on the COVID-19 pandemic dynamics was studied in [3-19]. The influence of the population volume  $N_{pop}$  on the final sizes  $V_{\infty}$  of the first pandemic waves in different countries and regions was studied in [19] and compared with the real CC values at fixed moments of time. Relative final size of the first epidemic wave  $\bar{V}_{\infty}$  was approximated by following equations:

$$\bar{V}_{\infty} \equiv \frac{V_{\infty}}{N_{pop}} = 0.0018546N_{pop}^{-0.11} \quad (1)$$

$$\bar{V}_{\infty} \equiv \frac{V_{\infty}}{N_{pop}} = 0.0013101N_{pop}^{0.0778} \quad (2)$$

with the use of results of SIR simulations for  $n=13$  countries and regions and the results for  $n=11$  (without mainland China and South Korea), respectively.

In this paper we will study the influence of the volume of population  $N_{pop}$ , its density, and the level of urbanization  $N_{ubr}/N_{pop}$  ( $N_{ubr}$  is the number of people living in cities) on the accumulated number of laboratory-confirmed cases per capita in European countries and regions of Ukraine.

Since we are already in the second year of the pandemic, it is reasonable to compare the DCC numbers for the same periods in 2020 and 2021 to find some seasonal dependence. In this paper the comparisons for Argentina, Brazil, India, South Africa, Ukraine, EU, the UK, USA, and the whole world will be presented and discussed.

## 2. Data and averaged CC and DCC values

We will use the data set regarding the numbers of laboratory-confirmed COVID-19 cases in the regions of Ukraine accumulated at the time June 27, 2021, and registered by national statistics, [20]. The corresponding CC numbers (per 100 persons of population) and demographic data sets for Ukrainian regions [21] are shown in Table 1. As the information from the regions of Ukraine fully or partially occupied by the Russian Federation is inaccurate, we excluded from consideration Donetsk and Luhansk regions, Crimea, and Sevastopol. CC values vary from 2.25 (Kirovohrad oblast) to 8.84 (Chernivtsi oblast). Rather high CC values were registered in Zhytomyr, Khmelnytskyi, Kyiv (oblast and city), and Sumy regions that are not in the west of Ukraine with traditionally close ties with the EU countries.

The CC figures (per 1,000,000 persons of population) accumulated at the time June 28, 2021, and registered by JHU, [2] are shown in Table 2, which also contains the demographic data sets for European countries taken from [22-24]. The highest CC levels were registered in Andorra - 18%, Montenegro - 16%, Czech Republic - 15.5%, San Marino - 15%, Slovenia - 12.4%. The populations of these countries are not very high as well as populations of Iceland and Finland where the lowest CC values were registered (1.9% and 1.7%, respectively). More than a tenfold difference in values raises a reasonable question about its causes. They may be related to the population density or the level of urbanization. A possible relationship with these factors will be explored further.

The CC figures (per 1,000,000 persons of population) registered by JHU, [2] are shown in Table A1 (March 1 – August 31, 2020) and Table A2 (March 1 – August 31, 2021). We denote these values as  $V_j$  corresponding time moments  $t_j$  measured in days. It must be noted that JHU regularly updates its previous data. The data sets presented in Tables A1 and A2 correspond to the moment of time September 3, 2021 (in particular, some differences can be seen in Tables 2 and A2). Since the  $V_j$  values are random and demonstrate some weekly periodicity, we need proper smoothing. Like the approach proposed in [18, 25, 26], we will use the averaged CC values (calculated with the use of the nearest 7-day figures):

$$\bar{V}_i = \frac{1}{7} \sum_{j=i-3}^{j=i+3} V_j, \quad (3)$$

and averaged DCC values as follows:

$$\left. \frac{d\bar{V}}{dt} \right|_{t=t_i} \approx \frac{1}{2} (\bar{V}_{i+1} - \bar{V}_{i-1}) \quad (4)$$

Table 1. Demographic characteristics and the accumulated number of laboratory-confirmed COVID-19 cases in the regions of Ukraine as of June 27, 2021

Oblast (region)	Population, $N_{pop}$ , [21]	Urban population, $N_{ubr}$ , [21]	Population density (number of people per square kilometer), [21]	Accumulated number of laboratory-confirmed cases per hundred, [20]
Vinnitsia	1 545 416	799 385	58.29	4.67
Volyn	1 031 421	539 179	51.2	6.06
Dnipropetrovsk	3 176 648	2 668 744	99.54	4.33
Zhytomyr	1 208 212	716 457	40.5	7.43
Zakarpattia	1 253 791	465 904	98.13	4.98
Zaporizhzhia	1 687 401	1 306 231	62.08	6.30
Ivano-Frankivsk	1 368 097	606 764	98.23	6.38
Kyiv (oblast)	1 781 044	1 105 383	63.31	7.12
Kirovohrad	933 109	591 944	37.95	2.25
Lviv	2 512 084	1 534 040	115.06	5.52
Mykolaiv	1 119 862	768 022	45.53	6.34
Odesa	2 377 230	1 597 062	71.37	5.95
Poltava	1 386 978	867 201	48.25	5.70
Rivne	1 152 961	548 088	57.51	6.93
Sumy	1 068 247	741 430	44.82	7.43
Ternopil	1 038 695	473 727	75.14	6.82
Kharkiv	2 658 461	2 158 121	84.62	5.66
Kherson	1 027 913	631 317	36.12	3.53
Khmelnitskyi	1 254 702	720 752	60.82	7.18
Cherkasy	1 192 137	678 682	57.04	6.97
Chernivtsi	901 632	390 551	111.35	8.94
Chernihiv	991 294	649 063	31.11	5.92
Kyiv (city)	2 967 360	2 967 360	3536.78	7.22

Table 2. Demographic characteristics and the accumulated number of laboratory-confirmed COVID-19 cases in European countries as of June 28, 2021

Country	Population, [22]	Urbanization $N_{ubr}/N_{pop}$ , %, [23]	Population density (per square km), [24]	Total cases per million, [2]
Monaco	38682	100	1,547	65615.126
Holy See (Vatican City)	801	100	2,273	33374.536
Malta	514564	95	1,447	69330.229
San Marino	33785	97	561	150008.84
Netherlands	17059560	91	416	99886.646
Belgium	11482178	98	384	93486.963
United Kingdom	67141684	83	270	70284.988

Liechtenstein	37910	14	245	79555.288
Luxembourg	604245	91	243	112850.972
Germany	83124418	77	225	44576.917
Italy	60627291	70	207	70432.141
Switzerland	8525611	74	204	81198.962
Andorra	77006	88	183	179667.379
Denmark	5752126	88	136	50743.387
Czech Republic	10665677	74	136	155658.773
Poland	37921592	60	122	76088.436
Portugal	10256193	65	112	85856.051
Slovakia	5453014	54	111	71720.074
Albania	2882740	60	107	46046.633
Austria	8891388	66	106	72206.875
France	64990511	80	105	86325.089
Hungary	9707499	71	105	83645.21
Turkey	82340088	75	105	64196.94
Slovenia	2077837	55	104	123742.383
Moldova	4051944	43	99	63613.375
Spain	46692858	80	99	81117.733
Serbia	8802754	56	91	105279.579
Romania	19506114	54	89	56174.491
North Macedonia	2082957	58	83	74722.806
Greece	10522246	79	80	40416.745
Bosnia and Herzegovina	3323925	48	75	62481.731
Croatia	4156405	57	75	87610.845
Ireland	4818690	63	74	55002.07
Ukraine	44246156	69	73	52556.15
Bulgaria	7051608	75	63	60682.066
Belarus	9452617	78	46	44001.045
Montenegro	627809	67	44	159544.758
Lithuania	2801264	68	42	102372.965
Latvia	1928459	68	29	72759.97
Estonia	1322920	69	27	98740.406
Sweden	9971638	87	23	107819.278
Norway	5337962	82	17	24116.983
Finland	5522576	85	16	17176.113
Iceland	336713	94	3	19208.791

It must be noted that there are some evident irregularities in  $V_j$  values for the European Union. Figure corresponding to May 20, 2021, is smaller than  $V_j$  registered for the previous day. This fact yields unrealistic values of DCC for the time periods close to May 20, 2021.

### 3. Linear and nonlinear regressions, Fisher tests

The linear regression will be used to calculate the regression coefficient  $r$  and the coefficients  $a$  and  $b$  of corresponding straight lines, [27]:

$$CC = a + bx \tag{5}$$

where  $x$  is the volume of population  $N_{pop}$ , its density per square km, or the urbanization level  $N_{urb}/N_{pop}$ .

We will also use the F-test for the null hypothesis that says that the proposed linear relationship (5) fits the data sets. The experimental values of the Fisher function can be calculated with the use of the formula:

$$F = \frac{r^2(n-m)}{(1-r^2)(m-1)} \tag{6}$$

where  $m=2$  is the number of parameters in the regression equation, [27]. The corresponding experimental values  $F$  are shown in Table 3. They must be compared with the critical values  $F_C(k_1, k_2)$  of the Fisher function at a desired significance or confidence level ( $k_1 = m - 1$ ,  $k_2 = n - m$ , see, e.g., [30]). Comparisons of the values in the last two columns of Table 3 show that the critical values are much higher than the experimental  $F$  values. It

means that the data sets presented in Tables 1 and 2 do not support the linear relationship (5).

We will also check the non-linear dependences:

$$CC = \delta x^\eta \tag{7}$$

instead of (5) as it was done in [19, 31, 32].

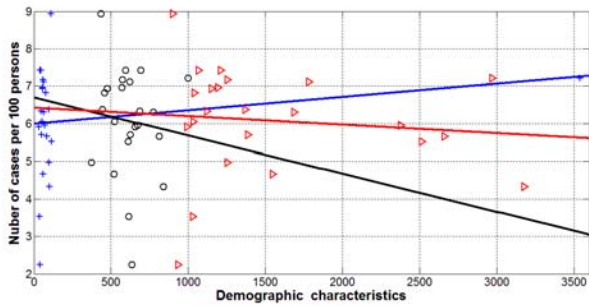
#### 4. Results

The CC values (per 100 persons) versus the volume of population (red "triangles"), its density (blue "crosses") and the urbanization level (black "circles") are shown in Figs. 1 and 2. We have used datasets from Tables 1 and 2. The best fitting lines were calculated by the least squares method [27] and shown by corresponding colors. The linear regression was used to calculate the regression coefficient  $r$  and the coefficients  $a$  and  $b$  of corresponding straight lines (5), [27].

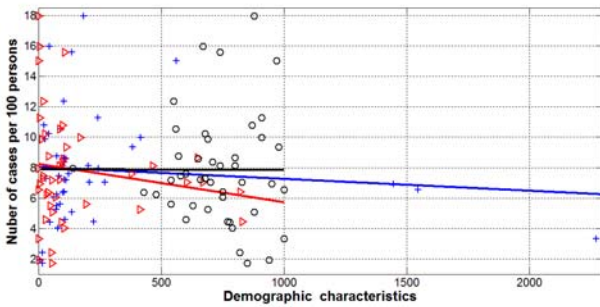
Table 3. Optimal values of parameters in eq. (5), correlation coefficients and the results of Fisher test applications.

Number of Figure, relationship, region	$N$	Correlation coefficient $R$	Optimal values of parameters $a$ in eq. (5)	Optimal values of parameters $b$ in eq. (5)	Experimental value of the Fisher function $F$ , eq. (6), $m=2$	Critical value of Fisher Function $F_C(1, n-2)$ for the confidence level 0.1, [30]
1, CC versus volume of population, Ukraine	23	-0.1082	6.4203	-2.2551e-007	0.2486	2.96
2, CC versus volume of population, Europe	44	-0.1607	8.2330	-2.5094e-008	1.1132	2.84
1, CC versus density of population, Ukraine	23	0.1792	5.9935	3.5699e-004	0.6967	2.96
2, CC versus density of population, Europe	44	-0.0953	8.0331	-7.7955e-004	0.3848	2.84
1, CC versus urbanization level, Ukraine	23	-0.1024	6.6956	-1.0123	0.2224	2.96
2, CC versus urbanization level, Europe	44	-0.0019	7.8739	-0.0394	1.5088e-004	2.84

Figs. 1 and 2 illustrate that there is no visible correlation between CC values and the volume of population both in the case of Ukrainian regions and European countries. We can see only a slight decrease of CC values with the increase of  $N_{pop}$ . The same tendency was revealed in [19] for the  $\bar{V}_\infty$  (see eq. (1)). Corresponding values of  $r$ ,  $a$ ,  $b$  and the number  $n$  of regions or countries taken for calculations are shown in Table 3.



**Figure 1.** Number of COVID-19 cases per 100 persons (CC) in the regions of Ukraine accumulated as of June 27, 2021 versus the volume of population  $N_{pop}/1000$  (red), its density per square km (blue), and the urbanization level  $1000 \cdot N_{urb}/N_{pop}$  (black). Markers represent values from Table 1. Best fitting lines (5) correspond to values shown in Table 3.



**Figure 2.** Number of COVID-19 cases per 100 persons (CC) in European countries accumulated as of June 28, 2021 versus the volume of population  $N_{pop}/100000$  (red), its density per square km (blue), and the urbanization level  $1000 \cdot N_{urb}/N_{pop}$  (black). Markers represent values from Table 2. Best fitting lines (5) correspond to values shown in Table 3.

Figs. 1, 2 and Table 3 illustrate that CC values do not correlate with the density of population and the urbanization level both in the case of Ukrainian regions and European countries. In Fig. 1 we can see only a slight increase of CC values with the increase of the density of population in Ukrainian regions. Opposite trend is visible

in Fig. 2 for European countries. The corresponding values of the correlation coefficient and parameter  $b$  have opposite signs. In Figs. 1 and 2 we can see a slight decrease of CC values with the increase of the urbanization level  $N_{urb}/N_{pop}$ .

The DCC values calculated with the use of (3), (4) and datasets presented in Tables A1 and A2 are shown in Figs. 3 and 4 for northern and southern regions, respectively. “Crosses” and “triangles” correspond to the years 2020 and 2021, respectively. March 2020 corresponded to the pandemic outbreak and its dynamics evidently differs from the situation in March 2021. The DCC values follow the straight lines in March 2020 (see Figs. 3 and 4 where the logarithmic scale was used). It means that the number of new cases increased exponentially versus time. It follows from the exponential dependence for the accumulated number of cases (or CC when the volume of population is fixed) versus time  $t$ , i.e.,

$$V = e^{\gamma t + \beta} \tag{8}$$

Where  $\gamma$  and  $\beta$  are constant parameters, see ,e.g., [18]. Differentiation of (8) yields the exponential growth also for the DCC values:

$$\frac{dV}{dt} = \gamma e^{\gamma t + \beta}$$

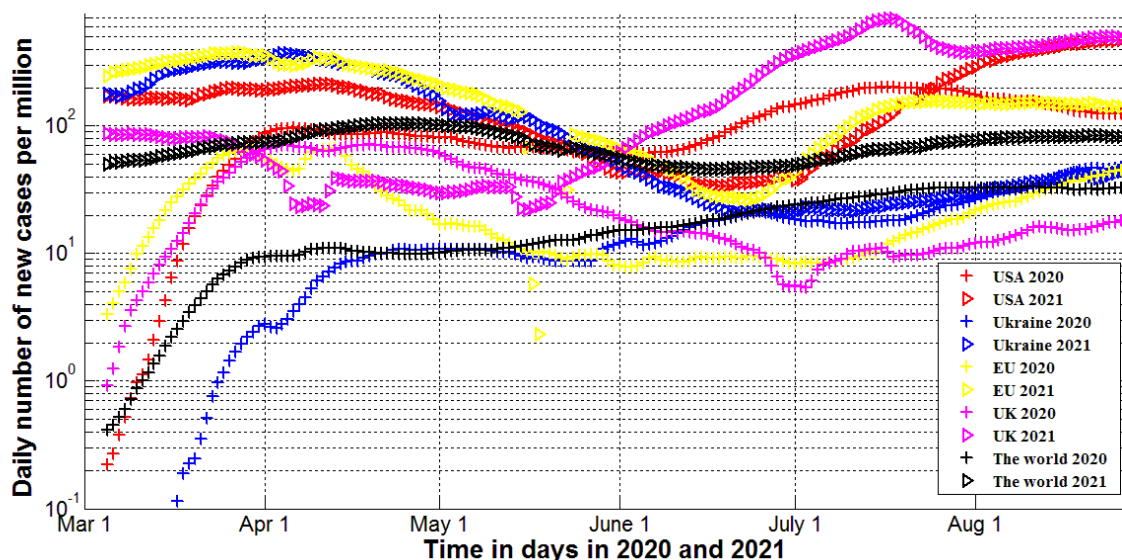
Then, corresponding averaged values calculated with the use of (3) and (4) and taken in logarithmic scale must follow the straight lines.

The slopes of DCC lines are different for different countries. The highest ones can be seen for the USA and Ukraine (see Fig. 3) and for Argentina, Brazil, and South Africa (see Fig. 4). The number of cases in the whole world had increased not so intensively. The duplicated time of the accumulated number of cases was estimated to be 2.31 days for the USA and 3.65 days for the whole world [18]. For the northern region, the DCC values started to decrease in June-July 2021 respectively, indicating the end of the first pandemic waves. Unfortunately, releasing the quarantine limitations in the vacation season 2020 caused new pandemic waves in northern countries and regions (see “crosses” in Fig. 3.). Especially intensive growth of DCC values can be seen in the USA and is probably connected with mass protests and ignoring the social distance in this country.

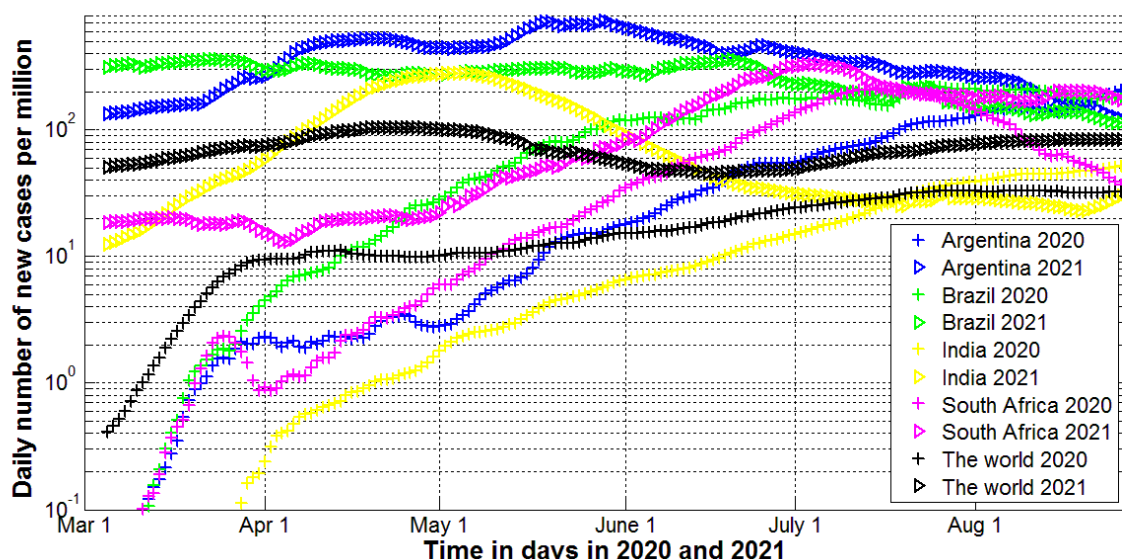
After some stabilization in April-May 2020, the DCC numbers for the whole world started to increase almost exponentially (see corresponding black “crosses” in Fig. 3 or 4). Some seasonal similarities in the world dynamics are visible in July and June (black “crosses” and “triangles” in Fig. 3 or 4 follow almost parallel lines). In southern region in April-June 2020, the DCC numbers

continue to increase almost exponentially with the almost equal slopes, smaller than in March 2020 but much intensively than in the whole world. Probably these differences in the “northern” and “southern” dynamics relate to the cold or rainy seasons and neglecting the quarantine restrictions in

the South. On the other hand, the pandemic dynamics in Brazil, Argentina and India significantly differ in 2020 and 2021 (compare “crosses” and “triangles” in Fig. 4). The maximum of DCC values in India probably is connected with a new “delta” strain of coronavirus emerged in this country.



**Figure 3.** Averaged daily number of new cases for the northern region in March-July, 2020 and 2021. “Crosses” correspond to the DCC values calculated for 2020 with the use of eqs. (3), (4) and Table A1. “Triangles” correspond to the DCC values calculated for 2021 with the use of eqs. (3), (4) and Table A2.



**Figure 4.** Averaged daily number of new cases for the southern region in March-July, 2020 and 2021. “Crosses” correspond to the DCC values calculated for 2020 with the use of eqs. (3), (4) and Table A1. “Triangles” correspond to the DCC values calculated for 2021 with the use of eqs. (3), (4) and Table A2.

Probably, a new strain is responsible for almost exponential increase of DCC values in May-July 2021 in the UK (see the magenta "triangles" in Fig. 3). Similar seasonal behavior of DCC values we can see in the case of EU and South Africa (corresponding yellow markers in Fig. 3 and magenta markers in Fig. 4 follow parallel lines in May-June 2020 and 2021).

We can see in Fig. 4 the results of national lockdowns established in Argentina and South Africa on March 19, 2020, and March 23, 2020, respectively [28, 29]. The daily number of new cases stabilized and even decreased. Further pandemic dynamics in these countries showed smaller DCC values in comparison with Brazil, where no lockdowns and strict quarantines were used. Nevertheless, in July 2021 the DCC numbers in Argentina became higher than in Brazil and much higher than in South Africa (see Table A2). And still we cannot conclude that the restriction policy in South Africa was the most effective since these countries have different climate conditions and structures of population.

## 5. Discussion

The results of Fisher tests are shown in Table 3. Comparisons of the values in the last two columns show that the critical values are much higher than the experimental  $F$  values. It means that the data sets presented in Tables 1 and 2 do not support the linear relationship (5). Application of the non-linear dependence (7) showed that corresponding values  $|r| \ll 1$  and  $F_C(k_1, k_2) > F$ . It means that hypothesis (7) was not also supported by the datasets presented in Tables 1 and 2.

Very different CC values registered in the regions of Ukraine and European countries could be a result of different coronavirus strains, quarantine measures, testing, tracing and isolating patients. One more reason may be the large number of unregistered cases observed in many countries [33-37]. Estimates for Ukraine and Qatar made in [33, 37] showed that the real number of cases is about 4-5 times higher than registered and reflected in the official statistics. Similar estimates can be made for the regions of Ukraine and other European countries.

If we apply the visibility coefficients (the ratios of real cases to the laboratory-confirmed ones)  $\beta_{10}=3.7$  and  $\beta_3=5.308$  calculated for the Ukraine and Qatar (see [33, 37]) and take accumulated numbers of laboratory-confirmed cases, the CC values could be estimated as 20% in Ukraine and 42% in Qatar (as of the end of June 2021). Such a high percentage of people who catch the coronavirus infection can significantly affect the evaluation of the vaccination efficiency. Probably this is why we did not see the effect of vaccination on the pandemic dynamics in Qatar in the summer of 2021, [38]. Moreover, Israel has experienced a fairly strong wave of

the COVID-19 pandemic in the summer and autumn of 2021 despite a rather high level of vaccination (the proportion of fully vaccinated people was approximately 60%), [39]. A recent statistical analysis [40] showed that vaccination does not decrease the DCC values. But the daily number of new deaths per capita (DDC) and deaths per case ratio (DDC/DCC) can be sufficiently reduced at high levels of vaccination.

The highest CC values registered in Europe are close to ones in other regions, e.g., Seychelles-15.8%, Bahrain-15.6%. The lowest CC values in Europe is much higher than in Vanuatu, Micronesia, Tanzania (around 0.001%), and China (0.006%). Very small CC values in the WHO Western Pacific region (e.g. Vietnam – 0.017%; Laos - 0.029%; South Korea, Cambodia - 0.3%; and 0.63% for Japan) need special investigations, but let us express some hypotheses.

First, the COVID-19 pandemic probably started in this region in August 2019, [18]. It means that first cases were not identified and registered during at least 4 months. Probably these first cases were not very severe, and the symptoms were not so pronounced. Presumably mutations of the coronavirus made it more pathogenic and sick people became more noticeable in December 2019. But previous cases were not taken into account in the statistics. Recent DNA investigations of East Asia population reported the presence of coronavirus around 20,000 years ago [41]. Probably, the population of this region had a collective immunity to pathogens similar to Covid-19 before the pandemic.

Very small CC values in mainland China and Hong Kong can be explained by very high values of the test per case ratio. E.g., as of August 31, 2021 this value was 680.4 in Hong Kong and exceeded the critical value 520, which was estimated to be enough to control the COVID-19 pandemic completely (DCC and DDC figures tend to zero), [40].

## 6. Conclusions

The CC values in Europe do not show any visible dependence on the volume of population, its density and the urbanization level. More or less similar seasonal behavior of DCC values we can see only in the case of the EU, South Africa and the whole world. The highest CC values registered in Europe are close to ones in other regions, the lowest ones are much higher than in Vanuatu, Micronesia, Tanzania, and China. Very small CC values in the WHO Western Pacific region need special investigations. Unfortunately, we cannot conclude where the quarantine restrictions were the most effective since the dynamics of the pandemic are influenced by many other factors not considered in this study tests per capita and tests per case ratios, the emergence of new strains and

the large number of unreported cases. Probably, it could be the subject of further research.

## Appendix A. The accumulated numbers of laboratory-confirmed COVID-19 cases per million (CC) reported by JHU, [2]

Table A1. CC values for the period March 1- August 31, 2020.

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	World
2020-03-01	0	0.009	0.002	0	0.096	0	4.723	1.378	11.225
2020-03-02	0	0.009	0.004	0	0.165	0	5.828	1.965	11.477
2020-03-03	0.022	0.009	0.004	0	0.222	0.023	7.178	2.771	11.807
2020-03-04	0.022	0.019	0.02	0	0.321	0.023	9.124	3.607	12.1
2020-03-05	0.022	0.019	0.022	0.017	0.553	0.023	12.058	4.325	12.457
2020-03-06	0.044	0.061	0.022	0.017	0.712	0.023	15.524	5.483	12.954
2020-03-07	0.175	0.061	0.024	0.017	1.211	0.023	19.996	6.29	13.474
2020-03-08	0.263	0.093	0.028	0.05	1.559	0.023	25.285	7.081	13.976
2020-03-09	0.263	0.117	0.031	0.05	1.784	0.023	31.812	9.237	14.505
2020-03-10	0.373	0.145	0.04	0.117	2.349	0.023	38.002	13.034	15.118
2020-03-11	0.417	0.178	0.044	0.217	3.445	0.023	48.409	19.074	16.092
2020-03-12	0.417	0.243	0.052	0.283	4.764	0.023	55.735	26.244	16.828
2020-03-13	0.68	0.706	0.059	0.4	6.665	0.069	78.481	33.281	18.654
2020-03-14	0.746	0.706	0.073	0.633	8.945	0.069	95.054	38.618	20.062
2020-03-15	0.987	0.757	0.081	0.849	9.648	0.069	111.512	45.113	21.494
2020-03-16	1.228	0.935	0.085	1.033	14.055	0.161	134.27	54.129	23.373
2020-03-17	1.491	1.5	0.102	1.033	19.561	0.322	156.634	65.418	25.4
2020-03-18	1.732	1.738	0.112	1.932	27.542	0.322	184.521	80.168	27.888
2020-03-19	2.127	2.902	0.139	2.498	41.04	0.368	222.17	95.796	31.328
2020-03-20	2.807	3.706	0.175	3.364	60.165	0.667	261.283	114.24	35.25
2020-03-21	3.464	4.771	0.237	3.997	78.173	1.081	303.137	132.054	39.33
2020-03-22	5.833	7.225	0.284	4.563	104.826	1.679	341.935	152.403	43.782
2020-03-23	6.6	8.991	0.358	6.695	138.582	1.679	391.719	186.843	49.213
2020-03-24	8.486	10.5	0.385	9.227	170.479	2.232	437.215	221.766	54.427
2020-03-25	8.486	11.935	0.472	11.808	206.77	3.336	496.538	261.6	60.908
2020-03-26	11.007	13.949	0.522	15.439	260.406	4.509	566.14	307.446	68.903
2020-03-27	12.915	15.968	0.637	19.486	316.546	7.132	634.569	355.08	77.169
2020-03-28	15.13	18.244	0.708	19.769	375.51	8.19	705.821	396.762	85.705
2020-03-29	16.336	19.888	0.735	21.318	432.278	10.928	762.421	439.162	93.256
2020-03-30	17.98	21.398	0.898	22.085	498.593	12.607	821.351	502.602	101.546
2020-03-31	23.111	26.716	1.003	22.534	577.628	14.839	889.36	569.076	111.304
2020-04-01	23.111	31.945	1.434	22.984	674.595	18.267	955.887	642	121.853
2020-04-02	24.843	37.59	1.825	24.35	771.395	20.636	1019.339	714.266	132.396
2020-04-03	27.738	42.319	1.842	25.066	868.438	24.662	1086.972	787.293	143.032
2020-04-04	31.816	48.413	2.212	26.398	965.718	28.182	1100.336	847.008	150.545
2020-04-05	31.816	52.011	2.575	27.564	1055.515	30.092	1146.305	900.522	159.611
2020-04-06	34.075	56.829	3.429	28.08	1149.804	30.345	1190.304	978.461	168.931

2020-04-07	35.697	65.581	3.812	29.13	1242.257	33.635	1225.028	1058.892	177.804	
2020-04-08	37.605	75.563	4.246	30.728	1336.07	38.374	1282.849	1134.588	188.391	
2020-04-09	39.359	84.545	4.826	32.211	1444.041	43.527	1338.489	1206.516	199.427	
2020-04-10	43.306	91.769	5.453	33.36	1547.38	50.682	1390.423	1270.542	210.269	
2020-04-11	43.306	96.858	6.061	33.776	1634.738	57.768	1435.408	1323.513	219.706	
2020-04-12	46.968	103.704	6.606	36.191	1716.609	63.888	1586.769	1375.399	234.936	
2020-04-13	48.415	109.489	7.502	37.84	1797.527	71.365	1624.156	1437.05	243.95	
2020-04-14	49.928	118.05	8.244	40.222	1884.09	77.576	1688.462	1500.797	254.652	
2020-04-15	53.568	132.341	8.843	41.737	1960.41	86.595	1736.354	1575.569	264.507	
2020-04-16	56.374	142.177	9.638	43.386	2050.529	95.728	1810.206	1653.904	276.633	
2020-04-17	58.523	157.397	10.3	46.351	2149.852	107.254	1856.972	1727.063	287.821	
2020-04-18	60.475	171.304	11.283	50.531	2233.678	117.469	1892.489	1796.499	297.619	
2020-04-19	62.251	180.632	12.642	52.597	2311.962	125.36	1933.606	1853.091	307.391	
2020-04-20	64.487	190.394	13.305	54.962	2401.534	131.365	1962.64	1924.433	316.985	
2020-04-21	66.461	201.31	14.411	57.71	2479.41	140.912	1997.411	1994.44	326.606	
2020-04-22	68.939	213.824	15.336	60.541	2566.252	151.656	2035.236	2075.15	336.935	
2020-04-23	75.319	233.82	16.562	65.837	2667.215	164.953	2065.536	2150.919	347.643	
2020-04-24	79.091	252.545	17.604	70.284	2764.318	175.927	2073.025	2223.947	358.33	
2020-04-25	82.884	277.223	18.862	72.632	2855.572	186.924	2101.678	2279.132	368.789	
2020-04-26	85.34	294.869	20.016	75.714	2935.136	198.243	2124.453	2330.05	377.849	
2020-04-27	87.774	315.178	21.136	79.827	3006.37	207.262	2150.044	2399.017	386.769	
2020-04-28	90.493	342.23	22.48	83.208	3080.188	216.487	2174.483	2468.32	396.378	
2020-04-29	93.957	372.371	23.727	89.104	3159.665	226.978	2192.708	2548.224	406.18	
2020-04-30	97.093	407.428	25.02	94.051	3247.39	239.401	2212.601	2621.002	416.788	
2020-05-01	99.373	430.864	26.738	99.114	3352.242	249.869	2231.663	2690.35	428	
2020-05-02	102.64	453.752	28.491	105.526	3434.389	262.522	2247.824	2737.706	438.044	
2020-05-03	104.877	475.837	30.504	112.971	3507.444	274.071	2260.981	2781.352	447.565	
2020-05-04	107.157	507.586	33.326	120.249	3579.739	283.688	2273.119	2830.951	457.442	
2020-05-05	110.074	539.526	35.453	126.112	3653.415	292.108	2289.24	2885.036	467.677	
2020-05-06	114.196	591.658	38.027	130.042	3727.212	303.312	2313.579	2941.277	479.125	
2020-05-07	117.77	634.473	40.441	137.104	3809.605	314.976	2332.177	2996.564	490.383	
2020-05-08	12	3.033	686.442	42.841	148.146	3890.196	326.571	2349.675	3041.31	501.829
2020-05-09	126.65	729.279	45.075	156.89	3965.816	338.419	2362.875	3072.832	512.647	
2020-05-10	132.308	760.299	48.199	166.8	4022.305	350.428	2373.598	3106.875	522.15	
2020-05-11	137.658	792.52	50.788	177.409	4080.263	359.999	2388.994	3159.494	531.88	
2020-05-12	143.907	832.801	53.317	189.034	4149.139	368.626	2402.635	3209.269	542.613	
2020-05-13	150.836	888.518	56.017	201.093	4210.515	377.874	2414.616	3257.651	553.417	
2020-05-14	156.427	949.398	58.846	212.168	4291.067	387.583	2427.586	3296.034	565.625	
2020-05-15	163.992	1029.429	61.564	225.242	4365.36	398.695	2439.576	3332.995	577.79	
2020-05-16	171.14	1091.206	65.055	239.083	4437.85	410.842	2449.635	3363.374	589.77	
2020-05-17	176.907	1126.577	68.679	258.402	4493.089	420.804	2456.715	3390.145	599.681	
2020-05-18	183.551	1193.345	72.002	273.692	4560.34	428.281	2465.469	3427.927	610.999	
2020-05-19	193.155	1270.53	76.413	286.466	4623.356	434.262	2476.86	3472.761	623.293	
2020-05-20	203.549	1362.56	80.399	299.84	4691.617	442.406	2487.793	3512.522	636.261	
2020-05-21	217.757	1449.049	84.847	318.727	4769.018	453.357	2497.474	3549.967	649.803	

2020-05-22	233.501	1546.262	89.56	335.182	4840.057	463.526	2511.336	3579.891	663.31
2020-05-23	248.938	1623.405	94.318	355.468	4903.434	473.465	2520.265	3602	676.593
2020-05-24	264.791	1697.3	99.422	376.12	4963.74	482.805	2526.162	3621.866	688.553
2020-05-25	276.894	1751.914	104.025	393.308	5019.797	488.764	2531.511	3645.514	699.557
2020-05-26	290.051	1828.196	108.219	404.117	5078.86	496.563	2540.775	3669.837	711.47
2020-05-27	305.509	1924.456	113.453	431.981	5134.583	503.948	2548.356	3696.359	724.517
2020-05-28	322.371	2047.904	118.692	456.397	5201.627	514.921	2567.634	3721.811	739.644
2020-05-29	338.093	2173.74	124.508	486.992	5275.153	524.791	2578.401	3743.92	754.985
2020-05-30	355.525	2329.23	130.491	515.756	5346.138	533.832	2589.432	3760.15	772.317
2020-05-31	369.492	2405.91	136.793	544.336	5403.159	544.599	2595.175	3775.838	785.814
2020-06-01	381.859	2460.108	142.363	572.216	5455.466	565.075	2601.342	3797.009	798.006
2020-06-02	401.681	2595.327	148.694	596.449	5520.05	572.736	2606.058	3818.561	813.491
2020-06-03	422.49	2729.13	155.607	624.979	5579.696	584.009	2606.072	3838.339	827.998
2020-06-04	442.86	2873.644	162.704	679.391	5644.749	597.72	2623.355	3856.489	844.628
2020-06-05	461.279	3017.714	169.501	723.394	5721.06	610.627	2633.644	3872.763	861.289
2020-06-06	482.833	3144.237	176.992	765.681	5784.565	623.487	2643.311	3884.404	878.273
2020-06-07	499.805	3232.613	184.789	804.187	5838.414	634.944	2650.565	3894.931	892.537
2020-06-08	517.916	3305.765	190.847	847.39	5891.328	645.941	2657.931	3910.97	905.54
2020-06-09	542.935	3455.727	198.18	882.566	5946.544	655.189	2666.63	3927.963	921.424
2020-06-10	569.818	3609.531	205.686	923.037	6009.962	667.521	2675.543	3945.351	938.583
2020-06-11	600.208	3751.648	213.53	975.451	6079.547	683.418	2684.768	3960.115	956.115
2020-06-12	630.709	3873.063	221.753	1031.395	6154.125	699.729	2695.7	3975.568	972.46
2020-06-13	664.279	3974.486	230.314	1094.834	6229.856	717.26	2704.379	3988.587	989.634
2020-06-14	692.39	4054.442	238.569	1166.484	6286.75	732.766	2711.316	4000.418	1006.429
2020-06-15	718.877	4150.926	246.224	1224.693	6346.306	748.525	2717.602	4015.534	1021.622
2020-06-16	749.005	4314.1	254.1	1271.343	6417.396	764.008	2727.28	4031.412	1039.673
2020-06-17	779.55	4464.515	263.344	1339.263	6498.714	781.884	2737.747	4046.059	1057.929
2020-06-18	822.483	4570.897	273.094	1397.189	6584.433	801.37	2750.894	4061.013	1075.843
2020-06-19	867.652	4826.844	283.512	1460.894	6679.184	822.581	2760.42	4075.44	1098.681
2020-06-20	903.481	4988.84	294.566	1543.603	6776.146	842.367	2768.868	4085.204	1118.674
2020-06-21	938.148	5062.496	305.21	1620.566	6851.69	859.529	2775.572	4094.353	1134.889
2020-06-22	985.203	5170.579	315.927	1691.982	6948.244	875.518	2782.498	4107.431	1152.586
2020-06-23	1035.021	5354.865	327.386	1767.23	7059.599	894.958	2792.974	4120.362	1173.777
2020-06-24	1093.084	5554.521	339.531	1861.963	7167.368	916.837	2803.84	4131.754	1195.697
2020-06-25	1150.226	5739.026	351.943	1971.537	7288.498	939.889	2813.912	4141.973	1218.342
2020-06-26	1213.507	5958.005	365.257	2075.048	7426.669	965.679	2826.553	4151.341	1242.686
2020-06-27	1266.154	6138.819	379.543	2195.13	7550.815	987.696	2835.876	4160.636	1265.31
2020-06-28	1314.152	6281.235	393.508	2300.623	7673.17	1008.953	2841.236	4166.604	1286.122
2020-06-29	1365.352	6393.631	406.801	2402.718	7797.223	1024.644	2849.215	4175.693	1305.829
2020-06-30	1414.951	6551.794	420.179	2518.387	7936.658	1041.116	2857.191	4181.617	1327.994
2020-07-01	1473.43	6770.081	433.929	2653.693	8092.313	1056.53	2867.173	4182.54	1355.626
2020-07-02	1533.598	6994.878	448.931	2799.058	8262.432	1077.166	2876.731	4182.628	1382.288
2020-07-03	1595.98	7192.188	465.273	2950.002	8416.681	1097.504	2886.239	4189.988	1407.86
2020-07-04	1652.771	7369.403	483.107	3130.759	8553.932	1118.738	2893.708	4199.151	1432.468
2020-07-05	1706.251	7491.141	500.508	3276.873	8706.365	1138.063	2899.263	4206.761	1455.828

2020-07-06	1763.963	7585.672	516.477	3426.285	8835.845	1151.522	2909.451	4212.024	1476.655
2020-07-07	1829.284	7797.384	532.806	3595.067	9018.057	1164.612	2916.262	4220.586	1503.501
2020-07-08	1908.309	8005.666	550.661	3741.798	9198.64	1183.822	2926.066	4229.925	1530.7
2020-07-09	1988.628	8204.826	569.683	3969.538	9386.403	1202.871	2935.39	4239.353	1559.502
2020-07-10	2062.456	8415.337	589.142	4175.194	9590.83	1221.989	2946.169	4247.035	1589.053
2020-07-11	2138.082	8597.693	609.672	4399.987	9771.102	1240.969	2954.271	4259.145	1616.538
2020-07-12	2196.342	8713.73	630.292	4600.813	9946.6	1257.212	2959.848	4268.675	1640.95
2020-07-13	2264.294	8808.527	650.744	4793.245	10123.612	1271.89	2972.525	4276.548	1665.269
2020-07-14	2344.218	9004.126	671.864	4968.056	10328.012	1286.752	2980.148	4294.728	1693.49
2020-07-15	2437.101	9190.693	695.314	5180.524	10532.548	1306.261	2990.893	4302.616	1722.879
2020-07-16	2516.85	9402.863	720.414	5399.904	10760.429	1326.069	3003.914	4312.102	1754.797
2020-07-17	2615.916	9562.573	745.714	5622.631	10977.412	1345.072	3017.749	4322.174	1785.626
2020-07-18	2686.587	9695.905	773.485	5843.893	11165.256	1365.018	3025.869	4334.328	1815.62
2020-07-19	2779.36	9805.857	802.497	6067.886	11346.852	1382.135	3032.005	4344.972	1842.718
2020-07-20	2867.485	9900.518	829.145	6222.778	11533.404	1398.009	3053.7	4353.563	1869.016
2020-07-21	2984.663	10092.15	856.23	6358.849	11727.03	1413.814	3066.051	4360.088	1898.681
2020-07-22	3111.445	10409.26	889.041	6577.863	11939.036	1433.162	3081.098	4368.342	1934.225
2020-07-23	3245.792	10689.46	924.429	6796.11	12144.629	1453.269	3099.397	4379.763	1970.151
2020-07-24	3366.237	10950.64	959.534	7028.347	12364.862	1476.367	3117.499	4391.038	2005.84
2020-07-25	3471.794	11189.66	994.421	7231.605	12559.96	1502.686	3128.159	4402.327	2038.104
2020-07-26	3563.712	11304.51	1030.29	7418.691	12724.618	1524.404	3136.5	4413.323	2065.158
2020-07-27	3670.935	11413.32	1062.196	7536.875	12895.184	1543.614	3164.222	4423.41	2093.911
2020-07-28	3801.159	11604.05	1099.224	7657.324	13094.67	1565.102	3179.079	4431.517	2126
2020-07-29	3924.85	11926.84	1135.318	7846.558	13310.554	1589.212	3199.149	4443.276	2163.047
2020-07-30	4064.678	12197.11	1173.199	8030.529	13513.206	1617.326	3222.329	4455.694	2198.63
2020-07-31	4194.684	12441.9	1217.15	8213.967	13719.607	1642.724	3245.254	4468.639	2235.543
2020-08-01	4309.603	12654.02	1256.431	8382.3	13888.416	1670.446	3257.14	4479.914	2267.078
2020-08-02	4427.483	12774.58	1294.448	8518.787	14025.295	1696.949	3265.519	4490.866	2296.405
2020-08-03	4533.259	12852.35	1331.802	8608.341	14161.969	1720.416	3302.159	4504.677	2322.625
2020-08-04	4682.187	13093.49	1369.486	8682.556	14338.516	1745.699	3328.751	4514.573	2355.38
2020-08-05	4838.9	13360.56	1409.877	8825.106	14502.119	1775.354	3353.627	4527.856	2390.498
2020-08-06	5003.637	13608.88	1454.759	8963.46	14680.387	1806.32	3381.702	4541.99	2426.708
2020-08-07	5167.695	13843.61	1498.922	9084.908	14858.522	1840.898	3413.577	4555.185	2462.551
2020-08-08	5302.196	14077.12	1545.139	9213.351	15021.125	1875.776	3427.092	4566.401	2495.38
2020-08-09	5404.99	14184.65	1589.68	9324.457	15158.608	1904.142	3438.472	4582.718	2523.912
2020-08-10	5566.57	14287.68	1628.147	9386.73	15301.602	1928.183	3480.523	4594.711	2552.605
2020-08-11	5721.002	14531.43	1671.898	9428.551	15445.795	1956.044	3504.685	4611.572	2585.313
2020-08-12	5889.029	14789.17	1719.981	9475.351	15614.126	1990.116	3535.735	4626.805	2620.441
2020-08-13	6053.438	15069.98	1766.308	9541.072	15768.268	2027.661	3575.55	4643.636	2657.168
2020-08-14	6193.003	15306.64	1812.764	9645.582	15964.519	2068.635	3613.196	4665.056	2695.737
2020-08-15	6339.103	15500.92	1858.716	9720.746	16105.552	2111.841	3635.912	4680.333	2727.194
2020-08-16	6459.022	15608.88	1900.133	9782.236	16223.336	2150.836	3653.689	4696.622	2754.428
2020-08-17	6558.943	15699.41	1939.618	9824.557	16333.418	2185.736	3703.717	4707.192	2780.801
2020-08-18	6708.924	15922.7	1985.959	9862.164	16468.699	2223.604	3734.702	4723.51	2813.601
2020-08-19	6855.682	16153.08	2035.96	9927.385	16610.837	2269.731	3775.673	4735.694	2849.102

2020-08-20	7036.031	16364.87	2085.407	9992.006	16743.126	2319.24	3820.824	4753.214	2883.715
2020-08-21	7214.934	16506.72	2135.555	10048.6	16889.839	2368.427	3870.067	4768.755	2916.887
2020-08-22	7385.066	16740.52	2185.245	10110.34	17019.193	2423.389	3894.099	4788.284	2950.442
2020-08-23	7502.419	16849.97	2229.315	10155.775	17122.063	2470.367	3917.901	4803.648	2976.621
2020-08-24	7693.469	16929.78	2273.075	10183.705	17231.647	2513.043	3980.181	4817.973	3005.219
2020-08-25	7885.791	17150.04	2314.142	10209.804	17352.861	2552.499	4019.82	4835.581	3036.206
2020-08-26	8117.121	17370.42	2375.637	10254.506	17488.547	2591.701	4056.583	4852.382	3072.242
2020-08-27	8338.672	17577.13	2431.088	10297.559	17624.897	2637.943	4122.714	4874.99	3108.296
2020-08-28	8595.591	17780	2485.969	10328.304	17765.57	2695.665	4178.303	4894.006	3144.315
2020-08-29	8797.977	17973.23	2542.493	10368.593	17893.987	2754.998	4208.033	4910.28	3177.819
2020-08-30	8955.567	18048.74	2598.838	10410.313	17997.335	2805.128	4233.998	4935.966	3205.883
2020-08-31	9159.686	18263.51	2649.018	10443.374	18103.554	2855.787	4308.295	4956.712	3239.261

Table A2. CC values for the period March 1- August 31, 2021.

	Argentina	Brazil	India	South Africa	United States	Ukraine	European Union	United Kingdom	World
2021-03-01	46310.38	49473.484	7983.677	25215.001	86236.816	32206.955	50428.302	61493.424	14538.187
2021-03-02	46456.261	49753.516	7994.434	25229.258	86408.469	32332.569	50499.301	61587.417	14577.623
2021-03-03	46628.497	50088.591	8006.926	25253.358	86610.152	32501.755	50809.024	61681.542	14633.621
2021-03-04	46791.459	50439.546	8019.01	25276.741	86814.618	32735.934	51112.237	61778.952	14691.173
2021-03-05	46964.485	50792.337	8032.132	25298.609	87014.125	32972.275	51414.845	61867.271	14747.925
2021-03-06	47071.051	51117.623	8045.591	25319.045	87189.14	33185.242	51680.978	61956.968	14800.071
2021-03-07	47135.121	51493.84	8058.939	25333.402	87312.514	33352.818	51901.468	62034.086	14846.838
2021-03-08	47246.028	51644.877	8069.982	25344.028	87447.368	33483.492	52052.504	62104.797	14884.758
2021-03-09	47406.249	51975.56	8082.843	25360.533	87620.622	33560.885	52323.298	62190.844	14937.437
2021-03-10	47574.934	52348.824	8099.245	25385.132	87794.511	33709.964	52679.035	62279.119	14996.736
2021-03-11	47754.823	52701.227	8115.956	25409.682	87982.141	33921.32	53008.809	62379.329	15057.295
2021-03-12	47926.928	53101.534	8133.813	25430.084	88166.909	34221.434	53338.88	62477.325	15119.429
2021-03-13	48064.586	53457.517	8151.984	25455.749	88326.205	34529.163	53662.138	62559.677	15177.093
2021-03-14	48145.65	53662.252	8170.852	25472.504	88441.171	34738.749	53919.246	62628.511	15222.862
2021-03-15	48280.808	53831.599	8188.429	25482.714	88611.019	34897.076	54108.38	62703.723	15267.149
2021-03-16	48461.377	54223.788	8209.172	25498.253	88773.244	35120.925	54437.755	62782.351	15327.241
2021-03-17	48643.459	54645.778	8234.915	25523.752	88951.415	35395.18	54807.732	62867.284	15395.746
2021-03-18	48826.068	55052.248	8263.425	25548.135	89132.819	35743.561	55221.57	62960.119	15466.051
2021-03-19	49004.992	55475.485	8292.815	25572.484	89318.091	36110.208	55598.206	63031.548	15537.38
2021-03-20	49154.666	55844.978	8324.282	25595.435	89484.87	36463.949	55940.152	63114.223	15600.729
2021-03-21	49243.076	56068.228	8357.977	25612.939	89586.481	36722.284	56224.052	63192.748	15654.5
2021-03-22	49383.431	56298.576	8387.197	25622.916	89740.98	36905.919	56477.427	63272.022	15707.409
2021-03-23	49589.654	56684.069	8421.115	25631.41	89902.303	37171.961	56789.691	63351.442	15772.738
2021-03-24	49771.649	57104.605	8459.493	25648.864	90163.115	37500.165	57253.67	63433.926	15853.208
2021-03-25	49952.284	57572.648	8501.92	25674.746	90366.01	37885.793	57712.56	63525.954	15935.938
2021-03-26	50235.931	57966.328	8546.6	25699.995	90598.433	38305.101	58148.445	63617.367	16017.395
2021-03-27	50462.613	58367.967	8591.608	25723.096	90787.214	38708.305	58535.198	63674.678	16091.638

2021-03-28	50620.663	58575.104	8640.423	25739.168	90917.028	38985.321	58826.128	63732.546	16151.329
2021-03-29	50927.948	58757.011	8680.764	25748.295	91125.108	39180.136	59051.922	63802.67	16209.526
2021-03-30	51150.595	59151.855	8719.145	25760.886	91309.626	39425.105	59414.94	63862.356	16281.728
2021-03-31	51502.656	59575.41	8771.053	25784.569	91510.173	39686.108	59898.967	63922.687	16368.5
2021-04-01	51819.063	60001.11	8829.519	25806.121	91747.9	40092.878	60354.834	63989.616	16458.901
2021-04-02	52036.184	60329.335	8893.483	25827.323	91957.825	40553.068	60734.346	64039.786	16539.38
2021-04-03	52263.874	60532.682	8960.405	25840.264	92147.846	41023.68	60981.865	64089.986	16606.643
2021-04-04	52482.158	60679.224	9034.725	25847.975	92253.402	41342.498	61355.33	64125.247	16676.861
2021-04-05	52781.834	60813.084	9104.325	25855.503	92485.809	41579.46	61525.723	64166.752	16738.988
2021-04-06	53239.451	61219.54	9187.385	25862.781	92668.057	41887.695	61724.435	64201.998	16815.732
2021-04-07	53722.701	61652.38	9278.377	25875.372	92893.433	42245.094	61997.326	64243.006	16902.679
2021-04-08	54241.999	62057.309	9373.085	25898.123	93133.389	42694.771	62528.619	64288.807	17009.326
2021-04-09	54771.098	62493.383	9477.422	25919.225	93381.83	43150.268	62840.243	64218.624	17104.341
2021-04-10	55196.899	62829.057	9587.138	25940.627	93582.143	43554.875	63085.139	64258.4	17188.73
2021-04-11	55531.549	63002.038	9708.36	25956.132	93721.845	43836.423	63515.84	64283.764	17276.455
2021-04-12	55957.745	63169.263	9824.433	25967.041	93932.355	44020.126	63724.65	64337.805	17354.715
2021-04-13	56549.796	63553.322	9956.75	25981.148	94166.526	44291.805	64080.633	64374.531	17453.724
2021-04-14	57101.414	63896.851	10100.813	26007.78	94393.019	44629.465	64470.088	64411.61	17557.473
2021-04-15	57649.568	64238.796	10256.799	26030.63	94616.238	45010.284	64833.206	64452.163	17661.21
2021-04-16	58295.801	64639.621	10425.23	26054.347	94856.738	45415.236	65177.427	64493.317	17769.764
2021-04-17	58715.024	64955.687	10612.823	26076.415	95014.532	45762.72	65457.527	64526.642	17869.822
2021-04-18	59071.711	65156.534	10809.321	26094.552	95141.054	46002.144	65650.266	64554.263	17956.845
2021-04-19	59520.36	65299.642	10995.316	26106.944	95345.626	46154.674	65829.964	64599.039	18044.935
2021-04-20	60159.423	65623.862	11207.14	26121.15	95528.702	46363.109	66161.461	64636.132	18153.403
2021-04-21	60728.035	65996.392	11432.949	26147.282	95717.513	46645.784	66504.543	64671.67	18266.408
2021-04-22	61324.801	66207.511	11671.874	26170.816	95919.592	47022.094	66843.529	64712.223	18380.644
2021-04-23	61936.214	66530.441	11920.75	26198.08	96107.102	47353.381	67150.895	64752.6	18495.393
2021-04-24	62401.505	66862.867	12171.711	26221.147	96267.783	47648.802	67385.58	64783.712	18599.668
2021-04-25	62730.674	67015.077	12425.04	26239.484	96364.363	47834.185	67577.184	64809.119	18691.394
2021-04-26	63142.748	67148.895	12656.862	26253.624	96507.21	47953.448	67721.078	64840.187	18778.092
2021-04-27	63701.778	67486.008	12915.887	26268.281	96659.91	48138.348	67997.654	64879.728	18885.347
2021-04-28	64221.843	67858.57	13188.102	26289.099	96825.583	48361.714	68298.19	64910.971	19000.393
2021-04-29	64793.108	68182.828	13465.519	26307.187	97000.555	48632.035	68578.125	64947.023	19114.391
2021-04-30	65284.712	68502.151	13754.015	26335.067	97174.503	48866.466	68810.174	64982.166	19226.027
2021-05-01	65646.551	68815.076	14035.69	26362.248	97310.899	49065.975	69014.166	65010.184	19327.184
2021-05-02	65896.388	68950.291	14299.833	26382.601	97399.179	49185.998	69129.189	65034.726	19412.791
2021-05-03	66245.466	69065.336	14556.266	26397.54	97550.843	49252.232	69252.445	65059.269	19499.339
2021-05-04	66820.787	69426.838	14830.519	26417.31	97673.165	49311.795	69484.651	65088.357	19601.885
2021-05-05	67348.768	69769.349	15126.506	26451.835	97807.524	49373.773	69722.259	65119.952	19708.704
2021-05-06	67876.902	70112.256	15423.754	26487.627	97950.296	49515.467	69950.603	65158.335	19819.196
2021-05-07	68371.401	70480.894	15711.593	26525.201	98095.038	49711.686	70159.111	65194.842	19924.916
2021-05-08	68766.613	70777.305	16001.103	26525.201	98196.019	49915.082	70327.378	65224.985	20024.667
2021-05-09	69020.572	70959.137	16264.122	26591.305	98260.417	50041.639	70417.892	65250.936	20106.107
2021-05-10	69401.686	71076.898	16500.91	26610.108	98370.914	50109.368	70526.506	65285.8	20185.07
2021-05-11	69971.262	71416.698	16750.959	26635.89	98472.027	50163.065	70729.026	65322.306	20278.868

2021-05-12	70507.926	71775.083	17011.276	26681.841	98579.64	50270.25	70903.902	65355.969	20375.397
2021-05-13	71089.672	72123.654	17257.538	26735.487	98694.011	50429.774	71067.962	65395.011	20467.509
2021-05-14	71689.661	72523.368	17491.567	26787.8	98820.944	50606.598	71210.803	65427.237	20558.68
2021-05-15	72160.412	72836.503	17714.882	26833.602	98907.63	50765.777	71324.117	65457.439	20638.417
2021-05-16	72518.919	73026.738	17916.823	26876.655	98958.331	50852.004	71421.36	65485.676	20708.063
2021-05-17	73147.786	73167.621	18105.951	26905.918	99044.302	50903.998	71499.607	65514.896	20776.641
2021-05-18	73927.139	73520.179	18297.807	26945.14	99127.758	51001.106	71640.513	65480.266	20855.694
2021-05-19	74796.589	73890.372	18495.962	27003.799	99215.835	51122.095	71797.666	65511.729	20941.009
2021-05-20	75583.418	74273.744	18682.232	27064.44	99306.504	51243.682	71121.103	65551.3	20976.554
2021-05-21	76361.126	74632.89	18866.886	27119.935	99390.435	51361.243	71239.446	65591.003	21056.023
2021-05-22	77066.54	74990.331	19039.73	27190.485	99449.919	51470.061	71328.223	65628.008	21129.445
2021-05-23	77610.353	75157.715	19199.278	27238.685	99488.706	51531.189	71396.118	65658.694	21189.948
2021-05-24	78107.022	75332.944	19340.246	27278.374	99566.113	51564.708	71456.947	65693.441	21247.653
2021-05-25	78646.448	75676.193	19490.182	27278.374	99634.464	51627.515	71530.368	65728.877	21315.241
2021-05-26	79422.643	76052.308	19641.823	27406.734	99706.434	51708.519	71626.886	65772.729	21387.461
2021-05-27	80323.405	76367.584	19775.569	27480.382	99789.011	51792.192	71733.105	65822.342	21457.907
2021-05-28	81183.098	76600.151	19900.292	27556.562	99854.541	51871.149	71827.002	65881.427	21521.427
2021-05-29	81837.422	76972.453	20019.104	27631.826	99890.59	51945.459	71899.714	65928.944	21582.536
2021-05-30	82305.477	77175.823	20128.715	27631.826	99910.817	51987.767	71954.516	65974.599	21632.236
2021-05-31	82923.271	77318.043	20220.225	27740.867	99928.164	52014.362	72002.892	66022.893	21680.346
2021-06-01	83698.501	77686.867	20315.522	27801.058	99997.07	52066.539	72072.182	66068.372	21739.241
2021-06-02	84466.319	78133.614	20411.8	27897.357	100047.966	52120.259	72131.244	66130.888	21800.925
2021-06-03	85174.365	78523.304	20506.793	27986.628	100105.341	52182.536	72235.292	66206.848	21863.053
2021-06-04	85853.006	78700.58	20593.292	28081.028	100155.954	52237.589	72299.276	66296.926	21916.351
2021-06-05	86371.076	79009.08	20675.436	28171.798	100197.818	52284.315	72345.001	66379.835	21966.931
2021-06-06	86731.008	79194.306	20747.659	28256.289	100214.023	52309.046	72381.192	66456.44	22007.907
2021-06-07	87217.678	79367.937	20809.735	28311.001	100260.426	52324.391	72423.172	66538.499	22048.692
2021-06-08	87900.42	79615.193	20876.188	28381.102	100299.421	52364.33	72476.974	66626.071	22095.28
2021-06-09	88552.903	80015.896	20943.263	28529.015	100355.432	52399.322	72534.464	66733.42	22148.536
2021-06-10	89158.702	80427.554	21009.497	28681.358	100399.122	52443.586	72605.191	66839.553	22205.631
2021-06-11	89749.285	80825.459	21070.019	28814.931	100473.312	52483.777	72647.855	66956.256	22259.109
2021-06-12	90145.221	81193.227	21128.031	28970.14	100498.027	52516.538	72677.538	67066.978	22306.342
2021-06-13	90431.215	81370.559	21178.569	29097.667	100512.376	52539.981	72699.256	67174.503	22344.801
2021-06-14	90898.086	81556.761	21221.967	29190.069	100550.659	52553.578	72731.423	67286.236	22383.971
2021-06-15	91495.816	81933.45	21266.623	29330.571	100584.607	52581.116	72766.514	67397.574	22431.158
2021-06-16	92063.244	82379.104	21314.856	29551.183	100621.947	52609.482	72801.738	67526.754	22481.753
2021-06-17	92584.668	82725.106	21359.696	29747.162	100653.126	52641.415	72833.248	67685.432	22531.608
2021-06-18	93031.168	83186.952	21403.296	29922.206	100714.998	52668.516	72864.646	67836.252	22583.157
2021-06-19	93373.91	83571.487	21445.083	30148.298	100740.602	52693.339	72886.201	67983.979	22627.274
2021-06-20	93601.841	83777.932	21483.441	30367.395	100752.293	52709.973	72901.441	68117.059	22665.39
2021-06-21	93790.545	83959.728	21514.042	30519.955	100789.299	52723.477	72927.752	68270.533	22703.164
2021-06-22	94259.498	84370.123	21550.534	30704.709	100822.269	52736.66	72961.757	68439.239	22750.448
2021-06-23	94858.523	84908.588	21589.338	30996.055	100859.65	52762.565	72995.112	68672.983	22805.94
2021-06-24	95394.924	85252.534	21626.417	31263.834	100898.237	52791.276	73024.382	68917.899	22857.243
2021-06-25	95921.676	85622.998	21661.366	31576.315	100969.294	52818.975	73054.051	69143.301	22910.779

2021-06-26	96328.532	85922.699	21697.278	31875.373	100991.246	52844.489	73071.617	69406.411	22956.87
2021-06-27	96593.959	86080.199	21730.397	32125.797	101003.02	52863.331	73085.465	69620.949	22996.201
2021-06-28	96997.175	86210.128	21757.356	32329.355	101048.332	52878.906	73120.672	69954.096	23038.357
2021-06-29	97524.849	86513.423	21790.334	32551.649	101082.392	52892.273	73162.182	70251.147	23087.139
2021-06-30	98022	86718.27	21825.346	32876.522	101121.858	52916.245	73204.137	70627.501	23137.145
2021-07-01	98486.349	87022.779	21858.801	33236.004	101165.239	52942.012	73259.78	71032.825	23193.096
2021-07-02	98944.361	87327.298	21890.458	33640.221	101255.049	52967.848	73314.574	71426.67	23248.974
2021-07-03	99252.085	87582.24	21921.369	34081.329	101269.326	52994.097	73340.869	71785.357	23296.638
2021-07-04	99449.428	87712.072	21949.929	34357.552	101280.43	53013.1	73362.663	72135.701	23338.149
2021-07-05	99828.261	87818.164	21974.834	34565.956	101297.035	53029.251	73458.005	72533.108	23385.305
2021-07-06	100301.67	88110.247	22006.219	34824.109	101369.88	53052.096	73525.996	72952.845	23442.988
2021-07-07	100727.55	88362.694	22039.155	35180.976	101438.618	53076.528	73611.182	73422.898	23501.875
2021-07-08	101149.78	88613.753	22070.296	35562.542	101498.922	53101.237	73701.025	73893.465	23563.035
2021-07-09	101468.12	88883.561	22100.988	35936.297	101643.784	53127.049	73803.927	74419.583	23627.554
2021-07-10	101721.62	89110.222	22130.775	36296.212	101671.017	53149.641	73862.538	74886.323	23681.708
2021-07-11	101915.67	89208.061	22157.439	36567.722	101689.532	53167.563	73912.331	75346.422	23727.989
2021-07-12	102244.33	89287.648	22181.055	36753.958	101794.649	53182.862	74037.09	75856.779	23783.902
2021-07-13	102683.38	89498.037	22208.947	36962.729	101874.074	53205.224	74203.207	76391.914	23849.807
2021-07-14	103115.28	89767.84	22238.897	37254.008	101969.835	53229.219	74330.563	77010.369	23918.552
2021-07-15	103494.5	90014.525	22266.849	37527.733	102054.994	53255.055	74480.966	77723.505	23991
2021-07-16	103872.99	90227.574	22294.177	37793.197	102293.223	53283.882	74639.651	78485.142	24067.047
2021-07-17	104141.15	90388.041	22323.714	38038.043	102332.23	53309.579	74724.568	79279.531	24127.207
2021-07-18	104293.22	90547.514	22351.103	38224.829	102368.42	53328.835	74804.569	79981.041	24180.859
2021-07-19	104573.09	90618.876	22372.7	38344.894	102524.871	53345.331	75005.151	80577.328	24244.32
2021-07-20	104903.69	90747.814	22402.852	38493.59	102653.144	53371.42	75166.393	81261.831	24311.881
2021-07-21	105224.52	91002.574	22432.552	38764.068	102809.436	53398.912	75342.2	81908.113	24382.961
2021-07-22	105520.54	91235.091	22457.915	39011.528	102980.176	53427.877	75522.783	82494.987	24454.973
2021-07-23	105863.08	91743.2	22457.915	39240.018	103338.099	53457.738	75693.992	83024.155	24542.503
2021-07-24	106107.26	91921.201	22514.495	39440.811	103421.61	53487.577	75806.063	83487.802	24602.731
2021-07-25	106271.85	92005.918	22542.743	39602.664	103461.299	53506.925	75882.489	83912.054	24657.654
2021-07-26	106547.14	92094.701	22564.05	39697.048	103729.716	53524.732	76079.312	84277.587	24726.74
2021-07-27	106914.57	92288.216	22595.379	39825.841	103942.202	53552.96	76255.107	84620.675	24804.474
2021-07-28	107262.84	92512.583	22626.604	40114.006	104148.775	53582.109	76440.731	84997.659	24886.204
2021-07-29	107572.34	92710.173	22658.346	40340.947	104383.579	53614.226	76619.536	85450.265	24968.949
2021-07-30	107867.98	92901.319	22688.236	40555.547	104968.137	53648.965	76790.157	85880.177	25062.485
2021-07-31	108095.06	93076.942	22718.257	40762.369	105066.684	53682.531	76892.767	86258.172	25127.099
2021-08-01	108228.44	93172.753	22747.059	40907.767	105142.202	53706.089	76977.311	86612.578	25185.911
2021-08-02	108473.65	93243.517	22768.983	41000.602	105526.63	53724.586	77164.757	86939.333	25260.472
2021-08-03	108799.27	93394.531	22799.574	41150.298	105846.709	53756.012	77320.507	87259.754	25341.824
2021-08-04	109100.45	93584.798	22830.42	41371.193	106125.201	53790.981	77500.399	87687.144	25427.047
2021-08-05	109402.74	93771.972	22862.459	41598.467	106455.087	53827.975	77673.364	88127.112	25514.405
2021-08-06	109699.83	93968.983	22890.181	41823.693	107220.991	53866.349	77842.784	88590.891	25618.68
2021-08-07	109914.78	94170.078	22918.22	42028.716	107353.427	53904.24	77954.408	89006.449	25687.861
2021-08-08	110049.43	94235	22943.697	42194.9	107426.22	53932.169	78046.711	89405.879	25743.394
2021-08-09	110272.65	94291.474	22963.938	42307.421	107980.343	53953.013	78202.128	89773.231	25827.207

2021-08-10	110544.81	94454.493	22991.462	42416.345	108301.299	53985.083	78368.125	90117.315	25907.739
2021-08-11	110794.71	94606.101	23021.026	42540.891	108707.021	54024.999	78555.396	90548.077	25997.501
2021-08-12	111087.85	94792.938	23049.819	42778.575	109057.327	54067.974	78736.248	91030.211	26084.479
2021-08-13	111273.62	94951.508	23077.569	43010.346	109930.715	54111.202	78909.411	91507.273	26194.52
2021-08-14	111409.19	95097.036	23103.464	43227.194	110059.006	54156.432	79028.14	91935.762	26261.407
2021-08-15	111490.92	95162.258	23127.102	43396.059	110174.597	54186.547	79125.268	92324.05	26319.807
2021-08-16	111570.64	95229.881	23145.163	43529.016	110805.986	54210.197	79267.991	92739.813	26404.853
2021-08-17	111749.83	95405.648	23170.409	43706.975	111193.193	54244.683	79429.754	93131.4	26488.508
2021-08-18	111963.93	95600.58	23196.533	43952.253	111607.16	54291.823	79612.319	93626.333	26578.357
2021-08-19	112196.27	95770.281	23222.778	44179.944	112023.101	54341.493	79781.081	94161.952	26666.83
2021-08-20	112375.19	95928.636	23247.507	44418.31	112982.787	54391.876	79945.329	94706.294	26776.534
2021-08-21	112504.32	96061.295	23269.717	44639.172	113171.067	54445.204	80067.423	95173.782	26844.581
2021-08-22	112569.64	96128.605	23287.71	44818.18	113271.684	54481.784	80162.765	95643.44	26900.884
2021-08-23	112704.16	96189.836	23305.987	44945.291	113962.043	54509.138	80298.747	96110.488	26989.434
2021-08-24	112882.19	96334.102	23332.966	45117.604	114368.294	54538.241	80485.523	96561.497	27073.856
2021-08-25	113035.54	96477.429	23366.097	45338.3	114813.29	54567.941	80664.558	97083.7	27163.849
2021-08-26	113185.68	96622.405	23398.146	45551.001	115297.9	54616.645	80821.118	97642.542	27254.352
2021-08-27	113313.01	96750.19	23431.703	45751.61	116267.919	54675.518	80916.834	98197.528	27359.085
2021-08-28	113394.69	96865.609	23464.058	45921.042	116427.332	54735.057	81070.46	98668.769	27427.48
2021-08-29	113440.14	96927.34	23494.852	46049.951	116542.902	54790.134	81160.028	99152.473	27483.705
2021-08-30	113557.63	96976.248	23517.057	46143.952	117319.488	54818.109	81279.858	99537.843	27570.832
2021-08-31	113705.22	97091.153	23547.174	46261.936	117742.133	54859.405	81407.209	100009.451	27645.549

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