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THE IMPACT OF MIGRATION ON THE TRANSMISSION PATTERNS OF COVID-19

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Abstract: The outbreak of the COVID-19 pandemic has caused severe damage to socio-economic activities, leading to a deep recession in the global economy. Most countries have responded quickly and have attempted to support the labour market and socio-economic conditions through unprecedented policy packages since the beginning of the crisis to reduce the economic shock and support workers. The analysis showed that the pandemic had affected all migration forms, including labour and return migration. On the other hand, the return migration accelerated the spread of the virus. The current study aims to assess the relationship between the COVID-19 pandemic and migrant stock in the countries of origin and destination. Econometric modelling was used to test the hypotheses. The study reveals a significant relationship between international migrant stocks (countries of origin) and the confirmed cases of COVID-19.

Keywords: COVID-19 pandemic, migration stock, human mobility.

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Introduction

The COVID-19 pandemic has influenced daily lives from the early stages of the outbreak in March 2020. The pandemic has affected different domains of politics, economy and society, including various forms of human mobility (Baghdasaryan & Sirkeci, 2020; Patrawala and Singh, 2021; Sirkeci and Yucesahin, 2020; Cohen, 2020; Cohen, 2021; Sirkeci and Cohen, 2020; Vatansever et al., 2021). Multiple studies have already explored the transmission mechanism of COVID-19. Some academics have done early studies to estimate and predict the virus' impact channels by applying the dynamic modelling method (Tian *et al.*, 2020; Feng *et al.*, 2020; Samui *et al.*, 2020). Sanyi *et al.* (2020) studied the risk of the spread of the epidemic after returning to regular economic activity. Other authors have assessed the parameters and trends of the pandemic (Xia *et al.*, 2020; Sen-zhong *et al.*, 2020). On the other hand, some studies estimate the effectiveness of some quarantine measures for containing the spread of the coronavirus (Qian *et al.*, 2020; Juping *et al.*, 2020).

Governments applied various measures to contain the spread of the virus, including strict lockdowns (Sardar *et al.*, 2020; Allen, 2022), travel and human mobility restrictions (Devi, 2020; Gursoy & Chi, 2020), social distancing (Qian & Jiang, 2020; Kissler *et al.*, 2020), ceasing of many types of economic activity (Stannard *et al.*, 2020; Keh & Tan, 2021).

The COVID-19 pandemic has impacted migration patterns in various regions as countries have restricted international, cross-border and domestic movements to minimize the spread and impact of the pandemic. Hence, in the early days, the pandemic caused a historical decrease in daily mobility and travel volumes (Bonaccorsi *et al.*, 2020). As of June 2020, 6% of airports, 25% of land border crossings and 9% of maritime border crossings were closed to entry and exit in the European Union (IOM, 2020). Moreover, the number of illegal border crossings decreased by 85% compared to the previous month and amounted to about 900 (Frontex, 2020).

Despite the direct effect on human mobility caused by the restrictions that governments applied to contain the spread of the virus, the pandemic also indirectly impacts migration through economic consequences. Monras (2018) argues that negative economic shocks significantly impact the migration processes.

Regarding the relationship between the COVID-19 pandemic and migration flows, we distinguish the following types of migration: refugee and asylum, labour migration and return (reverse) migration. In general, the measures aimed at curbing the consequences of the pandemic directly impacted the migration policy of countries for all forms of migration. However, the countries' migration policies significantly varied from the complete closure of borders for international migrants to partial ones (Guadagno, 2020; Piccoli *et al.*, 2020).

Refugees and asylum seekers are the most vulnerable migrants affected by the pandemic (Kondilis *et al.*, 2020). The asylum system in developed countries, including the European Union member-states, has been frozen as registrations were suspended due to social distancing and lockdown measures (UNHCR, 2020a). To overcome the asylum crisis due to the pandemic, UNHCR (2020b) provided practical recommendations to address the issue.

Labour migrants were severely affected by the outbreak of the COVID-19 pandemic due to the strict measures applied to contain the spread of the virus (Pouliakas & Branka, 2020). As a result, many migrants lost their jobs, hence their source of income and had no other choice but to return to their countries of origin (de Haan, 2020). As a result, the return migration was the only form of migration that not only didn't decrease but was significantly activated as most countries' constitutions guarantee unconditional entry for their citizens. Moreover, many governments developed support packages for return migrants during the pandemic to enhance the reverse migration flows (Kumar *et al.*, 2020; Martin & Bergmann, 2021).

Considering that the emigrants were returning to their countries of origin in high numbers, we assume that the number of migrant stocks significantly impacted the spread of the COVID-19 pandemic (see Sirkeci and Yucesahin, 2020). While during the first quarter of 2020, primarily the migrant stock in China mattered, the spread of the virus may have intensified in March. This study aims to assess the relationship between the COVID-19 pandemic and migrant stock in the countries of origin and destination.

Data and Method

The current article aims to explore the influence of migration on the spread of the COVID-19 pandemic in donor and host countries in 2020. The statistical basis of the analysis was the cross-sectional data of 164 countries for the year 2020. Table 1 represents the cross-sectional data series used for the research and their sources.

Table 1. Cross-sectional data for 164 countries, 2020

Variable	Source	Transformation
Migrant Stock - Destination	UN Population Division	% of population
Migrant Stock - Origin	UN Population Division	% of population
Confirmed cases of COVID-19	WHO	Per million, log(e)
Confirmed deaths of COVID-19	WHO	Per million, log(e)
Population density	World Bank	-

Human Development Index	UNDP Human Development Report	-

The study covers 164 countries as presented in Appendix. To build and estimate the econometric models testing the impact of selected independent variables on the infection rate (confirmed cases) and death rate (confirmed death), the econometric package EViews 10 was applied. Following the review of empirical studies on similar topics, the cross-sectional data approach was chosen to test the primary hypothesis from a regional perspective (see Franc et al., 2019; Istudor et al., 2020). The data was adjusted considering the presence of outliers and was checked against normal distribution and heteroscedasticity. Table 2 presents the correlation matrix for all the indicators used for estimation. As is evident from the results, a significant correlation is found between migration stock and the spread of coronavirus.

Table 2. Correlation matrix for the selected indicators (Authors' own calculation)

	DR	**HDI**	**IR**	**MSD**	**MSO**	**PD**
DR	*1*	*0.62127 **	*0.91837**	*0.21938**	*0.21881**	*-0.01577*
HDI	*0.62127*	*1*	*0.69235**	*0.46271**	*0.113712*	*0.132836*
IR	*0.91837*	*0.6924*	*1*	*0.3735**	*0.17303**	*0.044649*
MSD	*0.219385*	*0.46271 5*	*0.373452*	*1*	*-0.02703*	*0.17597**
MSO	*0.218818*	*0.11371 2*	*0.17303*	*-0.02703*	*1*	*0.025854*
PD	*-0.01577*	*0.13283 6*	*0.044649*	*0.175968*	*0.025854*	*1*

*Correlation is significant at the 0.05 level

The following hypotheses were formulated:

- A higher percentage of migrant stock abroad has contributed to a higher infection and death rate in the country.
- The presence of immigrant stock in the country did not significantly influence the spread of coronavirus.

The following models have been developed to test these hypotheses:

$$IR_i = C + \alpha\, MSD_i + \beta\, MSO_i + \gamma\, PD_i + \delta\, HDI_i + \varepsilon_i\,, \quad (1)$$

$$DR_i = C + \alpha\, MSD_i + \beta\, MSO_i + \gamma\, PD_i + \delta\, HDI_i + \varepsilon_i\,, \quad (2)$$

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Where i = 1, …, N represents the countries included in the model; MSD_i represents a vector of explanatory variables for immigrant stock across 164 countries; MSO_i represents a vector of explanatory variables for emigrant stock across 164 countries; PD_i represents a vector of explanatory variables for population density in the selected countries; HDI_i represents a vector of explanatory variables for the human development index in the selected countries; ε_i is the error term. The models have 164 observations.

Findings and Discussion

Table 3 represents the estimation results for the impact of migration processes on the spread of coronavirus confirmed cases, while Table 4 represents the estimation results for the impact of migration processes on the spread of coronavirus confirmed deaths.

In model 1, the probability values of two regressors – migrant stock_origin and human development index are significant. We take the 10% and 5% significance levels, and at these levels, we have strong evidence to reject the null hypothesis of coefficients being equal to 0. Hence both MSO (at a 10% significance) and HDI (at a 5% significance) are considered significant factors influencing the infection rate of COVID-19. On the other hand, the p-value of the variable of migrant stock_destination is high enough to accept the null hypothesis of the coefficient being equal to 0 and consider this indicator as not significant. The adjusted R-square equals 0.48, indicating that the regressors can explain 48% of changes in COVID-19 confirmed cases. However, we aimed to test the significance of the regressors. The probability of F-statistic for the model used to estimate equation (1) is less than 0.05 indicating that the data used for the model estimation provides sufficient evidence that model (1) fits the data better than would a model without MSD, MSO, PD and HDI as independent variables.

Table 3. Results for Model 1 for the impact on COVID-19 infection rate (IR) (Authors' own calculation)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MSD	*0.010964*	*0.008134*	*1.347838*	*0.1796*
MSO	*1.748545*	*0.964107*	*1.813642*	*0.0716**
PD	*-0.07989*	*0.077041*	*-1.037*	*0.3013*
HDI	*8.039739*	*0.7964*	*10.0951*	*0.000****
C	*2.769859*	*0.621364*	*4.457704*	*0.000****

R-squared	*0.496487*	Mean dependent var	*8.578844*
Adjusted R-squared	*0.48382*	SD dependent var	*1.934475*
SE of regression	*1.389836*	Akaike info criterion	*3.526263*
Sum squared resid	*307.1316*	Schwarz criterion	*3.620771*
Log-likelihood	*-284.154*	Hannan-Quinn criter.	*3.564629*
F-statistic	*39.19535*	Durbin-Watson stat	*2.080178*
Prob(F-statistic)	*0*		

***p < 0.01; **p < 0.05; *p < 0.1

In model 2, the probability values of the same two regressors – migrant stock_origin and human development index are significant at a 5% confidence level. Hence we have enough evidence to reject the null hypothesis of the estimated coefficients being equal to 0 and consider both MSO and HDI significant factors influencing the death rate of COVID-19. On the other hand, the p-value of the variable of migrant stock_destination is high enough to accept the null hypothesis of the coefficient being equal to 0 and consider this indicator insignificant. The adjusted R-square equals 0.4, indicating that the regressors can explain 40% of changes in COVID-19 confirmed deaths. The probability of F-statistic for the model used to estimate equation (2) is less than 0.05, indicating that the data used for the model estimation provides sufficient evidence that model (2) fits the data better than would a model without MSD, MSO, PD and HDI as independent variables.

Table 4. Results for Model 2 for the impact on COVID-19 death rate (IR) (Authors' own calculation)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MSD	*-0.00729*	*0.008667*	*-0.84064*	*0.4018*
MSO	*2.466118*	*1.027184*	*2.400855*	*0.0175***
PD	*-0.12682*	*0.082081*	*-1.54502*	*0.1243*
HDI	*7.933904*	*0.848504*	*9.350461*	*0.000****
C	*-0.91064*	*0.662017*	*-1.37555*	*0.1709*
R-squared	*0.420958*	Mean dependent var		*4.500857*
Adjusted R-squared	*0.406391*	SD dependent var		*1.921924*

SE of regression	*1.480766*	Akaike info criterion	*3.65301*
Sum squared resid	*348.6343*	Schwarz criterion	*3.747518*
Log-likelihood	*-294.547*	Hannan-Quinn criter.	*3.691377*
F-statistic	*28.89789*	Durbin-Watson stat	*2.382686*
Prob(F-statistic)	*0*		

***p < 0.001; **p < 0.01; *p < 0.05.

Equations (3) and (4) show the estimated models for infection rate and death rate, respectively.

$$IR_i = 2.78 + 0.01\, MSD_i + 1.75 * MSO_i - 0.08 * PD_i + 8.04\, HDI_i\,, \quad (3)$$

$$DR_i = -0.91 - 0.007 * MSD_i + 2.47 * MSO_i - 0.13 * PD_i + 7.93\, HDI_i \quad (4)$$

As our dependent variables are log-transformed, we have transformed the estimated coefficients to show the results in percentages. Thus, the estimation results show that a one percent increase in migrant stock (origin) as a percentage of the population leads to an increase in the infection rate by 4.75 per million and in the death rate by 10.8 per million. On the other hand, the variables MSD and PD do not show to be significant due to high p-values.
The estimation results of model 1 and model 2 provide enough evidence for accepting our initial hypotheses about migration stock of origin significantly impacting the transmission channels of COVID-19. In contrast, the migration stock of the destination is not statistically significant.

Conclusions

The COVID-19 pandemic has had a disruptive effect on all domains of life. Economies shrunk, projects were halted, lengthy lockdowns caused severe delays and troubles in transportation and health services were overburdened. Migration, travel patterns, and labour markets have been adversely affected by these and by the measures implemented to prevent the spread of the coronavirus. Many countries have responded quickly to mitigate the economic impact of the pandemic, introducing unprecedented policy packages since the beginning of the crisis to reduce the financial shock and to support workers and businesses. Our analysis here showed that the pandemic had adversely affected all migration forms, including labour and return migration, i.e. reducing the volumes and frequencies. On the other hand, return migration has been accelerated by the spread of the virus. There is a significantly positive relationship between the migrant stocks in receiving counties and the spread of COVID-19. In contrast, the immigrant stocks in the destination countries were found not to be significant. Hence we can argue that not those migrants visiting their home countries or returnees were critical but those settled migrants in destination countries were found to have some relation with the spread of the coronavirus. This line of research, once expanded and deepened, can be useful in policy formulation against the spread of pandemics.

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Appendix

Table A1. Selected indicators by countries (n=164) [27.05.2022] (UN Population Division – International Migrant Stock 2020, UNDP Human Development Report, WHO, WB)

	Migration stock - destination	Migration stock - origin	Cases per million	Deaths per million	Population density	Human dev. index
Afghanistan	*0.4*	*0.1S50375*	*1313.655*	*54.951*	*54.422*	*0.511*
Albania	*1.7*	*0.440633*	*20298.41*	*411.078*	*104.871*	*0.795*
Algeria	*0.6*	*0.046118*	*2232.576*	*61.771*	*17.348*	*0.748*
Andorra	*59.0*	*0.144076*	*104054.1*	*1085.917*	*163.755*	*0.868*
Angola	*2.0*	*0.020327*	*517.275*	*11.935*	*23.89*	*0.581*
Antigua and Barbuda	*30.0*	*0.679693*	*1610.485*	*50.644*	*231.845*	*0.778*
Argentina	*5.0*	*0.023716*	*35642.69*	*948.234*	*16.177*	*0.845*
Armenia	*6.4*	*0.32336*	*53706.92*	*951.105*	*102.931*	*0.776*
Australia	*30.1*	*0.023304*	*1102.248*	*35.249*	*3.202*	*0.944*
Austria	*19.3*	*0.067371*	*39374.12*	*827.816*	*106.749*	*0.922*
Azerbaijan	*2.5*	*0.115318*	*21392.22*	*258.33*	*119.309*	*0.756*
Bahamas	*16.2*	*0.136792*	*19830.49*	*428.304*	*39.497*	*0.814*
Bahrain	*55.0*	*0.034245*	*53008.79*	*201.339*	*1935.907*	*0.852*
Bangladesh	*1.3*	*0.044944*	*3087.788*	*45.453*	*1265.036*	*0.632*
Barbados	*12.1*	*0.346629*	*1331.211*	*24.33*	*664.463*	*0.814*
Belarus	*11.3*	*0.15817*	*20574.68*	*150.802*	*46.858*	*0.823*
Belgium	*17.3*	*0.050022*	*55577.5*	*1678.769*	*375.564*	*0.931*
Belize	*15.6*	*0.132679*	*26612.99*	*612.474*	*16.426*	*0.716*
Benin	*3.3*	*0.056242*	*261.103*	*3.534*	*99.11*	*0.545*
Bolivia (Plurinational State of)	*1.4*	*0.079435*	*13532.06*	*774.533*	*10.202*	*0.718*
Bosnia and Herzegovina	*1.1*	*0.514396*	*34008.39*	*1241.015*	*68.496*	*0.78*
Botswana	*4.7*	*0.027029*	*6175.852*	*17.52*	*4.044*	*0.735*
Brazil	*0.5*	*0.008925*	*35893.77*	*911.579*	*25.04*	*0.765*
Brunei Darussalam	*25.6*	*0.103638*	*355.58*	*6.795*	*81.347*	*0.838*
Bulgaria	*2.7*	*0.242727*	*29328.13*	*1098.504*	*65.18*	*0.816*
Burkina Faso	*3.5*	*0.076512*	*311.996*	*3.954*	*70.151*	*0.452*

	Migration stock - destination	Migration stock - origin	Cases per million	Deaths per million	Population density	Human dev. index
Burundi	*2.9*	*0.046347*	*66.746*	*0.163*	*423.062*	*0.433*
Cabo Verde	*2.8*	*0.337342*	*21071.33*	*201.103*	*135.58*	*0.665*
Cameroon	*2.2*	*0.016613*	*965.205*	*16.456*	*50.885*	*0.563*
Canada	*21.3*	*0.033975*	*15505.16*	*438.296*	*4.037*	*0.929*
Central African Republic	*1.8*	*0.169091*	*1008.743*	*12.805*	*7.479*	*0.397*
Chad	*3.3*	*0.013534*	*124.919*	*6.148*	*11.833*	*0.398*
Chile	*8.6*	*0.033678*	*31696.94*	*864.443*	*24.282*	*0.851*
China	*0.1*	*0.007413*	*64.865*	*3.209*	*147.674*	*0.761*
China, Hong Kong SAR	*39.5*	*0.134713*	*1171.221*	*19.595*	*7039.714*	*0.949*
Colombia	*3.7*	*0.059436*	*32044.24*	*842.92*	*44.223*	*0.767*
Comoros	*1.4*	*0.173441*	*926.326*	*11.255*	*437.352*	*0.554*
Congo	*7.0*	*0.020456*	*1256.316*	*19.091*	*15.405*	*0.574*
Costa Rica	*10.2*	*0.029493*	*32947.9*	*425.176*	*96.079*	*0.81*
Côte d'Ivoire	*9.7*	*0.04357*	*831.312*	*5.064*	*76.399*	*0.538*
Croatia	*12.9*	*0.25682*	*51654.76*	*960.394*	*73.726*	*0.851*
Cuba	*0.0*	*0.155148*	*1048.2*	*12.9*	*110.408*	*0.783*
Cyprus	*15.8*	*0.143462*	*24939.59*	*133.928*	*127.657*	*0.887*
Czechia	*5.1*	*0.095917*	*67010.81*	*1079.765*	*137.176*	*0.9*
Dem. People's Republic of Korea	*0.2*	*0.004282*	*1203.952*	*17.873*	*527.967*	*0.916*
Democratic Republic of the Congo	*1.1*	*0.040552*	*191.149*	*6.398*	*35.879*	*0.48*
Denmark	*12.4*	*0.044076*	*28121.54*	*223.281*	*136.52*	*0.94*
Djibouti	*12.1*	*0.018588*	*5818.217*	*60.866*	*41.285*	*0.524*
Dominican Republic	*5.6*	*0.148284*	*15591.52*	*220.382*	*222.873*	*0.756*
Ecuador	*4.4*	*0.063928*	*11879.83*	*784.528*	*66.939*	*0.759*
Egypt	*0.5*	*0.035281*	*1324.23*	*73.193*	*97.999*	*0.707*
El Salvador	*0.7*	*0.246532*	*7093.963*	*203.574*	*307.811*	*0.673*
Equatorial Guinea	*16.4*	*0.091786*	*3639.584*	*59.315*	*45.194*	*0.592*
Estonia	*15.0*	*0.155423*	*21121.53*	*172.806*	*31.033*	*0.892*

	Migration stock - destination	Migration stock - origin	Cases per million	Deaths per million	Population density	Human dev. index
Eswatini	2.8	0.043131	7982.128	174.86	79.492	0.611
Ethiopia	0.9	0.00823	1054.191	16.314	104.957	0.485
Finland	7.0	0.056404	6564.461	106.698	18.136	0.938
France	13.1	0.034757	39463.02	958.797	122.578	0.901
Gabon	18.7	0.021742	4199.964	28.085	7.859	0.703
Gambia	8.9	0.057604	1526.778	49.861	207.566	0.496
Georgia	2.0	0.231303	57143.96	629.433	65.032	0.812
Germany	18.8	0.046359	20497.35	394.169	237.016	0.947
Ghana	1.5	0.032321	1726.042	10.557	126.719	0.611
Greece	12.9	0.101724	13388.62	466.504	83.479	0.888
Guatemala	0.5	0.081172	7562.356	263.728	157.834	0.663
Guinea	0.9	0.04194	1016.653	6.001	51.755	0.477
Guinea-Bissau	0.9	0.056804	1216.578	22.327	66.191	0.48
Guyana	4.0	0.557381	8011.853	207.509	3.952	0.682
Haiti	0.2	0.1552	866.338	20.448	398.448	0.51
Hungary	6.1	0.073273	33476.08	989.915	108.043	0.854
Iceland	19.2	0.118023	15602.29	78.635	3.404	0.949
India	0.4	0.012949	7382.404	106.928	450.419	0.645
Indonesia	0.1	0.016823	2689.221	80.105	145.725	0.718
Iran (Islamic Republic of)	3.3	0.015776	14408.56	649.463	49.831	0.783
Iraq	0.9	0.051662	14456.06	311.151	88.125	0.674
Ireland	17.6	0.147285	18418.78	448.935	69.874	0.955
Israel	22.6	0.038924	45556.13	357.873	402.606	0.919
Italy	10.6	0.054817	34905.65	1228.46	205.859	0.892
Jamaica	0.8	0.377869	4313.827	101.565	266.879	0.734
Japan	2.2	0.006406	1870.27	27.703	347.778	0.919
Jordan	33.9	0.079868	28677.9	373.356	109.285	0.729
Kazakhstan	19.9	0.22414	10592.07	144.723	6.681	0.825
Kenya	2.0	0.009956	1754.238	30.372	87.324	0.601
Kuwait	72.8	0.049706	34788.53	215.776	232.128	0.806
Kyrgyzstan	3.1	0.117688	12225.37	204.425	32.333	0.697
Latvia	12.7	0.199958	21909.72	340.13	31.212	0.866
Lebanon	25.1	0.125532	26813.26	216.866	594.561	0.744

	Migration stock - destination	Migration stock - origin	Cases per million	Deaths per million	Population density	Human dev. index
Lesotho	*0.6*	*0.09437*	*1433.026*	*23.621*	*73.562*	*0.527*
Liberia	*1.7*	*0.04618*	*347.476*	*16.023*	*49.127*	*0.48*
Libya	*12.0*	*0.026999*	*14410.64*	*212.401*	*3.623*	*0.724*
Liechtenstein	*67.9*	*0.097176*	*58059.29*	*1150.207*	*237.012*	*0.919*
Lithuania	*5.3*	*0.23545*	*53925.44*	*669.179*	*45.135*	*0.882*
Luxembourg	*47.6*	*0.129687*	*73115.91*	*779.756*	*231.447*	*0.916*
Madagascar	*0.1*	*0.006989*	*623.133*	*9.181*	*43.951*	*0.528*
Malawi	*1.0*	*0.01626*	*335.052*	*9.619*	*197.519*	*0.483*
Malaysia	*10.7*	*0.057469*	*3447.929*	*14.37*	*96.254*	*0.81*
Maldives	*13.0*	*0.006873*	*25306.28*	*88.297*	*1454.433*	*0.74*
Mali	*2.4*	*0.064368*	*339.955*	*12.898*	*15.196*	*0.434*
Malta	*26.0*	*0.199469*	*24751.02*	*424.336*	*1454.037*	*0.895*
Mauritania	*3.9*	*0.028008*	*3008.098*	*72.668*	*4.289*	*0.546*
Mauritius	*2.3*	*0.144558*	*413.844*	*7.853*	*622.962*	*0.804*
Mexico	*0.9*	*0.086756*	*10947.87*	*965.798*	*66.444*	*0.779*
Mongolia	*0.7*	*0.025043*	*358.936*	*0.3*	*1.98*	*0.737*
Montenegro	*11.3*	*0.214009*	*76820.2*	*1085.899*	*46.28*	*0.829*
Morocco	*0.3*	*0.088382*	*11760.49*	*197.832*	*80.08*	*0.686*
Mozambique	*1.1*	*0.020482*	*579.609*	*5.161*	*37.728*	*0.456*
Myanmar	*0.1*	*0.068218*	*2274.021*	*48.936*	*81.721*	*0.583*
Namibia	*4.3*	*0.0188*	*9253.118*	*79.232*	*3.078*	*0.646*
Nepal	*1.7*	*0.089224*	*8781.591*	*62.544*	*204.43*	*0.602*
Netherlands	*13.8*	*0.055638*	*46969.99*	*667.265*	*508.544*	*0.944*
New Zealand	*28.7*	*0.158375*	*421.747*	*4.877*	*18.206*	*0.931*
Nicaragua	*0.6*	*0.108408*	*720.49*	*24.618*	*51.667*	*0.66*
Niger	*1.4*	*0.016512*	*132.228*	*4.138*	*16.955*	*0.394*
Nigeria	*0.6*	*0.008104*	*414.412*	*6.097*	*209.588*	*0.539*
North Macedonia	*6.3*	*0.334806*	*40010.83*	*1201.828*	*82.6*	*0.774*
Norway	*15.7*	*0.035578*	*9068.856*	*79.771*	*14.462*	*0.957*
Oman	*46.5*	*0.004915*	*24671.21*	*286.979*	*14.98*	*0.813*
Pakistan	*1.5*	*0.028649*	*2141.111*	*45.187*	*255.573*	*0.557*
Panama	*7.3*	*0.032335*	*56324.39*	*917.933*	*55.133*	*0.815*
Papua New Guinea	*0.3*	*0.000538*	*85.536*	*0.987*	*18.22*	*0.555*

	Migration stock - destination	Migration stock - origin	Cases per million	Deaths per million	Population density	Human dev. index
Paraguay	*2.4*	*0.125689*	*14949.77*	*313.312*	*17.144*	*0.728*
Peru	*3.7*	*0.046089*	*30430.3*	*2789.917*	*25.129*	*0.777*
Philippines	*0.2*	*0.055615*	*4269.043*	*83.244*	*351.873*	*0.718*
Poland	*2.2*	*0.127314*	*34258.75*	*755.457*	*124.027*	*0.88*
Portugal	*9.8*	*0.202137*	*40684.61*	*679.195*	*112.371*	*0.864*
Qatar	*77.3*	*0.008922*	*49081.33*	*83.603*	*227.322*	*0.848*
Romania	*3.7*	*0.207041*	*33054.71*	*824.299*	*85.129*	*0.828*
Russian Federation	*8.0*	*0.074661*	*21433.1*	*385.65*	*8.823*	*0.824*
Rwanda	*4.0*	*0.038024*	*631.416*	*6.93*	*494.869*	*0.543*
Sao Tome and Principe	*1.0*	*0.180726*	*4539.675*	*76.109*	*212.841*	*0.625*
Saudi Arabia	*38.6*	*0.008596*	*10264.12*	*176.086*	*15.322*	*0.854*
Senegal	*1.6*	*0.041434*	*1113.03*	*23.842*	*82.328*	*0.512*
Serbia	*9.4*	*0.14552*	*49177.14*	*467.289*	*80.291*	*0.806*
Sierra Leone	*0.7*	*0.019116*	*320.709*	*9.335*	*104.7*	*0.452*
Singapore	*43.1*	*0.061287*	*10745.01*	*5.318*	*7915.731*	*0.938*
Slovakia	*3.6*	*0.076876*	*50392.62*	*392.346*	*113.128*	*0.86*
Slovenia	*13.4*	*0.076197*	*58763*	*1297.431*	*102.619*	*0.917*
South Africa	*4.8*	*0.015426*	*17607.03*	*474.151*	*46.754*	*0.709*
South Sudan	*7.9*	*0.230117*	*312.616*	*5.535*	*19*	*0.433*
Spain	*14.6*	*0.031455*	*41250.54*	*1087.534*	*93.105*	*0.904*
Sri Lanka	*0.2*	*0.089421*	*2014.159*	*9.49*	*341.955*	*0.782*
Sudan	*3.1*	*0.048003*	*567.81*	*32.688*	*23.258*	*0.51*
Suriname	*8.1*	*0.465723*	*10493.45*	*206.151*	*3.612*	*0.738*
Sweden	*19.8*	*0.03164*	*43048.44*	*858.943*	*24.718*	*0.945*
Switzerland	*28.8*	*0.082628*	*51895.62*	*903.334*	*214.243*	*0.955*
Syrian Arab Republic	*5.0*	*0.483251*	*625.639*	*38.904*	*105*	*0.567*
Tajikistan	*2.9*	*0.06153*	*1401.592*	*9.231*	*64.281*	*0.668*
Thailand	*5.2*	*0.015573*	*98.412*	*0.872*	*135.132*	*0.777*
Togo	*3.4*	*0.065881*	*428.509*	*8.021*	*143.366*	*0.515*
Trinidad and Tobago	*5.6*	*0.236171*	*5094.864*	*90.496*	*266.886*	*0.796*
Tunisia	*0.5*	*0.076343*	*11657.4*	*391.764*	*74.228*	*0.74*

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	Migration stock - destination	Migration stock - origin	Cases per million	Deaths per million	Population density	Human dev. index
Turkey	*7.2*	*0.040449*	*25971.08*	*245.535*	*104.914*	*0.82*
Uganda	*3.8*	*0.017084*	*747.312*	*5.326*	*213.759*	*0.544*
Ukraine	*11.4*	*0.139109*	*25007.51*	*443.58*	*77.39*	*0.779*
United Arab Emirates	*88.1*	*0.020547*	*20800.75*	*66.96*	*112.442*	*0.89*
United Kingdom	*13.8*	*0.070549*	*36532.7*	*1078.612*	*272.898*	*0.932*
United States of America	*15.3*	*0.009038*	*60650.01*	*1054.44*	*35.608*	*0.926*
Uruguay	*3.1*	*0.105667*	*5485.844*	*51.935*	*19.751*	*0.817*
Uzbekistan	*3.5*	*0.059238*	*2270.761*	*18.093*	*76.134*	*0.72*
Venezuela (Bolivarian Republic of)	*4.7*	*0.19044*	*3956.043*	*35.813*	*36.253*	*0.711*
Viet Nam	*0.1*	*0.034848*	*14.923*	*0.357*	*308.127*	*0.704*
Yemen	*1.3*	*0.043625*	*68.841*	*20.006*	*53.508*	*0.47*
Zambia	*1.0*	*0.010917*	*1095.364*	*20.507*	*22.995*	*0.584*
Zimbabwe	*2.8*	*0.083652*	*918.821*	*24.052*	*42.729*	*0.571*