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How Does Globalisation Affect COVID-19 Responses?

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How Does Globalisation Affect COVID-19 Responses?

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Abstract:

This paper examines the effects of globalisation on the pace of governments implementing international travel restrictions during the recent coronavirus pandemic. We find that more globalised countries experienced a longer delay in implementing international travel restriction policies with respect to the date of the first confirmed COVID-19 case. We also find that informational (a subcomponent of social globalisation) and political globalisation have the strongest effects on the observed delays in implementing international travel restriction policies in more globalised countries. Lastly, we do not find evidence that more globalised countries are more likely to adopt a more restrictive international travel policy as the first response to the pandemic. These findings highlight the dynamic relationship between globalisation and protectionism when governments respond to significant global events such as a public health crisis.

Keywords: Coronavirus, SARS-CoV-2, Travel Restriction, Border Closure, Health Screening, Policy Analysis

***JEL* codes:** F50, F60, F68

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1 Introduction

The level of complexity around containing emerging and re-emerging infectious diseases has increased with the ease and increased incidence of global travel (Lim, 2014), along with greater global social, economic, and political integration (Lindahl & Grace, 2015). In reference to influenza pandemics, but nonetheless applicable to many communicable and vector-borne diseases, the only certainty is in the growing unpredictability of pandemic-potential infectious disease emergence, origins, characteristics, and the biological pathways through which they propagate (Kilbourne, 2006). Globalisation of trade and increased international travel have been seen as some of the main human influences on the emergence, re-emergence, and transmission of infectious diseases in the 21st Century (Blake et al. 2017).

Emerging and re-emerging infectious diseases have been a major challenge for human health in ancient and modern societies alike (Armelagos & McArdle, 1975; Barrett et al. 1998; Cockburn, 1971; Elinor et al. 2014; Spencer Larsen, 2018). The relative rise in infectious disease mortality and shifting patterns of disease emergence, re-emergence, and transmission in the current era have been attributed to increased global connectedness, among other factors (Kock, 2013). More globalized countries and in particular global cities are at the heart of human influence on infectious diseases; these modern, densely populated urban centres, highly interconnected with the world economy in terms of social mobility, trade, and international travel (Ali & Keil, 2006; Keil & Ali, 2007). One might assume that given their high susceptibility to the transmission of infectious diseases, globalised countries would be more willing than less globalised countries to adopt screening, quarantine, travel restriction, and border control measures during times of mass disease outbreaks. However, given their nature, globalised countries would also be assumed to favour less protectionist policies in general; thus, contradicting the aforementioned assumption. Moreover, the costs of closing are comparatively higher for open countries than for already protective ones. Globalisation, after all, is known to promote growth and does so via a combination of three main globalisation dimensions: economic integration (flow of goods, capital and services, economic information and market perceptions), social integration (proliferation of ideas, information, culture and people), and political integration (diffusion of governance and participation in international coordination efforts) (Dreher, 2006).

The recent COVID-19 pandemic has highlighted the vast differences in approaches to the control and containment of coronavirus across the world and has demonstrated the varied success of such approaches in minimising the transmission of coronavirus. Restrictive government policies formerly deemed impossible have been implemented within a matter of months across democratic and autocratic governments alike. This presents a unique natural experiment through which to observe and investigate a plethora of human behaviour and decision-making processes. We explore the relative weighting of risks and benefits in globalised countries who balance the known economic, social, and political benefits of globalisation with a higher risk of coronavirus emergence, spread, and extended exposure.

2 Data

The record for each country's international travel policy response to COVID-19 is obtained from the Oxford COVID-19 Government Response Tracker (OxCGRT) database (Hale et al. 2020). The database records the level of strictness on international travel from 1 January 2020 to the present (continual updating), categorised into 5 levels: 0 - no restrictions; 1 - screening arrivals; 2 - quarantine arrivals from some or all regions; 3 - ban arrivals from some regions; and 4 - ban on all regions or total border closure. At various points in time from the beginning of 2020 to the time of writing, 73 countries have introduced screening on arrival policy, 77 have introduced arrival quarantine, 133 have introduced travel bans, and 137 have introduced total border closures.

Covid-19 statistics were obtained from the COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (Dong, Du, Gardner, 2020). The dataset consists of records on number of confirmed cases and death on a daily basis for 205 countries since January 2020.

Our measure of globalisation is generated from the 2019 KOF Globalisation Index (of more than 200 countries), published by the KOF Swiss Economic Institute[1] . The KOF Globalisation Index is made up of 44 individual variables (24 de facto and 20 de jure variables) relating to globalisation across economic, social, and political factors[2] (see also Gygli et al 2019; Dreher 2006). The complete index is calculated as the average of the de facto and the de jure globalisation indices. In this analysis, we focus on the overall index as well as the major sub-components (i.e. Economic (Trade and Financial), Social (Interpersonal, Informational, and Cultural), and Political globalisation). Each index ranges from 1 to 100 (highest globalisation).

We also take into account that a country's decision to adopt travel restrictions can be affected by the decision made by its (economic) neighbours. We constructed a variable to reflect this by averaging the international travel strictness of each country's 'neighbours' weighted by share of international tourism and foreign trade. We obtained inbound tourism data of 197 countries from the Yearbook of Tourism Statistics of the World Tourism Organization (World Tourism Organization, 2020). The data consist of total arrivals of non-resident tourists or visitors at national borders or in hotels or other types of accommodations and overnight stays of tourists, broken down by nationality or country of residence, from 1995 to 2018. Due to difference in statistical availability for each country, we take the year 2018

[1] https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html
[2] See https://ethz.ch/content/dam/ethz/special-interest/dual/kof-dam/documents/Globalization/2019/KOFGI_2019_method.pdf for detailed methods on the calculation of the weights of each component and the overall index

record (or 2017 if 2018 is not available) of arrivals of non-resident tourists/visitors at national borders as the country weights for the computation of foreign international travel policy. If the records of arrivals at national border are not available for these years, we check for the 2018 or 2017 records on arrivals or overnight stays in hotels or other types of accommodation before relying on records from earlier years. To calculate the weighted foreign international restriction policy, for each country, we calculated the weighted sum using the share of arrivals of other countries multiplied by the corresponding policy value ranging from 0 to 4[3].

Additionally, we check our results using the share of total gross bilateral export or import in 2018 as the weights for constructing the weighted foreign policy variable. The data on trade, broken down by country, was obtained from the World Integrated Trade Solution – World Bank under the UN COMTRADE Standard International Trade Classification, Revision 4 (SITC Rev4) 2018 (UN COMTRADE, 2020).

For additional control variables, we account for each country's macroeconomic conditions, political, and geographical characteristics. First, we consider the country's economic risk assessments taken from the International Country Risk Guide (ICRG), which is a composite rating accounting for factors such as inflation rate, real GDP growth, per capita GDP, balance of payment and current account as a percentage of GDP. From the World Development Indicators, we obtained the latest record of population density and the number of physicians per 1,000 people in the population, which we used to proxy for a country's health system capability[4]. We also use the Boix-Miller-Rosato (BMR) dichotomous variable to identify

[3] Specifically, the strength of travel restrictions, for a given country i, that is influenced by the country's neighbours indexed by j, can be written as: $Restriction_{it} = \sum_{j=1}^{N} \gamma_j Restriction_{jt}$, where $0 < \gamma_j < 1$ is the share of country i's visitors which come from country j.

[4] Additionally, we check the robustness of our results using the number of hospital beds and nurses and midwives per 1,000 people; we present those results in the appendix.

democratic and autocratic countries[5] (Boix et al. 2012). Lastly, we include continent dummies, whether the country is landlocked, and the land area (in log sq. km), which were obtained from GeoDist (CEPII) (Mayer and Zignago, 2011).

3 Empirical strategy

We hypothesize that more globalised countries are more likely to impose international travel restrictions later than less globalised countries. To test this hypothesis, we use records from the Oxford COVID-19 Government Response Tracker (OxCGRT; Hale et al. 2020) on the timing of restrictions on international travel for each country, COVID-19 case statistics from the Johns Hopkins University Center for Systems Science and Engineering COVID-19 dataset to derive our main dependent variable, namely, the time gap between the first national confirmed case and the first international travel restriction policy was implemented.

To study relationships between our outcome variable and the level of globalisation, we first present the simple correlations between them. We then apply ordinary least squares (OLS) regression models to estimate the following model:

$$Gap_i = \alpha + \beta Globalisation_i + \mathbf{X}_i \gamma_j + \epsilon_i \quad (1)$$

where Gap_i is the number of days passed since the first Covid-19 case in country i to the implementation of travel restriction. $Globalisation_i$ is the KOF globalisation index of country i and $\mathbf{X}$ is a vector of country-specific controls such as the country's health care capacity, economic risk, population density, geographical characteristics and the number of cases per million people in the population at the time of policy implementation.

Additionally, we examine how a country responds to the international travel policy implemented by those countries that contribute most towards its tourism sector. To do so, for each country, we constructed a variable based on the average strictness of international travel

[5] We took the latest record (y 2015), which classifies 195 countries into democracies (119) and autocracies (76).

policy weighted by the share of tourists to the country of interest, calculated daily. We therefore include this variable, measured at the time of the focal country's first implementation of the international travel policy into the regression.

4 Results

First, we examine whether the level of globalisation of the country is correlated with the timing of international travel restrictions implementation. With a simple correlation analysis, we find that the Pearson's correlations between the first policy implementation-first case gap and globalisation index is a significantly positive ρ=0.357 (p<0.001; n=166). Figure 1 also shows that countries which reacted before the first local Covid-19 case tend to adopt screening on arrivals or quarantine rules as the first precautionary measures. One noteworthy case is the United Kingdom, which only enforced quarantine on travellers from high-risk regions on the 8^{th} June 2020, 129 days since Covid-19 first emerged in the country.

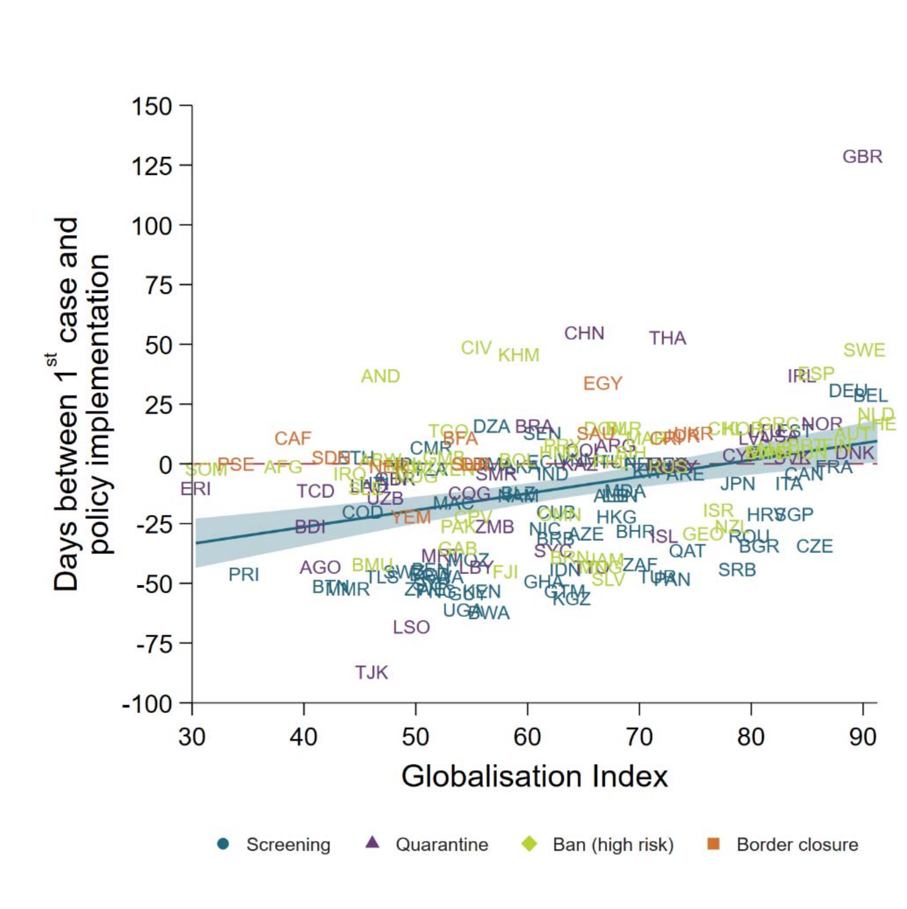

Fig. 1. Correlation between the globalisation level of a country and the number of days between the first international travel restriction policy implemented and the first confirmed case. The colours represent the four international travel restriction implemented first in each country.

We also look at the correlation between the policy-first case gap and globalisation index for each travel restriction policy – in case the country imposed a more restrictive policy first or skipped the less restrictive policy (e.g., impose banning travel from high risk regions first and return to screening arrivals later or did not impose screening at all), we take the date of the earliest imposed more restrictive policy to calculate the gap. Thus, we interpret the gap as the number of days between the date of the first case and the date a country imposes a policy that is at least as strict.

We find the correlations are again positive and significant: 0.396 (p=0.0006; n=71), 0.397 (p=0.0005; n=74), 0.243 (p=0.0058; n=128), and 0.301 (p=0.0004; n=131) for screening, quarantine, banning high risk regions, and total border closure, respectively (see Figure 2), showing that more globalised countries are more likely to impose international travel restrictions later, relative to the first confirmed case in the country.

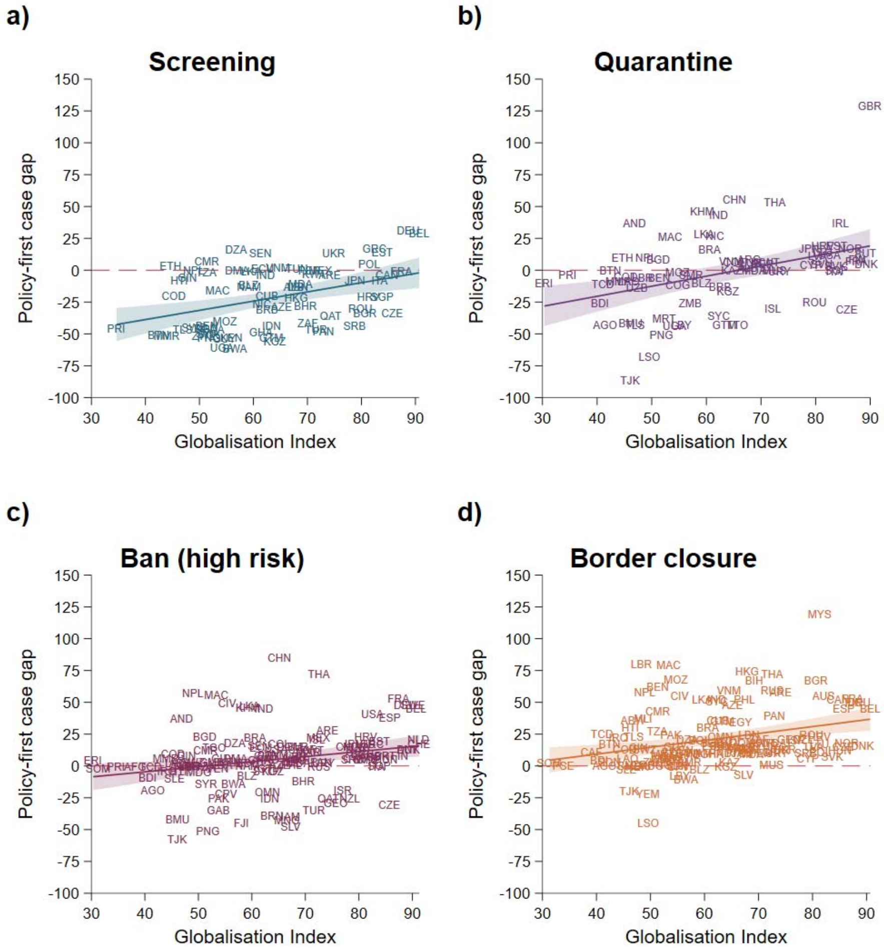

Fig. 2. Correlation between international travel restriction policy-first confirmed case gap and globalisation.

We confirm this finding with OLS regressions results (Table 1). We find that the KOF globalisation index is significantly and positively correlated with the gap between the first confirmed case and the introduction of an international travel restriction policy. Specifically, for a one unit increase in the globalisation index (again, values ranging from 1 to 100), the number of days between the first restriction policy and the first case in the country increases by 0.82. We find similar results examining each specific strictness in which one unit increase in the KOF index corresponds to 1.32, 1.08, .94, and .96 days in the duration between the first case and the implementation of screening, quarantining arrivals, banning travels from high risk countries, and border closure, respectively. The coefficient of the KOF globalisation index is robustly estimated when we use bilateral trade (export or import volume) to determine the foreign policy variable (reliance on close trading partners, Table S2) or using the number of hospital beds or nurses and midwives per 1,000 people as proxy for health care capacity.

It is noteworthy globalisation index is statistically significant even when including the number of cases per 1,000 people, i.e. globalization plays a role independently of the specific health situation in a country. The number of cases per 1,000 people is itself significantly and positively correlated with the length between the first case and policy introduction. Interestingly, we find that the international travel strictness of close foreign countries is positively correlated with the outcome variable, except for border closure[6], which might indicate that when neighbouring countries (in terms of tourism export or trade) heighten their travel restriction measures, thus generating positive externalities for their neighbours, there is less of an incentive for a country to impose travel restrictions earlier. We also find that the coefficients for democracy are negative and significant on case lags between first policy, screening, and banning travel from high risk countries[7]. Surprisingly, we find that more population dense countries have a longer lag time between imposing travel restrictions measures and first case, while the economic risk rating and health system capacity have no effect on the timing of travel restriction implementation[8]. Countries who are landlocked and/or smaller in terms of land size tend to have a shorter time gap between the date of travel restriction implementation and first case.

[6] However, the coefficients of foreign international restriction policy is positive and significant when trade (import or export) is used to determine the weights.
[7] The effect of for democracy are robust for first policy and banning on high-risk countries case gap.
[8] There is a weak effect with border closure as the outcome variable when trade volumes are used as weights. We also did not find significant using the other two proxies of healthcare system capacity.

Table 1. Relationship between globalisation and duration of international travel restriction implementation-first confirmed COVID-19 case gap.

Dependent variable	**Days between policy introduction and first case**				
Independent variable	*First policy*	*Screening*	*Quarantine*	*Ban (high risk)*	*Border closure*
KOF Globalisation Index	0.85***	1.31***	1.07**	1.02***	1.00*
	(0.217)	(0.366)	(0.392)	(0.283)	(0.397)
Case per 1,000 people in population	0.021***	1.26*	0.019***	0.047***	0.041
	(0.00153)	(0.516)	(0.00200)	(0.0113)	(0.0247)
Democracy	-12.2**	-25.9***	3.03	-17.4**	-9.63†
	(4.207)	(6.904)	(10.17)	(5.449)	(5.456)
Foreign international restriction policy^	13.2***	39.1***	29.3***	22.8***	8.98
	(1.633)	(7.903)	(7.353)	(6.013)	(9.215)
*ln(*Population density)	3.55*	6.78*	4.14	6.69***	6.73***
	(1.712)	(2.499)	(2.648)	(1.861)	(1.729)
Economic risk rating	0.36	0.95	-0.38	0.30	0.23
	(0.338)	(0.587)	(0.633)	(0.436)	(0.457)
Physicians per 1,000 people	0.41	-2.88	-1.61	-1.13	-1.54
	(1.541)	(1.929)	(3.074)	(1.483)	(1.823)
Landlocked	-9.70*	-18.3*	-14.9†	-4.07	-2.39
	(4.089)	(7.693)	(8.101)	(5.215)	(4.768)
Continent					
Africa	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
America	5.85	12.4†	-5.44	-2.56	4.85
	(6.037)	(7.194)	(16.31)	(6.082)	(6.017)
Asia	-2.83	-3.55	17.6	-9.64	8.47
	(6.024)	(7.438)	(12.76)	(6.505)	(7.990)
Europe	8.65	12.8	5.03	-1.36	-2.71
	(8.051)	(9.188)	(16.38)	(9.138)	(9.511)
Pacific	-7.88	16.3*	-23.8*	-22.6**	8.47
	(10.96)	(7.424)	(10.46)	(8.209)	(9.879)
*ln(*Area in sq. kms)	5.00***	6.21***	5.04**	7.44***	5.95***
	(1.165)	(1.658)	(1.554)	(1.568)	(1.199)
Constant	-166.8***	-245.9***	-151.5***	-188.2***	-152.9***
	(24.80)	(39.40)	(37.18)	(30.12)	(29.25)
N	117	51	47	92	89
Prob. > *F*	0.000	.	.	0.000	0.000
R^2	0.710	0.689	0.821	0.551	0.476

Notes: OLS estimates. Standard errors (robust) in parentheses. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$. ^For specific travel restrictions, we calculated the weighted share of countries implemented the same policy at the time of restriction implementation, with weights being the share of arrivals.

Next, we assess which aspects of globalisation are more important in predicting the outcome by examining the effect of each (sub)components of the globalisation index. We first summarize the regression coefficients for each globalisation component in Fig. S1 by substituting the component with the overall globalisation index. Each regression includes the same set of control variables as those used in Tables 1. We find that the *economic* globalisation (and its trade and financial subcomponents) has a very weak effect, which is often not statistically significant, on the outcome variables, whereas *social* (particularly its *informational* and *cultural* subcomponents) have comparable significant effects on the two dependent variables. *Political* globalisation seems to have a stronger effect on the time duration between the first case and screening and quarantining policy implementation. Then, we include each of the subcomponents of each globalisation measure (i.e., subcomponents of economic and social globalisation and political globalisation) into the unconditional regression model ("horse-race" regression, see Figure 2) to assess the relative importance of each globalisation aspect. We find that *informational* globalisation seems to be the strongest factor, followed by *political* globalisation which has a comparatively smaller but statistically significant effect.

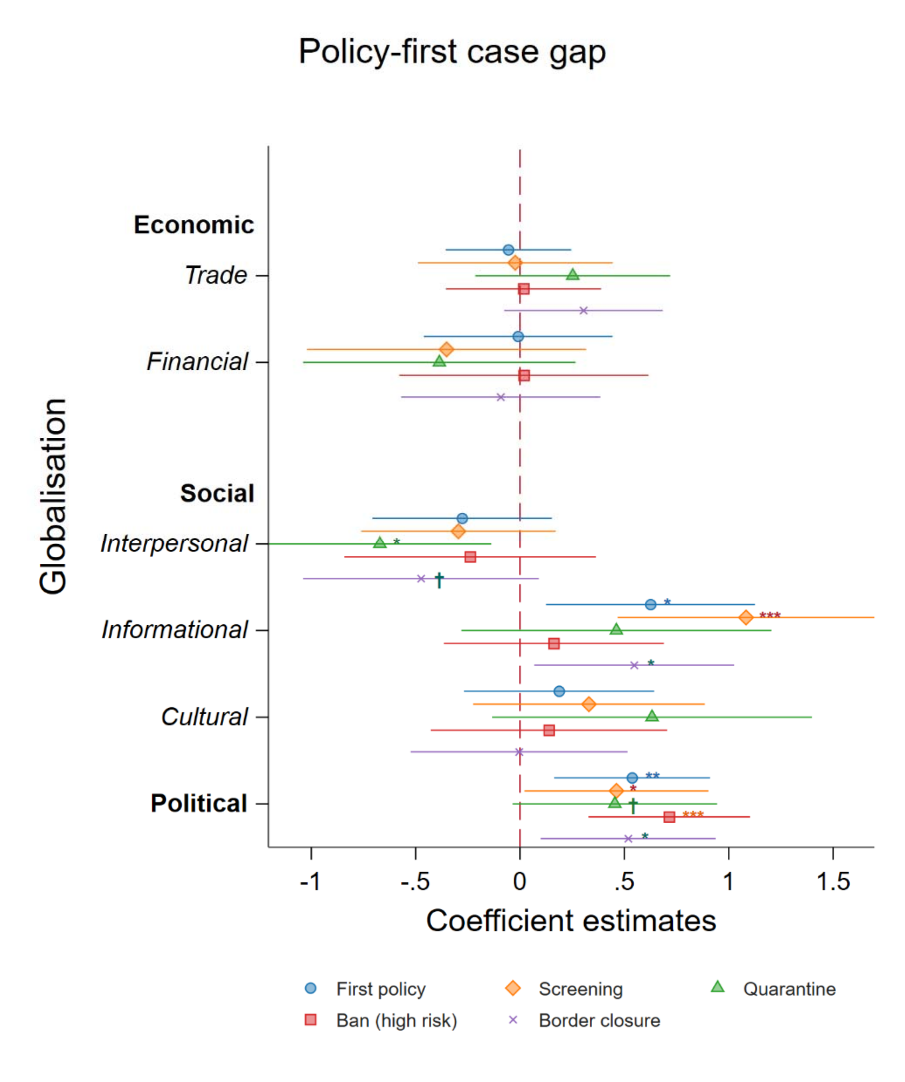

Fig. 2. Horse race between *Economic*, *Social*, and *Political* globalization on late international travel restriction policy implementation. Coefficients estimates obtained using OLS with robust SEs, controlling for number of confirmed case at time of implementation, population density and economic risk rating. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Do more globalised countries impose a more restrictive policy first?

We address this question by taking the level of strictness of the first international travel policy implemented in each country as the dependent variable and regressing it on the KOF globalisation index (as well as its subcomponents), controlling for the date of policy implementation, number of cases per million, population density, economic risk rating, and physicians per 1,000 people. We use a multinomial logit model, since the dependent variable is categorical (outcome 1 = impose screening as the first policy; 2 = quarantine; 3 = ban travel from high risk regions; 4 = total border closure). We present the regression estimates in Table 2 with the average marginal effects on each outcome (policy choice). We use screening as first travel restriction policy as the reference group for the regression, hence, the parameter estimates (and the corresponding average marginal effects) are relative to the reference group.

Table 2. Choice of first international travel policy to implement in response to COVID-19

	First international travel restriction		
	Quarantine	*Ban (high risk)*	*Border closure*
KOF Globalization Index	-0.034	-0.0061	0.29
	(0.0471)	(0.0365)	(0.190)
	-0.0056	*-0.0037*	*0.0094*
Date implemented	0.062**	0.068***	0.81*
	(0.0210)	(0.0180)	(0.335)
	-0.0030	*-0.0055*	*0.024*
Democracy	1.91†	1.40†	-5.03
	(1.023)	(0.762)	(3.397)
	0.14	*0.19*	*-0.16*
Case per 1,000 people in population	0.074	0.071	-0.17
	(0.0797)	(0.0797)	(0.295)
	0.0050	*0.011*	*-0.0069*
ln(Population density)	-0.84**	-0.54†	-2.91*
	(0.320)	(0.282)	(1.289)
	-0.041	*0.0079*	*-0.076*
Economic Risk Rating	0.077	0.048	-0.037
	(0.0778)	(0.0600)	(0.191)
	0.0060	*0.0041*	*-0.0025*
Physicians (per 1,000 people)	0.52†	0.22	-1.84
	(0.276)	(0.252)	(1.173)
	0.058	*0.036*	*-0.065*
Landlocked	-0.57	0.24	-1.10
	(1.006)	(0.796)	(1.775)
	-0.074	*0.098*	*-0.035*
Continent			
Africa	(ref.)	(ref.)	(ref.)
America	-0.79	-0.51	5.28
	(1.253)	(1.000)	(3.759)
	-0.079	*-0.070*	*0.12*
Asia	1.06	1.88†	5.99†
	(1.276)	(1.036)	(3.120)
	-0.063	*0.16*	*0.094*
Europe	-1.89	-1.79	6.91
	(1.668)	(1.286)	(5.186)
	-0.12	*-0.18*	*0.18*
Pacific	-18.8	1.04	16.8
	(7692.0)	(1.641)	(10277.7)
	-0.25	*-0.014*	*0.37*
ln(Area in sq. kms)	-0.067	-0.27	-0.47
	(0.236)	(0.185)	(0.642)
	0.013	*-0.036*	*-0.0095*
Constant	-1354.9**	-1501.2***	-17876.5*
	(460.2)	(394.4)	(7375.7)
Number of countries	125		
Log likelihood	-101.181		
Prob. > Chi^2	0.000		

McFadden's pseudo R^2	0.343

Notes: Multinomial logistic regression estimates with screening as base outcome. Standard errors in parentheses and average marginal effects in italics. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

In summary, we do not find that globalisation is an important factor in explaining the strictness of the policy adopted in the initial response to the pandemic outbreak (all coefficients of KOF Globalisation Index are not statistically significant).

5 Conclusions

The recent COVID-19 pandemic highlights the vast differences in approaches to the control and containment of infectious diseases across the world and demonstrates their varied degrees of success in minimising the transmission of coronavirus. This paper examines the effects of globalisation on the timeliness of government interventions in the form of international travel restrictions. We find that more globalised countries experience a longer delay in implementing international travel restriction policies with respect to the date of the first confirmed COVID-19 case. We also find that informational and political globalisation have the strongest effects on the observed delays in implementing international travel restriction policies in more globalised countries. Nevertheless, we did not find substantial evidence that more globalised countries are more likely to adopt a more or less restrictive travel policy to first counter the pandemic. These findings highlight the relationship between globalisation and protectionist policies as governments respond to significant global events such as a public health crisis as in the case of the current COVID-19 pandemic.

References

Ali, S. H., & Keil, R. (2006). Global Cities and the Spread of Infectious Disease: The Case of Severe Acute Respiratory Syndrome (SARS) in Toronto, Canada. *Urban Studies, 43*(3), 491-509. https://doi.org/10.1080/00420980500452458

Armelagos, G. J., & McArdle, A. (1975). Population, Disease, and Evolution. *Memoirs of the Society for American Archaeology*(30), 1-10.

Barrett, R., Kuzawa, C., McDade, T., & Armelagos, G. (1998). Emerging and re-emerging infectious diseases: The third epidemiologic transition. *Annual Review of Anthropology, 27*, 247-271.

Blake, D., Betson, M., Jones, B. A., Betson, M., & Pfeiffer, D. U. (2017). Eco-social processes influencing infectious disease emergence and spread. *144*(1), 26-36. https://doi.org/10.1017/S0031182016001414

Boix, C., Miller, M., & Rosato, S. (2013). A complete data set of political regimes, 1800–2007. *Comparative Political Studies*, *46*(12), 1523-1554. https://doi.org/10.1177/0010414012463905

Cockburn, T. A. (1971). Infectious Diseases in Ancient Populations. *Current Anthropology, 12*(1), 45-62. https://doi.org/10.1086/201168

Dong, E., Du, H., & Gardner, L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *The Lancet infectious diseases*, *20*(5), 533-534. https://doi.org/10.1016/S1473-3099(20)30120-1

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics, 38*(10), 1091-1110. https://doi.org/10.1080/00036840500392078

Elinor, K. K., Dominic, P. K., & Pardis, C. S. (2014). Natural selection and infectious disease in human populations. *Nature Reviews Genetics, 15*(6), 379. https://doi.org/10.1038/nrg3734

Gygli, Savina, Florian Haelg, Niklas Potrafke and Jan-Egbert Sturm (2019): The KOF Globalisation Index – Revisited, *Review of International Organizations, 14(3), 543-574* https://doi.org/10.1007/s11558-019-09344-2

Hale, T., Webster, S., Petherick, A., Phillips, T., & Kira, B. (2020). *Oxford COVID-19 Government Response Tracker.*

Keil, R., & Ali, H. (2007). Governing the Sick City: Urban Governance in the Age of Emerging Infectious Disease. *Antipode, 39*(5), 846-873. https://doi.org/10.1111/j.1467-8330.2007.00555.x

Kilbourne, E. D. (2006). Influenza Pandemics of the 20th Century. *Emerging Infectious Diseases, 12*(1), 9-14.

Kock, R. A. (2013). Will the damage be done before we feel the heat? Infectious disease emergence and human response. *14*(2), 127-132. https://doi.org/10.1017/S1466252313000108

Lim, P. L. (2014). Travel the globalization of emerging infections. *Transcripts of the Royal Society of Tropical Medicine and Hygience, 108*(1), 309-310. https://doi.org/10.1093/trstmh/tru051

Lindahl, J. F., & Grace, D. (2015). The consequences of human actions on risks for infectious diseases: a review. *Infection Ecology & Epidemiology, 5*(1), 30048. https://doi.org/10.3402/iee.v5.30048

Mayer, T. & Zignago, S. (2011). Notes on CEPII's distances measures : the GeoDist Database CEPII Working Paper 2011-25

Spencer Larsen, C. (2018). The Bioarchaeology of Health Crisis: Infectious Disease in the Past. *47*(1), 295-313. https://doi.org/10.1146/annurev-anthro-102116-041441

UN COMTRADE (2020). *United Nations Commodity Trade Statistics Database*. United Nations Statisitcal Division (NewYork: United Nations).

World Tourism Organization (2020), *Yearbook of Tourism Statistics, Data 2014 – 2018, 2020 Edition*, UNWTO, Madrid, DOI: https://doi.org/10.18111/9789284421442

Appendix

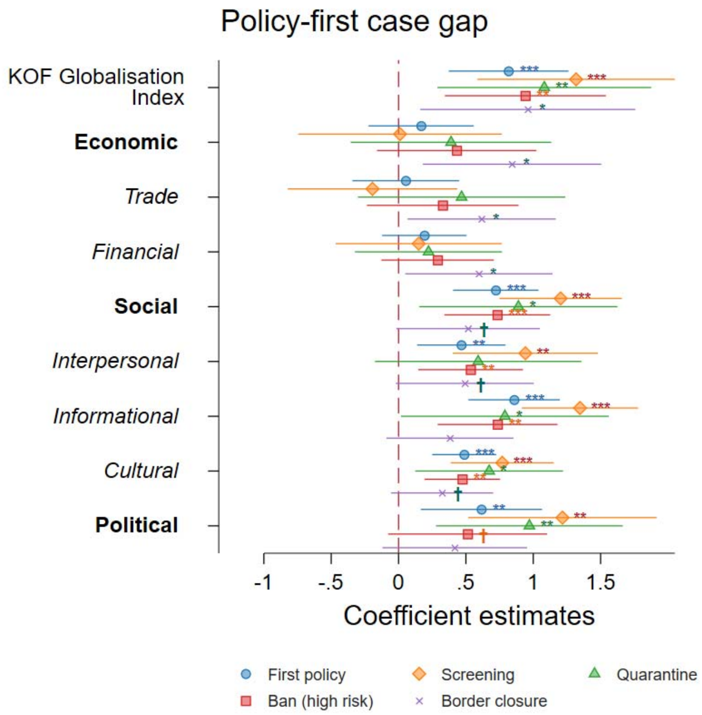

Fig. S1. Correlation between economic, social and political dimensions of globalisation indices with travel restriction policy implementation-first confirmed case gap. Coefficients estimates obtained using OLS with robust SEs, controlling for number of confirmed case at time of implementation, population density and economic risk rating. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table S1. Robustness – Relationship between globalization and policy-first case time gap: Foreign international restriction policy weights using 2018 gross bilateral import and export

Dependent variable	**Days between policy introduction and first case**									
	Import					*Export*				
Independent variable	First policy	Screening	Quarantine	Ban (high risk)	Border closure	First policy	Screening	Quarantine	Ban (high risk)	Border closure
KOF Globalization Index	1.14***	0.91†	1.11**	1.33***	1.17**	1.05***	0.91†	1.10**	1.12**	1.22**
	(0.224)	(0.454)	(0.365)	(0.312)	(0.398)	(0.211)	(0.449)	(0.342)	(0.330)	(0.414)
Case per 1,000 people in population	0.018***	1.18	0.018***	0.029**	0.12*	0.019***	0.93	0.018***	0.034**	0.11*
	(0.00161)	(1.123)	(0.00177)	(0.00953)	(0.0462)	(0.00120)	(1.118)	(0.00163)	(0.0117)	(0.0480)
Democracy	-9.21†	-12.4	7.73	-14.0*	-8.92†	-6.72	-11.6	5.81	-12.5†	-9.56†
	(4.672)	(9.917)	(5.699)	(5.523)	(5.125)	(5.393)	(10.72)	(6.577)	(6.451)	(5.016)
Foreign international restriction policy	16.2***	37.3***	35.1***	39.1***	17.7*	16.8***	35.3***	36.8***	29.3***	25.5*
	(1.603)	(8.011)	(5.299)	(6.925)	(8.184)	(1.633)	(8.867)	(5.152)	(7.653)	(11.89)
*ln(*Population density)	2.19†	5.08†	4.08†	4.10*	3.45*	3.54*	7.05*	5.35*	5.74**	2.94*
	(1.269)	(2.702)	(2.099)	(1.771)	(1.332)	(1.355)	(2.806)	(2.065)	(2.005)	(1.379)
Economic risk rating	0.23	0.90	-0.17	0.12	-0.33	0.45	0.93	-0.032	0.45	-0.47
	(0.384)	(0.597)	(0.523)	(0.520)	(0.523)	(0.323)	(0.553)	(0.450)	(0.688)	(0.474)
Physicians per 1,000 people	-0.92	0.25	-1.87	-1.47	-4.24†	-0.61	0.90	-1.63	-1.74	-5.69*
	(1.865)	(5.358)	(2.749)	(2.280)	(2.487)	(1.578)	(5.650)	(2.557)	(2.492)	(2.679)
Landlocked	-8.59*	-16.5*	-10.9	-7.11	-4.10	-6.84†	-18.9*	-9.07	-3.87	-6.13†
	(3.767)	(7.784)	(6.547)	(4.430)	(3.618)	(3.793)	(8.364)	(6.647)	(4.778)	(3.563)
Continent										
Africa	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
America	5.09	5.16	-5.51	7.90	8.69	4.80	8.24	-3.81	2.61	15.0*
	(6.623)	(11.92)	(12.02)	(7.301)	(5.463)	(7.524)	(12.02)	(11.95)	(9.796)	(5.909)
Asia	4.95	-3.67	14.4	-1.42	17.4**	2.63	-6.72	9.70	-10.5	23.0***
	(5.794)	(12.71)	(9.889)	(6.569)	(6.177)	(6.176)	(14.02)	(9.875)	(8.147)	(6.182)
Europe	7.61	2.25	1.57	-0.46	1.81	1.49	-1.13	1.63	-7.38	7.33
	(9.243)	(15.75)	(11.74)	(9.840)	(7.951)	(9.036)	(15.52)	(12.10)	(13.09)	(8.056)
Pacific	-7.36			-19.9†	20.2†	-14.5			-28.5*	24.7*
	(12.43)			(10.60)	(10.50)	(16.75)			(13.93)	(11.43)
*ln(*Area in sq. kms)	5.02***	5.09*	4.67**	6.65***	6.08***	5.13***	5.00*	5.50***	7.07***	5.64***
	(1.006)	(1.874)	(1.480)	(1.409)	(1.069)	(0.981)	(1.911)	(1.472)	(1.676)	(1.145)
Constant	-183.8***	-207.7***	-163.2***	-196.2***	-135.3***	-192.5***	-214.8***	-183.9***	-194.8***	-128.3***
	(18.76)	(43.02)	(31.63)	(31.07)	(28.58)	(19.70)	(43.81)	(32.60)	(36.78)	(26.12)
N	98	43	41	78	73	98	43	41	78	73
Prob. > *F*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.805	0.681	0.891	0.651	0.630	0.796	0.666	0.899	0.550	0.641

Notes: OLS estimates. Standard errors (robust) in parentheses. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table S2. Robustness – Relationship between globalization and policy-first case time gap: Hospital beds and nurses and midwives as proxy for health system capacity

Dependent variable	**Days between policy introduction and first case**									
	Hospital beds (per 1,000 people)					*Nurses and midwives (per 1,000 people)*				
Independent variable	First policy	Screening	Quarantine	Ban (high risk)	Border closure	First policy	Screening	Quarantine	Ban (high risk)	Border closure
KOF Globalization Index	0.80^{***}	0.94^{*}	1.09^{**}	0.89^{***}	0.87^{*}	0.78^{***}	$0.67^{\dagger}$	1.11^{*}	0.85^{**}	0.86^{*}
	(0.204)	(0.389)	(0.387)	(0.258)	(0.361)	(0.220)	(0.391)	(0.424)	(0.289)	(0.409)
Case per 1,000 people in population	0.022^{***}	1.12^{*}	0.018^{***}	0.048^{***}	$0.043^{\dagger}$	0.021^{***}	1.19^{*}	0.019^{***}	0.043^{**}	$0.043^{\dagger}$
	(0.00166)	(0.525)	(0.00216)	(0.0119)	(0.0247)	(0.00136)	(0.441)	(0.00216)	(0.0140)	(0.0250)
Democracy	-12.4^{**}	-22.6^{**}	5.55	-16.5^{**}	-8.99	-12.1^{**}	-20.9^{**}	4.17	-16.2^{**}	-8.96
	(4.146)	(7.845)	(8.150)	(5.090)	(5.415)	(4.180)	(7.648)	(9.047)	(5.264)	(5.613)
Foreign international restriction policy	13.4^{***}	35.5^{***}	29.9^{***}	22.4^{***}	7.41	13.3^{***}	35.6^{***}	28.5^{**}	22.4^{***}	7.48
	(1.625)	(7.811)	(7.653)	(5.991)	(8.994)	(1.683)	(6.883)	(8.094)	(5.946)	(9.011)
*ln(*Population density)	3.59^{*}	6.94^{**}	$4.39^{\dagger}$	7.09^{***}	7.23^{***}	3.73^{*}	7.25^{**}	4.02	7.07^{***}	7.23^{***}
	(1.580)	(2.543)	(2.458)	(1.867)	(1.813)	(1.647)	(2.445)	(2.777)	(1.859)	(1.629)
Economic risk rating	0.41	0.99	-0.44	0.36	0.27	0.30	0.80	-0.22	0.31	0.26
	(0.338)	(0.627)	(0.645)	(0.442)	(0.465)	(0.352)	(0.563)	(0.605)	(0.448)	(0.455)
Health system capacity	1.09	1.12	-1.13	0.45	0.071	0.48	$1.63^{\dagger}$	-0.71	0.33	0.057
	(0.671)	(1.269)	(1.022)	(0.793)	(1.398)	(0.507)	(0.851)	(0.692)	(0.601)	(0.771)
Landlocked	-10.4^{*}	-20.6^{*}	$-15.2^{\dagger}$	-4.66	-2.61	-9.62^{*}	-22.5^{**}	-16.8^{*}	-4.40	-2.57
	(4.173)	(7.632)	(7.632)	(5.237)	(4.734)	(4.132)	(7.511)	(7.812)	(5.240)	(4.868)
Continent										
Africa	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)	(ref.)
America	6.26	7.13	-10.1	-4.13	2.39	6.36	7.08	-9.24	-4.24	2.43
	(5.423)	(8.984)	(12.95)	(5.497)	(5.694)	(5.454)	(9.205)	(13.10)	(5.438)	(5.723)
Asia	-4.25	-7.86	18.0	$-11.6^{\dagger}$	6.56	-2.63	-7.06	16.5	$-10.8^{\dagger}$	6.64
	(5.746)	(8.147)	(12.36)	(6.305)	(7.851)	(5.592)	(7.781)	(12.09)	(5.944)	(7.244)
Europe	6.49	4.44	2.18	-4.82	-5.27	8.36	5.18	2.79	-3.95	-5.16
	(7.149)	(8.274)	(14.72)	(8.271)	(10.31)	(7.537)	(8.577)	(15.08)	(8.059)	(9.114)
Pacific	-8.74	7.58	-21.6^{*}	-24.6^{**}	6.95	-8.47	10.8	-26.1^{**}	-25.0^{**}	6.86
	(11.07)	(8.372)	(8.551)	(8.189)	(9.562)	(11.22)	(7.942)	(9.377)	(8.382)	(9.664)
*ln(*Area in sq. kms)	4.82^{***}	5.86^{***}	5.25^{***}	7.43^{***}	6.20^{***}	4.93^{***}	5.97^{***}	5.47^{***}	7.39^{***}	6.19^{***}
	(1.157)	(1.640)	(1.343)	(1.601)	(1.197)	(1.167)	(1.621)	(1.372)	(1.671)	(1.246)
Constant	-164.5^{***}	-223.4^{***}	-154.3^{***}	-185.4^{***}	-151.8^{***}	-161.6^{***}	-206.3^{***}	-163.0^{***}	-181.2^{***}	-151.2^{***}
	(24.51)	(37.76)	(37.07)	(30.04)	(29.55)	(26.26)	(36.68)	(37.13)	(35.40)	(34.35)
N	117	51	47	92	89	117	51	47	92	89
Prob. > *F*	0.000	.	.	0.000	0.000	0.000	.	.	0.000	0.000
R^2	0.715	0.681	0.823	0.550	0.471	0.712	0.700	0.823	0.550	0.471

Notes: OLS estimates. Standard errors (robust) in parentheses. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.