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COVID-19 Risk Perceptions and Social Distancing Practice in Latin America

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Abstract

Objectives: Many developing countries use social distancing as part of their mitigation strategy during epidemics. This study aimed to understand individual decisions to practice different social distancing measures in the immediate emergence of COVID-19. **Study design:** Utilizing social media advertising and snowball sampling, a web-based survey was administered in 16 Latin American countries. **Methods:** We estimated seemingly unrelated Probit models to identify factors associated with the decision to implement social distancing practices. **Results:** From 5,480 respondents, estimated marginal effects indicate that risk perceptions are positively related to distancing from friends or relatives and avoiding public places but do not seem to influence the decision to stay home. Results also indicate that risk perceptions are related to household income, the number of reported COVID-19 cases in the country, and perceived preparedness of the health care system. **Conclusions:** Our findings support the notion that people will follow social distancing measures if there is a clear understanding of risk. Providing the public ways to access accurate numbers of confirmed cases can inform perception of disease severity. Since household income was a determinant of practicing social distancing, without financial assistance, some will be forced to break regulations in order to procure food or resources for their survival.

Keywords

COVID-19, social distancing, risk perceptions, Latin America

Amid a pandemic for which neither a vaccine nor therapeutic antiviral treatment is not yet widely available, the swift implementation of traditional public health measures is a primary way to lessen person-to-person transmission (Wilder-Smith & Freedman, 2020; World Health Organization [WHO], 2020a). Based on preliminary estimates of the basic reproduction number (R0)[1] of coronavirus (SARS-Co-V2), in the absence of intense quarantine and social distancing measures, about 70% of contacts would have to be successfully traced to control early spread (Keeling et al., 2020). Many developing countries do not have the capacity to effectively undertake this task, leaving social distancing as a crucial strategy for mitigation in the transmission of SARS-Co-V2 (henceforth, COVID-19).

Social distancing measures are designed to limit close contact with others outside of one's household as a way to decrease interactions between those who may be infectious but not yet identified. Examples of social distancing include closure of schools and places of business and cancellation of gatherings. Since the coronavirus is currently thought to be primarily transmitted by respiratory droplets (WHO, 2020b), which require a certain proximity for person-to-person transmission to occur, these measures are likely to reduce the spread. Social distancing is useful in settings where community transmission has occurred (as is the case with COVID-19), but where the linkages between cases is unclear (i.e., limited capacity for contact tracing) as seen in many developing countries (Wilder-Smith & Freedman, 2020).

As we monitor the global spread and impact of the COVID-19 pandemic, continued concerns of serious repercussions in the Latin American region abound. Latin America was one of the last regions in the world to see the coronavirus emerge.[2] In some respects, this allowed these countries to learn the ways in which the virus spread, proactively employ measures to minimize morbidity and mortality, avoid a spike that would overwhelm health care systems, and limit the effects on the economy (Anderson et al., 2020). However, certain Latin American countries have not been consistent or preemptive with their actions as reported cases rapidly increased. Given the context of politically divided countries, social inequalities, internal conflicts, and economic limitations (Rodriguez-Morales et al., 2020), the rapid growth of the initial stages of the virus in many of these countries was alarming.

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Table 1. Initial Public Health Measures (Including Dates) Announced and Implemented to Limit the Spread and Transmission of COVID-19 in Various Latin American Countries.

Country	Declared a State of Emergency	Traveler Self-Quarantine	Suspended Incoming Flights	Suspension of Classes	Closing of Borders	Remote Working/Change in Hours	Banned Public Gatherings/Closed Restaurants	Obligatory Quarantine or Curfew
Argentina	3/13	3/11	3/12	3/15	3/15	3/17	3/12	3/19
Bolivia	3/11	3/16	3/12	3/12	3/17	3/17	3/15	3/21
Brazil	3/18	3/12	3/19	3/16	3/19		3/21	3/21
Chile	3/18	3/14	3/14	3/30	3/18	3/24	3/18	3/18
Colombia	3/17	3/15	3/23	3/15	3/16		3/16	3/24
Costa Rica	3/16	3/16		3/12	3/16		3/12	3/23
Dominican Republic	3/17		3/16		3/17		3/17	3/20
Ecuador	3/11	3/11		3/12	3/14		3/15	3/16
El Salvador	3/13	3/11	3/11	3/11	3/11		3/13	3/22
Guatemala		3/11	3/11	3/14	3/17	3/15	3/14	3/21
Honduras	3/11	4/29		3/12	3/15		3/23	3/16
Mexico	3/30			3/14		3/14	3/24	
Nicaragua								
Panama	3/12	3/16	3/19		3/15		3/16	3/19
Peru	3/15	3/11		3/11	3/16			3/18
Uruguay	3/13	3/13	3/18	3/13	3/22		3/18	

Across these regions, there has been substantial variation in government responses. Bolivia, Ecuador, and Honduras were the first to act, declaring national emergencies on March 11, 2020, with nine other countries to follow over the next 7 days. Additionally, 12 countries in our sample suspended all classes and 11 instituted bans on public gatherings or required restaurants to close before the start of our survey on March 19 (see Table 1).[3] These responses served as initial signals to citizens of the potential severity of the pandemic. Two countries that stand apart are Brazil and Nicaragua, the first and last countries, respectively, to announce their first confirmed coronavirus case. Brazil's policies were implemented only at the municipality level (e.g., closing of beaches in Rio and quarantine in Sao Paolo) and were announced 22 days after their first documented case. Nicaragua had no formal policies implemented during our survey period. It is important to note that across different countries, the actions and inactions of the local versus national authorities may also communicate conflicting messages. In two instances, the efforts by local politicians to contain the virus were directly contradicted by national leaders. For example, Mexico's President Andrés Manuel López Obrador called for citizens to continue "living life as usual" (Agren, 2020), going to restaurants and outings; and in Brazil, President Jair Bolsanaro endorsed anti-lockdown protestors (Friedman, 2020). These mixed messages demonstrate the range in perceived risks by government officials and inform some of the individual debates over whether to practice social distancing.[4]

Beyond legal requirements, individuals will also assess their personal level of risk associated with disease transmission and severity of illness (Webster et al., 2020). This perception may be influenced by particular circumstances, for example, advanced age or residences with higher risk household members. Personal opinions regarding the preparedness of their country's health care infrastructure, their ability to access those services should they be needed, and level of trust in health professionals/officials may also contribute to risk perceptions (McFadden et al., 2020).

The final consideration is whether, and how effectively, an individual is able to distance themselves from others during the pandemic. Income and household size are critical factors in determining whether individuals are financially and physically able to distance from others. There are fewer financial costs associated with social distancing for those with monetary savings or jobs that can transition to working remotely. However, workers in the service sector or informal markets (like cleaning, construction, etc.) have limited opportunities to work from home. Moreover, larger households have increased risk of points of contact outside the home, which may exacerbate intra-household exposure.

The goal of this study was to improve our understanding of individual decisions to practice different types of social distancing measures (distancing from friends and relatives, avoiding public places, staying at home) during the initial stages of the COVID-19 pandemic in 16 Latin American countries. It is during the early stages of an epidemic when the mitigation of the spread may be most helpful to prevent cases overwhelming the health care systems. Our empirical methodology accounted for two dimensions on their decisions to participate in social distancing practices: individual risk perceptions for themselves or household members (i.e., likelihood of dying from virus) and financial ability, while controlling for national policies through country-level fixed effects. Additionally, we accounted for endogeneity of these decisions with an alternative IV estimation using confirmed COVID-19 cases by country-day and perceived preparedness of health care systems as identifying instruments of risk perceptions.

Methods

After receiving approval from University Institutional Review Board, we administered a web-based survey in 16 Latin American

Table 2. Variables Definitions and Descriptive Statistics.

Variables	Definition	Mean	*SD*
Dependent variables			
SDPEOPLE	If the respondent is distancing from friends and relative (1 = yes, 0 = otherwise)	0.846	0.361
SDPLACES	If the respondent is avoiding public places (1 = yes, 0 = otherwise)	0.912	0.283
SDWORK	If the respondent is working from home or not working (1 = Yes, 0 = Otherwise)	0.685	0.464
Explanatory variables			
RISK	If the respondent believes they would likely or very likely dye if infected with COVID-19 (1 = yes, 0 = otherwise)	0.541	0.498
FEMALE	Sex of the respondent (1 = female, 0 = otherwise)	0.584	0.493
AGE	Age of the respondent in years	39.954	14.376
EDUCATION	Education of the respondent in years of schooling	16.396	5.238
HHSIZE	Household size	4.159	2.925
INCOME	Monthly household income measured in intervals of 1,000 US$	1.069	1.138
Instrumental variables			
CASES	Accumulated number of cases reported in the country where the respondent lives.	1,586.971	1,960.201
PREPARED	If the respondent believes that, in their country, the health care system is prepared to face COVID-19 (1 = yes, 0 = otherwise)	0.140	0.347

countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, and Uruguay, utilizing social media advertising and snowball sampling. The survey was posted from March 19 to April 5, 2020, beginning after all included countries had identified their first case, but prior to widespread transmission. We focused on three types of social distancing practices: (1) *SDPEOPLE:* distancing from friends/relatives, (2) *SDPLACES:* avoiding public places (e.g., malls and parks), and (3) *SDWORK:* staying at home. The decision to implement the social distancing practice i was represented using binary indicators (Y = SDPEOPLE; SDPLACES; SDWORK) that take the value of one if the unobserved propensity to adopt those behaviors (Y^*) is greater than zero (i.e., strong enough to adopt that behavior), and zero otherwise (see Table 2 for a definition of those dependent indicators). We estimated seemingly unrelated Probit models to identify factors associated with the decision to implement social distancing practices while accounting for potential correlations among those practices (i.e., households could implement some or all of those practices concurrently) as follows:

$$\begin{aligned} Y_i &= 1 \quad \text{if } Y_i^* = X\beta + e_i > 0 \\ Y_i &= 0 \qquad \text{otherwise} \end{aligned} \tag{1}$$

where X represents the set of covariates, β is the vector of coefficients to be estimated, and e is the idiosyncratic error term that depicts unobserved covariates assumed to follow a standard normal distribution. The correlation between error terms was empirically estimated (i.e., $\rho[e_i, e_j] \neq 0$).

Table 2 shows the variables included in vector X. The binary indicator *RISK* takes the value of one for respondents who believe they would *likely* or *very likely* die due to COVID-19, and zero otherwise. A particular concern with the inclusion of this indicator is that risk perceptions could be affected by unobserved covariates depicted by error terms. In that case, estimated coefficients would show some biases due to the endogeneity of risk perceptions. We addressed this potential endogeneity issue by simultaneously modeling the binary indicator of risk perceptions using two instrumental variables: (1) the accumulated number of cases reported in each country up to the day when the respondent took our survey and (2) a binary indicator depicting whether the respondent believes that the health care system is prepared to face the pandemic or not. The underlying assumption is that those instrumental variables influence social distancing practices only indirectly through risk perceptions.

Finally, we included country fixed effects to control for differences across countries. To address concerns of representation from our convenience sample, we used an iterative proportional fitting (raking) procedure to generate weights that mirror the total population by country of residence, sex, and age, for a total of 204 groups (17 countries × 2 sexes × 6 age ranges: 18–24, 25–34, 35–44, 45–54, 55–64, and 65+) (Kolenikov, 2014). We simultaneously estimated models for each type of social distancing and the perceived risk of dying from COVID-19 using the Stata command *cmp*, which implements the maximum likelihood estimation method.

Results

In this study, we used information on preventive measures and risk perceptions from 5,480 respondents. Weighted estimates shown in Table 2 indicate that 84.6% of individuals were distancing themselves from friends and relatives, 91.2% were avoiding public places, and 68.5% were staying at home at the time of responding to our survey. Those descriptive statistics also provide a profile of the average respondent. Approximately 58% of respondents were female. The average respondent was approximately 40 years old and had 16 years of education. On average, there were four members in the respondents' household, which together earned more than US$ 1,000 in a month.

Table 3 shows our estimation results. Estimated marginal effects indicate that risk perceptions are positively related to two

Table 3. IV Seemingly Unrelated Probit Models of Social Distancing Practices.

	Social Distancing Measures			Endogenous
Dep. Var. =	SDPEOPLE	SDPLACES	SDWORK	Variable: RISK
(a) Marginal effects of covariates on the probability of social distancing practices				
RISK	0.330	0.235	0.143	—
	(0.074)***	(0.077)***	(0.152)	
FEMALE	0.048	0.038	0.014	0.016
	(0.016)***	(0.015)***	(0.020)	(0.022)
AGE	0.002	-0.000	−0.000	0.001
	(0.001)***	(0.001)	(0.001)	(0.001)
EDUCATION	−0.001	0.000	0.010	0.003
	(0.002)	(0.002)	(0.002)***	(0.002)
HHSIZE	−0.005	−0.004	−0.009	0.004
	(0.002)**	(0.003)*	(0.003)***	(0.004)
INCOME	0.029	0.029	0.045	−0.043
	(0.009)***	(0.009)***	(0.012)***	(0.012)***
CASES	—	—	—	0.00002
				(0.00001)**
PREPARED	—	—	—	−0.152
				(0.034)***
(b) Correlation matrix				
SDPEOPLE	—	.659***	.372***	−.690***
SDPLACES	—	—	.476***	−.612***
SDWORK	—	—	—	−.211
(c) Predicted probability of social distancing practices				
	0.773	0.852	0.680	0.539
	(0.027)***	(0.031)***	(0.014)***	(0.011)***

Note. Observations = 5,480. Standard errors are reported in parentheses. ***, ** and * imply statistical significance at 1%, 5%, and 10% level, respectively. Sampling weights and country-level fixed effects were used to estimate the seemingly unrelated Probit models.

social distancing practices: distancing from friends/relatives and avoiding public places. Relative to individuals who believe that it is *unlikely* or *less likely* they would die if infected with COVID-19, individuals who believe it is *likely* or *very likely* to die from COVID-19 are about 33 percentage points more likely to distance themselves from friends and relatives, and almost 24 percentage points more likely to avoid public places. In contrast, risk perceptions do not seem to influence the decision to stay at home. A similar pattern is observed for respondent's sex. Females are about four percentage points more likely to implement social distancing (from friends and public places) than males, but equally likely to stay at home.

Marginal effects of household size are negative and statistically significant for all types of social distancing practices, suggesting that the likelihood of implementing social distancing decreases with household size. This could be related to social and economic needs, which tend to be greater for larger households than for smaller ones. Respondent's age was statistically significant for distancing from friends and relatives only, which is consistent with the known vulnerability of elders (Center for Disease Control and Prevention [CDC], 2020). On the other hand, results indicate that education is related to staying at home, presumably because more educated individuals have the opportunity to continue working remotely. Education was insignificant for other forms of social distancing.

Results also indicate that risk perceptions are related to household income, the number of reported COVID-19 cases in the country, and the perceived preparedness of the health care system. Risk perceptions of dying from COVID-19 decrease as household income increases. Compared to poor households, more affluent individuals may believe they can afford appropriate health care, increasing the likelihood of survival. Estimated marginal effects of the number of COVID-19 cases were positive and statistically significant. This could be expected given that the actual likelihood of infection increases with the number of reported cases. Results also show that individuals who believed the health care system is prepared to face the pandemic are about 15 percentage points less likely to believe they would die if infected than people who believe that the health system is not ready. The significance of instrumental variables provides evidence of their validity to control for potential endogeneity biases.

Correlation estimates provide further support to our modeling approach (see Panel B of Table 3). Error terms between social distancing practices are significantly and positively correlated, indicating that social distancing practices are deemed as complements of each other. Correlation estimates between the equations on risk perceptions and distancing from friends/relatives and public places are also significant. This suggests that there could be potential endogeneity biases that our modeling approach corrects for.

Discussions

Initial Rt^5 estimations in Latin American countries for the COVID-19 pandemic reflect an aggressive outbreak (Ochoa et al., 2020), indicating an intense need for multiple efforts to slow down the spread. In the United States, we have seen that the tracking of Rt metrics demonstrates a reduction in the spread of coronavirus in states implementing more social distancing measures (Systrom, 2020). As we wait for an immunization to become widely available for SARS-CoV-2, traditional public health measures are the primary way to mitigate transmission and therefore understanding what influences an individual's decision to social distance is important. The predicted probabilities shown in Panel C of Table 3, along with estimation results discussed above, suggest that people have more control with distancing from friends or relatives and public places versus staying at home. Staying at home depends on education, household size, and income, but not on risk perceptions and other individual characteristics. Overall, our findings suggest that people living in poorer and larger households are less likely to stay at home. Presumably, this is because they need to work or procure aid while the economy is closed. In contrast, higher educated people are more likely to stay at home, perhaps because they can work remotely.

When people perceive greater risk, they are more likely to implement protective behaviors (Bruin & Bennett, 2020;

Webster et al., 2020). In this sample, perceived risk of death influenced social distancing practices. Individuals who believed they were more likely to die if infected with COVID-19 practiced social distancing measures (avoiding gathering with friends or relatives and avoiding public places). Additionally, respondent's age was statistically significant for distancing from friends and relatives. Our findings support the notion that people will follow social distancing measures if there is a clear understanding of risk. From the onset of the emergence of the coronavirus, it was consistently reported that older adults were more at risk of contracting and/or having more severe complications from the virus (CDC, 2020). Continued social distancing focused on these groups may be an effective way to reduce morbidity and mortality.

Additionally, providing the public with ways to access accurate numbers of confirmed cases can inform perceptions of disease severity. In our sample, risk perceptions were significantly related to the number of reported cases in the country. Certain Latin American regions have not been transparent regarding accuracy of cases, making it difficult to decipher the gravity of COVID-19 in certain communities. A recent study found individual risk perceptions were lower among those who trusted health professionals and officials providing information on COVID-19 (McFadden et al., 2020). Our results also indicated that confidence in the health care system influences risk perceptions. Individuals who believed their health care system was prepared were less likely to believe they would die if infected. Given that various Latin American countries have received mixed messages from government officials, it was not surprising that even at the start of the pandemic the majority of our sample lacked confidence in their health care system (86%).

Based on our findings, household income is a determinant of practicing all kinds of social distancing analyzed in this study. This is concerning given that many households are currently experiencing income reductions and/or unemployment as national governments intend to slow down the spread of the virus by reducing economic activity. Without financial assistance, some people will be forced to break social distancing regulations in order to procure food and other resources for their survival. This contradiction has led governments to quickly implement transfer programs while the economy is relatively closed (Organization for Economic Co-operation and Development, 2020). While effective as a stopgap, cash transfers may be unsustainable in the long-term, given that official expenditures on health services are increasing while tax revenues decrease (due to low economic activity). This scenario may be even worse for those Latin American countries that currently are in a compromised fiscal position (e.g., highly indebted). Many regions will be in dire need of external aid to prevent further deterioration of current health and economic crises.

As any other study, our research had some limitations that should be noted. While access to mobile phones and social media has rapidly increased in developing regions (Pew Research Center, 2019), there is still a large part of the population that does not utilize the internet (Durand-Morat et al., 2015). Therefore, a web-based survey will not yield a representative sample. We computed sampling weights to minimize this issue. Yet, future studies could be conducted at the country and local levels using a representative sample, as long as social distancing policies allow to do so. Despite these aforementioned points, our study provides a deeper understanding of what drives social distancing behaviors. Latin America had the advantage of being able to watch what other countries have implemented and see what has been successful or not. Government actions to ban mass gatherings and restrict travel are important; however, individual behavior will be crucial to control the spread of COVID-19. Therefore, ensuring communities have the needed information and economic means to implement appropriate distancing decisions is a critical factor in measure efficiency.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. R0, the basic reproduction number, represents the number of infections caused by a single infection of a given disease. For SARS-CoV2, the range is 2.4–3.1 (D'Arienzo & Coniglio, 2020). As a point of comparison, the average R0 for seasonal influenza viruses is about 1.8 (Biggerstaff et al., 2014).
2. Brazil was the first country in Latin America to see a case of COVID-19 on February 26, 2020, and El Salvador and Nicaragua were the last countries to report their first cases on March 18.
3. Supplemental Appendix A shows national-related responses implemented in select Latin American countries during the initial stages of the pandemic.
4. At the time of our survey, face mask use was not compulsory or widely recommended in the Americas.
5. Rt (the effective reproduction rate) is the average number of people who become infected by an infectious person. It is a more real-time and dynamic measure of how fast a disease is spreading. When Rt is above 1.0, the virus will spread quickly.

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