Epidemics, Pandemics and Income Inequality

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Abstract

The novel coronavirus is part of a series of infectious disease outbreaks that include: Ebola, Avian influenza, Middle East respiratory syndrome coronavirus (MERS-CoV), Influenza A (H1N1), and others. This paper addresses the question of how do these epidemics and pandemics affect income inequality in countries around the world during the first two decades of the 21st century. To achieve its objective, the paper explores the effect on the Gini coefficient of a dummy variable that indicates the occurrence of an epidemic or a pandemic in a country in a given year, in addition to the fatality rate of the epidemic or the pandemic. The panel estimations show that the dummy variable has a statistically significant positive effect on income inequality, while the fatality rate does not have a statistically significant nor an economically important effect on income inequality. To properly address potential endogeneity, we implement a Three-Stage-Least Squares technique. The estimation shows that both epidemics indicators have a statistically significant positive effect on income inequality, while income inequality does not have a statistically significant effect on the epidemics and pandemics indicators.

Keywords: Epidemics, income inequality.

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1 Introduction

This paper examines the effect of epidemics and pandemics on income inequality. An epidemic is a widespread outbreak of an infectious disease in a community. A pandemic is an epidemic that has spread worldwide. This paper argues that epidemics and pandemics have significant effects on income inequality either through their potential direct disproportionate health effects, or through the indirect economic consequences caused by the intervention of governments to contain these health crises. This question is of important policy implications as policy makers around the world attempt nowadays to comprehend and address the consequences of emerging disease epidemics and pandemics.

The paper uses a panel of 191 countries during the period 2000-2018 to examine the effect of epidemics and pandemics on income inequality. During this period, the world experienced several outbreaks of infectious diseases such as MERS-Cov, H1N1, SARS, Ebola, and others. We use a dummy variable to indicate the occurrence of an epidemic or a pandemic in a country in a given year, in addition to a variable that captures the fatality rate of these health crises. Panel estimation techniques are used to explore the association between these health variables and the Gini Coefficient.

The Fixed Effects estimations show that the epidemics and pandemics dummy variable has a statistically significant positive effect on income inequality. This result is robust even after we include additional control variables that are identified by the literature as determinants of income inequality, such as the level of economic development captured by the logarithm of GDP per capita, the sectoral structure of the economy, the institutional quality captured by the extent of corruption and the democratic system of governance, in addition to indicators of fiscal policy, monetary policy and trade policy. This indicates that the occurrence of an epidemic or a pandemic, captured by the dummy variable, can trigger a policy response that may affect the income distribution.

The paper also deals with the issue of potential endogeneity. As much as epidemics and pandemics can affect income distribution, the extent of income inequality can determine the disproportionate exposure of various groups to a health crisis causing it to exacerbate to an epidemic or a pandemic. To properly address the issue of causality, we use a Three-Stage-Least Squares estimation technique. The estimation results show that both the epidemics and pandemics dummy variable and fatality rate have a statistically significant positive effect on income inequality, while income inequality does not have a significant effect on either health indicators. This confirms our previous findings and implies that reverse causality is not a concern in the relationship of interest.

The remainder of the paper is organized as follows: section 2 discusses the hypothesis, section 3 contains the literature survey, section 4 includes the description of the data, section 5 includes the empirical estimation, and section 6 concludes. References, tables and figures are included thereafter.

2 Hypothesis

The intuition of this paper is straight forward. On one hand, we expect that epidemics and pandemics cause an increase in income inequality. This is because health crises cause authorities and policy makers to interfere in an attempt to contain an outbreak before it strains or overwhelms the health care system. Examples of these interventions are stay-at-home orders, shelter-in-place orders, restrictions on in-person transactions, lockdowns and social distancing. These policies can cause the loss of jobs that cannot be done remotely but require in-person presence in the workplace. Many of these jobs are likely to be low-skilled jobs. On the other hand, many high-skilled jobs can be done remotely in an easier manner. Not to mention that high-skilled workers are more capable than low-skilled ones to use the technology that allows them to work remotely. Accordingly, more low-skilled jobs are lost during an epidemic or a pandemic than high-skilled ones. This can cause an increase in income inequality between low-skilled and high-skilled workers.

Epidemics and pandemics also have an effect on the school system which is likely to affect worker's compensation that is usually dependent on the level of educational attainment. School closures during an epidemic or a pandemic can widen the student achievement gap. Students from a poorer background are less likely to catch-up in an online educational or remote learning environment compared to their more affluent peers. This could be due to the lack of access to internet or the technological devices needed, the lack of knowledge of the technology used, or the need for both parents to work. This achievement gap in education causes a subsequent income gap. In addition, the policy response to epidemics and pandemics usually causes severe budget deficits that lead to spending cuts on public education. This adversely affects the prospects of social upward mobility and thus can cause persistence in income inequality.

The health effects of epidemics and pandemics are also disproportionate between income categories. The fatality rate of epidemics or pandemics is usually highest amongst those who are less healthy due to obesity, worse diets or preexisting chronic conditions. These conditions are more common amongst the poor than the affluent. Thus, epidemics and pandemics have disproportionate health consequences that can exacerbate income disparities as well. Unequal access to health care in any country also makes getting sick more costly for the poor. This implies that epidemics, along with the unequal access to health care, have a disproportionate effect on those in lower income categories. In addition, preventive care and public health education have steadily tilted towards the educated and the well-off. These groups tend to react to the epidemics in a manner that better enables them to lessen its spread compared to those who are poorer and less educated. This contributes to an increase in income inequality.

Epidemics also tend to spread faster in densely populated areas which is typical of poorer communities, compared to the sparsely populated suburbs which only the affluent can afford. This implies that infectious diseases hit poorer areas harder than others. This causes the existing income inequality to exacerbate. The economic conditions during the periods of epidemics and pandemics favor larger corporations who can adjust their operations to serve their customers online and can deliver their commodities to the consumers' doorsteps. These big businesses, compared to smaller ones, are also the ones who have sufficient cash buffer to ride out the economic repercussions caused by these health crises. This would increase income inequality.

On the other hand, epidemics and pandemics can cause a decrease in income inequality. Closures of non-essential businesses during lockdowns can cause the shutdown of many small businesses who cannot serve their customers online. This affects the incomes of business owners, and accordingly can cause a decline in income inequality. The fatality rate of these health crises are also higher amongst the elderly who are more likely to have a larger accumulation of wealth compared to the younger ones. This can decrease income disparities.

The epidemics or pandemics can also have a significant effect on the stock market. Financial markets usually react to any adverse shocks to the economy, such as health crises with economic repercussions. In some cases, shareholders can see a decline in the value of their equity in sectors hit hard by the health crisis. This can decrease income inequality. These events can also cause volatility in stock prices, that can deter some from participating in financial trading activities which is one source of income disparities. This can also close the income gap. Social distancing can also affect the real estate market adversely. The lack of opportunity to physically shop for houses, due to lockdowns, affect the demand for houses and accordingly real estate prices. The decline in the value of houses, which is one of the main sources of wealth, can decrease wealth inequality between home owners and others. Finally, the economic slowdown caused by epidemics and pandemics is usually followed by a fiscal stimulus that aims at easing its economic consequences on the most vulnerable. This can be considered as a form of transfer payments that can decrease income inequality.

Since the effect of epidemics and pandemics on income inequality is inconclusive, an empirical analysis is warranted.

3 Literature

This paper contributes to a nascent literature on the economic outcomes of epidemics and pandemics. Studies in this literature focus primarily on the effects of these health crises on labor market outcomes, especially employment and wages, income distribution and aggregate economic conditions. For instance, Lin and Meissner (2020) find that stay-at-home orders are only weakly associated with slower growth of Covid-19 cases, while job losses have been no higher in U.S. states that implemented stay-at-home order during the Covid-19 pandemic than others that did not. Rojas et al. (2020) estimate how the spread of Covid-19 and school closures affect labor market conditions at the state level. The authors find that the slowdown in the labor market was due to the nationwide reaction, while state policies and epidemiological conditions have had a modest effect. Papanikolaou and Schmidt (2020) analyze the supply-side disruptions of Covid-19. The authors find that sectors in which a larger fraction of the workforce is not able to work remotely experienced greater declines in employment, greater declines in expected revenue growth, worse stock market performance, and higher expected likelihood of default.

Borjas and Cassidy (2020) show that the employment decline due to Covid-19 was severe for immigrants who had previous employment advantage in the labor market. This is because immigrants were less likely to work in jobs that could be performed remotely during the lockdown. Montenovo et al. (2020) show greater declines in employment during the Covid-19 pandemic for Hispanics, young workers, those with high school degrees and some college, and those with occupations that require more interpersonal contact. Kahn et al. (2020) find that the collapse in job vacancies and the spike in unemployment insurance claims due to Covid-19 affected all the states of the United States, irrespective of the intensity of the spread of the virus or the timing of stay-at-home policies. The authors also show that nearly all industries and occupations saw contraction in job postings and increases in unemployment insurance claims, with the exception of essential front line jobs.

Sumner et al. (2020) show that COVID-19 poses a challenge to the United Nations Sustainable Development Goal of ending poverty by 2030 as "global poverty could increase for the first time since 1990 demonstrating a reversal of a decade of progress in reducing world poverty." The authors show that under the scenario of a 20 percent income or consumption contraction, the number of people living in poverty could increase by 420–580 million, compared to 2018. Fenichel (2013) compare social distancing outcomes under decentralized, full control social planner, and constrained social planner. The author finds that constrained social planner decision making can in some instances make society worse off than decentralized decision making with no intervention.

Some studies also discuss the distributional consequences of epidemics. For instance, Bell and Gersbach (2009) find that during an outbreak, programs under which supported families enjoy the benefits of spending on health and education simultaneously are superior to those under which the benefits are sequenced. The authors also find that these superior programs restrict support to fewer families initially and thus increases income inequality. Glover et al. (2020) develop a model that predicts that young workers in sectors deemed non-essential would benefit from ending the shutdown, while others would lose. The authors conclude that redistribution can render the welfare impacts less unequal. Furceri et al. (2020) show that the COVID-19 pandemic could exert an adverse effect on income inequality in the absence of efforts to protect the vulnerable segments of society. The authors conclude that their finding that inequality increases with the adverse effect of a pandemic on economic activity "suggests that, all else equal, the distributional consequences of COVID-19 may be larger than those in previous pandemic episodes." Palomino et al. (2020) explore the effect of lockdowns on income inequality and poverty in Europe. The authors find that a two months' lockdown scenario causes an average increase in the headcount poverty index of 4.9 percentage points, and an increase in the Gini coefficient by 3.5 percentage point. The authors also show that these estimates increase under longer lockdown scenarios and that both between-countries and within-countries income inequality significantly increase, with the change of the latter being more important.

Our paper's contribution to the literature is twofold. It is the first to have a global analysis of the effects of epidemics and pandemics on income inequality, and it is also the first to address the issue of causality between epidemics and income inequality.

4 Data

This paper uses a panel of 191 countries during the period 2000-2018. The countries included in the analysis are: Afghanistan, Albania, Algeria, Angola, Anguilla, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, The Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Democratic, Republic of the Congo, Republic of Costa Rica, Croatia, Cyprus, Czech Republic, Cote d'Ivoire, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, The Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Korea, Kosovo, Kuwait, Kyrgyz Republic, Lao P.D.R., Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Macedonia FYR, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Rep. of, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, Russia, Rwanda, Samoa, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, Somalia, South Africa, South Sudan, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Sao Tome and Principe, Taiwan, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, West Bank and Gaza, Yemen, Zambia, and Zimbabwe. The summary statistics of the variables used in the analysis are included in table 1.

4.1 Epidemics and Pandemics

For epidemics and pandemics, we use a dummy that takes the value of 1 for countries which had reported an epidemic or a pandemic during a year, and zero otherwise. These are infectious disease epidemics that are highly contagious and have the potential to become pandemics, or have been pandemics in the past. The World Health Organization data and statistics is used to identify the location and time of the epidemic or the pandemic. This includes SARS (2002-04), H1N1 (2009), MERS (2012), Ebola (2014-2016) and others. We also include the epidemics fatality rate or the number of deaths caused by the epidemic or pandemic divided by the number of cases of the disease in a country in a given year. This data is also derived from the World Health Organization data and statistics[1].

4.2 Income Inequality

The data for income inequality is derived from the Standardized World Income Inequality SWIID Database, Version 8. The SWIID's income inequality estimates are based on reported Gini indices from published sources, including the OECD Income Distribution Database, the Socio-Economic Database for Latin America and the Caribbean generated by CEDLAS and the World Bank, Eurostat, the World Bank's PovcalNet, the UN Economic Commission for Latin America and the Caribbean, national statistical offices around the

[1] https://www.who.int/data/collections

world, and academic studies. The SWIID incorporates comparable Gini indices of disposable and market income inequality for 198 countries for as many years as possible from 1960 to the present.

4.3 Controls

Several control variables are used in the analysis to check the robustness of our results. These are factors that are identified by the literature as potential determinants of income inequality. The first variable used is Real Gross Domestic Product GDP per capita which is derived from the Penn World Tables version 8.0. The logarithm of real Gross Domestic Product per capita is used in the analysis. According to the Kuznets curve, there is an association between the level of economic development and the extent of income inequality.

We also use indicators that reflect the sectoral structure of the economy. In particular, we use the share of agriculture in the labor force and the share of agriculture in GDP. The first variable is defined as Agriculture, forestry, and fishing, value added (% of GDP). The second variable is defined as Agriculture, forestry, and fishing, value added per worker (constant 2010 US$). This data is derived from the World Development Indicators. We expect that an economy that is more agricultural in nature to have a lower level of income inequality.

We use various institutional quality indicators. Democracy reflects the quality of political institutions. The democracy variable is extracted from the Polity IV Project. The Polity score captures a country's political regime on a 21-point scale ranging from -10 (strongly autocratic) to +10 (strongly democratic). The paper uses the Polity2 variable which is a modified version of the Polity variable by applying a simple treatment to convert instances of "standardized authority scores" ($-66, -77, -88$) to conventional polity scores within the range between -10 to +10. Some studies argue that a transition from dictatorship to democracy is expected to give greater weight to the preferences of the poor in collective decision-making. The poor may use the political process to their benefit and influence policy makers to implement inequality-reducing policies. Acemoglu et al. (2015) survey the existing empirical literature on why democracy is expected to increase redistribution and decrease income inequality. Another institutional indicator is the corruption perception index derived from Transparency International. Some studies find an association between corruption and income inequality, such as Pedersen (1995) and Spinesi (2009).

We also include some policy indicators that reflect fiscal policy, monetary policy and trade policy. We include the tax rate in a country, derived from the World Development Indicators. The higher the tax rate the larger is the welfare state, which is expected to decrease income inequality. Another policy indicator is the inflation rate, consumer prices (%) derived from the World Development Indicators. This indicator reflects the efficiency of the conduct of monetary policy by central banks. Several studies examine the effect of inflation on income inequality. For instance, Albanesi (2007) provide cross-country evidence on a positive association between inflation and income inequality. We also include trade openness, which is the sum of exports and imports of goods and services as a share of Gross Domestic Product. This is derived from the World Development Indicators. Some studies find an association between trade liberalization and income inequality, such as Goldberg and Pavcnik (2007).

5 Estimation

5.1 Results and Robustness

This section empirically estimates the effect of epidemics and pandemics on income inequality as follows

$$Gini_{it} = \alpha + \beta EpiPan_{it-1} + X_{it-1}\gamma + \delta_i + \varepsilon_t + u_{it} \tag{1}$$

where $Gini_{it}$ is the Gini coefficient in country i in year t. $EpiPan_{it-1}$ is the indicator for epidemics or pandemics in country i in year $t-1$. This can be either the dummy variable or the fatality rate. X_{it-1} is a vector of control variables identified by the literature as determinants of income inequality in country i in year $t-1$. The δ_i denotes a full set of country dummies, the ε_t denotes a full set of time effects that capture common shocks to income inequality of all countries, and u_{it} is an error term capturing all other omitted factors, with $E(u_{it}) = 0$ for all i and t.

The Fixed Effects estimation results are included in tables 2 and 3. Table 2 includes the results using the epidemic and pandemic dummy as our variable of interest. Column 1 of table 2 shows the results without control variables. We add the control variables in the subsequent columns. The results show that the epidemics and pandemics dummy has a statistically significant positive effect on income inequality in all specifications. When we include all control variables in column 8, the coefficient is 2.818. This implies that the Gini coefficient is higher by 2.8 points in the case of the occurrence of an epidemic or a pandemic compared to the case when there are no such health crises.

Table 3 includes the results using the epidemic and pandemic fatality rate as our variable of interest. Column 1 of table 3 shows the results without control variables. We add the control variables in the subsequent columns. The results show that the epidemics and pandemics fatality rate does not have a statistically significant coefficient when we add all the control variables. The results imply that the existence of an epidemic or pandemic, captured by the dummy variable, matters for income inequality. This is because the occurrence of an epidemic or a pandemic is what triggers the policy response that may affect income distribution as shown in our hypothesis section.

5.2 Causality

This section attempts to address the issue of causality between epidemics or pandemics and income inequality. An article in the New York Times suggests that[2]:

"*As the coronavirus spreads across the globe, it appears to be setting off a devastating feedback loop with another of the gravest forces of our time: economic inequality. In societies where the virus hits, it is deepening the consequences of inequality, pushing many of the burdens onto the losers of today's polarized economies and labor markets. Research suggests that those in lower economic strata are likelier to catch the disease. They are also likelier to die from it. And, even for those who remain healthy, they are likelier to suffer loss of income or health care as a result of quarantines and other measures, potentially on a sweeping scale. At the same time, inequality itself may be acting as a multiplier on the coronavirus's spread and deadliness. Research on influenza has found that in an epidemic, poverty and inequality can exacerbate rates of transmission and mortality for everyone.*"

This implies an issue of reverse causality. As much as epidemics and pandemics can affect the income distribution, income inequality can exacerbate these health crises as well. To deal with potential endogeneity, we use a system of simultaneous equations that can be jointly estimated using Three-Stage-Least-Squares (3SLS). Simultaneous equations are a statistical model in which the dependent variables are functions of other dependent variables, rather than just independent variables. In our context, both the Gini coefficient and the epidemic and pandemic indicators can be determined jointly as follows

$$\begin{aligned} Gini_{it} &= \alpha + \beta EpiPan_{it-1} + X_{it-1}\gamma + u_{it} \\ EpiPan_{it} &= \lambda + \tau Gini_{it-1} + Z_{it-1}\rho + e_{it} \end{aligned} \quad (2)$$

Where Z_{it-1} is a vector of control variables identified by the literature as determinants of an epidemic or a pandemic in country i in year $t-1$. This vector includes population density, urbanization, democracy and individualism. The identification strategy is based on the intuition that a high level of population density in a country can contribute to a faster spread of a disease causing it to turn into an epidemic, and can also

[2] https://www.nytimes.com/2020/03/15/world/europe/coronavirus-inequality.html

exacerbate the health effects of these epidemics. Population density is captured by the number of people per square kilometer of land area, derived from the World Development Indicators. Infectious diseases also spread faster in urban concentrations compared to sparsely populated rural areas. Thus, the urbanization rate is expected to have a positive association with the epidemics and pandemics indicators. Urbanization is measured by the urban population as a percentage of total population, derived from the World Development Indicators. We also include our indicator for democracy, the Polity score. Democratic governments are more likely to be held accountable for how they deal with health crises and accordingly can be more proactive in their attempt to contain the spread of infectious diseases. On the other hand, authoritarian countries tend to cover up the spread of a disease, which makes them more impotent to deal with an epidemic once out of control. Finally, we include the individualism score from the Geert Hofstede dataset[3]. This is because those in collectivist cultures are more likely to sacrifice their personal freedom to follow the rules imposed for the common good of the group. While those in individualistic cultures value more their individual freedoms and personal rights even in the face of a calamity that requires the collective involvement of every individual to be able to deal with it. Thus, we expect that individualism to have a positive association with the spread of infectious diseases which can transform them into epidemics or pandemics. In our estimation, we include an interaction term between population density and individualism.

The results of the Three-Stage-Least-Squares estimation are included in tables 4 and 5. In table 4, our variable of interest is the epidemics or pandemics dummy variable. In table 5, our variable of interest is the epidemics and pandemics fatality rate. In both tables, column 1 shows the results of the first equation where the Gini coefficient is our dependent variable while column 2 shows the results of the second equation where the health indicator is the dependent variable. In tables 4 and 5, the results show that the epidemics and pandemics dummy has a statistically significant positive effect on the Gini coefficient, while income inequality does not seem to have a statistically significant effect on the health indicator. The coefficient for the epidemics dummy is 5.041. This implies that the Gini coefficient is higher by 5.04 points in the case of the occurrence of an epidemic or a pandemic compared to the case when there are no such health crises. The coefficient of the epidemics fatality rate is higher and equals to 7.213. This implies that an increase in the fatality rate by one unit increases the Gini coefficient by 7 points. These results confirm our previous findings that epidemics and pandemics tend to exacerbate income inequality.

[3] https://geerthofstede.com/research-and-vsm/dimension-data-matrix/

6 Conclusion

This paper examines the effect of epidemics and pandemics on income inequality. To achieve its objective, the paper explores the effect on the Gini coefficient of a dummy variable that indicates the occurrence of an epidemic or a pandemic in a country in a given year, in addition to the fatality rate of the epidemic or the pandemic. The Fixed Effects estimations show that the dummy variable has a statistically significant positive effect on income inequality. To properly address potential endogeneity, we implement a Three-Stage-Least Squares estimation technique. The 3SLS estimations confirm our previous finding and show that the epidemics and pandemics dummy variable and fatlity rate have a statistically significant positive effect on the Gini coefficient, while income inequality does not have a statistically significant effect on the epidemics and pandemics indicator.

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Variable	Obs	Mean	Std. Dev.	Min	Max
Gini Coefficient	3629	39.52	7.98	22.4	66.2
Epidemic fatality rate	3629	0.558	5.318	0	100
Epidemic dummy	3629	0.049	0.217	0	1
GDP per capita	3648	11,534.14	17,405.60	0	118,824
Democracy	3010	4.016	6.178	-10	10
Agriculture/Labor	3344	28.433	23.45	0.1	92.3
Agriculture/GDP	3553	11.601	11.891	0	79
Tax rate	3344	6.368	4.58	0	32.075
Inflation rate	3533	24.87	1,099.91	-72.7	65,374.10
Population density	3552	215.316	723.722	1.543	7,953.00
Corruption	3629	-0.057	0.99	-1.87	2.47

Table 1: Summary Statistics for 191 countries for 2000-2018.

LAGGED VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Epidemic dummy	3.0228***	2.9961***	3.1936***	2.6321**	2.7827**	2.6815**	2.9062***	2.8180***
	(1.0635)	(1.0701)	(1.1092)	(1.1718)	(1.2199)	(1.2332)	(1.0955)	(1.0716)
Corruption		1.8390	1.8527	4.5834*	5.2815*	4.6194	6.1707**	6.2536**
		(2.5272)	(2.5703)	(2.7445)	(3.0098)	(2.9664)	(2.6764)	(2.6651)
GDP per capita			-0.0003***	-0.0003***	-0.0002***	-0.0003***	-0.0001*	-0.0001*
			(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)
Democracy				-0.3789	-0.4115	-0.4368	-0.0580	-0.1552
				(0.3047)	(0.3198)	(0.3279)	(0.3231)	(0.3016)
Tax rate					-2.0029***	-2.0819***	-1.0030**	-1.0709**
					(0.4962)	(0.4805)	(0.4570)	(0.4574)
Inflation rate						-0.0207	-0.0187	-0.0154
						(0.0460)	(0.0490)	(0.0498)
Agriculture/Labor							1.4682***	1.5638***
							(0.2264)	(0.2552)
Agriculture/GDP								-0.3179
								(0.2728)
Constant	28.0672***	28.1719***	31.6970***	34.2271***	47.7548***	48.8475***	-3.4017	-1.4782
	(0.0554)	(0.1575)	(0.7836)	(1.5064)	(3.6452)	(3.5783)	(8.2883)	(8.5372)
Observations	3,438	3,438	3,348	2,814	2,661	2,633	2,615	2,615
R-squared	0.0019	0.0025	0.0143	0.0146	0.0422	0.0439	0.1720	0.1766
Number of countries	191	191	191.0	164.0	150	149	148	148

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2: Effect of epidemics dummy on income inequality (Fixed Effects estimation). Dependent variable is the Gini coefficient.

LAGGED VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Epidemic fatality rate	-0.1076**	-0.1070**	-0.1066**	-0.1040**	-0.0844*	-0.0887*	-0.0596	-0.0595
	(0.0497)	(0.0496)	(0.0493)	(0.0482)	(0.0465)	(0.0472)	(0.0443)	(0.0441)
Corruption		1.8646	1.8762	4.5336	5.2017*	4.5153	6.0865**	6.1711**
		(2.5217)	(2.5693)	(2.7437)	(3.0110)	(2.9676)	(2.6779)	(2.6664)
GDP per capita			-0.0003***	-0.0003***	-0.0002***	-0.0003***	-0.0001*	-0.0001*
			(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)
Democracy				-0.3591	-0.3957	-0.4212	-0.0459	-0.1445
				(0.3020)	(0.3171)	(0.3252)	(0.3215)	(0.2996)
Tax rate					-1.9911***	-2.0717***	-0.9988**	-1.0675**
					(0.4959)	(0.4801)	(0.4571)	(0.4567)
Inflation rate						-0.0218	-0.0197	-0.0165
						(0.0458)	(0.0488)	(0.0496)
Agriculture/Labor							1.4631***	1.5599***
							(0.2256)	(0.2542)
Agriculture/GDP								-0.3217
								(0.2713)
Constant	28.2880***	28.3924***	31.9094***	34.3211***	47.7845***	48.8954***	-3.1549	-1.2134
	(0.0293)	(0.1445)	(0.7799)	(1.4881)	(3.6335)	(3.5665)	(8.2816)	(8.5275)
Observations	3,438	3,438	3,348	2,814	2,661	2,633	2,615	2,615
R-squared	0.0014	0.0020	0.0136	0.0148	0.0416	0.0436	0.1707	0.1754
Number of countries	191	191	186	159	150	149	148	148

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Effect of epidemics fatality rate on income inequality (Fixed Effects estimation). Dependent variable is Gini coefficient.

LAGGED VARIABLES	(1) Gini	(2) Epidemic dummy
Epidemic dummy	5.0408***	
	(1.7455)	
Corruption	5.8816***	
	(0.7195)	
GDP per capita	-0.0002***	
	(0.0000)	
Inflation rate	0.2123***	
	(0.0696)	
Agriculture/GDP	-0.3038***	
	(0.1022)	
Agriculture/Labor	0.1133**	
	(0.0454)	
Democracy	0.0797*	-0.0005
	(0.0441)	(0.0006)
Tax rate	0.4269***	
	(0.0750)	
Gini		0.0002
		(0.0004)
Population density		0.0021
		(0.0063)
Urbanization		0.0004
		(0.0003)
Individualism*Population density		0.0000
		(0.0000)
Constant	32.4885***	0.0181
	(1.6853)	(0.0431)
Observations	1,545	1,545
R-squared	0.1023	0.0034

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Effect of epidemics dummy on income inequality (Three-Stage-Least-Squares).

LAGGED VARIABLES	(1) Gini	(2) Epidemics Fatality
Epidemic fatality rate	7.2131**	
	(3.2685)	
Corruption	5.9606***	
	(0.7203)	
GDP per capita	-0.0002***	
	(0.0000)	
Inflation rate	0.2187***	
	(0.0697)	
Agriculture/GDP	-0.3011***	
	(0.1024)	
Agriculture/labor	0.1112**	
	(0.0454)	
Democracy	0.0775*	0.0002
	(0.0441)	(0.0003)
Tax rate	0.4223***	
	(0.0750)	
Gini		0.0000
		(0.0002)
Population density		-0.0013
		(0.0034)
Urbanization		0.0002
		(0.0002)
Individualism*Population density		-0.0000
		(0.0000)
Constant	32.7690***	0.0051
	(1.6770)	(0.0231)
Observations	1,545	1,545
R-squared	0.1003	0.0013

Notes: Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5: Effect of epidemics fatality rate on income inequality (Three-Stage-Least-Squares).