

The Protective Effect of the Constitutional Right to Health during Natural and Man-made Disasters,
1970–2007

Hiroaki Matsuura

Abstract

In the past ten years, a series of papers by myself and others has demonstrated that introducing a wide variety of human rights provisions into national constitutions leads to the improvement of their implied outcomes in the real world. The literature finds that the introduction of a right to health is associated with subsequent reductions in child mortality. These pieces of evidence suggest that governments restrained by the constitutional right to health, on average, work harder toward the realizations of such a right in peace time, but no study has yet to examine how bounded governments restrained by constitutional rights to health behave during emergency situations. Using data from Matsuura (2013), the IFO GAME Natural Hazard and Disaster, and the Uppsala Conflict Data Program, this paper examines the protective effects of the constitutional right to health on child health outcomes when six natural disasters and internal armed conflicts strike. I found that child mortality increases when international armed conflicts are initiated, but child mortality does not increase in the countries whose government is restrained by the constitutional right to health. The results of this paper confirm that there is a protective effect of the constitutional right to health in addition to the health-improving effects found in the previous literature.

Introduction

The empirical investigation of human rights laws has flourished in the fields of economics, political

science, and public health (Ben-Bassat and Dahan, 2008, Matsuura, 2013, Jeffords, 2015, Edwards and Marin, 2015). In the traditional view, a right to health or other human rights have been considered as an aspiration or social objective that countries should work toward. However, this recent research has focused on the aspect of these rights as legal, political, or even social instruments to achieve health and other outcomes implied in these rights.

Although the literature of the right to health in state and national constitutions generally finds that introducing a right to health improves child health outcomes in peace time, little is known about how a bounded government restrained by the constitutional right to health behaves during the emergency situation arising from natural and man-made disasters (Matsuura, 2013, Matsuura, 2015, Matsuura, 2016).

Natural and man-made disasters result in human suffering, mass starvation, and tremendous humanitarian catastrophe. In an emergency situation, governments have the least capacity to meet the urgent needs of their people. These emergencies tend to disproportionately affect the poor, children, the elderly, and other marginalized populations of a country, therefore aggravating existing health inequities in peace time. The empirical literature of the right to health generally finds that introducing right to health constitutions improves health inequality by protecting the health of the poor, children and other marginalized populations (Matsuura, 2013, Matsuura, 2015, Matsuura, 2016). During an emergency, the right to health in national constitutions should take a more significant role toward the protection and promotion of health among the marginalized population and is used to monitor and improve the humanitarian response by local, national, and international actors.

This paper examines the protective or preventive effects of the presence of the constitutional right to health on the surge of child health at the time that natural and man-made disasters strike. More specifically, I examine whether internal armed conflicts or natural disasters are

associated with an increase in child mortality in the countries with and without the presence of the constitutional right to health. If I do find a significant increase in child mortality during internal armed conflicts or natural disasters in the countries without the presence of the constitutional right to health, but find no increase in child mortality in the countries with the presence of such a right, I could infer that the constitutional right to health has some role in mitigating the impact of disasters on child health outcomes.

The rest of the paper is organized as follows. Section 2 describes the data used. Section 3 presents the empirical method. Section 4 presents the results of the empirical analysis. Finally, Section 5 summarizes the discussion and concludes the paper.

2. Data

This paper examines whether internal armed conflicts or natural disasters are associated with an increase in child mortality in the countries with or without the presence of the constitutional right to health. My main variables of interest are, therefore, internal armed conflicts and natural disasters and their interactions with the presence of the constitutional right to health.

Internal Armed Conflicts

The Uppsala Conflict Data Program (UCDP) data has recorded violent conflicts (Pettersson and Wallensteen, 2015). The dataset includes information from 1946 up to today, and the datasets are updated continuously. Over time, interstate conflicts, which accounted for half of all armed conflict in the early period have waned, and internal armed conflict has become the predominant form of conflict in the world, although quite often involving external state actors (international internal

armed conflict). Many internal armed conflicts continue to be internationalized today. The increasing internationalization of internal armed conflicts is worrisome because such conflicts generally last longer, create more victims, and are more difficult to end.

In my analysis, I construct two different variables for internal armed conflict: a dummy variable for (domestic) internal armed conflict and a dummy variable for international internal armed conflicts. Internal armed conflict is defined as 1 if conflicts between the government of a state and one or more internal opposition group(s) occur without intervention from other states in a given year, otherwise 0, while internationalized internal armed conflict is defined as 1 if conflicts between the government of a state and one or more internal opposition group(s) occur with intervention from other states on one or both sides in a given year, otherwise 0.

Unlike natural disasters, internal armed conflicts are man-made disasters. These measures are less exogenous to the economic and political conditions of a country. While causes for internal armed conflict may be largely endogenous, their solutions are significantly influenced by inter-state relations in case of international internal armed conflict.

Natural Disasters

Every year, natural disasters related to meteorological, hydrological, and climate hazards cause significant loss of life and property. Felbermayr and Gröschl (2014) present a new disaster database termed ifo GAME Natural Hazard and Disaster data, covering the period of 1979 to 2010 (Felbermayr and Gröschl, 2014). The data consists of information on six different areas of natural disasters, including earthquake, volcano eruptions, storms and hurricanes, flood, drought, and extreme temperature events. This database includes all disaster events reported by EM-DAT, the most widely used and publicly available data in the field of international disaster research. For this

reason, ifo GAME is the most comprehensive database, although the data only covers the years 1979 to 2010.

In this paper, the disaster index which aggregates the six different disaster intensity measures weighted by land area is used for the analysis. In addition, to investigate the different effects of the presence of the constitutional right to health in different areas of disaster events, I used each of the six disaggregated disaster intensity measures. The first component is the Richter scale for earthquakes, and measures the maximum value recorded on the Richter scale. The second component is the maximum Volcanic Explosivity Index for volcanoes. The third component is wind speed, measuring the maximum total wind speed in knots for storms and hurricanes. The fourth component is the extreme temperature events through the percentage difference between the monthly maximum temperature and the monthly mean over the period. The fifth component is drought, a dummy taking the value 1 if at least for three successive months or five months within a year, rainfall level is below 50% of the period monthly mean. The sixth component is flood measured as the positive difference in precipitation over the long-term mean. I constructed a dummy variable for the country and year in which each disaster measure is included in the top quartile of the entire sample, otherwise 0.

These measures are purely based on the physical intensities of disasters, making them rather exogenous to the economic and political condition of a country.

Other Variables

Matsuura (2013) constructed a comprehensive dataset of the constitutional right to health for 157 countries during 1970–2007 (Matsuura, 2013). There were a number of difficult cases wherein the interpretation of a constitution is a matter of judgment. Such cases are discussed in the Appendix of

Matsuura (2013). This dataset was constructed to be consistent with Backman et al. (2009).

Data for the democratic variables are from the Polity IV database (Marshall). The Polity score reflects an aggregate of six component measures that record key qualities of democratic governance, including the presence of mechanisms for citizens to express their political preferences, constraints on the exercise of power by the executive branch, and the guarantee of civil liberty. This democracy measure is based on high scores for these qualities, whereas autocracy is associated with low scores, with a total range of -10 to 10. Following the procedure of Besley and Kudamatsu (Besley and Kudamatsu, 2006), a dummy variable for democratic governance, with 1 signifying that the Polity variable is greater than 0; otherwise, the value is set to 0 is constructed.

Finally, the data on infant, and under-five mortality, mean years of education for women of reproductive age (15–44 years old), and income are from the IHME data (Gakidou et al., 2010, Rajaratnam et al., 2010).

3. Method

I employed a cross-country panel dataset to examine the relation between natural disasters and internal armed conflicts and infant and under-five mortality in countries with and without the constitutional right to health over time, at the country level during 1970–2007.

For the analysis of internal armed conflicts, the dependent variables included a log of under-five mortality rate and infant mortality rate. My main explanatory variables were dummy variables of (domestic) internal armed conflict, dummy variable of international internal armed conflict, and the presence of a constitutional right to health, as well as the interaction between disasters and the constitutional right to health. As control variables, I added a dummy variable of democracy, the level of real income per capita, and the education levels of women of reproductive

age, all of which may affect infant and child health. My panel data model also included country and year-fixed effects, as well as country-specific linear and quadratic trends. These captured unobserved variables that are fixed for each country over time, as well as world-wide changes that concurrently affect all countries and each country's declining trends of infant and child mortality. Reported standard errors of the estimates were clustered at the country level to control for autocorrelations in health outcomes over time (Bertrand et al., 2004).

For the analysis of natural disasters, my main explanatory variables were dummy variable of aggregated disaster index weighted by land area. Dependent variables and other control variables are exactly same as the specification for the analysis of internal armed conflicts. Because Ifo Game data covers only 108 countries during 1979–2007, the sample size of our panel data becomes much smaller compared to the panel data used for the analysis of internal armed conflicts. To take account of the heterogeneous effect of the presence of a right to health in national constitutions in different disaster settings, I also include each of six disaggregated disaster indexes: earthquake, volcano eruptions, storms and hurricanes, flood, drought, and extreme temperature in the specifications.

4. Results

Table 1 shows the means and standard deviations of each dependent and independent variable in natural units (non-log form).

Table 2 presents the results of the regression analysis for the effect of internal armed conflicts on child health outcomes during 1970–2007. In column 1 of Table 2, explanatory variables include internal armed conflict, international internal armed conflict, the presence of a constitutional right to health, a dummy variable for democracy, the mean years of education of women aged 15–44, and the log of the real GDP per capita. The coefficient of 0.00985 on internal

armed conflict (the coefficient of 0.0120 on international internal armed conflict) indicates that internal armed conflict (international internal armed conflict) is associated with an increase in the under-five mortality rate by 1.0 per cent (1.2 per cent) of its initial level. The standard error, given in parentheses under the estimate, indicates that the result is statistically significant at the 10 per cent level.

The coefficient of -0.0550 on the constitutional right to health indicates that the introduction of a constitutional right to health is significantly associated with a reduction in the under-five mortality rate by 5.5 per cent of its initial level.

In column 2, I examine the interaction terms of internal armed conflict, international internal armed conflict, and the presence of the constitutional right to health. In countries without the presence of the constitutional right to health, international internal armed conflict is associated with a 2.2% increase in under-five mortality, but in countries with the presence of mortality, no significant increase in under-five mortality is observed. The internal armed conflict is not associated with an increase in under-five mortality, regardless of the presence of the constitutional right to health.

The second two columns of Table 2 replicate the results of the first two columns based on the log of infant mortality rate as the dependent variable. The estimates in these columns provide highly similar results to those found for the under-five mortality rate.

Table 3 presents the results of the regression analysis for the effect of natural disasters on child health outcomes during 1979–2007.

In column 1 of Table 3, explanatory variables included a dummy variable of the top 25% of aggregated disaster index, weighted by land area, the presence of a constitutional right to health, a dummy variable for democracy, the mean years of education of women aged 15–44, and the log of the real GDP per capita. The result suggests that a dummy variable of the top

25% aggregated disaster index is significantly associated with the level of under-five mortality. Column 2 examines the interaction terms of aggregated disaster index and the presence of the constitutional right to health. Since the aggregated disaster index does not increase under-five mortality, I could not observe the protective effect of a constitutional right to health.

The next two columns replicate the result of the first two columns by using six disaggregated disaster measures: earthquake, volcano eruptions, storms and hurricanes, flood, drought, and extreme temperature events. Again, since none of them significantly increases under-five mortality, I could not observe the protective effect of a constitutional right.

The introduction of a constitutional right to health is significantly associated with a reduction in the under-five mortality rate by 12 per cent of its initial level. Even though I could not find the protective effects, I still observe the health improving effect of a right to health in national constitutions in peacetime.

The second two columns of Table 3 replicate the results of the first two columns based on the log of infant mortality rate as the dependent variable. Again, the estimates in these columns provide highly similar results to those found for the under-five mortality rate.

5. Discussion

The results of this paper suggest the protective effect of the right to health in national constitutions at the time of international internal armed conflict, which significantly increases child mortality. On the other hand, I could not observe the protective effect at the time of (domestic) internal armed conflict and natural disasters, simply because these natural and man-made disasters are not severe enough to increase child mortality. I also find the health improving effect of introducing a right to health into national constitutions in peace time, as the previous literature found.

The finding of the protective effect of international internal armed conflict also implies the potential role of the international community in protecting the right to health enshrined in national constitutions at the time of internal armed conflict. The effective response to the protective of the rights to health of children during emergencies depends not only on the presence of the constitutional right to health, but also on effective mechanisms to implement such a constitutional right during an emergency. There is a question of whether intervention of other states in internal armed conflict helps to protect the right to health of a population in the country of an internal armed conflict. Although there is a complex issue regarding state sovereignty, the interventions of other state governments may help to enforce the constitutional promise of the right to health at the time that judicial checks and civil society's ability to advocate for citizens' needs are paralyzed. The involvement of the international community also promotes more emergency aid to the country at the time that a country's health care system is dis-functioned by dispatching medical personnel and supplying emergency relief goods.

The results of this paper confirm that there is a protective effect of the constitutional right to health at the time of emergency in addition to the health-improving effects in peace time. The right to health improves population health in peace time, but citizens will benefit even more at the time of emergency situations.

Table 1. Summary Statistics

Data for the Effect of Internal Armed Conflict	Obs	Mean	Std. Dev.	Min	Max
Logged under-five mortality	5,966	3.88	1.12	1.09	5.91
Logged infant mortality	5,966	3.62	0.97	0.95	5.41
Internal Armed Conflict	5,966	0.01	0.1	0	1
International Armed Conflict	5,966	0.001	0.04	0	1
Constitutional Right to Health	5,966	0.23	0.42	0	1
Democracy	5,609	0.46	0.5	0	1
Logged GDP per capita	5,038	8.32	1.18	4.98	11.17
Years of education for women in reproductive age	5,928	6.27	3.75	0.1	14.5
Data for the Effect of Natural Disasters	Obs	Mean	Std. Dev.	Min	Max
Logged under-five mortality	2884	44.86	38.25	2.59	166.15
Logged infant mortality	2884	66.46	66.99	2.97	329.67
Top 25% of Aggregated Disaster index	2884	0.18	0.38	0	1
Top25% of Earthquake	2884	0.18	0.39	0	1
Top25% of Volcano eruption	2884	0.11	0.31	0	1
Top25% of Wind	2884	0.18	0.38	0	1
Top25% of Temperature	2884	0.17	0.37	0	1
Top25% of Drought	2884	0.06	0.24	0	1
Top25% of Flood	2884	0.19	0.40	0	1
Constitutional Right to Health	2884	0.26	0.44	0	1
Democracy	2796	0.60	0.49	0	1
Logged GDP per capita	2577	8.48	1.18	4.98	10.57
Years of education for women in reproductive age	2884	7.06	3.79	0.20	14.50

Table 2. The Effect of Internal Armed Conflict on Child Mortality in Countries with and without a Constitutional Right to Health

	-1	-2	-3	-4
DEPENDENT VARIABLES	U5MR	U5MR	IMR	IMR
Internal Armed Conflict	0.00985* (0.0052)	0.00607 (0.0046)	0.00861 (0.0053)	0.00448 (0.0046)
International Internal Armed Conflict	0.0120* (0.0068)	0.0216*** (0.0041)	0.0101* (0.0057)	0.0172*** (0.0041)
Internal Armed Conflict*Constitutional Right to Health		0.015 (0.0110)		0.0164 (0.0112)
International Internal Armed Conflict*Constitutional Right to Health		-0.0183** (0.0084)		-0.0135* (0.0080)
Constitutional Right to health	-0.0550*** (0.0189)	-0.0549*** (0.0189)	-0.0535*** (0.0189)	-0.0534*** (0.0189)
Democracy	0.00229 (0.0070)	0.00227 (0.0070)	0.00392 (0.0068)	0.00389 (0.0068)
Logged GDP per capita	-0.0450* (0.0248)	-0.0449* (0.0248)	-0.0437* (0.0249)	-0.0435* (0.0250)
Years of Education in Reproductive Age	-0.0181 (0.0356)	-0.0182 (0.0356)	-0.0227 (0.0340)	-0.0228 (0.0340)
Year-Fixed Effects	YES	YES	YES	YES
Country-Fixed Effects	YES	YES	YES	YES
Country-specific Time Trends and Their Square Terms	YES	YES	YES	YES
The Effect of Internal Armed Conflict in Countries with a Constitutional Right to Health		.0210352**		0.0208629**
The Effect of International Internal Armed Conflict in Countries with a Constitutional Right to Health		0.0032587		0.0036307
# of Countries	157	157	157	157
Observations	4,690	4,690	4,690	4,690
R-squared	0.999	0.999	0.998	0.998

*Clustered standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regression equations included both country- and year-fixed effects, as well as country-specific linear and quadratic trends.

Table 3. The Effect of Natural Hazard and Disasters on Child Mortality in Countries with and without the Constitutional Right to Health

DEPENDENT VARIABLES	U5MR	U5MR	U5MR	U5MR	IMR	IMR	IMR	IMR
Top 25% of Weighted Disaster index	-0.0134 (0.0252)	-0.0134 (0.0336)			-0.0144 (0.0251)	-0.0133 (0.0338)		
Top 25% of Weighted Disaster index*Constitutional Right to Health		0.0000 (0.0376)				-0.00306 (0.0375)		
Top 25% of Earthquake			0.0142 (0.0237)	0.0107 (0.0281)			0.0136 (0.0243)	0.0123 (0.0285)
Top 25% of Earthquake*Constitutional Right to Health				0.0088 (0.0365)				0.000948 (0.0367)
Top 25% of Volcano eruption index			-0.0083 (0.0106)	0.0098 (0.0155)			-0.00583 (0.0101)	0.00778 (0.0160)
Top 25% of Volcano eruption index*Constitutional Right to Health				-0.0416 (0.0279)				-0.032 (0.0297)
Top 25% of Wind speed			-0.0068 (0.0261)	-0.0005 (0.0287)			-0.00563 (0.0271)	0.00676 (0.0294)
Top 25% of Wind speed*Constitutional Right to health				-0.0241 (0.0539)				-0.0453 (0.0584)
Top 25% Flood			0.0037 (0.0095)	-0.0004 (0.0115)			-0.00115 (0.0091)	-0.00536 (0.0107)
Top 25%*Constitutional Right to Health				0.0169 (0.0275)				0.017 (0.0294)
Top 25% Extreme Temperature			-0.0012 (0.0156)	0.0095 (0.0198)			-0.00541 (0.0158)	0.0113 (0.0201)
Top 25% Extreme Temperature*Constitutional Right to Health				-0.0435 (0.0509)				-0.0662 (0.0544)
Drought			-0.0012 (0.0243)	0.0044 (0.0275)			-0.0036 (0.0230)	0.00185 (0.0259)
Drought*Constitutional Right to Health				-0.0424 (0.0397)				-0.0392 (0.0404)
Constitutional Right to Health	-0.0042 (0.0191)	-0.0042 (0.0188)	-0.120*** (0.0407)	-0.106** (0.0445)	-0.00303 (0.0186)	-0.00243 (0.0180)	-0.112*** (0.0407)	-0.0888** (0.0425)
Democracy	-0.0106 (0.0093)	-0.0106 (0.0093)	-0.0254 (0.0308)	-0.0251 (0.0306)	-0.00809 (0.0088)	-0.00806 (0.0089)	-0.0235 (0.0295)	-0.0229 (0.0290)
Logged GDP per capita	-0.0601 (0.0504)	-0.0601 (0.0503)	-0.238** (0.0949)	-0.238** (0.0952)	-0.0553 (0.0492)	-0.0552 (0.0491)	-0.253*** (0.0917)	-0.251*** (0.0919)
Years of Education in Reproductive Age	0.0462 (0.0629)	0.0462 (0.0627)	-0.236*** (0.0195)	-0.236*** (0.0195)	0.0406 (0.0613)	0.0404 (0.0611)	-0.220*** (0.0187)	-0.220*** (0.0187)
Country	108	108	108	108				
Observations	2500	2500	2500	2500	2500	2500	2500	2500
R-squared	0.998	0.998	0.987	0.987	0.998	0.998	0.984	0.984

*Clustered standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regression equations included both country- and year-fixed effects, as well as country-specific linear and quadratic trends.

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