International financial organisations and global child mortality rates

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This paper makes a contribution to the sociology and political economy of "successful societies" by investigating how children's health across the world is impacted by multilateral financial organisations. In particular, I assess the causal effect of domestic policy reforms mandated by the International Monetary Fund (IMF) on child mortality rates across 176 countries between 1990 and 2017 using instrumental variables. I find that IMF programmes cause up to 90 excess under-5 deaths per 1,000 live births (95% CI: 50–130). This aggregate effect appears to be driven by large-scale privatisation reforms, which cause up to 132 excess child deaths per 1,000 live births (95% CI: 72–191).

Introduction

Previous social scientific scholarship has posited that a key characteristic of "successful societies" is that they enhance the functional capabilities of its members to live healthy and meaningful lives (Hall and Lamont 2009). Such functional capabilities are said to derive not merely from technical biomedical interventions but from fundamental social causes (Link and Phelan 1995) involving the distribution of material and symbolic goods. From this perspective, human organisms are viewed as embedded within institutional configurations that organise social power and distribute population health (Beckfield 2018). However, the causal nexus linking institutions and capabilities is often nebulous in its conceptual articulation (Evans 2009), whilst its global or international dimension tends to be neglected (Sewell 2009).

This paper examines the international institutional forces that can shape a society's chances of being "successful", in the sense referred to above. My empirical focus is on the International Monetary Fund (IMF), a powerful financial organisation that seeks to foster global economic stability and growth. For the purpose of studying the macroscopic causes of population-level capability expansion or contraction, the IMF constitutes a "strategic research site" (Merton 1987) because it influences the institutional determinants of population health through its conditional lending schemes. Countries across the world that are experiencing economic turmoil may turn to the IMF to secure financial support. However, fresh credit is typically issued on the condition that national governments agree to a wide variety of domestic policy reforms, known as "conditionalities". The goal of these reforms is to ensure macroeconomic stability through reduced public spending, the privatisation of state-owned enterprises, and other related policy interventions. Consequently, as further detailed below, the IMF's structural adjustments programmes can exert profound effects on national health systems, state capacities, and attendant health outcomes.

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A widely accepted index of how well — or poorly — a society is faring is children's life chances. For members of a society to be able to function and flourish, they must first be able to survive through the stage of childhood. Although previous research has identified negative associations between IMF programmes and population health (Forster et al. 2020; Kentikelenis 2017; Stuckler and Basu 2009), the causal impact of such programmes on child mortality rates has, to the author's knowledge, never been systematically assessed. Moreover, the rapid privatisation of state-owned enterprises has been shown to fuel mortality crises in recent history (Azarova et al. 2017; Scheiring et al. 2018; Stuckler, King, and McKee 2009), yet whether or not IMF-mandated privatisation reforms affect child deaths remains unknown. To fill these gaps in the extant literature, I employ previously unavailable data covering 176 countries between 1990 and 2017, coupled with a compound instrumentation technique suited to isolating exogenous variation in IMF interventions across the world.

Background, pathways, and mechanisms

The rise in recent decades of the IMF as global lender of last resort, as provider of technical assistance, and as agent of economic surveillance is a signal feature of the international institutional landscape (Babb 2005; Babb and Carruthers 2008; Kentikelenis, Stubbs, and King 2016). In times of financial turbulence, the IMF issues much-needed credit to fiscally distressed governments in exchange for an extensive overhaul of domestic policy arrangements, with a view to ensuring future macroeconomic stability and growth. This typically entails a set of measures targeting fiscal consolidation and foreign debt servicing, external sector liberalisation, and a variety of other market-oriented reforms. Earlier scholarship has posited that the Fund's wide-ranging and sometimes intrusive interventions — from cutting healthcare expenditure to instituting public sector wage ceilings — have the potential to undermine its clients' (cap)abilities to protect and promote the welfare of its citizens (Forster et al. 2020; Kentikelenis 2017; Stuckler and Basu 2009), for instance by weakening state capacities (Reinsberg et al. 2019) and eroding primary care systems (Kentikelenis, Stubbs, and King 2017). In this section, I draw on the extant literature to sketch the pathways and mechanisms by which IMF programmes in general, and privatisation conditionalities in particular, may affect child mortality rates — a powerful indicator of societal "success".

My emphasis on privatisation reforms is motivated by previous research having shown that the rapid privatisation of state-owned enterprises is associated with rising unemployment and labour market precariousness, reduced public provision of welfare services, including housing and healthcare, as well as weaker social cohesion and state capacities (Stuckler and Basu 2013). These factors, in turn, have driven large upticks in working-age mortality rates, resulting in one of the most salient declines in population health in recent history, namely the post-Communist mortality crisis (Azarova et al. 2017; Scheiring et al. 2018; Stuckler, King, and McKee 2009). However, research on the link between privatisation and mortality through the lens of structural adjustment remains scarce, and virtually nothing is known about how IMF-mandated privatisation reforms affect children's life chances.

The key causal mechanisms linking structural adjustment to population health have been described as falling into three major categories (Kentikelenis 2017). The first pertains directly to the functioning of health systems across four principal dimensions, namely (*a*) the financing of healthcare, which the IMF shapes by mandating cuts in public health spending

(Kentikelenis, Stubbs, and King 2017; Stubbs et al. 2015); (*b*) the quality of care provision, which is impacted by the migration of key workers away from hiring freezes, wage cuts, and increased redundancies wrought by IMF-sponsored fiscal retrenchment in the health sector (Marphatia 2009; Stubbs et al. 2017); (*c*) healthcare coverage, which is reduced by the Fund's promotion of user fees or co-payments coupled with changing eligibility criteria (Maresso et al. 2015; Thomson et al. 2015); and (*d*) the organisational capacities of health systems in the wake of decentralisation, outsourcing, and privatisation reforms (Kentikelenis et al. 2014, Stubbs et al. 2015). Children's survival chances are sensitive to the functional capacities of health systems, especially in the perinatal and infant stages, and are thus directly affected through these four dimensions.

The second category encompasses a range of mechanisms *in*directly pertaining to the functioning of health systems. These involve the potential spillover effects of currency devaluation and trade liberalisation on the cost of (imported) medicines and equipment or the value of tax revenues that fund the health sector (Breman and Shelton 2006; Baunsgaard and Keen 2010). In addition, since state-owned enterprises often provide health coverage and other welfare benefits to their employees, privatisation reforms can reduce access to healthcare and related social services (Azarova et al. 2017; Scheiring et al. 2018; Stuckler, King, and McKee 2009). Also here, these indirect effects are likely to impact child mortality rates by influencing maternal stress and (in)security levels or the quality of care received during critical aetiological windows in early life.

The third category pertains to the broader social determinants of health, including (un)employment, poverty, education, and social cohesion. Economic dislocations wrought by mass redundancies, wage declines, exchange rate volatility, or reduced social expenditure (Dreher 2006; Forster et al. 2019; Lang 2020; Vreeland 2002, 2003) are likely to induce widespread psychosocial stress and "social sundering" (Therborn 2013). By acting upon and sometimes amplifying these social forces, IMF programmes shape the circumstances in which local populations are born, grow, live, work, and age, thereby influencing the central parameters of human life chances (Marmot Review 2010). For instance, children can experience malnourishment as a result of hikes in food prices in the wake of current and capital account liberalisation or as a result of parental unemployment, which has profound effects on their early health and development (Handa and King 2003).

To counter these adverse effects, the Fund can complement their baseline conditionalities with priority spending schemes that typically inject funds into the health or education sectors (Khemani et al. 2000). In addition, non-state actors including international aid donors or non-governmental organisations can step in to fill important gaps in health coverage and social care provision wrought by structural adjustment. These auxiliary interventions, however, tend to be weakly coordinated and offer a fragmented set of services to affected populations (Kentikelenis et al. 2014; Sridhar and Woods 2010). As such, I hypothesise that IMF programmes and attendant privatisation conditionalities will increase child mortality rates in borrowing countries.

Data and methods

My outcome variable is the mortality rate per 1,000 live births amongst children under the age of 5, measured across 176 countries between 1990 and 2017. These data are drawn from the World Bank World Development Indicators database (WDI n.d.). The key treatment variables are (a) a binary indicator of a country's participation in an IMF programme in a given year and (b) a binary indicator of whether a country has received any privatisation conditionalities under an IMF programme. These variables are taken from the IMF Monitor database (Kentikelenis, Stubbs, and King 2016). In addition, I employ a collection of control variables. Macroeconomic controls — which might influence selection into structural adjustment programmes (Vreeland 2003) and simultaneously predict a country's population health status (Forster et al. 2020) — are GDP per capita (WDI n.d.), a binary financial crisis indicator (Laeven and Valencia 2013), and foreign reserves in months of imports (WDI n.d.). To gauge the political condition of (non-)participating countries, I also control for two measures of democracy — the Polity IV democracy index (Center for Systemic Peace n.d.) and a measure of egalitarian democracy (Quality of Government database n.d.). The reasoning here is that (egalitarian) democratic countries might be reluctant to accept the implementation of policies that are harmful to society's most vulnerable and they are likely to have better population health profiles to begin with. In addition, I assess a country's political (in)stability through an indicator of coup d'état incidence (Powell and Thyne 2011). Finally, I control for the average number of years of formal education in a country's female population (WDI n.d.) — an important predictor of child mortality. Descriptive statistics and data sources are provided in TABLE 1.

To assess the impact of IMF programmes on under-5 mortality rates, I posit the following data-generating process:

$$Y_{it} = T_{i[t-1]}\beta + X_{it}\theta + \mu_i + \varphi_t + \varepsilon_{it}. \tag{1}$$

Y_{it} denotes the outcome variable as measured in country i at time t; $T_{i[t-1]}$ is one of the two dichotomous treatment indicators, lagged by one year to allow for delayed effects to manifest; X_{it} is a vector of control variables; μ_i captures time-invariant country-specific effects; φ_t measures time-fixed effects; and ε_{it} is a stochastic error term. The principal quantity of interest is β, which is a causal effect parameter to be estimated. To distinguish causal from merely correlational relationships, I follow recent advances in the methodological literature on IMF programmes (Lang 2020; Stubbs et al. 2018) by adopting a compound instrument, Z, derived from the interaction between the country-specific average exposure to structural adjustment over the sample period and the number of countries with an IMF programme in a given year, which approximates the Fund's annual budget constraint (Vreeland 2003). This instrument is *relevant* insofar as the IMF is likely to impose more stringent loan conditions when facing liquidity concerns. It is also *excludable* insofar as the Fund's aggregate annual budget constraint is independent of any given client country, such that unit-specific shocks that deviate from a country's long-run average exposure to structural adjustment result from a treatment assignment mechanism that is random with respect to any given country's counterfactual outcomes. Put differently, child mortality rates in countries with varying propensities to participate in IMF programmes will not be affected by changes in the Fund's budgetary constraint other than through the impact of structural adjustment.

In short, the adopted instrumental variable approach hinges on the idea that liquidity concerns lead the IMF to impose harsher loan conditions but are unrelated to any individual country's child mortality profile, thus providing a source of exogenous variation. Any time-invariant confounders are accounted for by isolating changes in child mortality rates within countries over the sample time period via country-fixed effects, whilst aggregate time trends, such as secular improvements in survival probabilities, that affect all countries simultaneously

Table 1: Descriptive statistics

Statistic	N	Mean	St. Dev.	Min	Max
Under-5 mortality rate	5,068	50.9	54.3	2.1	327
IMF programme	4,874	0.3	0.5	0.0	1.0
IMF-mandated privatisation reform	4,827	0.04	0.2	0.0	1.0
GDP per capita	4,610	11,589	17,245	164	111,968
Financial crisis	4,928	0.1	0.3	0.0	1.0
Foreign reserves	3,818	4.4	4.7	0.002	79.2
Democracy index	4,786	3.5	6.5	−10	10
Egalitarian democracy	4,053	0.4	0.2	0.03	0.9
Coup d'état	4,286	0.02	0.1	0.0	1.0
Mean years of formal female education	5,068	8.8	4.0	0.5	15.5

Notes: The under-5 mortality rate is per 1,000 live births. The second column lists the number of observed country-years. The two IMF variables are binary variables indicated the presence or absence of IMF programmes or of IMF-mandated privatisation reforms. The democracy index ranges from −10 to 10. The egalitarian democracy index ranges from 0 to 1. Sources: World Bank World Development Indicators, IMF Monitor, Systemic Banking Crises database, The Polity Project, Quality of Government database, and Coups in The World database.

are controlled for through the use of time-fixed effects. I thus obtain a two-stage regression model with the following linearised selection equation:

$$T_{it} = Z_{it}\tau + X_{it}\eta + \alpha_i + \kappa_t + \upsilon_{it}, \tag{2}$$

where Z_{it} is the value of the compound instrument in country i at time t. I then re-specify the model in equation (1) as follows, with $\widehat{T}$ being a vector of fitted values from equation (2):

$$Y_{it} = \widehat{T}_{i[t-1]}\beta + X_{it}\theta + \mu_i + \varphi_t + \varepsilon_{it}. \tag{3}$$

To empirically assess the strength of the chosen instrument, I compare the model in equation (2) to a restricted first-stage regression in which the effect τ of Z on T is set to be null, obtaining a χ^2 test statistic of 50 on 1 degree of freedom ($p < 0.001$). The alternative instrument targeting privatisation reforms also passes the required significance threshold, with a χ^2 test statistic of 63 on 1 degree of freedom ($p < 0.001$). Hence, in both cases, Z comfortably satisfies the benchmark for identifying strong instruments. All variance estimators are consistent with serial autocorrelation, heteroskedasticity, and country-level clustering effects. All analyses are conducted in R, version 4.0.2 (R Core Team 2020).

Given that I cannot empirically verify that the instrument is strictly exogenous, the persistence of residual unmeasured confounding is conceivable. To address this concern, I conduct a simple non-parametric sensitivity analysis that allows me to quantify (a) the change in my parameter estimate $\hat{\beta}$ that would result from adjusting for some hypothesised amount of bias, and (b) the amount of unmeasured confounding that would in theory be required to eliminate the estimated causal effect $\hat{\beta}$ (i.e., reduce it to zero). For these two purposes, let C denote an unmeasured confounder. Then the *bias factor* is defined as the difference between $\hat{\beta}$ and what $\hat{\beta}$ would have been had C been controlled for as well (VanderWeele and Arah 2011). The *E-value*, on the other hand, is defined as the minimum strength of net association that an unmeasured confounder would need to have with both the exposure and the outcome to fully explain away a specific exposure-outcome association (VanderWeele and Ding 2017). Though ordinarily defined on the risk ratio scale, the E-value can be adjusted to obtain an approximate (conservative) value on the continuous scale.

Findings

Figure 1 visualises the output of a baseline two-way fixed effects instrumental variable regression model. The model tracks within-country changes in child mortality rates across units with and without IMF programmes. Estimation uncertainty is accounted for by simulating from the model sampling distribution. First differences in the outcome variable between the treatment and control groups are then visualised (see King, Tomz, and Wittenberg 2000). Figure 1 shows that, on average, IMF programmes cause 90 excess under-5 deaths per 1,000 live births (95% CI: 50–130). In percentage terms, this amounts to a 51% increase in such deaths. Figure 2 visualises a similar model, except that the instrumented treatment variable is now centred on IMF-mandated privatisation reforms. The model suggests that the aggregate effect of IMF programmes identified above is most likely driven by the Fund's privatisation policies, which lead to 132 excess child deaths per 1,000 live births (95% CI: 72–191). This is equivalent to a 77% increase in under-5 mortality rates.

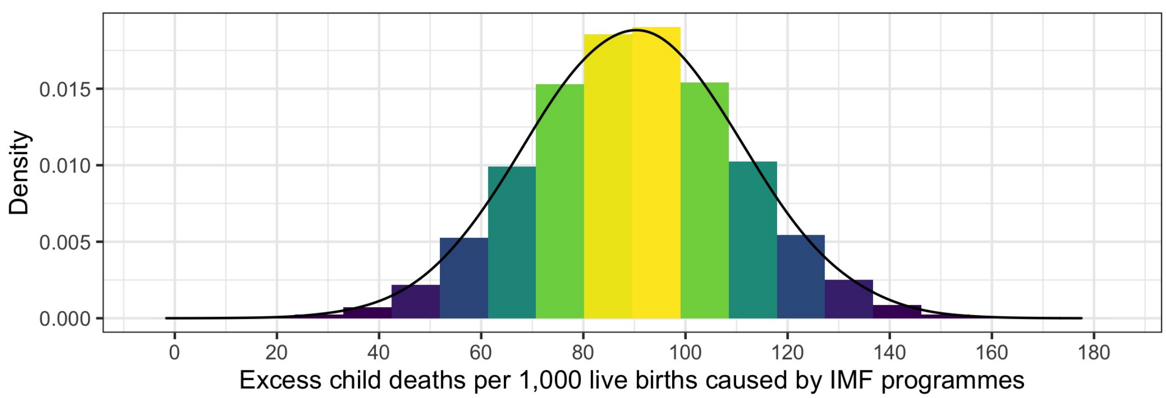

FIGURE 1: The figure visualises the estimated excess under-5 mortality burden per 1,000 live births caused by IMF programmes. The estimates are derived from two-way fixed effects instrumental variable regression models in which within-country changes in child mortality rates across units with and without IMF programmes are calculated. First differences in the outcome variable are then used to estimate excess death rates.

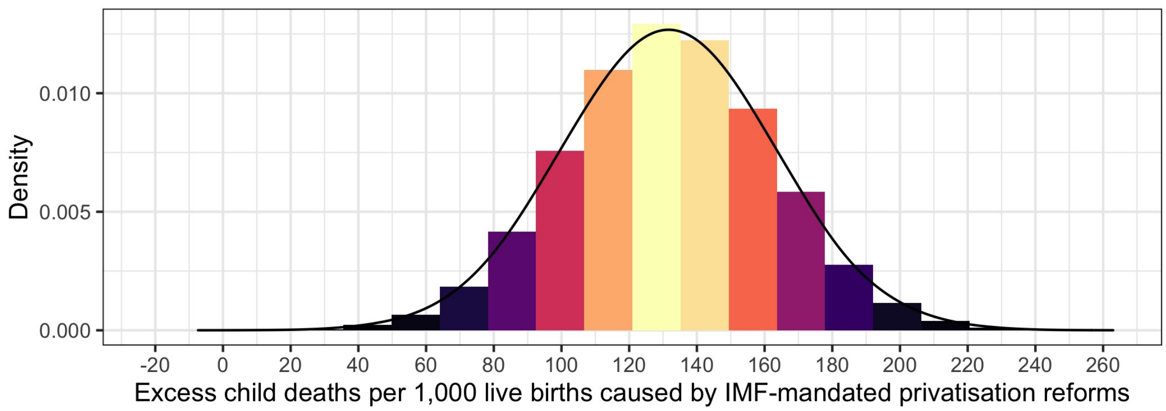

Figure 2: The figure visualises the estimated excess under-5 mortality burden per 1,000 live births caused by IMF-mandated privatisation reforms. The estimates are derived from two-way fixed effects instrumental variable regression models in which within-country changes in child mortality rates across units with and without privatisation reforms are calculated. First differences in the outcome variable are then used to estimate excess death rates.

I now assess the robustness of these baseline findings to confounding bias. To avoid multicollinearity issues and losing too many observations at once due to missing data, I insert and remove each control variable one by one and observe the effect this has on $\hat{\beta}$. TABLES 2 AND 3 show that the substantive findings presented in FIGURES 1 AND 2 are fully robust to each of these control variables. The only non-trivial modification of $\hat{\beta}$ is caused by controlling for foreign reserves, which are theoretically a central predictor of IMF programme participation (Vreeland 2003) and could plausibly be linked to child mortality rates insofar as greater reserve holdings would help national governments to bypass at least some of the deleterious effects of exchange rate volatility for the purchase of medicines, medical equipment, or other public health infrastructure. However, the variable is not significantly predictive of the outcome, nor is it significantly associated with structural adjustment in either of the selection equations (not displayed). Interpreting this observed effect attenuation therefore warrants some caution. Either way, the key results from the baseline model remain unaltered from a substantive point of view. As for the remaining covariates, we see (as expected) that egalitarian democracy is a powerful predictor of children's chances of survival, above and beyond the detrimental effects of structural adjustment programmes.

To further assess the sensitivity of $\hat{\beta}$ to unmeasured confounding, I calculate the (approximate) E-value corresponding to the baseline model estimates presented in FIGURES 1 AND 2. In the case of the overall programme model, the unmeasured confounder C would have to increase child mortality rates by around 5 standard deviations — equivalent to 385 excess deaths per 1,000 live births — in order to nullify the estimated treatment effect. In the case of the privatisation model, the corresponding number would be 9 standard deviations, or nearly 700 excess deaths per 1,000 live births. These are exceptionally large net effects that seem implausible. However, for the sake of argument, consider that $\hat{\beta}$ is biased by as much as 50% in both model specifications. The bias-adjusted parameter estimates would then be 45 (95% CI: 5–85; $p = 0.03$) and 66 excess child deaths per 1,000 live births (95% CI: 6–125; $p = 0.03$), respectively. These are still substantively important effect sizes, even after adjusting for a very large bias factor.

TABLE 2: IMF PROGRAMMES AND CHILD MORTALITY RATES

CONTROL VARIABLE	CONTROL COEFFICIENT	IMF_{t-1} COEFFICIENT
Log of GDP per capita	17	97**
	(11)	(23)
Financial crisis	−5	91**
	(5)	(21)
Foreign reserves	−0.05	65**
	(0.3)	(18)
Democracy	−2**	87**
	(0.6)	(19)
Egalitarian democracy	−127**	87**
	(39)	(22)
Coup d'état	5	92**
	(5)	(25)
Female education	−0.8	91**
	(3)	(20)

NOTES: The outcome variable is the annual under-5 mortality rate per 1,000 live births between 1990 and 2017. Each row is a separate two-way fixed-effects regression wherein the effect of IMF programmes on all-cause mortality is adjusted for the control variable listed in the first column. All models are also adjusted for country- and time-fixed effects. The IMF variable, lagged by one year, is instrumented as described in the DATA AND METHODS section. The corresponding parameter estimate is interpreted as the excess number of child deaths per 1,000 live births caused by structural adjustment. Standard errors consistent with serial autocorrelation, heteroskedasticity, and unit clustering are shown in parentheses below each parameter estimate. Statistical significance levels: $^*p < 0.01$; $^{**}p < 0.001$.

Table 3: IMF-mandated privatisation reforms and child mortality rates

Control variable	Control coefficient	Privatisation$_{t-1}$ coefficient
Log of GDP per capita	−9	134**
	(5)	(32)
Financial crisis	5	130**
	(3)	(30)
Foreign reserves	−0.01	104*
	(0.2)	(35)
Democracy	−1*	127**
	(0.3)	(32)
Egalitarian democracy	−71**	120**
	(21)	(36)
Coup d'état	5	123*
	(5)	(40)
Female education	0.3	131**
	(2)	(30)

Notes: The outcome variable is the annual under-5 mortality rate per 1,000 live births between 1990 and 2017. Each row is a separate two-way fixed-effects regression wherein the effect of IMF-mandated privatisation reforms on all-cause mortality is adjusted for the control variable listed in the first column. All models are also adjusted for country- and time-fixed effects. The privatisation variable, lagged by one year, is instrumented as described in the Data and methods section. The corresponding parameter estimate is interpreted as the excess number of child deaths per 1,000 live births caused by privatisation conditionalities. Standard errors consistent with serial autocorrelation, heteroskedasticity, and unit clustering are shown in parentheses below each parameter estimate. Statistical significance levels: *$p < 0.01$; **$p < 0.001$.

Concluding discussion

In conclusion, these findings provide remarkably robust empirical evidence of a substantively large deleterious impact of structural adjustment programmes on under-5 mortality rates. The paper is meant to contribute to the sociology and political economy of "successful societies" by spotlighting how supra-national institutions like the IMF seem to play a central role in shaping children's life chances across the world (see also Daoud and Reinsberg 2019; Daoud et al. 2017). The implications for future policy-making are substantial. IMF-mandated privatisation reforms are especially harmful and must be revised in order to prevent avoidable child deaths. The role of international financial organisations in shaping global health outcomes must be taken seriously by researchers and policy-makers alike.

I acknowledge the limitations of my analysis. First, as in any observational study, my models may suffer from unobserved confounding. However, the combination of a novel instrumental variable technique and two-way fixed effects panel models provides a rigorous framework for causal inference. In addition, my robustness checks indicate that an unusual amount of bias must be present in order to cast any serious doubt on the substantive findings. Second, although I rely on the extant literature to theorise the causal pathways by which structural adjustment programmes influence child mortality rates, I am unable to empirically substantiate the precise mechanisms at work. For lack of richer multilevel data, I therefore refrain from seeking to flesh out the hypothesised causal relationships in further detail. I hope, however, that the framework provided above and the robust empirical findings will instigate future research on the international institutional determinants of healthy societies — in all senses of the term.

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