Title: Structural adjustment programmes and communicable disease burdens: causal evidence from 187 countries

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Abstract:

International financial organisations like the International Monetary Fund (IMF) play a central role in shaping the developmental trajectories of low- and middle-income countries through their conditional lending schemes, known as "structural adjustment programmes". These programmes entail wide-ranging domestic policy reforms that influence local health and welfare systems. Using novel panel data from 187 countries and an instrumental variable technique, we find that IMF programmes cause over 400 excess deaths and over 4,100 excess disability-adjusted life years (DALYs) from communicable diseases per 100,000 population. IMF-mandated privatisation reforms cause over 570 excess deaths and over 6,700 excess DALYs per 100,000 population. Structural adjustment programmes, as currently designed and implemented, are harmful to population health and increase communicable disease burdens in developing contexts.

One Sentence Summary:

Policy interventions by the International Monetary Fund in developing countries increase communicable disease burdens.

Main Text:

In the wake of the COVID-19 pandemic, much scientific effort has been devoted to better understanding the institutional determinants of communicable disease control. We seek to contribute to this understanding by assessing the role of international multilateral organisations in shaping communicable disease burdens across the developing world. As one of the world's leading international financial institutions, the International Monetary Fund (IMF) is uniquely positioned to shape the developmental trajectories of low- and middle-income countries through its conditional lending schemes, known as "structural adjustment programmes". In particular, the Fund plays a pivotal role in shaping state capacities to manage pandemics by moulding the institutional infrastructure of local health and welfare systems (*1*). Previous research has shown that the IMF-sponsored pursuit of short-term economic goals at the expense of long-term public investments by financially constrained governments undermines local health systems via fiscal

austerity and rapid privatisation reforms (*2*, *3*). More generally, IMF-mandated policy reforms – known as "conditionalities" – have been associated with reduced state capacities and declining population health (*4*-*6*). However, with the exception of a few case studies (*7*, *8*), we are not aware of any prior systematic investigations of the causal relation between the IMF's structural adjustment programmes and communicable disease burdens. The purpose of our paper is to step into this breach by using previously unavailable data and a compound instrumentation technique to derive unbiased causal effect estimates.

We use two alternative outcome variables: the age-standardised mortality rate from communicable diseases and the burden of communicable disability-adjusted life years (DALYs) per 100,000 population in 187 non-high-income countries between 1990 and 2017 (*9*). We employ two sets of treatment variables to assess the effects of structural adjustment (*10*). On the one hand, we use a dichotomous indicator of whether a country is under an IMF programme to estimate an overall average treatment effect of IMF intervention. On the other hand, to further probe the specific nature of structural loan conditions and their relation to the outcome variables, we assess the role of IMF-mandated privatisations of state-owned enterprises, as motivated by earlier scholarship linking rapid privatisation reforms to substantially deteriorating health outcomes (*11*, *12*).

Our economic control variables are gross domestic product (GDP) per capita, measured in constant 2010 US dollars (*13*), a binary financial crisis indicator (*14*), and foreign reserves in months of imports (*13*). Our political control variables include a general democracy index (*15*) and a more refined measure of egalitarian democracy (*16*), a coup d'état indicator (*17*) as a measure of political instability, and United Nations General Assembly (UNGA) voting alignment with the G7 countries (*18*). The latter variable is construed as a proxy for geo-strategic alignment and is known to be predictive of IMF programme participation and potentially of the types of conditionalities received by borrowing countries (*19*). Finally, we also control for average years of completed education in the female population aged 25–29 (*20*). Descriptive statistics are shown in Table S1.

Results

We present results from two-way fixed effects instrumental variable regressions. To isolate exogenous variation in IMF intervention, we adopt a compound instrument derived from the interaction between the country-specific average exposure to structural adjustment programmes over the sample period and the Fund's annual budget constraint. To allow for delayed effects, we lag the treatment variable by one year. Methodological details are provided in the Supplementary Materials and complete replication files are available from the lead author's website.

Outputs from the two-way fixed-effects regression models are displayed in Tables 2 and 3 for the aggregate impact of IMF programmes on the two outcome variables. Our baseline models, shown in the first rows of each table, suggest that the adoption of IMF programmes in one year causes 402 excess communicable deaths (95% CI: 211–593; $P = 0.00004$) and 4,129 excess DALYs (95% CI: 2,123–6,135; $P = 0.00006$) per 100,000 population. To assess the robustness of these parameter estimates to additional covariates, we introduce our control variables. However, to avoid multicollinearity issues and the loss of too many observations at once due to missing data, we add

and remove these controls one by one and inspect the corresponding change in the treatment coefficient. As displayed in the remaining rows of Tables 1 and 2, we find that structural adjustment remains a robust predictor of both outcome variables. The greatest attenuation in the estimated treatment effect occurs when controlling for foreign reserves – which is a strong predictor of selection into IMF programmes – and (egalitarian) democracy – which may itself be affected by IMF policies through wide-ranging institutional reforms and weakened state capacity (*4*, *21*).

Given the observational nature of our study, the persistence of unmeasured residual confounding is possible. To address this concern, we conduct a simple non-parametric sensitivity analysis that allows us to quantify the amount of unmeasured confounding that would in theory be required to eliminate our estimated causal effect (see Supplementary Materials for methodological details). The results of this sensitivity analysis are visualised in Fig. 1. The X-axis ranges from 0 to 1, with higher values indicating a higher prevalence of some unmeasured confounder U in the treatment group (i.e., in countries with IMF programmes). We label this variable δ. The Y-axis quantifies the net effect of U on the outcome variable that would be required to completely eliminate the estimated causal effect of structural adjustment programmes. In light of our instrumented treatment variable, we believe it is plausible that the amount of residual confounding remains moderate. As such, the most likely magnitude of δ would be at the lower end of the X-axis in Figure 1. If δ = 0.1, U would have to cause around 4,000 excess deaths and over 40,000 excess DALYs per 100,000 population to nullify the effect of IMF programmes, which seems implausible. Even at higher values of δ, a substantial amount of unmeasured confounding would be needed to cast doubt on our causal estimates.

We proceed to the analysis of IMF-mandated privatisation reforms. To facilitate interpretation, we dichotomise the treatment variable. Our baseline models are shown in the first rows of Tables 3 and 4, according to which privatisation reforms lead to 576 excess communicable disease deaths (95% CI: 299–852; $P = 0.00005$) and 6,716 excess DALYs (95% CI: 3,265–10,167; $P = 0.0002$) per 100,000 population. These estimates are robust to additional controls, though the effect sizes are most strongly attenuated when adjusting for the incidence of coups d'état (in the first model) and for foreign reserves (in the second model). The corresponding sensitivity analysis is visualised in Fig. 2, suggesting once again that unusually high levels of bias are required to eliminate our estimated causal effects. If we assume, for the sake of argument, that our unadjusted effect sizes overestimate the true causal effect by as much as 100 excess deaths and 1,000 excess DALYs, then the bias-adjusted parameter estimates would still be 476 excess deaths (95% CI: 199–752; $P = 0.0008$) and 5,716 excess DALYs (95% CI: 2,265–9,167; $P = 0.001$) per 100,000 population, respectively.

Discussion

Our analysis provides novel causal evidence from previously unavailable cross-national panel data, linking the IMF's interventions in developing countries to poor health outcomes. We corroborate earlier studies and hypotheses surrounding this topic, yet we offer new empirical insights. We note that the observational nature of our analysis precludes any guarantee of strictly

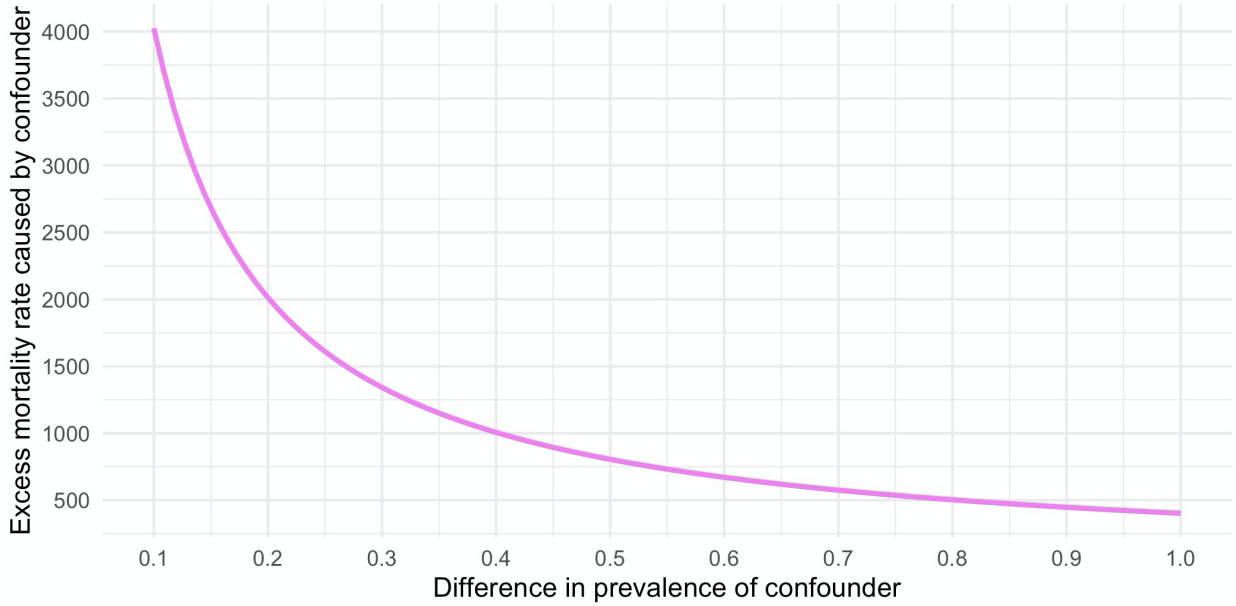
unbiased causal estimates. However, the sensitivity analysis suggests that an unusual amount of unmeasured confounding would be required to cast serious doubt on our substantive findings. We are unable to specify the mechanisms by which the estimated causal effects take place. The extant literature, however, suggests that IMF programmes affect healthcare system and exert durable influence on the social determinants of health (*1*). Moreover, the rapid privatisation of state-owned enterprises has previously been linked to turbulent labour market conditions, high levels of social insecurity and stress, and weaker public institutions (*11*, *12*). Such insights lend credence to our finding that IMF programmes as a whole, and especially privatisation conditionalities, have strong adverse impacts on both age-standardised all-cause mortality rates and on the total burden of disability-adjusted life years.

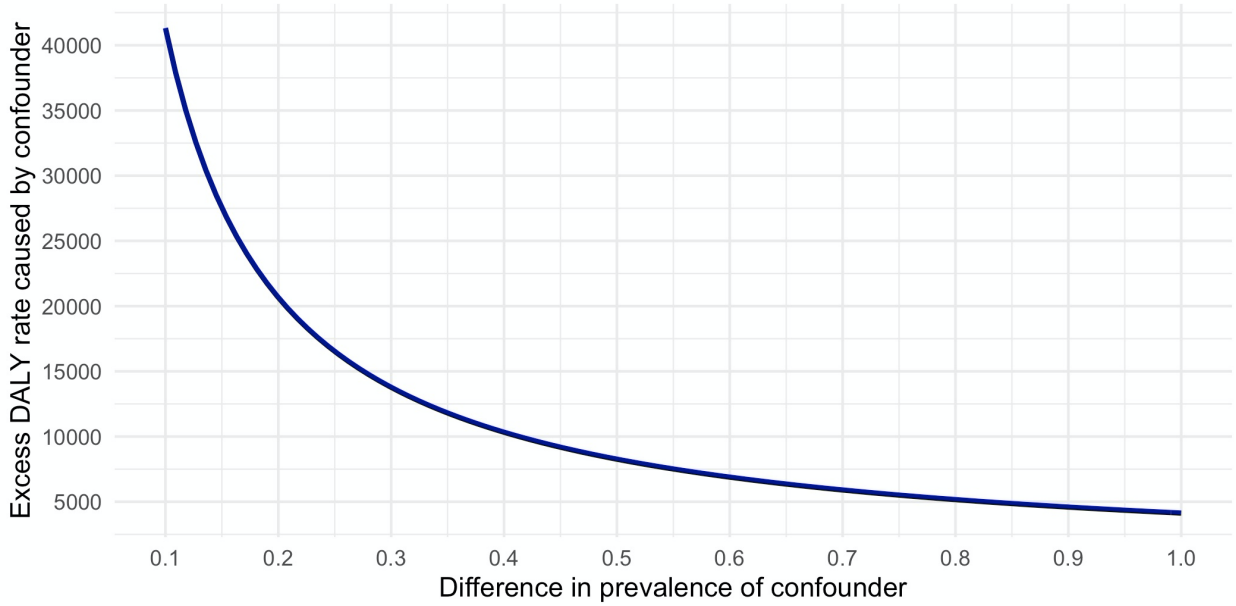
Table 1.

Control variable	Control coefficient	IMF_{t-1} coefficient
—	—	402***
		(98)
Log of GDP per capita	53	427***
	(54)	(111)
Financial crisis	28	408***
	(22)	(99)
Foreign reserves	2	314**
	(2)	(101)
Democracy	−7**	377***
	(3)	(94)
Egalitarian democracy	−373*	341**
	(161)	(108)
Coup d'état	14	388**
	(27)	(121)
UNGA voting alignment	−6	392***
	(14)	(98)
Female education	−13	413***
	(11)	(98)

The outcome variable is the age-standardised mortality rate from communicable diseases per 100,000 population between 1990 and 2017. Each row is a separate two-way fixed-effects regression wherein the effect of IMF programmes on the outcome variable 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 Supplementary Materials. The corresponding parameter estimate is interpreted as the excess number of deaths per 100,000 population caused by IMF programmes. Standard errors consistent with serial autocorrelation, heteroskedasticity, and unit clustering are shown in parentheses below each parameter estimate. Statistical significance levels: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

Fig. 1.





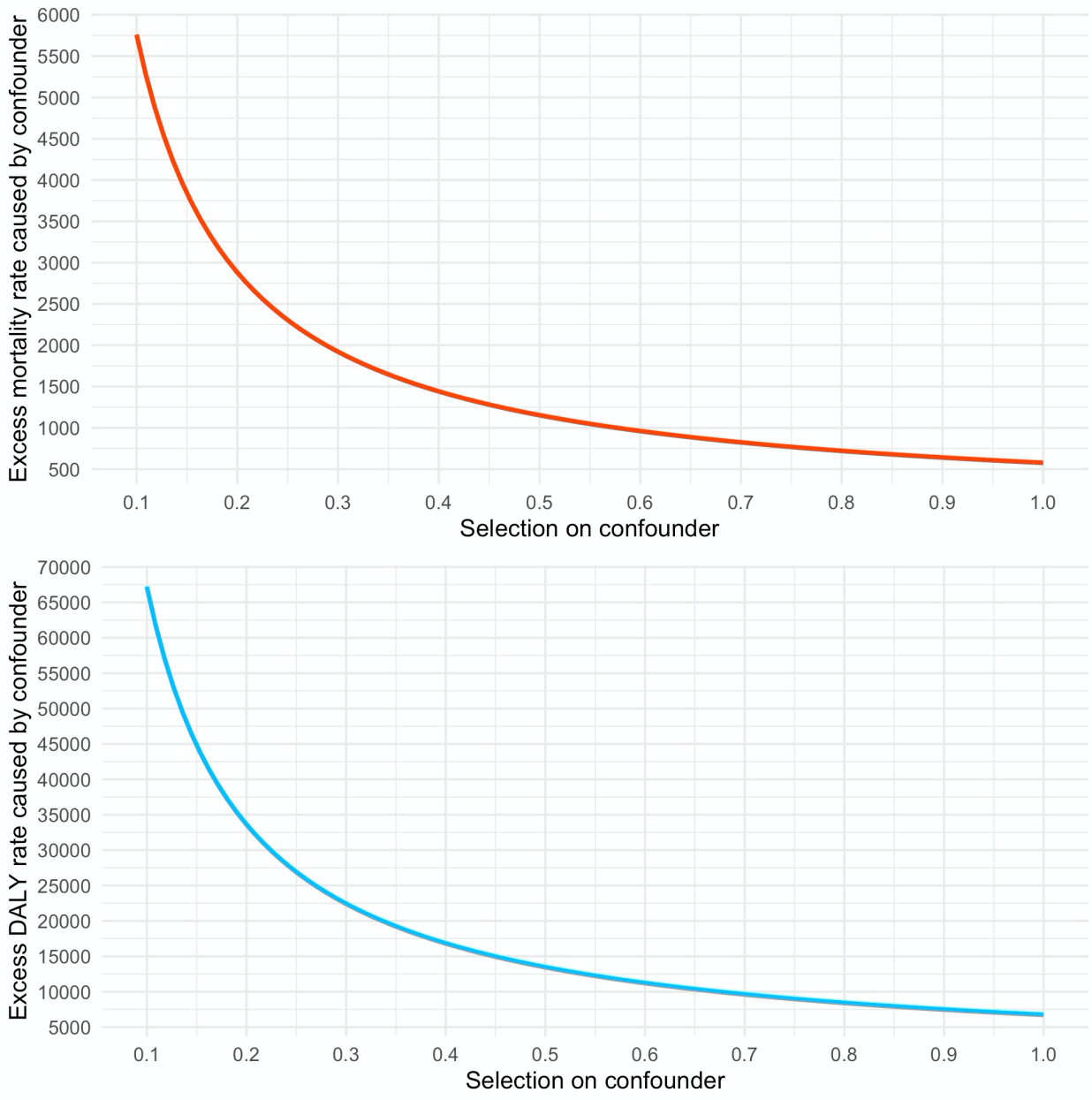
Sensitivity analysis plot to assess residual confounding of the estimated effect of IMF programmes on mortality rates from communicable diseases and disability-adjusted life years as per Tables 1 and 2. Values on the solid lines would completely eliminate the estimated effects of IMF programmes. Values above the plotted curves would reverse the sign of the estimated effects.

Table 2.

Control variable	Control coefficient	Privatisation$_{t-1}$ coefficient
—	—	576***
		(141)
Log of GDP per capita	−87*	571***
	(36)	(154)
Financial crisis	11	574***
	(14)	(141)
Foreign reserves	2	540**
	(1)	(198)
Democracy	−3	544***
	(2)	(142)
Egalitarian democracy	−114	504**
	(127)	(162)
Coup d'état	14	436**
	(21)	(148)
UNGA voting alignment	−4	554***
	(10)	(142)
Female education	−4	582***
	(8)	(142)

The outcome variable is the burden of disability-adjusted life years due to communicable diseases per 100,000 population between 1990 and 2017. Each row is a separate two-way fixed-effects regression wherein the effect of IMF programmes on the outcome variable 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 Supplementary Materials. The corresponding parameter estimate is interpreted as the excess number of disability-adjusted life years per 100,000 population caused by IMF programmes. Standard errors consistent with serial autocorrelation, heteroskedasticity, and unit clustering are shown in parentheses below each parameter estimate. Statistical significance levels: *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

Fig. 2.



Sensitivity analysis plot to assess residual confounding of the estimated effect of IMF-mandated privatisation reforms on communicable disease burdens as per Tables 3 and 4. Values on the solid lines would completely eliminate the estimated effects of IMF programmes. Values above the plotted curves would reverse the sign of the estimated effects.

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Supplementary Materials:

Materials and Methods

Fig. S1

Table S1

References (*22-25*)