

July 25th, 2008

Dear Listserv members:

We recently released a report on tuberculosis and the IMF:

<http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0050143>

The IMF has distributed a number of false statements about the paper, which we would like to correct:

<http://www.imf.org/external/pubs/ft/survey/so/2008/res072308a.htm>

Note: The IMF statements have been italicized and put in quotation marks in our response. We reference to the places in our paper where the IMF responses were already addressed.

1) The IMF claims *“The authors do not take into account that the economic and social instability following the collapse of Soviet Union may have had a direct impact on TB incidence in the 21 transition economies considered in the study. Any analysis that seeks to estimate the impact of IMF-supported programs on economic or social outcomes should take into account the economic and political conditions that first led the country to agree to an IMF-supported program. By not including these conditions, this study confuses the reasons for asking IMF assistance with the consequences of this assistance.”*

This is false. We anticipated this obvious possibility in the paper (1, p. 3), and explicitly considered and evaluated it using multiple approaches. Nonetheless, for the benefit of those who have not read the study, we recapitulate some of our findings below.

First, we adjusted for over ten different indicators of a country’s financial health. These included country per capita income, economic growth, inflation, hyperinflation, price liberalization, trade liberalization, foreign direct investment as a percentage of GDP, bank crisis, unemployment rates, real wages, military or ethnic conflict, democratization, the hazard of taking loans from the IMF, and other factors used by IMF researchers to measure economic distress (<http://www.imf.org/External/Pubs/FT/staffp/2008/02/index.htm>). Our results were robust to the possibility that the relationship between IMF lending and tuberculosis was falsely a result of these economic- and social-changes in the region (1, p. 7).

Second, we exploited the temporal (time) dimension of the data to test which came first, the IMF or tuberculosis rises. The IMF has claimed that tuberculosis rates were on the rise prior to their arrival, and hence they were an innocent bystander. We found just the opposite (1, see Table 2 and SI Text S4, Granger- and Sims-causality tests). Our before- and after-analysis indicated that tuberculosis rises occurred at the point of or within a few years after, but not before, the IMF’s arrival on the scene. When countries had paid back money owed to the IMF, tuberculosis rates fell by close to the same amount as they had risen upon IMF program participation. The IMF has wrongly indicated that TB mortality and similar variables take a long period of time to respond to health system changes; this is simply epidemiologically false, as TB mortality is a quickly detectable response to lack of medication supply and inadequate therapy among those persons who have active TB (2).

Third, as a further “control group” or counterfactual, we compared IMF loans to lending from non-IMF sources for similar amounts, duration and timing. Again, if the IMF was an innocent

bystander, we would have observed a similar effect from borrowing from other foreign sources after holding constant financial health. We found that these control loans, which thus differed from the IMF loans only insofar as they did not involve the IMF loan conditions, were linked to drops in tuberculosis incidence, prevalence and mortality rates (1, Figures 2-4). In our path-analysis, we found that the IMF loans had a significant and negative relationship to government spending and TB-related public health measures, but that the non-IMF loans had either a positive or neutral relationship to these determinants of tuberculosis (1, p. 9). This evidence further substantiated the link between IMF loan conditions and infectious disease control which has long been proposed by public health physicians (3).

Lastly, our analysis included the conditions that led countries to enter into agreements with the IMF by developing a 'hazard of IMF participation' statistic (1, pgs. 3,9; see our section on controlling for selection bias and SI Text S7). Once again, we found evidence in contrast with the IMF's response. Our models revealed that the countries that took on IMF programs, all things equal, had characteristics that would have predisposed them to further tuberculosis declines, had they not participated in the program.

2) The IMF claims *"The study speculates that IMF-supported programs are associated with lower public health expenditure, leading to higher TB incidence. However, this conjecture is not corroborated by data. The average increase in health spending as a share of GDP is larger for countries with Fund-supported programs than in countries without such programs (<http://www.imf.org/external/np/vc/2007/062907.htm> and IMF's [WP/05/100](#))."*

The first citation suggests the opposite. The second citation is misreported. Neither relates to our study.

The IMF first cites the IMF's own commentary on a Center for Global Development study, *Does the IMF constrain health spending in poor countries?*, as firm evidence that their programs are associated with greater health expenditure. The report suggests the opposite conclusion about the IMF's effects on the health sector based on case-study evidence from Mozambique, Rwanda and Zambia. The report concludes that "in a number of ways IMF actions have unduly constrained countries' policy choices and that it needs to do more to help explore a broader range of policy options" (4, p. 56).

The IMF next cites their own unpublished analysis as evidence that IMF programs boost health spending. This is misleading, however, because their study does not actually evaluate health spending but rather health spending as a percentage of total government spending (5, p. 15). In a situation where government expenditures are being cut by IMF-sponsored austerity programs, health as a percentage of government spending can rise even while overall health funding is falling. What matters for tuberculosis control is not health spending as a fraction of all government spending, but the total amount of money going into the health system. There is, to our knowledge, no evidence to support the IMF's claim that health spending is secured or improved as a result of IMF programs. Lastly, we note that neither of these citations involves the post-Communist countries we analyzed.

3) The IMF claims *"the study has a number of dubious results, which cast doubt on the methodology used by the authors. The study does not take into account many other factors that should have a direct impact on TB incidence, including health expenditure, poverty, initial mortality, and migration. Other results of the study, including that TB-incidence*

increases with income growth and decreases with urbanization, contradict previous studies that find that TB incidence increases with poverty and increases with urbanization.”

This is also incorrect. We controlled for all of the major population level factors that have been empirically linked to tuberculosis rates. The main socio-economic and healthcare variables that the WHO has identified as crucially relating to population TB are: GDP per capita, government spending, DOTS success rates, and DOTS population coverage (6). We also covered the variables used in Christopher Murray’s ecological analyses of tuberculosis (7). In addition, we used another set of 20+ variables, and dedicated a lengthy discussion in the methods and results sections of our paper to justify each of the parameters. The variables we used were:

DOTS population coverage, DOTS success rates, HIV/AIDS rates, Urbanization Rates, Log GDP per capita, Population Dependency Ratio, Heritage Foundation Democratization Index, Tertiary Education Rates, Change in Log GDP, Doctors per capita, Government spending a percentage of GDP, Incarceration Rates, Inflation Levels, Dummy for Hyperinflation, Index of foreign exchange and trade liberalization, Index of price liberalization, Foreign direct investment, Dummy for a bank system crisis, Unemployment rates, Real wages, Dummy for military or ethnic conflict, Hazard of taking loans from the IMF, Time Dummies, Country Dummies (including initial mortality).

Our findings replicated, and thus were corroborated by, those of independent scholars (7) and the WHO (6). Thus, our finding is consistent, not inconsistent as the IMF claims, with the existing population studies of tuberculosis.

We also note that migration is known to have been less of a primary driver of tuberculosis in the region under study, and much of the migration of TB cases was to outside of the studied region (8, see also the LSHTM website linked to by the IMF). Because the remaining migration within post-Communist countries proceeded directionally from rural areas to the cities, adjusting for urbanization rates was included to check that our findings were robust to this possibility (9).

The IMF suggests our findings linking higher growth rates to tuberculosis increases “contradict previous studies that find that TB incidence increases with poverty”. We actually found the expected relationship between higher income levels and lower tuberculosis rates (1, joint-significance test, p. 10 and also SI Text S3). This result is, contrary to the IMF’s claim, consistent with studies that find TB incidence increases with poverty. Growth rates and income levels are two different variables, as we would hope the IMF would know.

4) The IMF claims that *“Finally, the authors' finding that the only consistent factor impacting TB incidence is the presence of IMF-supported programs is in contrast with previous epidemiological studies on the incidence of TB.”* This is false. We note that aim of our study was only to characterize the relationship between IMF programs and tuberculosis. We thus set-up our analysis in order to isolate this relationship. Nonetheless, we also reported that HIV/AIDS was linked to higher tuberculosis, which is also consistent with existing literature (1, p. 4). We also presented evidence that government expenditures were linked to reduced tuberculosis (1, SI Text S5). As we noted above, several of our other empirical

findings were corroborated by prior independent analyses and the WHO's 2008 tuberculosis control report (6,7).

The IMF concludes, as a result, that “*severe methodological shortcomings limit the scope of these results and prevent any causal interpretation.*” We note that we carefully used terms such as ‘linked to’ and ‘associated with’ in reporting the findings, though we fulfilled many of Bradford Hill’s classical criteria of causality, including strength of association, temporality, biological gradient, consistency, specificity, coherence, and biological plausibility (10). Nevertheless, we are surprised to see that the IMF is now labelling its own methods a “dubious methodology” and “phony science”

(see IMF staff papers’ methods

<http://www.imf.org/External/Pubs/FT/staffp/2008/02/index.htm>

and their quote to the NY Times:

<http://www.nytimes.com/2008/07/22/health/research/22tb.html>).

References

1. Stuckler D, King LP, Basu S (2008) International Monetary Fund programs and tuberculosis outcomes in post-communist countries. PLoS Med 5(7): e143. doi:10.1371/journal.pmed.0050143. Available at <http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0050143>
2. Dye C, Watt CJ, Bleed DM, Hosseini SM, Raviglione MC. (2005) Evolution of tuberculosis control and prospects for reducing tuberculosis incidence, prevalence, deaths globally. JAMA 293(22): 2767-75.
3. Kim JY, Millen J, Irwin A, Gershman J (2000) Dying for growth: global inequality and the health of the poor Monroe (Maine): Common Courage Press.
4. Goldsborough D (2007) Does the IMF constrain health spending in poor countries? Evidence and an agenda for action. Report of the Working Group on IMF Programs and Health Spending Washington (D.C.): Center for Global Development.
5. Masud N and Yontcheva B. (2005) Does foreign aid reduce poverty? Empirical evidence from nongovernmental and bilateral aid. IMF Working Paper WP/05/100. Available at <http://www.imf.org/external/pubs/ft/wp/2005/wp05100.pdf>
6. World Health Organization (WHO) (2008) Global tuberculosis control—surveillance, planning, financing Available: http://www.who.int/tb/publications/global_report/2008/en/index.html. Accessed 31 March 2008.
7. Obermeyer Z, Abbott-Klafter J, Murray CJL (2008) Has the DOTS Strategy Improved Case Finding or Treatment Success? An Empirical Assessment. PLoS ONE 3(3): e1721. doi:10.1371/journal.pone.0001721

8. Walls, T and Shingadia, D. (2007) The epidemiology of tuberculosis in Europe. *Archives of Disease in Childhood* 92: 726-9.
9. Heleniak T (2002) Migration dilemmas haunt post-soviet Russia. *Migration Information Source*. <http://www.migrationinformation.org/Profiles/display.cfm?id=62>
10. Bradford-Hill, A (1965) The environment and disease: association or causation? *Proc. R. Soc. Med.* 9:295–300.

For further discussion of the methods, see
<http://medicine.plosjournals.org/perlserv/?request=read-response&doi=10.1371/journal.pmed.0050143#r2324>