Does Health Aid Reduce Mortality?

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Successful public health measures are being implemented in many places around the globe and country-level mortality has fallen significantly in all but a few countries. This study attempts to test the aggregate relationship between development assistance for health (DAH) and a recipient country's mortality trajectory. Using a new data source containing DAH on 96 high mortality countries, my empirical analysis suggests no effect of DAH on mortality at the country level. Other types of aid, including water development, also have no effect. Economic growth, on the other hand, has a strong negative effect on mortality. These findings confirm and build upon the work of others and are shown to be robust to a variety of sensitivity analyses and alternative model specifications and estimation methods.

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Introduction

Health, many believe, is an area where development assistance is likely to see positive results. Public health measures such as clean water, effective sanitation, immunizations, antibiotics, rehydration therapy, malaria prevention and treatment, and better nutrition have, among many other tools, dramatically reduced mortality among infants, children and adults across the globe, both historically and in recent decades. Encouraging case studies highlight apparent success at virtually eliminating measles in southern Africa, in eradicating smallpox globally, in preventing STDs in Thailand, in reducing child mortality through vitamin A in Nepal, in successfully implementing rehydration therapies and reducing diarrheal deaths in Egypt, and many others (Levine 2004 and 2007).

In the past two decades, a lot of attention and funds have been flowing into the health sectors of the world's developing economies. A recent examination of all DAH funds (Ravishankar, et. al. 2009) shows a four-fold increase between 1990 and 2007 in all public and private funds that can be tracked with available data sources. Figure 1 details this increase in DAH spending.

But these successes, though significant, tell us little about whether development assistance for health (DAH), in aggregate, has had a positive impact on health outcomes. To answer that question correctly, we need to look at all DAH programs in all places, rather than identifying only highly successful cases. When all the DAH projects are added up, do they result in a meaningful improvement in public health or health care in the recipient country, and is DAH actually improving health beyond where it would be without the assistance? Using a variety of specifications and alternative assumptions, I search diligently for statistical evidence that cumulative DAH reduces mortality.

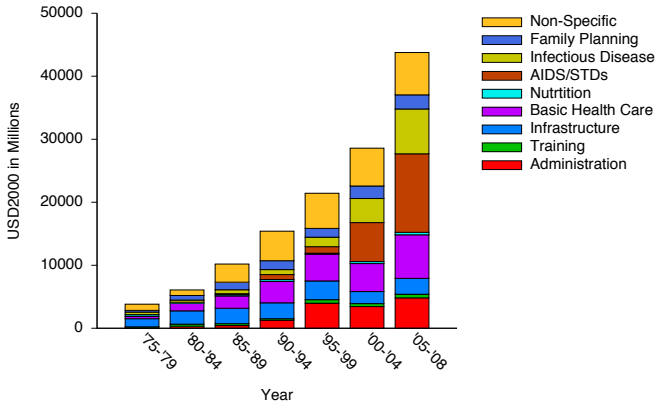
Data, Research Design, and Methodology

For this analysis I use data from AidData, which combines the widely used data from bilateral donors put out by the OECD's Creditor Reporting Service (CRS) with a large number of non-OECD bilateral donors and a variety of multilateral financial institutions including regional development banks (most of which are not in the CRS) as well as the World Bank. The analysis also includes health-related funding from the Bill and Melinda Gates Foundation (BMGF) and from the Global Alliance for Aids and Vaccinations (GAVI) obtained from the Institute for Health Metrics and Evaluation (IHME).

In this analysis health aid is understood to be of two types. In addition to DAH, total aid to the water sector is broken out as a separate category because clean water is such a crucial determinant of health. All other development finance given to the recipient country is included as an additional control.

Other data in this analysis come from the World Bank Development Indicators (WDI) database, including infant mortality (IMR), child (under 5) mortality (CMR), life expectancy at birth (eo), GDP per capita (in USD 2000 constant dollars) and population. The widely used Polity2 score is used to control for the level of democracy.

Figure 1: Health aid by sector, 1979-2008.



A variety of simple and more complex models are estimated as part of this analysis. More detail on these methods is included in the paper and on-line Appendix. Two models are highlighted:

The Dynamic Panel model includes both a country level fixed effect that captures unobserved factors that influence the dependent variable and a lagged dependent variable as suggested by Beck and Katz (1995) and used widely in the literature. I estimate this model in two ways. The first approach is to use the simple fixed effects model (sometimes called the least squares dummy variable model), with the addition of cluster-robust standard errors, to adjust for the panel structure of the error terms. Estimated this way, the DPM is known to have small bias. The second approach is to use the generalized method of moments (GMM) technique for panel data developed by Arellano and Bond (1991). GMM estimators are consistent, but are associated with very high standard errors and can perform poorly in small samples.

The Latent Growth Model is a longitudinal analysis technique designed to estimate growth over time. Its strength is the highly flexible functional form that allows both random intercepts and random slopes. Furthermore, in the estimation results, arbitrary correlation between the random effects in the model is allowed (and proves to be important).

Results

Even though the mortality trajectories of countries have almost universally and non-trivially improved since 1975 across the globe, countries receiving high levels of DAH have done no better, on average, than countries receiving low levels of DAH. Three important points can be made about estimated effects for DAH in this analysis. First, and most important, they are very small. All of the DAH coefficients for each model estimated for each of the 3 mortality measures are near zero, especially those coefficients with a negative sign—which is required for DAH to be effective. The interpretation of these coefficients suggests that even dramatic increases in aid would cause barely perceptible decreases in mortality.

Second, the estimated effects are reasonably precise. 95% confidence intervals on the DAH coefficient often contain zero, but the bounds of the intervals are not large. Although the estimates are largely statistically insignificant, that may be attributable to the fact that the estimates themselves are near zero.

Third, as suspected, the overall model results are quite sensitive to specification and estimation method. This is disconcerting but not unusual in time-series cross-sectional work when doing country-level analysis. However the "non-finding" regarding DAH spending is not sensitive to method. Additional sensitivity analyses are described below.

Robustness Checks

The models and specifications mentioned above make numerous assumptions which can be challenged and examined. The following assumptions were checked for robustness:

- Definition of high mortality country
- Time delay between commitments and disbursements
- Donor type
- Time it takes DAH to be effective
- Use of multiple imputation
- Contingent Effectiveness
- Non-linear effectiveness.
- Definition of DAH
- Changing effectiveness over time
- Sub-sector differences

Complete regression results for all models using these alternative assumptions are available in the on-line appendix accompanying this article. However, they all tell the same story about DAH. None of the alternative assumptions results in increasing the magnitude of the DAH effect.

Conclusion

I take two important conclusions away from this analysis of the allocation of DAH across countries. First, if recent declines in mortality are used by donors as proxies for the prospects of future success, then these results suggest that donors, as a whole, give more to countries where the prospects for success are greater.

Second, in the past four decades we have seen sharp reductions in mortality around the developing world. The results, taken together, suggest that donors move aid assistance to where declines in mortality have already occurred but, once there, the money has no added benefit in terms of mortality. The strikingly large magnitude of these effects suggests that donor dollars are highly responsive to mortality, but these dollars seem to be largely chasing after success, not causing it.

The central point of this empirical exercise is that although public health measures can be effective (and have been in selected cases), DAH spending from 1975-2005 had no discernible effect on country-level mortality rates in high mortality countries. This sobering conclusion is not due to limited data that allows only imprecise estimates, but comes from relatively precise estimates that are very close to zero. This finding was subjected to a multitude of alternative specifications and robustness checks, all to the same end. In sum, DAH dollars move strongly towards countries with declining mortality, but they do not generate it.

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