Author's response to reviews

Title: The impact of economic downturn on maternal and infant mortality: lessons from history

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Version: 2 Date: 17 September 2010

Author's response to reviews: see over
Reviewer: Barbara Starfield

1. Economic downturn

We of course accept that economic downturn is more than just a reduction in GDP per capita. Unemployment, general deprivation and differential impacts on different income groups are key features. GDP and GDP per capita are usually used as summary descriptors for downturn and recession. Indeed recession is commonly defined as two quarters of negative GDP growth. We suggest that perhaps the title should be changed to impact of economic recession rather than downturn. We have also added a note on page four to justify this.

2. Confounders

The range of confounding factors that can be included given the length of the time series is rather limited. We realise that we did not describe the inclusion of the crude birth rate as a proxy for fertility which is a major confounder which we did include but did not describe in the set up of the model. The nature of the model (panel, fixed effects) mean that country specific dummies are automatically included so allowing for variation across countries.

3. Discussion

The Stuckler paper is useful and we have now cited. The paper indicates that while a direct effect of GDP on health is modest an indirect effect, which we discuss in the first section, on the states’ ability to finance more medical staff etc is substantial. We have referred to these two effects in the opening section of the paper. We have qualified to need to continue external development assistance to direct it at health system strengthening.

Other

- In line with the terminology used in DHS etc we have changed to least wealthy.
- Etc deleted.
- Phrase ‘made available to authors’ deleted
- 5 year lag: There may be a misunderstanding of lag here. We are not saying (or specifying in the model) that a change in gdp per capita 5 years ago is associated with a change today. Rather than the cumulative change over 5 years in gdp per capita is associated with the cumulative change in outcome. This allows for the effect of income to build up over a period of time. A note on this has been added on page 8.
- First two sentences re-written
- Changed to ‘two countries’
- Discussion: Our understanding of the practice in the US is that at least will receive initial emergency care in an ER without asking for payment. We recognise, however, that immediately after charges may incur. Given this we have re worded the sentence as follows: “The US system provides free Emergency Room (Emergency Medical Treatment and Active
Labor Act, 1986) care which will include emergency complications during acute pregnancy and childbirth.”
Reviewer: BARTHELEMY Kuate-Defo

1. We ran a series of specification tests to test the robustness of modelling. Random and fixed effects was tested using a Hausman test. Fixed effects were show to efficient and consistent. We agree that simultaneity is a potential problem. We test for this by running specifications for low/middle and rich income groups using an instrumental variable method (xtivreg) and then inconsistency tested for using a Hausman test. The test was not significant. For the country specific specifications simultaneity and serial correlation was tested for. No evidence of simultaneity was found. Serial correlation was found to be a problem and an error correction method, Cochrane Orcutt regression was used in instead.

2. We have used the crude birth rate rather than total fertility (they are strongly correlated) rate since it was more readily available for the time series we used. This was included in all the regressions we neglected to include it in the model specification. We have now added it.

3. Time periods - Inconsistencies have been eliminated. We have four time periods: 1936 to 1950, 1951 to 1965, 1966 to 1980, 1981 to 2005. We have amended the text and tables to ensure these periods are now consistent.

4. Although we understand that survivor bias is important at an individual or sub-population level, for data where there is one observation per country, per year we are not sure it is relevant here. The bias usually arises because the observation of a group member is determined in part by the level of the dependent variable. In our data this might occur if countries were redefined as low or high income countries across the time period. We keep the categories constant so that the 14 countries are either classified as low/middle or rich countries.

5. Our hypothesis is that positive changes in GDP per capita will, ceteris paribus, lead to negative changes in maternal/infant mortality across the population as a whole – there is one observation per country, per year.

6. 5 year lag: There may be a misunderstanding of lag here. We are not saying (or specifying in the model) that a change in gdp per capita 5 years ago is associated with a change today. Rather than the cumulative change over 5 years in gdp per capita is associated with the cumulative change in outcome. This allows for the effect of income to build up over a period of time.

Minor

Impact – when referring to the modelling the term impact has been changed to association. Impact has been kept as a term for some of the literature and conceptual review.

Preston - Cited

Sources of data – national agencies provided information on maternal and infant mortality. As far as we can discern the methods used to compute mortality is similar across countries. GDP was derived from a single database.
Reviewer: Albert Okunade

1. More specification tests reported

On page 9 - Some text and footnotes added on the Hausman test used to compare random to fixed effects in the pooled country equations. Also added some text on the DW statistics computed that led to the choice of the Cochrance-Orcutt transformation for the individual country regressions.

There is no simple R square for the regressions. However we have now added the F test for overall regression explanatory power to table 1 for each regression. With the exception of one regression for neo natal mortality, all are significant at better than 1% level.

2. Papers suggested are now cited.

3. The concluding section has been rewritten a little to qualify the types of support required by domestic government and the international donor community.