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**Does Medical Expansion Improve Population Health**


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**Appendix A.** Multiple Imputation.

Although other multiple imputation methods are widely used, they often produce absurd results for missing values in time-series cross-sectional data like the Organization for Economic Co-operation and Development health data used in this study. The imputed values often deviate far from the preceding and subsequent observations, and are highly improbable in reality. In contrast, bootstrapped-based expectation maximization (EM) algorithm "recognize(s) the tendency of variables to move smoothly over time, to jump sharply between some cross-sectional units like countries, to jump less or be similar between some countries in close proximity, and for time series patterns to differ across many countries" (Honaker and King 2010:566). The EM algorithm includes time functions (e.g., polynomials, LOESS etc.) to smooth the time trends, and interactions of the time function with the cross-sectional unit to differentiate the trends among units. We use Amelia II embedded in the R statistical software package to apply multiple imputation to the missing data.

Besides the 11 indicators of medical expansion in Table 1, multiple imputation was applied to the following variables: the urban population as a percentage of the total population, GDP per capita, life expectancy at birth, male life expectancy at age 65, female life expectancy at age 65, the all-cause gross mortality rate, household consumption expenditure as percentage of GDP, government consumption expenditure as percentage of GDP, gross fixed capital formation, foreign direct investment net inflows as a percentage of GDP, industry value added, and the percentage of women in the labor force. These variables were included because they have modest-strong correlations with the medical expansion indicators; they also have relatively smaller proportions of missing values than alternate variables.