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[Book #8232]

# Demographic Forecasting

Federico Girosi and Gary King. Princeton, NJ: Princeton University Press, The, 2008. ISBN: 978-0-691-13094-1. xviii+267 pp. $75.00 (H). ISBN: 978-0-691-13095-8. $35.00 (P)

With their new book, Girosi and King contribute a new Bayesian methodology of forecasting mortality when time series are noisy and sparse. The method is strongly evocative of seemingly unrelated regression (Zellner, 1962); a somewhat less fortunate parallel is that the book's title is almost seemingly unrelated to the method's much broader applicability. This is not to understate the authors' valuable contributions to the particular field of mortality forecasting, as evidenced by extensive and repeated application of the methods. But it is not until the last section of the introductory chapter that we catch a glimpse of the wider relevance of the methods, during a discussion of their applicability to, and perhaps their partial genesis in, a seemingly unrelated field: comparative political science.

A book entitled *Inference When People Say Your Variables Are Meaningless Across Space Or Time*, while more truthful in its advertising, would probably be similarly limited in appeal, and a broad econometrics text aimed at students in public health, political science, or yes, demography would face stiff competition, not to mention the requirement that the wider applications actually be carried out rather than promised. While Girosi and King have sidestepped altogether the arguably more thorny issues of what to do about the other two components of demographic change, namely fertility and immigration, their insights into mortality forecasting are certainly deep and innovative enough to make this book a valuable and welcome addition to the subfield.

The acknowledgements section makes clear the authors' specific motivation to improve mortality forecasts for developing countries, even if it almost sounds like they did it on a dare, and their contribution is a great success in this regard. Prudent demographers will forgive the occasional gibe about their getting the order of applying priors exactly backward; Girosi and King make the excellent point that knowledge about the smoothness of mortality rates across ages, across borders, and even across time ought to be applied before the model is estimated, not only as a check on the results. Bayesian priors can accomplish this; another method forecasters use is to smooth the data via splines and then account for that when fitting (Currie et al., 2004). A second major insight is that because we expect this smoothness in mortality, which is our *dependent variable*, standard Bayesian methods that incorporate smoothness priors about *model coefficients* need some tweaking. The authors show how to do this theoretically and operationally, via Markov Chain Monte Carlo and some faster alternatives, in parts II and III respectively. The broadness of the method's appeal really hinges on a third insight that is related to the second: when mortality data are sparse, covariates like income or smoking are useful, but their marginal effects may vary considerably across countries. This is the hook to comparative political science, a field in which pooling across countries is apparently a mortal sin for those who are not armed with the latest in Bayesian techniques. Everyone, please do not tell political scientists what we economists are up to on a daily basis.

Part IV reveals the model in action, going toe-to-toe exclusively with the widely used model of Lee and Carter (1992), which the authors described in their review of the literature in Part I. They would be the first to admit that Lee-Carter was never designed to work on poor-quality data outside the U.S. or G-7, or on cause-specific mortality; they show here that their methods can generate results that indeed look much more "reasonable," like the Bayesian priors encapsulate, than those of Lee-Carter in these cases. The rough linearity of the Gompertz slope in log mortality is maintained over time, as any wild fluctuations that may be in the data melt away. There is debate about the wisdom of producing cause-specific forecasts given problems with bias at least over long periods (Wilmoth, 1995), but it is clear that there is great demand for them in public health circles. A recent review by Booth (2006) is useful in assessing the pitfalls. The penultimate chapter assesses model performance by fitting on data prior to 1990 and testing on data since then. The new method improves considerably on Lee-Carter exactly where it was intended: among developing countries and in cause-specific mortality. Although Li et al. (2004) have showed Lee-Carter can work when time series are short, the great advantage of Girosi-King is that it *looks like* it works when cross-sections are noisy.

Naturally, the book leaves some questions unanswered. We do not know how Girosi-King forecasts of future life expectancy compare to official Social Security forecasts, for example, although one suspects that like Lee-Carter projections, which are also extrapolative, they are comparatively optimistic. While the debate over optimism and pessimism seems unlikely to be unequivocally resolved until it is conducted *ex post*, it would be still useful to know where this method stands. It is not clear how smoothing priors may or may not change the predicted future of the global demographic transition and population aging, although this is surely a cheap shot here given the relatively large importance of the fertility transition. More practically, we do not know how much the Girosi-King method will help guide policy, because it is not clear how much it will help forecasters in government agencies, who are typically strapped for time and face impediments to incorporating innovative forecasting techniques. The present value of *Demographic Forecasting* seems mostly to derive from its very insightful approach to a specific problem that is isomorphic to many others in applied inference, although the work is clearly of significant interest to specialists forecasting mortality in developing countries.

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