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2010 : April 2010 - Emerging Research Fronts : Frank Windmeijer on GMM Estimators

EMERGING RESEARCH FRONTS - 2010

April 2010



Frank Windmeijer talks with *ScienceWatch.com* and answers a few questions about this month's Emerging Research Front Paper in the field of Economics & Business.



Article: A finite sample correction for the variance of linear efficient two-step GMM estimators

Authors: Windmeijer, F

Journal: J ECONOMETRICS, 126 (1): 25-51, MAY 2005

Addresses: Inst Fiscal Studies, Ctr Microdata Methods & Practice, 7 Ridgmt St, London WC1E 7AE, England.

Inst Fiscal Studies, Ctr Microdata Methods & Practice, London WC1E 7AE, England.

SW: Why do you think your paper is highly cited?

The estimation method for which my standard error correction works particularly well is very popular, especially when using panel, or longitudinal, data. As the usual standard errors are often much too small when the number of observations are moderate, the correction has been adopted quite quickly into mainstream statistical packages and is now being used in applied research, leading to much more reliable inference.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

It describes the development of the methodology used to account for estimation of nuisance parameters that do not affect the estimate of the variance in large samples, but have an impact when the sample size is small or moderately large.

The problem was quite well-known, but the paper develops the method to take account of the extra variation due to the estimation of these nuisance parameters. The result is that the corrected standard errors are in general larger and much more reliable in finite samples, but also still correct when the sample size is large.

SW: Would you summarize the significance of your paper in layman's terms?

"It was while working with them on a review book chapter on these methods that I discovered where the problem of

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As for any statistical analysis, obtaining correct confidence intervals is important, for example, to assess the direction, if any, of a causal treatment effect.

Standard methods often rely on large sample results to inform the reliability of results in observed data. Often these approximations are reliable, but not in the case of the particular estimation method considered here, leading often to confidence intervals that are too small, i.e., leading to a false sense of precision.

The standard error correction described in the paper corrects for this bias, inducing much more reliable confidence intervals on which to base, for example, policy decisions.

SW: How did you become involved in this research and were any particular problems encountered along the way?

During my time at University College, London, and the Institute for Fiscal Studies, I had the privilege of working with Professors **Richard Blundell**, and **Stephen Bond**, who were pioneers in the development of this estimation method for dynamic panel data models.

It was while working with them on a review book chapter on these methods that I discovered where the problem of the downward bias in the variance estimate came from. It then took a bit more research to actually be able to correct for this bias in a systematic way, although once I isolated the cause, this was not too onerous.

SW: Where do you see your research leading in the future?

In recent work with Whitney Newey, a Professor of Economics at the Massachusetts Institute of Technology, we have developed a similar correction for a more complicated estimation method for the same type of models.

As these estimators are less widely used, I now have a Ph.D. student looking at providing software code for wider dissemination, and to assess the properties inherent in a wide area of applications.

SW: Do you foresee any social or political implications for your research?

Not directly, but indirectly, as the applied research in this field will be based on better inference.

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KEYWORDS: GENERALIZED METHOD OF MOMENTS; VARIANCE CORRECTION; PANEL DATA; PANEL-DATA MODELS; OF-MOMENTS ESTIMATORS; GENERALIZED-METHOD; INFERENCE; INSTRUMENTS; RESTRICTIONS; TESTS; WEAK.

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