Special Issue of Econometric Reviews in Honor of Peter Schmidt 2014

Peter Schmidt: Econometrician, the Consumate Professional

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For about four decades the econometrics profession has benefitted from the knowledge, wisdom and leadership of Peter Schmidt as one of its best known and most respected generals. His knowledge and expertise have been sought in many domains, including in the important area of research assessment and adjudication. This is an area of intellectual and professional service where temperament and command are equally desirable and rare. Peter Schmidt has brought this to many scholarly outlets and societies, and played a foundational and constructive role in the development of the field and its organs. His distinguished service to Econometric Reviews exemplifies his contributions. Peter has served and led the development of ER for a very long time. Indeed, he is one of only 4-5 founding scholars that launched ER, and Peter has been on its board since inception in 1982-3. He has served longer than the current editor whom he "recruited" to replace the outgoing editor in 1987, and is the only continuously serving Board Member since 1982. His judgment has always been fair, informed, clear, decisive, and constructive. Respect for ideas and scholarship of others, young and old, is second nature to him. This is the best of traits, and an uncommon example to us all.

The 17 papers that make up this *Econometric Reviews Special Issue in Honor of Peter Schmidt* represent the work of 50 contributors. These papers, by the very finest econometricians in our profession, honor Professor Schmidt's lifelong accomplishments by contributing fundamental work that reflect many of the broad research themes that have distinguished his long and productive career. These include time series econometrics, panel data econometrics, and stochastic frontier production analysis.

Our intent was to honor Peter Schmidt with a collection of state-of-the-art articles on topics such as foundations, theory, methods, models, computational algorithms, and applications relating to these three broad research areas. We feel that our goal has been met by these fine contributions.

The first contribution in the Special Issue is "Estimation of Partially Specified Spatial Panel Data Models with Fixed-Effects" by Chunrong Ai and Yuanqing Zhang addresses issues in fixed effect estimation of spatial panel data regression models wherein the regression function is partially linear regressors may be endogenous or predetermined. They propose a sieve two stage least squares (S2SLS) estimator and derive the asymptotic distribution for the parameters of such a model. Limited simulations results indicate that the proposed procedure has good finite sample performance.

In "Inference in the Presence of Redundant Moment Conditions and the Impact of Government Health Expenditure on Health Outcomes in England" Martyn Andrews, Obbey Elamin, Alastair R. Hall, Kostas Kyriakoulis, and Matthew Sutton revisit Peter Schmidt's work with Breusch, Qian and Wyhowski on redundant moment conditions (JEC, 1999), extending the treatment of uninformative moment conditions in their empirical study of government health expenditures and their impact on health outcomes in England. They do this by introducing info-metric (IM) estimators, a class that includes both Empirical Likelihood (EL) and Exponential Tilting (ET) estimators, and by utilizing bootstrap procedures that improve on point and interval estimates of alternative GMM estimators.

Manabu Asai and Michael McAleer, in their contribution, "A Fractionally Integrated Wishart Stochastic Volatility Model," derive the conditional Laplace transform of the continuous time fractionally integrated Wishart stochastic volatility (FIWSV) process, in order to obtain a closed form expression of moments. They provide a two-step procedure involving the estimation of the parameter of fractional integration via the local Whittle estimator and then the estimation of the remaining parameters via the generalized method of moments. Their Monte Carlo results for the procedure show a reasonable performance in finite samples and their empirical results for the S&P 500 and FTSE 100 indexes show that the data favor the new FIWSV process rather than the one-factor and two-factor models of the Wishart autoregressive process for the covariance structure.

Richard T. Baillie, George Kapetanios, and Fotis Papailias consider a multivariate system of fractionally integrated time series in their paper "Inference for Impulse Response Coefficients from Multivariate Fractionally Integrated Processes." They also investigate the most appropriate way for estimating Impulse Response (IR) coefficients and their associated confidence intervals, extending work on univariate analysis recently provided by Baillie and Kapetanios (2013). They use a semi parametric, time domain estimator, based on a vector autoregression (VAR) approximation. Simulation evidence strongly indicates the desirability of applying the Kilian small sample bias correction, which is found to improve the coverage accuracy of confidence intervals for IRs. The most appropriate order of the V AR turns out to be relevant for the lag length of the IR being estimated.

In their contribution "Estimation and Identification of Change Points in Panel Models with Nonstationary or Stationary Regressors and Error Term" Badi H. Baltagi, Chihwa Kao, Long Liu study the estimation of change points in panel models, extending Bai (2010) and Feng, Kao and

Lazarova (2009) to the case of stationary or nonstationary regressors and error term, and whether the change point is present or not. The paper also proves consistency and derives the asymptotic distributions of the Ordinary Least Squares (OLS) and First Difference (FD) estimators. One of their main findings is that the FD estimator is robust for all of the aforementioned cases they considered.

"Distributions of Stationary Time Series Processes" by Herman J. Bierens and Li Wang introduces a weighted simulated integrated conditional moment (WSICM) test of the validity of parametric specifications of conditional distribution models for stationary time series data. The authors combine the weighted ICM test of Bierens (1984) for time series regression models, and the Bierens and Wang (2012) simulated ICM test of conditional distribution models for cross-section data, to provide their new consistent test for parametric conditional time series distributions.

"Bootstrapping Unit Root Tests with Covariates" by Yoosoon Chang, Robin Sickles, and Wonho Song considers the bootstrap method for the covariates augmented Dickey- Fuller (CADF) unit root test suggested in Hansen (1995) which uses related variables to improve the power of univariate unit root tests. They show that there are substantial power gains from including correlated covariates and use the parametric bootstrap procedure to obtain critical values, and establish the asymptotic validity of the bootstrap CADF test. A simulation study shows the gains of the bootstrap CADF test. The authors also find that classical conclusions drawn from the Nelson and Plosser data set concerning nonstationarity of many macro series are altered with their more powerful testing approach.

Abdelaati Daouia, Leopold Simar, and Paul Wilson's contribution, "Measuring Firm Performance using Nonparametric Quantile-type Distances," has a focus on another of Peter Schmidt's contributions--his work on frontier production. They consider a multiple inputs X and outputs Y technology and use a dimensionless transformation of the (p + q)-dimensional production process to develop an alternative formulation of distance from a realization of (X, Y) to the efficient support boundary. This allows them to motivate the presence of a new, unconditional quantile frontier lying inside the joint support of (X, Y), but near the full, efficient frontier. They prove that both the resulting efficiency score and its estimator share desirable monotonicity properties and develop a diagnostic tool to find the appropriate quantile-order. Their methodology is used to analyze the performance of U.S. credit unions, where outliers are likely to affect traditional approaches to estimating firm inefficiencies.

"Invariant Tests Based on M-estimators, Estimating Functions, and the Generalized Method of Moments" by Jean-Marie Dufour, Alain Trognon, and Purevdorj Tuvaandorj studies the invariance properties of various test criteria that have been proposed for hypothesis testing. The context is one of incompletely specified models, models estimated by pseudo-likelihood,

and M-estimation methods. The test statistics examined include Wald-type, LR-type, LM-type, score-type, and C(α) type criteria. With the exception of the Wald-type test statistic, these are shown to be invariant to equivalent hypothesis reformulations. However, they are also shown to not be generally invariant to model reparameterizations. Thus, testing two equivalent hypotheses in the context of equivalent models may lead to completely different inferences. They also show that using linear exponential pseudo-likelihood functions allows one to obtain invariant score-type and C(α) type test criteria. The invariance associated with linear exponential pseudo-likelihood functions is interpreted as a strong argument for using such pseudo-likelihood functions in empirical work.

'Nonparametric Estimation of Regression Models with Mixed–Discrete and Continuous Covariates by the K-nn Method" by Carl Green, Qi Li, and Yu Yvette Zhang provides an estimation method that smooths the continuous regressors using the k-nearest neighbor method and smooths the discrete regressors using the methods of Racine and Li (2004). The paper examines the asymptotic behavior of the smoothing parameters using least-squares cross-validation and shows that the smoothing parameters are asymptotically equivalent to non-stochastic smoothing parameters that minimize a weighted mean square error. They then derive the asymptotic normal distribution of the corresponding regression function estimator. Monte Carlo simulations demonstrate good finite sample performance of the proposed estimator and they use their method to estimate a model of corn yield in Iowa.

Chirok Han, Peter C. B. Phillips, and Donggyu Sul examine the use of the BIC criteria in their contribution "Lag Length Selection in Panel Autoregression," a criteria well known to be inconsistent in the presence of incidental parameters. Their paper shows that even without fixed effects in dynamic panels BIC is inconsistent and overestimates the true lag length with considerable probability. The reason for the inconsistency is explained and the probability of overestimation is found to be 50% asymptotically. To address the inconsistency of BIC, the paper develops three modified information criteria that are consistent in dynamic panels. These criteria involve simple modifications to BIC and are easy to implement in practice. Two of them modify BIC directly while an third involves sequential testing. They are compared in simulations to assess finite sample performance of the various criteria and some comparisons are also made with standard sequential testing procedures.

In "The Smooth Colonel and the Reverend Find Common Ground" Nicholas Kiefer and Jeffrey Racine develop a semiparametric regression estimator that exploits discrete- support kernel functions for a broad class of hierarchical models. These include the pooled regression estimator, the fixed-effects estimator familiar from panel data, and the varying coefficient estimator, among others. They allow for separate shrinking for each coefficient in setting in

which the regressors may be continuous or discrete. The estimator is motivated as an intuitive and appealing generalization of existing methods by demonstrating that it can be realized as a posterior mean in the Lindley & Smith (1972) framework. The authors demonstrate the flexibility of their model by extending it to non- parametric hierarchical regression based on B-splines.

"On-line Learning and Forecast Combination in Unbalanced Panels" by Kajal Lahiri, Huaming Peng, and Yongchen Zhao evaluates the performance of newly proposed on-line forecast combination algorithms. The paper compares them with existing approaches, including the simple average and those of Bates and Granger (1969). The paper derives asymptotic results for the new algorithms that justify certain established approaches to forecast combination including trimming, clustering, weighting and shrinkage. The authors show that when implemented on unbalanced panels, different combination algorithms implicitly impute missing data differently. This limits the comparability of the performance of the resulting combined forecasts. However, after explicitly imputing the missing observations in the U.S. Survey of Professional Fore- casters (SPF) over 1968 IV-2013 I, they find that although the equally weighted average continues to be hard to beat, the new algorithms can potentially deliver superior performance at shorter horizons, especially during periods of volatility clustering and structural breaks.

"Inference on Locally Ordered Breaks in Multiple Regressions" by Ye Li and Pierre Perron considers issues related to inference about locally ordered breaks in a system of equations, as originally proposed by Qu and Perron (2007). These apply when break dates in different equations within the system are not separated by a positive fraction of the sample size. This allows one to construct joint confidence intervals of all such locally ordered break dates. Extensions of Qu and Perron (2007) are accomplished by allowing the covariates to have trends, stationary or integrated regressors, breaks in the variance-covariance matrix of the errors, and multiple locally ordered breaks. Simulation experiments indicate that the derived limit distributions provide good approximations to the finite sample distributions, as well as several other important and distinguishing features of the break point estimates and their joint confidence intervals.

Kunpeng Li, Degui Li, Zhongwen Liang and Cheng Hsiao's "Estimation of Semi-Varying Coefficient Models with Nonstationary Regressors" explores the semi-varying coefficient model where the regressors are generated by the multivariate unit root processes. The influence of the explanatory vectors on the response variable satisfy the semiparametric partially linear structure with the nonlinear component being functional coefficients. A semiparametric estimation methodology with the first-stage local polynomial smoothing is then applied to estimate both the constant coefficients in the linear component and the functional coefficients

in the nonlinear component. Asymptotic distributions are derived for the new estimator and a simulation study investigates the finite sample performance of the developed methodology and results.

"A Semiparametric Generalized Ridge Estimator and Link with Model Averaging" by Aman Ullah, Alan T.K. Wan, Huansha Wang, Xinyu Zhang, and Guohua Zou introduces a new estimator for the model averaging problem--a semi-parametric estimator of regression coefficients, which is in the form of a feasible generalized ridge estimator, a la Hoerl and Kennard (1970b), but with different biasing factors. The regressors are shown to be orthogonal after a reparameterization and the authors also show that their generalized ridge estimator is algebraically identical to the model average estimator. Biasing factors that determine the properties of both the generalized ridge and semi-parametric estimators are directly linked to the weights used in model averaging. The authors demonstrate that the estimators based on model averaging weights can have properties superior to the well-known feasible generalized ridge estimator in a large region of the parameter space. Two empirical examples are considered that use the proposed methods for forecasting excess stock returns and wages.

Tom Wansbeek and Dennis Prak revisit the classical LIML estimator in their paper "LIML in the Static linear panel data model." Renewed interest in the LIML estimator has benefited from relatively recent developments in many-instruments asymptotics (Wansbeek and Meijer, 2000) and this contribution furthers that literature by carefully studying the asymptotic behavior of the LIML estimator under many-instruments asymptotics. They derive the LIML estimator for a panel model and show its consistency, derive its asymptotic variance, and present an estimator of the asymptotic variance that is consistent under many-instruments asymptotics. They also consider the extension to the static panel data model with multiple regressors.

We trust that the readers will find the collection of papers in this Special Issue to be a fitting reminder of the remarkable career of Peter Schmidt and of the wide-ranging set of topics in which he has made his mark on the profession.

We greatly appreciate the hard work and inspired research conducted by the contributors to this Special Issue, and to the equally talented and inspired work done by the referees, whose professionalism and high standards were instrumental in the success of our project.

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