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Dek Terrell
Daniel Millimet
Editors

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30TH ANNIVERSARY EDITION

EDITED BY

DEK TERRELL

Louisiana State University, Baton Rouge, LA

DANIEL MILLIMET

Southern Methodist University, Dallas, Texas

United Kingdom – North America – Japan
India – Malaysia – China

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LIST OF CONTRIBUTORS

Lee C. Adkins	Department of Economics, Oklahoma State University, Stillwater, OK, USA
Nathan S. Balke	Department of Economics, Southern Methodist University, Umphrey Lee Center, Dallas, TX, USA
Badi H. Baltagi	Department of Economics and Center for Policy Research, Syracuse University, Syracuse, NY, USA
Randall C. Campbell	Department of Finance and Economics, Mississippi State University, Mississippi State, MS, USA
Jiaqi Chen	Federal Reserve Bank of Dallas, Dallas, TX, USA
Juan Carlos Escanciano	Department of Economics, Indiana University, Bloomington, IN, USA
Thomas B. Fomby	Department of Economics, Southern Methodist University, Dallas, TX, USA
Mary N. Gade	Department of Economics, Oklahoma State University, Stillwater, OK, USA
William Griffiths	Economics Department, University of Melbourne, Victoria, Australia
Jeffery W. Gunther	Federal Reserve Bank of Dallas, Dallas, TX, USA
Joseph H. Haslag	Economics Department, University of Missouri, Columbia, MO, USA
R. Carter Hill	Department of Economics, Louisiana State University, Baton Rouge, LA, USA

Eric Hillebrand	Center for Research in Econometric Analysis of Time Series (CREATES), Department of Economics and Business, Aarhus University, Aarhus C, Denmark
Joseph G. Hirschberg	Department of Economics, University of Melbourne, Victoria, Australia
Yu-Chin Hsu	Department of Economics, University of Missouri, Columbia, MO, USA
Ivan Jeliazkov	Department of Economics, University of California, Irvine, CA, USA
George G. Judge	The Graduate School and Giannini Foundation, University of California, Berkeley, CA, USA
Chihwa Kao	Center for Political Research, Syracuse University, Syracuse NY, USA
Tae-Hwy Lee	Department of Economics, University of California Riverside, Riverside, CA, USA
James P. LeSage	Department of Finance and Economics, Texas State University, San Marcos, TX, USA
Long Liu	Department of Economics, University of Texas at San Antonio, San Antonio, TX, USA
Jenny N. Lye	Department of Economics, University of Melbourne, Victoria, Australia
Michael W. McCracken	Federal Reserve Bank of St. Louis, St. Louis, MO, USA
Daniel Millimet	Department of Economics, Southern Methodist University, Dallas, TX, USA
Ron C. Mittelhammer	School of Economic Sciences, Washington State University, Pullman, WA, USA

Asli Ogunc — Department of Economics and Finance, Texas A&M University – Commerce, TX, USA

R. Kelley Pace — Department of Finance, Louisiana State University, Baton Rouge, LA, USA

Dek Terrell — Department of Economics, Louisiana State University, Baton Rouge, LA, USA

Timothy J. Vogelsang — Department of Economics, Michigan State University, East Lansing, MI, USA

Charley Xia — Department of Mathematics and Statistics, University of Melbourne, Parkville, Victoria, Australia

Jingjing Yang — Department of Economics, College of Business Administration, University of Nevada, Reno, NV, USA

Weiping Yang — Capital One Financial Research, Richmond, VA, USA

Shuang Zhu — Department of Finance, Kansas State University, Manhattan, KS, USA

DEDICATION

This 30th volume of *Advances in Econometrics* is dedicated to Thomas B. Fomby and R. Carter Hill. The first chapter of this volume chronicles the 30-year history of the series and its achievements under the leadership of Thomas Fomby and Carter Hill. Thomas Fomby has edited the series since 1987; Carter Hill joined as co-editor in 1996. The success of this research series over the last 30 years is to a large extent attributable to these two men. Their work with the *Advances* volume, their own research, and their co-authoring of textbooks translated into several languages clearly attest to the deserving dedication of this volume to these two men.

Anyone who has authored a chapter for *Advances in Econometrics*, attended the associated conference, or been associated with the series in any way knows first-hand the time and energy these two individuals have devoted to the series. Each year at the conference dinner, Thomas Fomby discusses the mission of the series, which includes the publication of original articles containing sufficient detail to familiarize non-experts on the topic along with the sharing of computer programs and data used in chapters. While mission statements sound like a rather dry topic, Thomas Fomby's passion to this mission makes his dinner presentation a highlight for everyone in attendance. This passion is apparent in his 25 plus years of editorship as well.

Carter Hill's passion for econometrics and the *Advances in Econometrics* series are apparent in his work as well. In addition to his careful and painstaking work editing volumes, Carter promoted the initial idea of the conference with great vigor. He has also been an ardent advocate of increasing the accessibility of computer code and data to readers. His energy has been crucial in making the conference and the research series a great success.

Like this volume, the conference for the 30th volume of *Advances in Econometrics* was held in honor of Thomas B. Fomby and R. Carter Hill. Friends, family, former students, and both current and past colleagues gathered for a surprise dinner and conference in honor of Thomas and Carter. In addition to a tribute from Emerald Press, the event included a number of entertaining stories beginning with Stan Johnson, the dissertation advisor of both Fomby and Hill, shedding light on their days in graduate school.

One could go on far too long discussing the accomplishments of Thomas Fomby and Carter Hill, both with regard to *Advances in Econometrics* and other aspects of their careers. However, the greatest insight into both men comes from those that have interacted with them most. Stories from their many students, other colleagues such as the guest editors of this volume, authors publishing in the *Advances in Econometrics* series, and countless others using their research or textbooks provide the greatest insight into their accomplishments.

In conclusion, we happily dedicate this 30th volume of *Advances in Econometrics* to its long-standing co-editors, Thomas B. Fomby and R. Carter Hill.

PREFACE

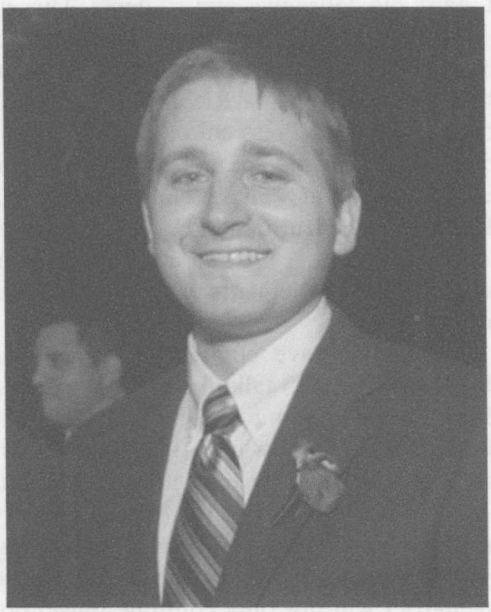
On March 24, 2012, we had one of the greatest surprises of our lives. We walked into the Lod Cook Conference Center on the LSU campus, to find scores of people, including our friend, mentor and major Professor Stanley R. Johnson, and many old colleagues and students. This event, in honor of the 30th volume of *Advances in Econometrics*, was engineered by our friend Dek Terrell, with the aide of his spouse, Dannielle Lewis, our spouses Nancy Fomby and Melissa Waters, Julianna Richard of LSU, Daniel Millimet of SMU, and our former Emerald Press editor Emma Whitfield. True to our nature we were oblivious to the nine months of planning and work that had gone into preparing the event. These cunning and diabolical people, obviously skilled in hiding the truth and keeping poker faces through it all, had organized a surprise conference! Not a birthday party, not a dinner, but a weekend conference with participants from all over the world! We are amazed, and honored.

Econometrics is fun! We have enjoyed a professional and personal friendship for 40 years. We like to talk about econometrics, think about it, do it, internalize it, and write about it. Our passion is to learn, and then facilitate the dissemination of knowledge (the catchy phrase "knowledge transfer" applies). Our friendship began with our graduate studies, under the inspiring guidance of Stan Johnson at the University of Missouri – Columbia. We are a good fit, because we do not mind asking each other "What the heck does that mean?" That curiosity has lasted. We hope that *Advances in Econometrics* will not only continue but improve, keeping the long citation property of the chapters. We are recruiting smart young editors to carry on the tradition.

To watch *Advances* grow and mature through the years has been a wonderful and rewarding experience. The experience has been full of friends, new and old, and full of exciting discoveries in our vast econometrics field. The discipline is now fully engaged in the big data era and there seems to be no end to the potential that exists in econometric theory and application. To us *Advances* has been a "village" and what a wonderful village it is. We look forward to seeing the advances that *Advances* engenders in econometric research and application in the future. We think it has a wonderful future ahead of it.

Once again, we thank Dek Terrell, his co-conspirators, and especially the contributors to this volume for the lasting smiles that memories of this event will bring.

In terms of dedication, Thomas would like to dedicate his 25 plus years of editorship of *Advances* to the memory of his son, Robert Blake Fomby, who passed away shortly after attending the 30th volume of *Advances* conference. He was a fine young man who left us much too early. He is sorely missed.



Thomas B. Fomby
R. Carter Hill
Editors

INTRODUCTION

The collection of chapters in this 30th volume of *Advances in Econometrics* provides a well-deserved tribute to Thomas B. Fomby and R. Carter Hill, who have served as editors of the *Advances in Econometrics* series for 25 and 21 years, respectively. Volume 30 contains a more varied collection of chapters than previous volumes, in essence mirroring the wide variety of econometric topics covered by the series over 30 years. Volume 30 starts with a chapter discussing the history of this series over the last 30 years. The next five chapters can be broadly categorized as focusing on model specification and testing. Following this section are three contributions that examine instrumental variables models in quite different settings. The next four chapters focus on applied macroeconomics topics. The final chapter offers a practical guide to conducting Monte Carlo simulations.

Randy C. Campbell and Asli Ogunc's "A History of the Advances in Econometrics Series" provides an excellent first chapter for this 30th volume of *Advances in Econometrics* in recognition of its longtime editors Thomas B. Fomby and R. Carter Hill. The chapter briefly documents the history of this series, which has included articles by 493 authors. The list of contributors includes four Nobel Prize winners and numerous outstanding econometricians. The chapter summarizes topics, key contributions and highlights beginning with the founding of this research annual in 1982, with Robert L. Basmann and George Rhodes serving as the initial co-editors. The chapter moves quickly through the period where Thomas B. Fomby first entered as co-editor in 1987 to R. Carter Hill's entry in 1996 and then to more recent volumes, which also typically include presentation of the papers at a conference.

In their chapter "Bayesian Unit Root Testing: The Effect of Choice of Prior on Test Outcomes," Charley Xia and William Griffiths focus on the sensitivity of unit root tests to the choice of prior. In particular, they consider using two testing procedures, a credible interval test and a Bayes factor test, using priors attributable to Jeffreys, Lubrano, and Berger and Yang to test for a unit root. These basic testing procedures are extended to allow for Bayesian model averaging and a test with a hierarchical prior for a hyperparameter. Monte Carlo simulations are used to evaluate the testing

procedures. The results indicate that conclusions can vary significantly across testing procedure and choice of prior. In terms of both test size and power, the prior recommended by Lubrano performs best in simulations. The chapter concludes with an application to Australian time series.

The chapter by Jenny N. Lye and Joseph G. Hirschberg, "Inverse Test Confidence Intervals for Turning-Points: A Demonstration with Higher Order Polynomials," extends work on a long-standing, but important econometric issue arising in nonlinear regression specifications. Specifically, Lye and Hirschberg are interested in obtaining confidence intervals for the estimated turning points of the outcome with respect to a covariate entering the model nonlinearly. As the turning points are nonlinear functions of the estimated parameters, proper inference, especially in finite samples, is not trivial. However, given the popularity of nonlinear models in many economic contexts, the question is salient. Here, the authors build on prior work by showing how one may derive confidence intervals for turning points in high order polynomial and fractional polynomial regression models by inverting a two-sided test for the location of the value of the regressor where the first derivative function is equal to zero. The model is also extended to perform tests using the second derivative function as well. Lye and Hirschberg illustrate the methods by examining time series data on per capita carbon dioxide emissions and per capita income, testing for the so-called environmental Kuznets curve.

The chapter by Jingjing Yang and Timothy J. Vogelsang, "Serial Correlation Robust LM Type Tests for a Shift in Trend," adds to the literature on testing for structural breaks with an unknown break date. Specifically, Yang and Vogelsang are interested in testing for a break in the trend of a univariate time series. Extending earlier results for models with non-trending data, the authors focus on the class of LM statistics based on nonparametric kernel estimators of the long-run variance and develop a fixed-b asymptotic theory for the nonparametric estimator of the long-run variance and the LM test statistics. The fixed-b theory suggests that, for a given statistic, kernel, and significance level, there usually exists a bandwidth such that the fixed-b asymptotic critical value is the same for both $I(0)$ and $I(1)$ errors. Yang and Vogelsang calculate these robust bandwidths using simulation methods for several well-known kernels. The authors demonstrate that when the robust bandwidth is used, the supremum statistic configured with either the Bartlett or Daniell kernel provides LM tests with good power. Finally, when testing for a slope change, Yang and Vogelsang obtain the surprising finding that less trimming of potential dates for the trend shift

leads to higher power, contrasting with the usual relationship between trimming and power.

Michael W. McCracken's contribution, "Consistent Testing for Structural Change at the Ends of the Sample," focuses on testing for structural breaks near the beginning or end of the sample using Chow or Predictive tests for structural change. The asymptotic results in this chapter rely on an innovative parameterization of the location of the break point. Intuitively, this parameterization models breakpoints as local to the beginning or end of the sample. By carefully controlling the rate of convergence of the breakpoint to the endpoint, the number of observations available for the hypothesis tests diverges. The theoretical contribution of the chapter consists of providing asymptotic distributions for the Chow test, a max-Chow test, and variants of the predictive test for structural breaks. Monte Carlo results are used to evaluate the performance of both tests. Results are generally consistent with the theory and suggest that the max-Chow test in particular has some power to detect structural breaks near the end of the sample.

The chapter by Eric Hillebrand and Tae-Hwy Lee, "Stein-Rule Estimation and Generalized Shrinkage Methods for Forecasting Using Many Predictors," provides a very appropriate contribution to the volume, focusing on Stein-rule shrinkage estimates. Their work builds on a number of contributions by Carter Hill, including joint work with Thomas Fomby. The focus of the chapter is to evaluate Stein-rule estimators that shrink an ordinary least squares estimator to a principal component estimator. Monte Carlo simulations evaluate the performance of the three estimators under varying conditions. Results suggest that the Stein-rule estimator can dominate both ordinary least squares and principal components under a relatively large set of simulated conditions.

The contribution by Badi H. Baltagi, Chihwa Kao, and Long Liu, "On the Estimation and Testing of Fixed Effects Panel Data Models with Weak Instruments," considers the asymptotic properties of weak instruments in a within k-class estimator for panel data. In particular, the coefficients of the weak instruments are modeled as shrinking to zero at a rate proportional to $\sqrt{n}T^{\delta}$. The primary results of the chapter show that as $(n, T) \to \infty$, the within group k-class estimator is consistent if $0 < \delta < 1/2$ and inconsistent if $1/2 < \delta < \infty$.

In the contribution by George G. Judge and Ron C. Mittelhammer, "A Risk Superior Semiparametric Estimator for Overidentified Linear Models," the authors discuss the merits of using a weighted average of ordinary and two-stage least squares (OLS and TSLS), instead of either alone, when

one is concerned about the potentially endogeneity of at least some covariates in a linear regression model. Estimation of the optimal weight, in terms of minimized mean squared error, is discussed. The authors present striking Monte Carlo evidence supporting the reduction in MSE from their combined estimator, relative to either TSLS or the usage of OLS or TSLS depending on the results of a Hausman test, in many cases. Finally, Judge and Mittelhammer illustrate the combined estimator in an application to the estimation of the returns to schooling.

The chapter by R. Kelley Pace, James P. LeSage, and Shuang Zhu, "Spatial Dependence in Regressors and its Effect on Performance of Likelihood-Based and Instrumental Variable Estimators," investigates estimators used in applications of the spatial autoregressive (SAR) model and spatial Durbin model (SDM) where there is spatial dependence in the regressors. The chapter contains analysis of the partial R^2 to highlight the fact that spatial dependence of the regressors can lead to weak instruments. It then compares maximum likelihood and restricted maximum likelihood to instrumental variables in both common data sets and simulations. Results of the simulations indicate that instrumental variables techniques may be unreliable in many settings where there is spatial dependence in the regressors, particularly for the SDM model.

The chapter by Nathan S. Balke, "Sectoral Effects of Aggregate Shocks," explores the identification of aggregate monetary and productivity (or technology) factors. The question is an important one as understanding the role of monetary shocks is vital for evaluating the effects of monetary policy, while the ability of productivity shocks to explain business cycle fluctuations remains an open issue. Using sectoral rather than aggregate data, along with a combination of long-run and sign restrictions to identify such factors in a Bayesian common factor model, Balke finds that the monetary factor is responsible for long swings in nominal variables, but has little effect on fluctuations in output, real wage, or labor input growth. In contrast, the productivity factor increases output and real wage growth in the short and long run, as well as increases labor input and decreases in prices. That said, the quantitative effect of the productivity factor on labor input is relatively small. Balke's results prove to be robust to the number of factors included in the model, to alternative priors about the short-run effects of the monetary factor, and to the inclusion of oil prices. Interestingly, oil prices appear to be largely driven by the other aggregate factors in the model.

The chapter by Joseph H. Haslag and Yu-Chin Hsu, "Cyclical Co-movement between Output, the Price Level, and the Inflation Rate," examines two

related sets of facts concerning business cycles. First, movements in the price level are countercyclical. Second, movements in the inflation rate are procyclical. One explanation for these stylized facts is that price and output are characterized by two sine waves with the same periodicity. In this case, there exists a phase shift that can generate the observed correlations. Haslag and Hsu examine the validity of this explanation. The authors find that a positive phase shift in the price level can generate these correlations, as well as yield a testable prediction concerning the price level having a causal effect (in the Granger sense) on output. This prediction also holds in the data. Finally, Haslag and Hsu find some changes in the relationships between the price level, inflation, and output over time. Specifically, the authors find that the countercyclical relationship between the price level and output has strengthened over time, while the procyclical relationship between the inflation rate and output has weakened. Further examination suggests that this may be attributable to a diminishing positive phase shift in the price level.

The contribution by Tae-Hwy Lee and Weiping Yang, "Money-Income Granger-Causality in Quantiles," revisits the question of whether money is useful for forecasting future output. While the prior literature has focused on Granger causality tests for money in models for the conditional mean of output, here the authors examine Granger causality in models for conditional quantiles. Using U.S. time series data on real personal income or industrial production, as well as either M1 or M2 to measure money, the analysis indicates that quantile forecasts of output growth are significantly improved by accounting for past money growth, particularly in the tails, whereas conditional mean forecasts are not generally improved by accounting for money. This discovery is intriguing, suggesting that the effectiveness of monetary policy has been masked by the existing focus on only the conditional mean.

The chapter by Jiaqi Chen and Jeffery W. Gunther, "Copula-GARCH Time-Varying Tail Dependence," builds on a growing literature assessing tail dependence in the returns to risky assets. Proper measurement of the joint susceptibility of different assets to the same downside risk is crucial to practitioners and policy-makers, otherwise portfolios that seem sufficiently diversified may, in fact, not be. Here, Chen and Gunther examine the tail dependence between bank returns and insurance. More importantly, the authors use this application to illustrate the value of time-varying copulas in an econometric setting. Specifically, Chen and Gunther apply a parametric copula – GARCH model to estimate time – varying tail dependence between bank and insurance daily stock returns over the previous two decades.