Introduction to the special issue

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1 Introduction

The papers appearing in this special issue of Empirical Economics on panel data econometrics were solicited from the 15th International Conference on Panel Data held at the University of Bonn, Germany, July 3–5, 2009. The conference program was chaired by Joerg Breitung and locally organized with the help of IZA. This is the third special issue published by Empirical Economics on panel data; see Raj and Baltagi (1992) and Baltagi (2004) for the previous two special issues on this subject. In fact, the Baltagi (2004) special issue was solicited from the 10th International Conference on Panel Data held at the Academy of Sciences in Berlin in July of 2002. The editors of this special issue believe that there are important developments in this field of econometrics as evidenced by the numerous papers presented at the conference. This special issue contains only a few of the papers submitted from the conference and that made it through the review process. We thank the referees and the Associate editors who helped us in making this special issue possible. The topics covered include: panel data seemingly unrelated regressions (SUR) with spatial error correlation; monotone series estimator for panel data examining the price process of eBay online auctions; a study that highlights the important distinction between spatial dependence driven by unobserved common factors and those based on a spatial weights matrix; a model selection approach for testing structural breaks in a semi-parametric panel varying coefficient model; GMM methods for estimating regime dependent dynamic adjustment models in a panel data context with partially or entirely unobserved targets;

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Corner solutions for (Gaussian) maximum likelihood estimation of a random effects model with autocorrelation in the error. Applications include self rated health status and mortality; productivity effects of information and communication technology in Europe; the determinants of central banks' reserve holdings; the impact of the local industrial structure on employment dynamics in Germany; the link between common shocks affecting the real economy and U.S. financial markets; the elasticity of private production with respect to public capital in a regional framework in Finland.

2 Summary of the contributions

Baltagi and Pirotte consider various estimators using panel data seemingly unrelated regressions (SUR) with spatial error correlation. The true data generating process is assumed to be SUR with spatial error of the autoregressive or moving average type. Moreover, the remainder term of the spatial process is assumed to follow an error component structure. Both maximum likelihood and generalized moments (GM) methods of estimation are used. Using Monte Carlo experiments, they check the performance of these estimators and their forecasts under misspecification of the spatial error process, various spatial weight matrices, and heterogeneous versus homogeneous panel data models. Some of their findings include the following: estimators and forecasts that ignore heterogeneity/spatial correlation and cross-equation correlation perform badly in terms of the RMSE criteria. Accounting for heterogeneity improves the RMSE forecast performance by a big margin, and accounting for spatial correlation improves the RMSE forecast performance, but by a smaller margin. Ignoring both leads to the worst forecasting performance.

Zhang, Guy and Li examine the price process of eBay online auctions by pooling sparse and unevenly-spaced bidding histories of individual auctions, resulting in an unbalanced panel of bids. Since the price processes of online auctions are monotonically increasing within individual auctions and exhibit a substantial degree of heterogeneity, they propose a monotone series estimator for panel data with auction-specific slopes for a common relative price growth curve. They generalize Ramsay (1998)'s monotone series estimator to fit their panel model of the price process. They apply the proposed model and estimator to eBay auctions of a popular handheld device (a Palm PDA). The results are shown to capture closely the overall pattern of observed price dynamics. In particular, the early bidding, mid-auction bidding drought, and end-auction bid sniping are well approximated by the estimated price curve.

Bhattacharjee and Holly highlight the important distinction between spatial dependence driven by unobserved common factors and those based on a spatial weights matrix. They argue that, purely factor driven models of spatial dependence may be inadequate because of their connection with the exchangeability assumption. They describe three methods to draw inferences on spatial (interaction) weights that explicitly address the above distinction. The first two methods are designed to draw inferences under the structural dependence assumption. The first does so using structural constraints on the spatial weights matrix. The second through moment restrictions inspired by the system GMM literature. The third method allows for both structural interactions and factor based dependence. The methods are illustrated using an appli-

cation to committee decision making within the Bank of England. The application highlights the relative advantages and shortcomings of each of the methods, and helps draw useful inferences on the nature and strength of interactions.

Liu, Li, and Wang propose a model selection approach for testing structural breaks in a semi-parametric panel varying coefficient model. Their Monte Carlo evidence show that their proposed model selection approach performs well in finite sample settings. They apply this method to the relationship between health care expenditure and income for a panel of 22 OECD countries. They find that this relationship is highly nonlinear and subject to both smooth structural changes and regime shifts. Therefore, neither a semi-parametric model allowing for smooth changes in parameters nor a linear model allowing for structural breaks may be sufficient to capture the underlying nonlinearity in the relationship.

Heiss uses the first seven waves of the Health and Retirement Study (HRS) to study Self Rated Health Status (SRHS). He argues that the dynamic pattern of SRHS is incompatible with a combination of time constant unobserved heterogeneity and (low-order) state dependence. The paper suggests a somewhat different model specification which explains the inter-temporal correlation pattern with state dependence of the underlying actual health instead of the observed SRHS. The model can also be interpreted as unobserved heterogeneity which is correlated but not necessarily constant over time. SRHS and future mortality are strongly related which leads to a specific selection problem known as survivorship bias. To account for this bias, Heiss proposes a joint dynamic model of SRHS and mortality. This allows one to disentangle effects on health from selection effects through mortality. Simulations show that the model captures both the SRHS dynamics and mortality selection observed in the data well.

Kongsted uses a multi-country sectoral panel data and provides econometric evidence of positive and significant productivity effects of information and communication technology (ICT) in Europe, mainly due to advances in total factor productivity. This result is in sharp contrast to the consensus in the growth-accounting literature that finds that there has been no acceleration of productivity growth in Europe, mainly due to a dismal performance of ICT-using sectors. The paper finds that the decline in labor productivity growth after 1995 is a general phenomenon across European industries; however, sectoral productivity growth rates decreased the most in non-ICT-intensive industries.

Steiner investigates the determinants of central banks' reserve holdings for a large panel data set of developing and transition countries covering the period from 1975 to 2003. He estimates both static and dynamic regressions and applies homogeneous and heterogeneous panel data estimators. His results show that neglecting dynamics and heterogeneity in country data may lead to misleading inference. Independently of the chosen estimation method, the findings suggest that trade openness and external debt are robust determinants of the level of reserves. Central banks take precautionary measures against the downside of the increasing international economic integration.

Fuchs studies the impact of the local industrial structure on employment dynamics using a sectoral panel data set of German firms. Employment growth is decomposed into internal growth due to employment changes in existing plants and external growth resulting from employment decisions of newly established plants. Using a system of

simultaneous equations, the dynamics of both components are estimated by taking into account the timing of the impact of specialization, diversity, and competition in a region. The empirical results indicate a substantial positive influence of diversity on both internal and external employment growth, whereas ambiguous results are obtained with respect to the impact of regional specialization. Furthermore, the effect of the local industrial structure on employment dynamics does not differ between small and large plants. This is in line with earlier evidence from a panel data analysis of regional unemployment in France.

Kalckreuth considers GMM methods for estimating regime dependent dynamic adjustment models in a panel data context with partially or entirely unobserved targets. He first shows that in such a setup the standard first difference GMM procedure that has become popular for estimating dynamic panel data models is generally invalid. To overcome this problem three estimation strategies are proposed. The first estimator is based on quasi-differencing, which leads to two different, but related sets of moment conditions. The second approach employs a state-dependent filter, while the third adapts the GMM estimator in levels. The simulation study suggests that the two quasi-differencing methods outperform the other two competitors.

Hämäläinen and Malinen apply recently developed panel estimation techniques to investigate the elasticity of private production with respect to public capital in a regional framework. To account for strong cross-sectional correlation a dynamic SUR-estimator is employed, which also controls for possible endogeneity of the regressors. The empirical findings suggest that the panel of Finnish sub-regions includes both stationary and nonstationary output series. In the sub-sample of the 10 fastest growing regions, all series appear to have unit roots and also seem to be cointegrated. For this sub-sample, the dynamic SUR yield econometrically reliable as well as plausible results, whereas the estimation results for the group of the slowest growing regions suffer from spurious regression problems.

Niang, Diagne, and Pichery explore the link between common shocks affecting the real economy and U.S. financial markets. The analysis is based on the assumption that shocks in those financial markets have a direct effect on real economic activity in other countries. Using panel data methods for nonstationary and cointegrated time series, the authors show that the factors are driven by common stochastic trends and, therefore, shocks have a permanent effect on the macroeconomic variables included in the panel data set. The empirical results give rise two types of economic links: a long-run relation represented by the cointegration relationships and a short-term comovement summarized by the short run dynamics of the error correction model. It turns out that U.S. financial markets adjust almost instantaneously to a new equilibrium. Thus, the empirical findings suggest that the recent financial crisis is amplified by adverse economic shocks in employment and the real estate sector.