Special issue on forecasting, use of survey data on expectations, and panel data applications: editors' introduction

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This is a Special Issue of Empirical Economics (EE) in honor of Kajal Lahiri. Kajal is Distinguished Professor of Economics at SUNY- Albany. Kajal finished his Ph.D. in economics in 1975 from the University of Rochester. He has published over 120 articles in professional journals like the *American Economic Review*, *Econometrica*, *Journal of Econometrics*, *JASA*, *JAMA*, and written/coedited a number of books and journal volumes.

Kajal has been a long-standing contributor to Empirical Economics and continues to serve as an Associate Editor of the journal. This special issue honors Kajal with a collection of state-of-the-art articles in applied econometrics primarily in areas that Kajal has worked on including: Economic forecasting, use of survey data on expectations in macroeconomic models, econometric theory and applied work in panel data, to mention a few. Kajal worked in other areas not well represented in this special issue including economics of health and disability and transportation economics.

The success of this Special Issue relies on the support of Kajal's colleagues, friends, students, and the many scholars influenced by his work. With Kajal's help in soliciting authors and his editorial help, we ended up with nineteen papers passing through the rigorous review process of Empirical Economics. Of course, we would like to thank all of the referees for their hard work.

Finally, let me say that Kajal has been a long time friend. This special issue is a token of our appreciation to his scholarship.

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Summary of Contributions:

Several contributions in honor of Kajal fall in the area of Economic forecasting, as well as use of survey data on expectations in macroeconomic models. These are as follows:

Elliott shows that when outcomes are difficult to forecast in the sense that forecast errors have a large common component that (a) optimal weights are not affected by this common component, and may well be far from equal to each other but (b) the relative MSE loss from averaging over optimal combination is small. Hence, researchers could well estimate combining weights that indicate that correlations could be exploited for better forecasts only to find that the difference in terms of loss is negligible. The results then provide an additional explanation for the commonly encountered practical situation of the averaging of forecasts being difficult to improve upon.

Bencivelli, Marcellino and Moretti propose the use of Bayesian model averaging (BMA) as an alternative tool to forecast GDP relative to simple bridge and factor models. They find that BMA-based forecasts produce smaller forecast errors than standard bridge model when forecasting GDP in Germany, France and Italy. At the same time, it also performs as well as medium-scale factor models when forecasting Eurozone GDP.

Rossi and Sekhposyan propose a new index to measure macroeconomic uncertainty in the Euro Area and its member countries. This uncertainty index measures how unexpected a realization of a macroeconomic variable is relative to the unconditional forecast error distribution. They use forecast error distributions based on the forecasts of the European Central Bank's Survey of Professional Forecasters. They use forecasts from 1999:I to 2015:II for inflation and unemployment rate and 1999:I to 2015:III for output growth. The index can differentiate between upside and downside and can be constructed for any country/variable for which point forecasts and realizations are available.

Dovern and Hartmann propose an imperfect information model for the expectations of macroeconomic forecasters that explains differences in average disagreement levels across forecasters by means of cross-sectional heterogeneity in the variance of private noise signals. They show that the forecaster-specific signal-to-noise ratios determine both the average individual disagreement level and an individuals' forecast performance: forecasters with very noisy signals deviate strongly from the average forecasts and report forecasts with low accuracy. Evidence based on data from the Surveys of Professional Forecasters for the US and for the Euro Area support the model for short- and medium-run forecasts but reject it based on its implications for long-run forecasts.

Building on the literature on regularization and dimension reduction methods, Golinelli, Girardi and Pappalardo present a quarterly forecasting model for the euro-area GDP. The pseudo-real-time nature of the information set is accounted for as the pattern of publication lags is explicitly considered. Forecast evaluation exercises show that predictions obtained through various dimension reduction methods outperform both the benchmark AR and the diffusion index model without pre-selected indicators. Moreover, forecast combination significantly reduce the forecast error.

Empirical studies in the forecast combination literature have shown that it is notoriously difficult to improve upon the simple average despite the availability of optimal combination weights. In particular, historical performance-based combina-

tion approaches do not select forecasters that improve upon the simple average going forward. Burgi and Sinclair show that this is due to the high correlation among forecasters, which only by chance causes some individuals to have lower root mean squared errors (RMSE) than the simple average. They introduce a new nonparametric approach to eliminate forecasters who perform well based on chance as well as poor performers. This leaves a subset of forecasters with better performance in subsequent periods. The average of this group improves upon the simple average in the SPF particularly for bond yields where some forecasters may be more likely to have superior forecasting ability.

Balcilar, Gupta and Kotze identify evidence of regime-switching behavior in the monetary policy response function and the variance of the shocks. They make use of various specifications of a small open-economy Markov-switching dynamic stochastic general equilibrium (DSGE) model that is applied to South African data from 1989 to 2014. While the in-sample statistics suggest that some of the regime-switching models may provide superior results, the out-of-sample statistics suggest that the inclusion of various forms of regime-switching does not significantly improve upon the forecasting performance of the model.

Gaglianone, Issler and Matos investigate whether combining forecasts from surveys of expectations is a helpful empirical strategy for forecasting inflation in Brazil. They employ the FGV-IBRE Economic Tendency Survey, which consists of monthly qualitative information from approximately 2000 consumers since 2006, and also the Focus Survey of the Central Bank of Brazil, with daily forecasts since 1999 from roughly 250 professional forecasters. Natural candidates to win a forecast competition in the literature of surveys of expectations are the (consensus) cross-sectional average forecasts (AF). The authors show that these forecasts are a bias-ridden version of the conditional expectation of inflation using the no-bias tests proposed in Issler and Lima (2009) and Gaglianone and Issler (2015). The results reveal interesting data features: consumers systematically overestimate inflation (by 2.01 p.p., on average), whereas market agents underestimate it. Next, they employ pseudo out-of-sample analysis to evaluate different forecasting methods: the AR(1) model, the Granger and Ramanathan (1984) forecast combination (GR) technique, a Phillips curve-based method, the Capistrán and Timmermann (2009) combination method, the consensus forecast (AF), the Bias-Corrected Average Forecast (BCAF), and the extended BCAF. Results reveal that: (a) the MSE of the AR(1) model is higher compared to the GR (and usually lower compared to the AF); and (b) the extended BCAF is more accurate than the BCAF, which, in turn, dominates the AF. This validates the view that the bias corrections are a useful device for forecasting using surveys. The Phillips curve-based method has a median performance in terms of MSE, and the Capistrán and Timmermann (2009) combination method fares slightly worse.

Pilar and Senra study the effects of expectations and uncertainty derived from the European Central Bank Survey of Professional Forecasters. They check whether there is any room for improvement of the consensus forecast accuracy for GDP growth and inflation when accounting for uncertainty. They propose a new measure of uncertainty based on principal components, as an alternative to the ad-hoc equal weights commonly used. They find that GDP growth and inflation in the euro area since 2008 are greatly affected by the business cycle, and uncertainty should be a key element that

could help improving 1 year ahead forecast accuracy. Both measures of uncertainty, traditional and principal component weights, show that uncertainty in the euro area increased significantly since 2008 and that it still remains at high levels. However, including them in the forecasting exercise does not improve significantly the forecast accuracy.

Stekler and Ye examine methods that have been used to evaluate leading indicators. Not all methods focus on what a good leading indicator should possess, namely accurately predicting turning points and not generating many false signals of turning points. This paper introduces a variant of the receiver operating characteristics (ROC) curves to the economic forecasting literature and define the event that is being predicted differently. This is applied to the term (interest rate) spread. The results were mixed because the indicator predicted every recession but also generated a large number of false signals.

Knuppel and Schultefrankenfeld examine the effects of different interest rate assumptions among central banks on their macroeconomic forecasts performance. Common approaches are given by the assumptions that interest rates remain constant over the forecast horizon, follow a path as expected by market participants, or follow a path as expected by the central bank itself. Theoretical papers suggest that employing central bank expectations yield the highest forecast accuracy, while conditioning on constant interest rates yield the lowest forecast accuracy. Investigating the predictive accuracy of the Bank of England's and the Banco Central Do Brazil's forecasts for interest rates, inflation and output growth, the paper finds hardly any significant differences between forecasts based on the different interest rate paths.

In a real-time analysis of the ECB's Survey of Professional Forecasters, Kruger compares ensemble methods to histogram-based forecast distributions of GDP growth and inflation in the Euro Area. He finds that ensembles perform very similarly to histograms, but they consistently generate wider prediction intervals than subjective survey histograms.

Chernis and Sekkel estimate a dynamic factor model (DFM) with a mix of soft and hard indicators. The model is then used to generate nowcasts for Canadian Gross Domestic Product. In a pseudo-real-time setting, they show that the DFM outperforms univariate benchmarks, as well as MIDAS and bridge regressions.

Colangelo, Giannone, Lenza, Pill and Reichlin analyze bank balance sheet data in conjunction with macroeconomic and other financial variables. The aim is to understand the nature of the instability in financial intermediation in the euro area during the recent financial crises. They define "large changes" as significant departures in the actual evolution of balance sheet variables during the crisis from their historical association with the business and financial cycles. In the course of the global 2008–2009 financial crisis, they find that "large changes" were features of the behavior of cross-border interbank flows, both within the euro area and between the euro area and the rest of the world. By contrast, retail assets and liabilities, as well as interbank flows among banks of the same country, did not significantly deviate from historical regularities. Since the euro area sovereign crisis of 2011–2012, "large changes" have been more pervasive. In particular, a significant home bias in the sovereign bond market has emerged.

Other contributions that fall in the area of applied work and panel data include the following:

Baltagi, Rokicki and Barreiro de Souza estimate the Brazilian wage curve using individual data from the National Household Survey at 27 Federative Units over the period 2002–2009. They find evidence in favor of the Brazilian wage curve with an unemployment elasticity of -0.08 . They also find that males in Brazil are significantly more responsive to local unemployment rates (-0.13) than their female counterparts. In fact, they find that the unemployment elasticity for women is statistically insignificant. Applying gender-specific unemployment rates, the elasticity for men increases this elasticity in absolute value to -0.09 , while the elasticity for women remains statistically insignificant. This paper also finds that the estimates for Brazilian wage curve are completely different for the case of formal and informal workers.

Kutlu and Sickles propose market power measures that are specifically designed to capture price discrimination. These measures are derived from a conduct parameter game where the firms price discriminate. They show that for a variety of sensible scenarios a positive relationship between market power, measured by the conduct, and price discrimination is supported. They estimate the market power of U.S. airlines under price discrimination settings during the period 1999I to 2009IV. They find on average, market power for the high-end segment is greater than that of the low-end segment.

Banerjee, Banik and Dalmia examine household preference and other factors leading to open defecation in India. They find that preference for having a toilet in the household is ranked 12 out of 21 different types of consumer durables. They also find that an educated woman (18 years of schooling) is 3.1 times more likely to use a toilet. Households living in urban areas are 19 times more likely to use a toilet in comparison with their rural counterparts.

Also, contributions that fall in the area of econometric theory include the following:

Under uncertainty, commonly used p value combination methods perform quite differently and often yield conflicting results. Consequently, Cheng and Sheng suggest a combination of “combinations of p values” (CCP) test aimed at maintaining good power properties across such uncertainty. This CCP test is based on a simple union-intersection principle that exploits the weak correspondence between two underlying p value combination methods. Monte Carlo simulations show that the CCP test controls size and closely tracks the power of the best individual methods. They empirically apply the CCP test to explore the stationarity in real exchange rates and the information rigidity in inflation and output growth forecasts.

A very common practice when extracting factors from non-stationary multivariate time series is to differentiate each variable in the system. As a consequence, the ratio between variances and the dynamic dependence of the common and idiosyncratic differentiated components may change with respect to the original components. Corona, Poncela and Ruiz analyze the effects of these changes on the finite sample properties of several procedures to determine the number of factors. In particular, they consider the information criteria of Bai and Ng (2002), the edge distribution of Onatski (2010) and the ratios of eigenvalues proposed by Ahn and Horenstein (2013). The performance of these procedures when implemented to differentiated variables depends on both the ratios between variances and dependencies of the differentiated factor and

idiosyncratic noises. The authors also analyze the role of the number of factors in the original non-stationary system as well as its temporal and cross-sectional dimensions.

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