21st Federal Forecasters Conference

Are Forecasts Accurate? Does it Matter?

September 24, 2015 at the Bureau of Labor Statistics, Washington, DC

Sponsoring agencies:

Bureau of Labor Statistics • Department of Veterans Affairs • Economic Research Service • Internal Revenue Service • National Center for Education Statistics • U.S. Census Bureau • U.S. Department of Labor • U.S. Energy Information Administration • U.S. Geological Survey

Partnering organization:

Research Program on Forecasting, The George Washington University
Society of Government Economists • Office of Revenue Analysis, DC Office of the Chief Financial Officer

www.federalforecasters.org

Announcement

The 22nd
Federal Forecasters Conference
FFC 2017

Will be held

April 20, 2017

in Washington,

DC

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The 21st Federal Forecasters Conference — 2015

Edited and Prepared by

Kel Schelach
Program Analyst
U.S. Department of Veterans Affairs
Veterans Health Administration
Milwaukee, WI

2015 Federal Forecasters Consortium Board

Busse, Jeffrey (Chair)
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U.S. Census
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Joutz, Frederick
Research Program on Forecasting
The George Washington University

MacDonald, Stephen
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Mallik, Arup
U.S. Energy Information Administration
U.S. Department of Energy

Matsuo, Jeff
Internal Revenue Service
U.S. Department of the Treasury

Mollica, Andrew
Bureau of Labor Statistics
U.S. Department of Labor

Niami, Farhad
Office of Revenue Analysis
DC Office of the Chief Financial Officer

Nicholson, Bradley
Bureau of Labor Statistics
U.S. Department of Labor

Schelach, Kel
Veterans Health Administration
U.S. Department of Veterans Affairs

Sinclair, Tara
Research Program on Forecasting
The George Washington University

Singh, Dilpreet
Veterans Health Administration
U.S. Department of Veterans Affairs

Sloboda, Brian
Office of Regulatory and Programmatic Policy
U.S. Department of Labor

Wodon, Quentin
Society of Government Economists

Yankay, James
Office of the Chief Financial Officer
U.S. Citizenship and Immigration Services

FFC Board

Left to Right: Tara Sinclair, Jeffrey Busse, Sandra Colby, Andrew Mollica Arup Mallik, Christopher Dick, Dilpreet Singh, William Hussar, Michelle Chu, and Stephen MacDonald (not pictured, but holding the camera, Bradley Nicholson).

Foreword

The 21st Federal Forecasters Conference (FFC/2015) was held September 24, 2015 in Washington, DC. This meeting continues a series of conferences that began in 1988 and have brought wide recognition to the importance of forecasting as a major statistical activity within the Federal Government and among its partner organizations. Over the years, these conferences have provided a forum for practitioners and others interested in the field to organize, meet, and share information on forecasting data and methods, the quality and performance of forecasts, and major issues impacting Federal forecasts.

The theme of FFC/2015, "Are Forecasts Accurate? Does it Matter?" was addressed from a variety of perspectives by a distinguished panel.

Steven M. Fortier, Director, National Minerals Information Center, U.S. Geological Survey

Prakash Loungani, Advisor, International Monetary Fund Research Department

Kathryn Byun, Branch Chief, Employment Projections Program, Bureau of Labor Statistics

The morning panel offered perspectives on how to be intelligent consumers of Federal forecasts. The concurrent afternoon sessions educated attendees on how to adapt forecasting techniques to particular challenges in both Federal and other settings.

Acknowledgements

Many individuals contributed to the success of the 21st Federal Forecasters Conference (FFC/2015). First and foremost, without the support of the sponsoring agencies and the partnering organizations, and the dedication of the Federal Forecasters Consortium Board, FFC/2015 would not have been possible.

Jeffrey Busse, of the U.S. Geological Survey, opened the morning program and introduced Bill Wiatrowski, Deputy Commissioner of the Bureau of Labor Statistics, who gave the welcoming remarks. Jeffrey Busse announced the winners of the 2015 Forecasting Contest. Tara Sinclair, from The George Washington University's Reasearch Program on Forecasting, announced the winner of the FFC/2014 Best Conference Paper Award. Jeffrey Busse presented award certificates. Brad Nicholson, of the Bureau of Labor Statistics, took photographs. Sandra Colby, of the U.S. Census Bureau, moderated the morning panel presentations and discussion. Tara Sinclair of The George Washington University Tweeted (#FFC_2015) highlights of the conference.

Michelle Chu and Jeff Matsuo, of the Internal Revenue Service, organized the afternoon sessions. William Hussar, of the National Center of Education Statistics, prepared the papers from the afternoon sessions for inclusion in this publication. Many thanks to the afternoon session chairs, who volunteered to organize and moderate the afternoon presentations. The session chairs are listed within these proceedings.

Thanks go to Fred Joutz, of The George Washington University, for reviewing the papers presented at the 20th Federal Forecasters Conference and selecting the winner of the Best Conference Paper Award for FFC/2015.

Thanks go to Brian Sloboda, of the U. S. Department of Labor, for running the contest and selecting the winners of the 2015 Forecasting Contest.

Kel Schelach of U.S. Department of Veterans Affairs produced the conference program, and this publication, which is an invaluable contribution.

We, also, thank the Society of Government Economists for providing coffee and snacks.

FFC/2015 was hosted by the BLS at their conference and training facility. The contributions of a number of BLS staff helped make this conference successful. Dennis Vilorio designed and prepared the graphics for the conference poster, program, and proceedings cover. Special thanks to the staff of the BLS Conference and Training Center, who once again helped to make the day go smoothly.

Finally, we thank all of the attendees, discussants, and presenters whose participation made FFC/2015 an educational and networking success.

The 21st Federal Forecasters Conference Forecasting Contest Winners 2015

Announcing the awards:

Jeffrey Busse
U.S. Geological Survey
U.S. Department of the Interior

Winner:

Roger Moncarz
U.S. Department of Labor
Bureau of Labor Statistics

Tied for 2nd Place:

Tom Garin
U.S. Department of Veterans Affairs

And

Nikki Czaplicki
U.S. Census Bureau

The 21st Federal Forecasters Conference
Best Conference Paper Award from FFC/2014

Announcing the award:

Tara Sinclair
Research Program on Forecasting
The George Washington University

Winner

"Evaluating ARIMA Models to Project International Services Trade Accounts"

Benjamin Bridgman, Alexis Grimm, and Ryan Howley
U.S. Bureau of Economic Analysis

The 21st Federal Forecasters Conference
FFC/2015
Scenes from the Conference

Photos by
Bradley Nicholson
Bureau of Labor Statistics

William J. Wiatrowski, Deputy Commissioner, of the Bureau of Labor Statistics Welcoming the 21st Federal Forecasters Conference to the Bureau of Labor Statistics Training and Conference Center.

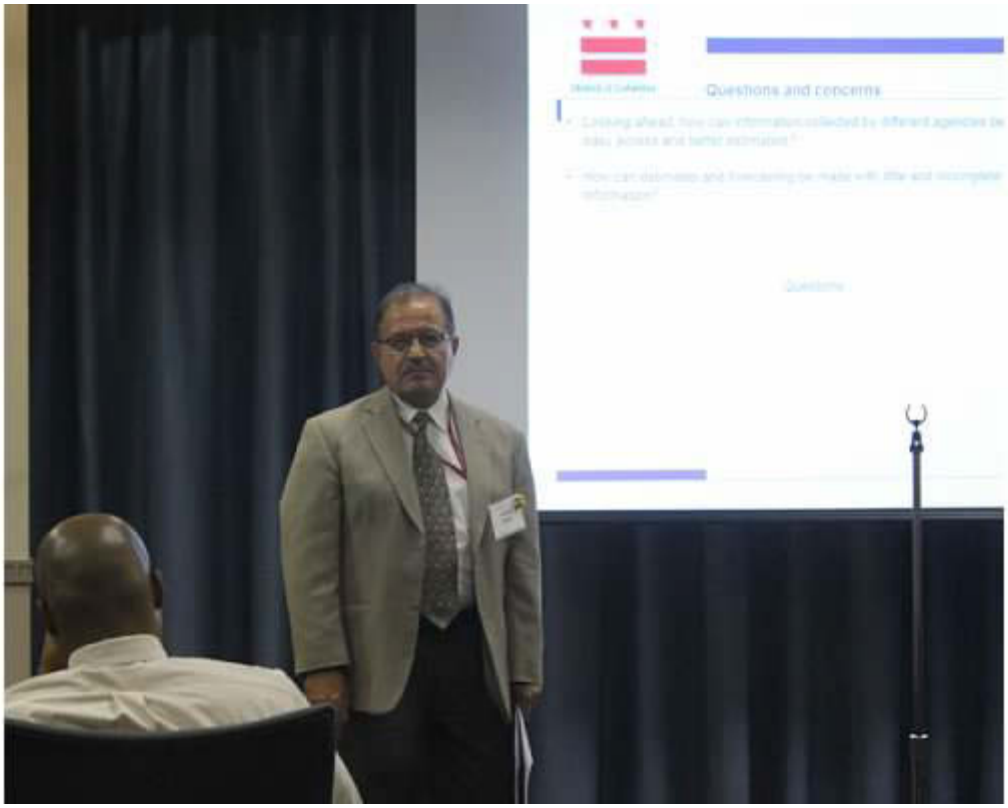
Left to Right: Steve Fortier, Katy Byun, and Sandra Colby.
Katy Byun answering a question from the audience.

Left to Right: Steve Fortier and Katy Byun.
Steve Fortier answering a question from the audience.

Left to Right: Katy Byun and Tara Sinclair.
Discussing Forecasting Topics.

Left to Right: Roger Moncarz, Jeffrey Busse, and Nikki Czaplicki.
Jeffrey Busse presenting awards for the Federal Forecasters Consortium 2015 Forecasting Contest.

Arup Mallik introducing the presenters and their papers for the session
"Topics in Forecasting."



Farhad Niami introducing the presenters and their papers for the session "Tax Policy in Washington DC."

Left to Right: Sharain Ward and Quentin Wodon.
Sharain Ward presenting her paper "Dedication of Revenue from the Sales and Use Tax in Washington DC." Quentin Wodon is handling the Power Point slide show.

Panel Discussion

Are Forecasts Accurate? Does it Matter?

Forecasts typically undergo a review before they are released to judge whether or not the forecast adheres to commonly accepted technical practice. Forecasts often face an ex post evaluation that focuses on realized accuracy. Whether forecasting immigration or emigration, agricultural production and price, mineral reserves and prices, or forecasting the direction of labor, economic, education, energy, and revenue trends, forecasters face similar private and public scrutiny. How are forecasts evaluated? How is forecast accuracy judged? How does the accuracy of forecasts affect users? Add your voice to the discussion. Join us at the 21st Federal Forecasters Conference, where these and other forecasting questions will be addressed.

Moderator

Sandra Colby
U.S. Census Bureau
U.S. Department of Commerce

Panelists

Steven M. Fortier
Director
National Minerals Information Center
U.S. Geological Survey

Prakash Loungani
Advisor
International Monetary Fund Research Department

Kathryn Byun
Branch Chief
Employment Projections Program
Bureau of Labor Statistics

Panelist Information

Steven M. Fortier
Director, National Minerals Information Center
U.S. Geological Survey

Forecasting Increased Global Demand for Mineral Resources

The U.S. Geological Survey – National Minerals Information Center is the agency of the Federal government responsible for the collection, analysis, and dissemination of non-fuel mineral information for commodities of importance to U.S. economic and national security. Data published by the Center are frequently used by other government agencies for forecasting economic trends (e.g. Federal Reserve Board) or future military raw material needs (e.g. Defense Logistics Agency). A long standing objective of government policy makers is the development of an "early warning" capability to forecast emerging risks to mineral supply chains and availability. The development of this capability, and the data and factors that are being evaluated to achieve it will be described and illustrated with examples.

Prakash Loungani
Advisor, IMF Research Department

The Inability of Macroeconomists to Predict Recessions

The record of failure to predict recessions is virtually unblemished. The presentation will provide evidence of this dismal record using forecasts for over 50 countries over 30 years. Both private sector and public sector forecasters are equally poor at forecasting recessions. After an overview, the presentation will focus on the performance of forecasts during the Great Recession, including the performance of the so-called troika (EC, ECB, IMF). The presentation will draw in part of new assessments of IMF forecasts carried out by external observers.

Kathryn Byun
Branch Chief, Employment Projections Program
Bureau of Labor Statistics

Evaluations of the Bureau of Labor Statistics' Projections

Every 2 years the Bureau of Labor Statistics (BLS) publishes 10-year projections including the outlook for hundreds of industries and occupations as well as detailed projections of the macro economy and labor force. Periodic evaluations of the BLS projections are important not only for apprising data users of past performance but also for internal review of assumptions and methodology. Given the breadth of data estimated and the 10-year horizon, providing meaningful analysis is challenging. Today's presentation will provide an overview of the methods used within the BLS evaluation exercises and discussion of the most recent results.

Concurrent Sessions I

Tax Policy in Washington DC

Session Chair: Quentin Wodon, World Bank

Policy Evaluation of Major Economic Development Project in Three Neighbourhoods in Washington DC

Amira Alghugham, DC Office of the Chief Financial Officer and Howard University

The aim of this study is to form a policy evaluation of major economic development project in the city; through review and compare the economic growth of neighbourhood before and after the development that the government investment and compare them to the surrounding neighbourhoods. In doing so, we investigate the start and completion time of these projects as well as how much public money invested in these projects. We attempt to answer the following questions to be able to form a policy:

1. Did the targeted neighborhoods grow, what is the average annual growth rate of neighborhood before and after the development In terms of group of fillers (single filers, head of household, married) and also for the surrounding neighborhoods?
2. Does the targeted neighborhood grow faster than the surrounding neighborhoods?
3. Find the (compare the individual tax revenue) how much the tax revenue increases in each neighborhood and compare it to the investment?
4. Did the neighborhood grow faster after the opening year?
5. After the opening, did the neighborhood had grown faster than the surrounding neighborhoods?
6. What is the incremental additional tax revenue from the focusing neighborhood? Compare to the neighboring neighborhood?
7. Compare the increment to the public investment for the same time period?

Using panel data of individual income tax from 2001 to 2013, neighbourhoods' economic growth was evaluated from two perspectives: the individual income tax data and property tax data as we compare their growth before and after the development, followed by regressing the explanatory variables that might affect the individuals income tax and property tax growth of each targeted neighbourhood in comparison to the surrounding neighbourhoods. Descriptive analysis has shown that these targeted neighbourhoods share of income tax has grown significantly after the development has taken place compare to the surrounding neighbourhoods. Moreover, comparing the annual percentage change in terms of income tax and total revenue, these neighbourhoods have a significant increase compare to the surrounding once. It find that government subsidies that has been invested in these neighbourhoods had a great effect in having these neighbourhoods grow faster.

Dedication of Revenue from the Sales and Use Tax in Washington DC

Sharain Ward, DC Office of the Chief Financial Officer

Before FY 1995, all revenue from The District of Columbia's sales and use tax went to the District's General Fund. Beginning in FY 1995, a portion of the sales and use tax mainly from restaurants and hotels was dedicated to the Convention Center Fund. Beginning in FY 1999, thanks to the reporting format, we are able to easily see sales tax revenue as a gross amount, amounts transferred to other funds, and net sales tax revenue to the general fund. The transfer to the Convention Center Fund in FY 1999 was $ 51.1 million, or 8.6 percent of gross sales and use tax revenue.

In the years since FY 1999, the number of dedicated funds from the sales and use tax has increased. In FY 2009, after the first instance of ear-marking sales tax revenues, revenues were dedicated to the following five funds: Convention Center, Ballpark Fund, DDOT, Tax Increment Financing (TIF), and School Modernization. The net sales and use tax revenue in FY 1999 was 91.4 percent of gross sales and tax revenue. In FY 2009, the net sales and use revenue, was 74.4 percent of gross sales and use revenue.

This study will report on our findings of the dedication of revenue from gross sales and use tax over the period FY 1998 to FY 2014. We will identify the growth and impact of dedicated revenue on the general fund and on programs funded by dedicated funds. Graphics describing the findings will be presented.

The Effect of District of Columbia's Refundable Tax Credits on Poverty and Income Distribution

Rhucha Samudra, American University, Daniel Muhammad, DC Office of the Chief Financial Officer

Using annual administrative tax data for all income tax filers in the District of Columbia (DC), we estimate the effect of refundable tax credits on the inequality, income distribution and poverty levels in DC for 2002-2012. Since rising income inequality has been a concern both nationally and within DC, it is important to evaluate how local tax policy affects income inequality through the system of tax and transfers. To understand how DC's tax system affects income inequality in the city, we focus on the following research question - what is the effect of refundable tax credits on the inequality, income distribution and poverty levels in DC? In this paper we limit the refundable tax credits to the ones provided by DC which include the DC supplement of the Earned Income Tax Credit (EITC), property tax credit and the other refundable credits. Using descriptive analysis we find that DC's refundable credits increase the average income of tax filers in the lowest income quintile by 5.3 percent. We also find that DC's refundable credits lift on an average of 4 percent of EITC tax filers out of poverty every year. Our analysis shows that the refundable credits help to lessen the gap between the city's highest and lowest income earners by redirecting approximately 4 percent of the city's annual individual income tax collections to the tax filers who are at the bottom of the city's income distribution. We also find that DC's standard individual income tax policy and structure is progressive but not unusually burdensome for the city's highest (or middle) income filers.

Uncertainty in Economic Forecasting

Session Chair: Xuguang (Simon) Sheng, American University

Surprise and Uncertainty Indexes: Real-time Aggregation of Real-Activity Macro Surprises

Chiara Scotti, Federal Reserve Board

I construct two real-time, real activity indexes: (i) a surprise index that summarizes recent economic data surprises and measures optimism/pessimism about the state of the economy, and (ii) an uncertainty index that measures uncertainty related to the state of the economy. The indexes, on a given day, are weighted averages of the surprises or squared surprises from a set of macro releases, where the weights depend on the contribution of the associated real activity indicator to a business condition index *a la* Aruoba, Diebold, and Scotti (2009). I construct indexes for the United States, Euro Area, the United Kingdom, Canada, Japan. I show that the surprise index preserves the properties of the underlying series in affecting asset prices, with the advantage of being a parsimonious summary measure of real-activity surprises. For the United States, I present the real-activity uncertainty index in relation to other proxies commonly used to measure uncertainty and compare their macroeconomic impact. I find evidence that when uncertainty is strictly related to real activity it has a potentially milder impact on economic activity than when it also relates to the financial sector.

Measuring Global and Country-specific Macroeconomic Uncertainty

Ezgi Ozturk, International Monetary Fund, Xuguang (Simon) Sheng, American University

With a panel of professional forecasters, we show that the uncertainty in predicting a typical economic variable has two components: (i) common uncertainty, defined as the conditional volatility of mean forecast errors and (ii) idiosyncratic uncertainty, proxied by disagreement among individual forecasters. Using individual survey data from the *Consensus Forecast* over the period of 1989-2014, we estimate an index of macroeconomic uncertainty as a weighted average of variable-specific uncertainties perceived by market participants. Our new measures are associated with episodes of recessions, and have large and persistent effect on real activity both within and across countries.

Uncertainty and Economic Activity: A Global Perspective

Ambrogio Cesa-Bianchi, Bank of England, Hashem Pesaran, University of Southern California, Alessandro Rebucci, Johns Hopkins University

The 2007-2008 global financial crisis and the subsequent anemic recovery have rekindled academic interest in quantifying the impact of uncertainty on macroeconomic dynamics based on the premise that uncertainty causes economic activity to slow down and contract. In this paper, we study the interrelation between financial markets volatility and economic activity assuming that both variables are driven by the same set of unobserved common factors. We further assume that these common factors affect volatility and economic activity with a time lag of at least a quarter. Under these assumptions, we show analytically that volatility is forward looking and that the output equation of a typical VAR estimated in the literature is mis-specified as least squares estimates of this equation are inconsistent. Empirically, we document a statistically significant and economically sizable impact of future output growth on current volatility, and no effect of volatility shocks on business cycles, over and above those driven by the common factors. We interpret this evidence as suggesting that volatility is a symptom rather than a cause of economic instability.

Projection of Current Trends and Their Policy Implications

Session Chair: Tara Sinclair, George Washington University

Accuracy Analysis of the Short-Term (11-year) National Health Expenditure Projections

Sean Keehan, Centers for Medicare & Medicaid Services, Devin Stone, Centers for Medicare & Medicaid Services

Projections of the National Health Expenditure Accounts are prepared annually by the Centers for Medicare & Medicaid Services. In this paper, the accuracy of 16 sets of projections will be addressed on a number of dimensions. This paper also discusses factors that can affect accuracy and their implications, such as uncertainty in economic growth, future legislative changes, revisions to the underlying accounts data, and changes in consumer or producer behavior. Ultimately, these projections provide policy makers and analysts insight into future health trends if current market trends persist under current law.

Individual Non-Filers and IRS Generated Tax Assessments: Revenue and Compliance Impacts of IRS Substitute Assessment When Taxpayers Don't File

Saurabh Datta, Internal Revenue Service, Stacy Orlett, Internal Revenue Service, Alex Turk, Internal Revenue Service,

The U.S. Income tax system relies on taxpayers voluntarily filing, reporting and paying their tax liabilities. When a taxpayer fails to voluntarily file a return, the IRS can file a "substitute for return" that creates a tax assessment. Many of the substitute assessments are done via the IRS's Automated Substitute for Return (ASFR) program. In recent years, the ASFR Program has experienced a noticeable decline in resources and a corresponding decline in the number of delinquent returns processed. To make the best use of resources available to IRS, it is critical that the IRS and policy makers understand the direct and indirect impacts of this program. To explore these impacts, we develop models of the potential collection of ASFR assessments and then predict the impact of the program on subsequent filing compliance. We then use these models to estimate the opportunity costs of reductions to the number of cases worked in the ASFR program. We find positive direct and indirect effects of ASFR treatments on dollars collected from delinquent returns and voluntarily filing tax returns for subsequent years.

Estimation of Economic Opportunity Costs Due to Constrained Regional Infrastructure Using Risk Modeling: Uinta Basin Energy and Transportation Study

Brian Park, U.S. Energy Information Administration

This paper presents an innovative method of applying an economic risk model to estimate economic opportunity costs to the regional economy resulting from a constrained regional transportation infrastructure.

Energy production in Utah is expected to increase because new energy extraction methods will be utilized in the Uinta Basin. The volumes of oil and natural gas production are expected to increase significantly over the next two to three decades. The study discusses: 1) the forecast of the energy production growth in the basin; 2) the regional transportation infrastructure's capacity to absorb transportation demand as a result of growth in energy production; and 3) if applicable, the opportunity of cost of failing to provide adequate transportation infrastructure.

The Emerging Electorate: Projections of the Eligible Voting Population in the United States, 2016-2022

Thomas File, U.S. Census Bureau, Jennifer Ortman, U.S. Census Bureau

In this paper, we present a series of projections of the citizen population aged 18 years and over, the population used by the U.S. Census Bureau and others to represent the voting-eligible population. Projections are made for the next two national election cycles (2016 and 2022). In addition to the total voting-eligible population projections, we present results by age, gender, race and Hispanic-origin. The projections rely on assumptions concerning the percentage of foreign-born individuals who will become citizens in upcoming years. This paper also includes discussion of important demographic factors in recent turnout, and explores projecting voting rate outcomes in future research.

Model Evaluation Techniques

Session Chair: Christopher Dick, U.S. Department of Commerce

Evaluating STEO Electricity Consumption Forecasts

Mark Hutson, George Washington University

In this paper, I evaluate the monthly electricity consumption forecasts of the Energy Information Administration's Short Term Energy Outlook model (STEO). I compare their performance against those of rival single-equation models; these rival models were specified using Autometrics, a sophisticated dynamics-based algorithm. I find that STEO produces forecasts that perform well against the alternative models. This chapter is thus a validation for STEO's forecasts and approach, as they incorporate the same informational signals as those identified by Autometrics. Additionally, in this analysis, I find a potential structural break in the Industrial Electricity Consumptions series following the 2007-2009 recession.

Evaluating the Directional Accuracy of the WES US Macroeconomic Forecasts Using The ROC Curves Analysis

Olga Bespalova, George Washington University

This paper evaluates directional accuracy of the U.S. macro-economic forecasts based on World Economic Survey (WES) of expert expectations for 1989:Q3 to 2014:Q4. I explain how to interpret the WES categorical responses, which actual data series to evaluate each question, and how to improve the traditional methods of evaluating directional qualitative forecasts using the Receiver Operating Characteristic (ROC) curves analysis. Results distinguish the variables for which the WES expectations produce reliable directional forecasts from those not statistically significant different from the random guess, and suggest the optimal thresholds to be used for each variable.

Forecasting the U.S. Farm Price of Upland Cotton: Evaluating the Use of Futures Prices

Linwood Hoffman, U.S. Department of Agriculture, Leslie Meyer, U. S. Department of Agriculture

Passage of The Agricultural Act of 2014 continues the sector's trend toward market orientation and risk transfer from the Government to the private sector and continues the need for season-average price forecasts. Alternative cotton forecast models are developed using a composite of monthly futures prices adjusted for a basis (cash minus futures), monthly marketing weights, and monthly cash prices to forecast the U.S. upland cotton season-average farm price. The preferred futures model is compared with USDA's mid-point price projections. Forecast model performance is evaluated using the mean error, root mean squared error, and mean absolute percentage error. Futures model forecasts are timely and can be a valuable SAP forecasting tool.

A Handy Toolkit for the Model Evaluation Process

Ken (Qi) Su, Internal Revenue Service, Alex Turk, Internal Revenue Service

In the model performance evaluation process, we focus on five aspects in general: [1] Model discrimination - the model's ability to differentiate between events and non-events. [2] Population stability - the difference between model development data and current scored data. [3] Characteristic stability - explanatory variable distributions of current population to model development population. [4] Model calibration or actual versus expected - accuracy of model performance. [5] Score distribution analysis – how an event has performed relative to other events when ranked by model scores.

There are several measures in each performance. We often observe three key measurements in model discrimination 1.Gini coefficient or accuracy rate - area under Gini curve/Lorenz curve. 2. Kolmogorov-Smirnov (KS) statistics. 3. ROC/statistics. Additional measurements explored include: Population stability index (PSI), Characteristic stability index (CSI), and the Herfindahl -Hirschman Index (HHI). This paper provides and describes how to create above performance curves and how to calculate performance measurement during the model evaluation process in SAS programs and macros.

Forecasting GDP

Session Chair: Melissa Kovalick, U.S. Department of the Treasury

Do Advance Estimates Affect Future GDP Growth? The Role of Recessions

Xudong Guo, George Washington University, Tara M. Sinclair, George Washington University

In this paper we study the predictive power of the first announcements, latest available output growth rate and the state of economy on the future output growth rate. Recent literature suggests that first announcements of real output growth has predictive power on future growth, while we find that first announcements per se may not have enough evidence to predict output growth rate in the future when the recessions are taken into account. Most predictive power lies in the state of economy, whether recession or not. It is the recession features in the first announcement that have the predictive power.

Forecasting the USD/CNY Exchange Rate under Different Policy Regimes

Yuxuan Huang, George Washington University

The USD/CNY exchange rate exhibits very different pattern in different periods as it changes wildly from one period to another according to the economic reforms and policies. This paper compares the performance of six different forecasting models of USD/CNY exchange rate under three different forecast scenarios from 2005-2014. In particular, the paper focuses in answering the following questions. (i) Which model has the best forecast when the regimes change? (ii) Which model has the best forecast within the appreciation channel (no change in regime)? (iii) Can forecasting robustifications help? The results of both dynamic forecast and one-step forecast do not point to any given model being very successful for all the forecast scenarios. In most cases, the intercept-correction robustifications improve the forecast performance in both dynamic forecast and one-step forecast.

Bias and Inefficiency in the Fed's International Greenbook Forecasts

Neil R. Ericsson, Federal Reserve Board, Emilio J. Fiallos, Rutgers University, J E. Seymour, Federal Reserve Board

Stekler and Symington (2015) apply a textual analysis to the minutes of the FOMC meetings over 2006-2010. From their analysis, Stekler and Symington construct quantitative indexes that gauge the FOMC's views on the current and future strength of the U.S. economy. The current paper shows that these indexes very closely track the current-quarter and one-quarter-ahead Fed staff Greenbook forecasts of the U.S. real GDP growth rate. Stekler and Symington's indexes provide a proximate mechanism for inferring Greenbook GDP forecasts, well in advance of the public release of the Greenbook.

Topics in Forecasting

Session Chair: Dilpreet "Debbie" Singh, U.S. Department of Veterans Affairs

Caseload Forecasting and Forecast Accuracy in the Federal Judiciary

John Golmant, Administrative Office of the U.S. Courts

The federal judiciary must be able to process its business efficiently. Having a sense of how much work is expected in the future helps the judiciary plan its budgetary and staffing requirements. To accomplish this, the Administrative Office of the US Courts regularly produces forecasts of future court caseloads, the main determinants of workload.
The forecasts are highly accurate, and the measures of error provide a sense of credibility and transparency. In addition, the measures of error and accuracy offer insights into the ongoing validity of particular forecasting models.

How Accurate Are Private Sector Fiscal Forecasts? Evidence from the Great Recession

Zidong An, American University, Joao Jalles, International Monetary Fund, Prakash Loungani, International Monetary Fund, Ricardo Sousa, University of Minho

Government fiscal forecasts invoke considerable skepticism: Frankel (2012), for instance, calls them "wishful thinking." But does the private sector do any better at forecasting the fiscal balance? In this paper, we provide evidence on the quality of private sector fiscal balance forecasts for 29 countries over the 1993–2014 time period, with a focus on performance during the Great Recession. We also assess the consistency of fiscal balance and GDP forecasts.

Estimating Monthly Crude Oil Movements by Rail

Arup Mallik, U.S. Energy Information Administration, Anthony Radich, U.S. Energy Information Administration

In March 2015, the U.S. Energy Information Administration (EIA) started publishing monthly estimates on the movements of crude oil within the United States and between the U.S. and Canada. EIA calculates these rail movements using railroad waybills, obtained from the Department of Transportation Surface Transportation Board on a quarterly basis. In order to meet a monthly data production schedule, EIA estimates up to 3 months of rail movements using a combination of averages, ordinary least squared regressions, and time series models. Challenges exist in finding the appropriate metric to evaluate these estimates and finding indicators that can predict turning points in these rail movements.

Concurrent Sessions II

Tax Policy in Washington DC

Session Chair: Farhad Niami, DC Office of the Chief Financial Officer

Data and Information Gathering: Lessons Learned Thus Far in Developing DC's First Tax Expenditure Evaluation Report

Charlotte Otabor, DC Office of the Chief Financial Officer

DC produces a tax expenditure report biennially that estimates the revenue loss to the District government resulting from tax expenditures during the fiscal year as well as forecasting future revenue losses. In 2014, the City Council passed a law requiring the OCFO to evaluate all major local tax expenditures on a 5-year cycle, grouped by similarly purposed tax expenditures. The OCFO must summarize the purpose of each provision, estimate the revenue loss, examine the impacts on the District's economy and social welfare, and offer recommendations about whether to maintain, revise, or repeal the tax preference.

The first evaluation report will focus on housing-related tax expenditures in the District using data and information from a variety of sources to attempt to determine whether the original goals of the provisions are being met. Such information will be useful for policymakers and others who may want to ensure the effectiveness of tax expenditure provisions.

This presentation will review the process of producing the first tax expenditure evaluation for the District, including data gathering of housing information for the tax expenditure evaluation and the tax expenditure report, and developing a methodology for evaluating the data collected. This presentation also examines the complications that arise from missing information and data, and how it could affect DC's tax expenditure revenue loss estimates and forecasting information.

Simple Decomposition Applied to the Capital Gains Outlays

Divya Wodon, DC Office of the Chief Financial Officer

Capital gains are crucial to an economy's growth and take part in the government's tax revenue. Understanding how certain key factor changes affect changes in outlays is important for policy decision makers. This paper proposes a simple multiplicative decomposition that can help in understanding what changes may have had an impact on the change in total capital gains outlays over the years 2006 to 2012, which includes the recession. The different variables used in this decomposition are the total capital gains outlays, the population, the number of tax return filers, the number of filers who report capital gains or losses, the per capita personal income, and the average capital gains reported by filers reporting capital gains, all in DC. The decomposition also includes an analysis on different income groups. This paper specifically focuses on the District of Columbia, but further research could lead to a study of all the states and the US as a whole.

What is the Probability of Income Tax Mobility Amongst Income Tax Filers in Washington, DC?

Britni Wilcher, DC Office of the Chief Financial Officer & American University

Today, inequality is seven times greater than it was in the 1980s. With income inequality reaching its highest level in Organization of Economic Co-operation (OECD) nations in the past century, it is increasingly important that policymakers investigate the drivers of inequality and mitigation strategies. Intergenerational mobility literature has examined the degree to which an individual's place in income distribution affects his offspring's position in income distribution. However, this study will assess how an individual's poverty spells influence his mobility in income distribution. Local tax and transfer policies are quantifiable contributors to income equality. This study will evaluate the extent to which the District of Columbia's (DC) tax system affects income mobility amongst low income tax filers. Using annual administrative tax data for all individual income tax filers in DC, this study will compare (1) the inter-temporal income mobility of the Earned Income Tax Credit (EITC) recipients and other low income tax filers during the period of 2001 – 2013 and (2) assess the likelihood of individuals below poverty in 2001 maintaining the same poverty status in 2013.

Comparative Tax Burden Data by States

Quentin Wodon, World Bank

Every year the D.C. Office of Revenue Analysis produces a study on tax rates and tax burdens that compares tax burdens across the largest city for all states and the District of Columbia. The study is widely quoted in the press and the reports provide important and fairly comparable data on key taxes paid by households locally, comparing hypothetical yet comparable households across states and cities. A compilation of key tax parameters and tax burdens across states for the last dozen years of this study has been put together and is being made open access. The data provide valuable insights on changes in tax policy in the US at the local and state levels. This paper presents the database, its useful features, but also its limits for tax burden analysis across states and cities.

Forecasting with International Data

Session Chair: Kajal Lahiri, University at Albany, SUNY

Forecasting New Entry into International Trade

David Riker, International Trade Commission

We estimate econometric models of the entry and exit of exports from developing countries to the U.S. market. We model entry and exit decisions as functions of bilateral real exchange rates, aggregate expenditures in the destination market, and the country's prior experience exporting the product to the United States. The models predict that most of the developing countries will significantly increase the number of products that they export to the United States over the next six years, based on export status in 2014 and IMF macroeconomic forecasts for subsequent years.

Measuring and Forecasting Food Security in Developing Countries

Sharad Tandon, U.S. Department of Agriculture

A number of different methods exist to assess the size of the undernourished population, but one of the most common estimation methods relies on nationally representative household consumption surveys. Using two different contexts in South Asia, we demonstrate how estimates based on household-level consumption data can misclassify large segments of the population. In particular, we focus on the difficulties in estimating consumption of food outside the household, difficulties in estimating consumption of processed foods, and difficulties in estimating individual-level intake given inequities in the household distribution of calories. The implications for effectively forecasting undernourishment and achieving the new Sustainable Development Goals are discussed.

Measuring inflationary expectations from cross-sectional surveys: Households vs. Experts

A. Das, IIM, Ahmedabad, K. Lahiri, University at Albany, SUNY, Y. Zhao, Towson University

On the heels of the last great recession, and a sudden surge in prices, a number of developing countries including Brazil, India, Mexico, and Pakistan initiated surveys of households and experts regarding their perceptions and expectations of inflation. In this study we use the recently released Inflation Expectations Survey of Households (IESH) and a Survey of Professional Forecasters (SPF) from the Reserve Bank of India (RBI). The newly released IESH data contains 112,422 individual responses from 2008Q3 to 2014Q4. By comparing the household and experts data, certain remarkable regularities emerge. First, the experts and households differed greatly where the former consistently underestimated the true inflation. The quarterly dynamics of the cross sectional distributions over the inflation cycle and the heterogeneity over socio-demographic groups are examined. The implied information rigidities in information updating not only in forecasts but also in perceptions are studied and compared with those in the US and the other developing countries. They are found to be very similar.

Topics in Forecasting

Session Chair: Arup Mallik, U.S. Department of Energy

Nowcasting the US Economy Using a Factor Model with Mixed-Frequency Data

Michele A. Trovero, SAS Institute, Inc., Rajesh Selukar, SAS Institute, Inc., Michel J. Leonard, SAS Institute, Inc.

Nowcasting in Economics refers to the practice of monitoring the state of an economy. It has been popular recently among institutions such as central banks to determine when an intervention is needed. We build an economic index of the US economy based on a simple single factor model for economic indicator variables sampled at different frequencies. The indicator variable data is extracted from the FRED® database of the Federal Reserve Bank of St. Louis.

HRSA's New Health Workforce Simulation Model: Purpose, Data and Model Design

Arpita Chattopadhyay, Health Resources and Service Administration

This presentation will describe HRSA's new integrated health workforce model designed to project supply and demand for approximately 60 healthcare providers in 42 medical specialties. Recognized shortcomings of past approaches and the fluidity of the current healthcare environment called for a dynamic, integrated model. The Health Workforce Simulation Model (HWSM) uses a microsimulation approach, accounting for individual characteristics and local healthcare environment. The mechanics of the model -- data sources, and inputs to integrate supply and demand into a dynamic model will be presented along with a discussion of issues, methods, and data related to health workforce modeling.

Forecasting Using Microsoft Excel, the Lost Art

Michael Jadoo, Bureau of Labor Statistics

For many, forecasting using the box-Jenkins method seems to only be capable in statistical platforms like R, SAS, STATA, PYTHON, and Eviews; however, Microsoft excel can perform all statistical the measures that is needed to create and evaluate forecasting models. I will demonstrate several steps in the forecasting process in order to show that model selection method can be calculated and illustrated in order to assist the forecasting analyst. Finally, measures used for statistical fit can be generated as well in order to pick the most optimal model.

Forecasting Techniques: Aggregation, Disaggregation, and Seasonal Adjustment

Session Chair: Stephen MacDonald, U.S. Department of Agriculture

The Effect of Forecast Quality on Seasonal Adjustment Revisions

Nicole Czaplicki, U.S. Census Bureau

When data are available, the X-11 method uses symmetric moving average filters, utilizing the same amount of data before and after the point of interest. For the most relevant points at the end of the series, we have two options: use asymmetric filters or extend the series with forecasts and use "symmetric" filters where possible. At the U.S. Census Bureau, most economic series are extended with RegARIMA models that incorporate holiday and trading day effects. We apply symmetric filters (with forecasts) and asymmetric filters (without forecasts) to empirical data from series with large forecast errors to assess the revision size-effects.

Separate and Unequal: Gender Differences Over the Business Cycle

Amy Guisinger, George Washington University

While most traditional macroeconomic models take individuals to be identical agents, the labor market is composed of many distinct groups that may have different reactions to policy. In this paper we show that men and women have different trend and cycle volatilities in hours, which are masked when aggregating the data. Motivated by this, we extend the traditional real business cycle model to be composed of two separate agents, men and women, in order to better match the features of U.S. data. This shows that allowing for disaggregation can lead to better model performance.

Can the Consensus be Beaten?

Constantin Burgi, George Washington University

Empirical studies in the forecast combination literature have shown that the simple average is notoriously difficult to improve upon despite the availability of optimal combination weights. In particular, performance based combination methods perform badly, even though individual forecasters tend to beat the simple average. This paper shows that this is due to the high correlation among forecasters, which by chance causes individuals to have lower mean squared errors (MSE) than the simple average. A new non-parametric method to choose a subset of forecasters with better previous performance is introduced. It improves upon the simple average over all forecasters in the SPF for at least one variable.

Applying Composite Forecasting Methods to the Food Price Outlook Data Product

David Levin, U.S. Department of Agriculture, Annemarie Kuhns, U.S. Department of Agriculture

ERS currently uses four distinct Error Correction Models to forecast the various Consumer Price Index food series; one of the four models is chosen and used for each CPI food index. In February 2015, ERS hosted a Food Price Forecasting Workshop in Washington, DC where it was proposed that ERS use composite forecasting methodology to combine the results of all four ECMs into a single forecast of a CPI food series rather than relying only on the one ECM chosen for a given CPI food series. This manuscript is ERS' initial evaluation of using composite forecasting in its CPI forecasts.

Forecasting Under the Condition of System Shocks

Session Chair: William Hussar, U.S. Department of Education

Agricultural Adjustments to Shocks

Flavius Badau, U.S. Department of Agriculture, Ralph Seeley, U.S. Department of Agriculture

Technological change, climate events, and shifting trade patterns could shock the U.S. agricultural sector, affecting future market conditions. As a result, it is important to analyze how USDA's long-term agricultural projections behave given certain shocks. To achieve this objective, different yield trends relative to the Baseline along with one-period yield shocks are implemented in the corn and soybean sectors. Results suggest these sectors exhibit resiliency to different shocks. Lower and higher yield trend patterns produce results that follow Baseline projections closely, while one-period yield shocks produce short-run market fluctuations with convergence to Baseline projections in the long run.

Forecaster Inattention: Measurement, Determinants and Policy Implications

Zidong An, American University, Xuguang (Simon) Sheng, American University, Jonathan Wallen, American University

Using the Survey of Professional Forecasters dataset during 1968-2014, we provide direct econometric estimates of time varying inattention, defined as the common component in forecasters' inattentiveness when predicting many economic variables. Based on this measure, we find that professional forecasters update their information sets every four months on average, and they are less inattentive in periods of recession and high economic uncertainty. Through the time varying structural vector autoregression model, we explore if inattention alters the real effect of monetary policy. Our empirical estimates show that the same sized monetary shock has larger and more persistent real effects when the degree of inattention is high. Our findings contribute to the literature on the transmission of monetary policy shocks and suggest inattention as an additional explanation why policy might become less effective during recessions.

An Economic Theory of Genocide

Mark Hutson, Artur Kolasa, Adrianna Rockford

This paper modifies an existing model that examines genocidal incidents. We update the State Failure Task Force Report - Phase III logit model that differentiates between failed states with and without genocide/politicide, improving the performance of the estimates relative to their baseline model, as well as a similar model later presented by one of the authors. This paper evaluates this model and uses encompassment techniques to enhance the estimates. The model is updated using economic impulse variables that describe shocks to the countries rather than levels of variables and indices. We find that including recent shocks to GDP, exports, imports, and redefining the way that current trade values are incorporated into the model all improve the predictive ability. We find that adding impulse data to the dataset further enhances predictive ability.

U.S. Commercial Aviation Demand Forecasting with a Panel Data: The Role of Individual Heterogeneity on Improving Forecast Accuracy

Mei Liu, Federal Aviation Administration, Roger Schaufele, Federal Aviation Administration, Dipasis Bhadra, Federal Aviation Administration, Li Ding, Federal Aviation Administration

Studies and practices in aviation demand forecasting have long relied on OLS or other time series approaches as the standard estimation technique, ignoring the individual heterogeneity or unobserved effect in a panel data. Individual heterogeneity is most evident in the U.S. aviation sector where large airports differentiate themselves by offering services from the airlines who dominate them and medium and smaller airports connecting them thus forming a network that evolve over time. This paper distinguishes itself by identifying and estimating the route-specific effects in the airline industry and takes it forward to perform a 4-year-ahead forecasting. The current setting defines the training data to be from 2000 through 2010, from which the estimates are developed to forecast passenger demand from 2011 through 2014. We evaluate whether the inclusion of individual heterogeneity reduces forecast errors. Our finding sheds light on how to improve the forecast accuracy given a panel data.

Using Macro Variables to Predict Retail Food Price Inflation

Annemarie Kuhns, U. S. Department of Agriculture, Ryan Kuhns, U.S. Department of Agriculture

The USDA Economic Research Service forecasts retail food prices based on the Bureau of Labor Statistics' CPI and PPI data products. ERS forecasts provide important signals to farmers, processors, wholesalers, consumers, and policymakers alike. The current forecast use a multi-stage pass-through approach that considers farm and wholesale prices, diesel prices, and manufacturing and retailing costs. However, many other economic and market variables may contribute to food price inflation. Our presentation will evaluate whether incorporating these variables improve forecasting accuracy. We will also consider several methods of forecast averaging to determine if average forecasts perform better than individual models.

Optimal Point Forecast for Certain Bank Deposit Series

*Argyn Kuketayev, E*TRADE Financial Corporation*

It is customary to use either the mean or the median as a point forecast in applied work, by default. These point forecasts are optimal for squared and absolute error cost functions. However, for these functions the optimal forecasts are not well defined when the data generation process (DGP) is a geometric random walk with "fat tailed" error distribution. I demonstrate that some bank deposit time series may have this kind of DGP; propose an asymmetric location dependent homogenous loss function, show that it is more suitable for certain applications and that it has a well-defined optimal forecast.