



THE 23RD FEDERAL FORECASTERS CONFERENCE

The 2021 Federal Forecasters Conference will consider the impact of missing data on forecasts. How does missing data affect forecasts, and what techniques can forecasters use when faced with missing data?



Theme Forecasting in the Presence of Missing Data

When May 6, 2021

Where Online Via WebEx, more information at

<http://www.federalforecasters.org/>

Sponsoring Agencies

Bureau of Economic Analysis • Bureau of Labor Statistics • Congressional Budget Office • Department of Veterans Affairs • Economic Research Service, USDA • Federal Aviation Administration • Federal Reserve Board • Internal Revenue Service • Office of Economic Policy, U.S. Department of the Treasury • U.S. Census Bureau • U.S. Department of Labor • U.S. Energy Information Administration, Office of Energy Analysis • U.S. Geological Survey

Partnering Organizations

H.O. Stekler Research Program on Forecasting, The George Washington University • Society of Government Economists



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FFC 2021

23rd Federal Forecasters Conference (FFC)

Conference Theme:
Forecasting in the Presence of Missing Data

Thursday, May 6, 2021

9:00 AM – 3:45 PM EDT

**Advance registration only.
Online conference via Webex.**

More information at: <http://www.federalforecasters.org/>

Sponsoring Agencies

Bureau of Economic Analysis; Bureau of Labor Statistics; Congressional Budget Office; Department of Veteran Affairs; Economic Research Service, USDA; Federal Aviation Administration; Federal Reserve Board; Internal Revenue Service; Office of Economic Policy, U.S. Department of the Treasury; U.S. Census Bureau; U.S. Department of Labor; Office of Energy Analysis, U.S. Energy Information Administration; U.S. Geological Survey

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H.O. Stekler Research Program on Forecasting, The George Washington University
Society of Government Economists

Program Committee

Greg Won, Chair, Federal Aviation Administration; Jeffrey Busse, U.S. Geological Survey; Derrick Dennis, Internal Revenue Service; Neil R. Ericsson, Federal Reserve Board; Edward N. Gamber, Congressional Budget Office; Tom Garin, Department of Veterans Affairs; Kyle Hood, Bureau of Economic Analysis; William Hussar, Department of Education; Maros Ivanic, U.S. Department of Agriculture; Sandra Leigh Johnson, U.S. Census Bureau; Federick Joutz, The George Washington University; Matthew MacLachlan, U.S. Department of Agriculture; Andrew B. Martinez, U.S. Department of the Treasury; Lauren Medina, U.S. Census Bureau; Andy Roche-DeJesus, Internal Revenue Service; Tara Sinclair, The George Washington University; Brian Sloboda, OSHA-Department of Labor; Christopher Williams, Congressional Budget Office

Updated: April 27, 2021.

FFC 2021 Conference Program

9:00 AM – 9:30 AM EDT **Opening Remarks** **Webex Event Room**
Greg Won, Federal Aviation Administration

2021 Forecasting Contest Announcements
Brian W. Sloboda, U.S. Department of Labor

Introduction of Panelists
Neil R Ericsson, Federal Reserve Board

9:30 AM – 11:45 AM EDT **Panel Discussion** **Webex Event Room**
Theme: Forecasting in the Presence of Missing Data
Dennis Fixler, BEA, U.S. Department of Commerce
David Raglin, ACS, U.S. Census Bureau
Jessica S. Banthin, Health Policy Center, Urban Institute
Neil R. Ericsson, Federal Reserve Board (moderator)

Use Webex’s Q&A function to ask questions for panelists.

11:45 AM – 12:30 PM EDT **Break**

Presenters and Chairs for Concurrent Sessions: Please enter your room **10 minutes prior to your session** for setup. If a presenter is not present at the beginning of the session, that person’s presentation will be dropped. Remaining presentations will occur in sequence but will be shifted up to fill in the gap.

12:30 PM – 2:00 PM EDT **Concurrent Sessions #1**

Inflation #1.....	Webex Meeting Room 1
Diffusion and Dispersion	Webex Meeting Room 2
Improvements to Government Data (one hour only).....	Webex Meeting Room 3
Automation, Data Mining, and Machine Learning	Webex Meeting Room 4

2:00 PM – 2:15 PM EDT **Break**

2:15 PM – 3:45 PM EDT **Concurrent Sessions #2**

Inflation #2.....	Webex Meeting Room 1
U.S. Government Interest Rates and Debt (one hour only)	Webex Meeting Room 2
COVID-19 and Nowcasting	Webex Meeting Room 3
Surveys and Sentiment Analysis.....	Webex Meeting Room 4

Technical assistance during the conference: Tara Sinclair (tsinc@gwu.edu).

Conference Theme: Forecasting in the Presence of Missing Data

Forecasters draw upon current and historical data to make predictions about likely future outcomes. In many instances, though, the data available to forecasters are incomplete or delayed. Missing data have consequences for the accuracy of forecasts whether researchers are aware of its presence or not. Sometimes there are lags in the collection or release of data, which can be revised in future periods. In other cases, data are permanently missing due to coverage error or nonresponse. Missing data are a growing concern for researchers and practitioners as technological changes in communication methods mean that those without a landline telephone or internet access are increasingly excluded from sample frames. Further, privacy concerns and mistrust of the government limit people's willingness to participate in surveys creating higher nonresponse rates. The 2021 Federal Forecasters Conference will consider the impact of missing data on forecasts. How does missing data affect forecasts, and what techniques can forecasters use when faced with missing data?

Panelists

Jessica S. Banthin is a senior fellow in the Health Policy Center, where she studies the effects of health insurance reform policies on coverage and costs. Before joining the Urban Institute, she served more than 25 years in the federal government, most recently as deputy director for health at the Congressional Budget Office. During her eight-year term at the Congressional Budget Office, Banthin directed the production of numerous major cost estimates of legislative proposals to modify the Affordable Care Act. Banthin has contributed to Congressional Budget Office reports and written about how reform proposals affect individuals' and families' incentives to enroll in coverage, influence employers' decisions to offer coverage to their employees, and affect insurance market competitiveness. In her recent work, Banthin has written on competition in insurer markets and the accuracy of various data sources used in modeling health reforms. Banthin has also conducted significant work on the financial burden of health care premiums and out-of-pocket costs on families, published in scientific journals. She has special expertise in the design of microsimulation models for analyzing health insurance coverage and a deep background in the design and use of household and employer survey data. Banthin earned her PhD in economics from the University of Maryland, College Park, and her AB from Harvard University.

Dennis Fixler is Chief Economist of the Bureau of Economic Analysis. Dr. Fixler is primarily responsible for statistical quality including source data, methods, interagency data sharing, dissemination policies, and leading selected research efforts. He also coordinates cross-program research projects. Prior to joining BEA in June 2001, Dr. Fixler was at the Bureau of Labor Statistics; most recently serving as Chief of the Division of Price and Index Number Research. Previous positions were at the Federal Trade Commission and the University of Wisconsin-Milwaukee. He has written articles on index number theory and construction, with particular attention to the development and implementation of service price indexes, as well as on other economic measurement issues. He received his Ph.D. in economics from Purdue University.

David Raglin has been at the U.S. Census Bureau for 35 years, the last 18 in the American Community Survey (ACS) program. He is Chief of the Survey Analytics and Measures Branch in the American Community Survey Office, which conducts research into all aspects of the ACS program. He has a Bachelor's Degree in Mathematics from Michigan Tech University and a Masters Degree in Survey Methodology from the University of Maryland's Joint Program in Survey Methodology.

Concurrent Sessions #1

12:30 PM – 2:00 PM EDT..... Webex Meeting Room 1

Inflation #1

Chair: Andrew B. Martinez (U.S. Department of the Treasury)

Evaluation and advancement of the methods used in the USDA's Food Price Outlook

Matthew J. MacLachlan* (USDA - Economic Research Service), Carolyn Chelius

This paper develops an improved methodology for forecasting annual food price inflation and modeling uncertainty. The use of autoregressive integrated moving average (ARIMA) models and optimal model selection techniques improve the fit of forecasting models to the underlying data. Forecast intervals are developed using a combination of the fitted model and the estimated error distribution. This approach improves on existing methods for forecasting food price inflation by improving accuracy, standardizing the models used in forecasting, and more rigorously using information to address uncertainty. These forecasts can provide policymakers with better information about the near-term trajectory of food prices.

How local is the local inflation factor? Evidence from Emerging European Countries

Oguzhan Cepni* (Copenhagen Business School), Michael Clements

We consider whether inflation is a 'global phenomenon' for European emerging market economies, as has been claimed for advanced or high-income countries. We find that a global inflation factor accounts for more than a half of the variance in the national inflation rates, and show that forecasting models of national headline inflation rates that include global inflation factors generally produce more accurate path forecasts than Phillips Curve-type models, and models with local inflation factors. Our results are qualitatively unaffected by allowing for sparsity and non-linearity in the factor forecasting models.

A Randomized Missing Data Approach to Robust Filtering and Forecasting

Dobrislav Dobrev* (Federal Reserve Board), Derek Hansen, Pawel Szerszen

We put forward a simple new randomized missing data (RMD) approach to robust filtering of state-space models, motivated by the idea that the inclusion of only a small fraction of available highly precise measurements can still extract most of the attainable efficiency gains for filtering latent states, estimating model parameters, and producing out-of-sample forecasts. In our general RMD framework we develop two alternative implementations: endogenous (RMD-N) and exogenous (RMD-X) randomization of missing data. A degree of robustness to outliers and model misspecification is achieved by purposely randomizing over the utilized subset of seemingly highly precise but possibly misspecified or outlier contaminated data measurements in their original time series order, while treating the rest as if missing. Time-series dependence is thus fully preserved and all available measurements can get utilized subject to a degree of downweighting depending on the loss function of interest. The arising robustness-efficiency trade-off is controlled by varying the fraction of randomly utilized measurements or the incurred relative efficiency loss. As an empirical illustration, we show consistently attractive performance of our RMD framework in popular state space models for extracting inflation trends along with model extensions that more directly reflect inflation targeting by central banks.

Diffusion and Dispersion
Chair: Neil R. Ericsson (Federal Reserve Board)

Expectation dispersion, uncertainty, and the reaction to news

Jonas Dovern* (Friedrich-Alexander University Erlangen-Nürnberg), Benjamin Born, Zeno Enders

Releases of key macroeconomic indicators are closely watched by financial markets. We investigate the role of expectation dispersion and economic uncertainty for the stock-market reaction to indicator releases. We find that the strength of the financial market response to news decreases with the preceding dispersion in expectations about the indicator value. Uncertainty, in contrast, increases the response. We rationalize our findings in a model of imperfect information. In the model, dispersion results from a perceived weak link between macroeconomic indicators and fundamentals that reduces the informational content of indicators, while higher fundamental uncertainty makes this informational content more valuable.

Prediction Intervals: Neglected Diagnostics?

Keith Ord* (Georgetown University)

Our inferences are made conditionally on the assumption that the model is a good enough approximation to the data generating process. Checks of this assumption are usually based upon a combination of goodness-of-fit of the chosen model and the performance of out-of-sample point forecasts. Although it is well-known that prediction intervals are sensitive to the underlying assumptions, this sensitivity is rarely used to assess model adequacy. The classic airline series, which gave rise to the Box-Jenkins airline model, is used to illustrate how prediction intervals can improve the model selection process.

Could Diffusion Indexes Have Forecasted the Great Depression?

Gabriel Mathy* (American University), Yongchen Zhao

Diffusion indexes provide an effective tool to forecast the business cycle (Zhao 2020). We test how effective diffusion indexes are in forecasting the deepest recession in U.S. history: the Great Depression. Moore (1961) tested the effectiveness of diffusion indexes historically, including for the Great Depression. We replicate Moore's diffusion indexes for this historical period and make a few of our own for comparison. We compare the forecast performance of each index during the output collapse of the Great Depression and discuss the implications of these results for forecasting both in the Great Depression and more broadly.

Improvements to Government Data
Chair: Brian W. Sloboda (U.S. Department of Labor)

Modeling Personal Transfers Using Survey Data

Christopher Steiner* (Bureau of Economic Analysis),
The Bureau of Economic Analysis (BEA) produces estimates of personal transfers—remittances sent from U.S. households to foreign households. Because of source data limitations, BEA uses modeling techniques to indirectly measure personal transfers. Soloveichik and Flatness (2012) outline an approach previously taken by BEA. Using microdata from a special migration supplement to the 2008 Current Population Survey (CPS), they identify demographic characteristics of foreign-born residents that affect the propensity to transfer. Transfer rate estimates from this analysis can then be applied to future American Community Survey (ACS) microdata to estimate annual personal transfers for the international economic accounts. After exploring other microdata options, I conclude that this CPS-ACS method produces the most reasonable estimate for the account. I modify BEA’s estimator for certain survey limitations, and I integrate recipient-country economic indicators into the estimator.

How Much is US Labor Productivity Revised?

Peter Meyer* (U.S. Bureau of Labor Statistics), Kendra Asher, John Glaser, Jay Stewart, Jerin Varghese
This paper examines revisions to official estimates of quarterly US productivity growth for 1994-2015 and to the main source data series. Underlying data on output and hours worked are revised substantially in the first months after the reference quarter and decline to near zero within five years. Revisions come from additional microdata, benchmarking, seasonal adjustment, and changes to definitions and procedures. Revisions to output are larger than revisions to labor. Revisions are larger for first quarters and recessions. Later revisions are approximately normally distributed but early ones are not. Periodic comprehensive revisions to GDP slightly raise measured productivity.

Automation, Data Mining, and Machine Learning
Chair: Maros Ivanic (Economic Research Service, USDA)

Scalable Cloud-based Automatic Time Series Imputation

Tammy Jackson* (SAS Institute Inc.), Michael Leonard, Thiago Quirino
Organizations need to process large numbers of time series for analysis, decomposition, forecasting, monitoring, data mining, and risk analysis. Often, these time series contain missing values that must be imputed. The TSMODEL procedure provides a resilient, distributed, optimized generic time series analysis scripting environment for cloud computing. It comes equipped with capabilities such as automatic time series model generation, automatic variable and event selection, and automatic model selection. It also provides advanced model-based time series imputation. This paper describes a scripting language that supports cloud-based automatic time series imputation. Examples are provided that demonstrate the use of this scripting language.

Ecce Signum: An R Software Package for Analyzing Multivariate Time Series

Tucker S. McElroy* (U.S. Census Bureau), James Livsey
The package provides multivariate time series models for structural analysis, allowing one to extract latent signals such as trends or seasonality. Models are fitted using maximum likelihood estimation, allowing for non-stationarity, fixed regression effects, and ragged-edge missing values. Extracted signals are produced with uncertainty measures that account for sample edge effects and missing values, and the signals (as well as the original time series) can be forecasted.

Standing on the Shoulders of Machine Learning: Can We Improve Hypothesis Testing?

Gary Cornwall* (Bureau of Economic Analysis), Jeff Chen, Beau Sauley
In this paper we have updated hypothesis testing framework by drawing upon machine learning. that We revisit the case of unit root testing through an expansive simulation environment to illustrate a more rapid and general approach that not only allows for the creation of pseudo-composite tests that reconcile the disagreement amongst multiple tests, but returns hypothesis testing to be more in line with Neyman and Pearson (1933a). First, we draw an equivalence between test statistics and decision stumps, demonstrating that tree ensembles are able to recover the full size-power trade-off for any test in question. Second, we show that our approach can improve upon overall accuracy of the traditional unit root test(s) by seventeen percentage points and the sensitivity by thirty six percentage points.

US Dollar / Algerian Dinar Exchange Rate Forecasting: A Comparative Study of Deep Learning Techniques and ARIMA Model

Habib Zouaoui* (University of Relizane), Mohamed Slimane, Meryem-Nadjat Naas
We discuss various machine learning algorithms for modeling and forecasting the Algerian Dinar (DZD) exchange rate forecast against the US Dollar. We compare predictive accuracy for a Machine Learning Linear Regression Model, Deep Learning models (Recurrent Neural Networks (RNN), Long Short-Term Memory (LSTM), Gated Recurrent Unit (GRU)), and ARIMA over 2000-2020 on daily data from Yahoo Finance. The results clearly depict that contemporary techniques outperform an autoregressive model. The machine learning Linear Regression Model provides the maximum accuracy (99.83%) followed by the RNN model with Long Short-Term Memory (LSTM) (90.12%), GRU Model (90.10%) and ARIMA Model (62.30%).

Concurrent Sessions #2

2:15 PM – 3:45 PM EDT..... Webex Meeting Room 1

Inflation #2 **Chair: Michael Kendix**

What Do (and Don't) Forecasters Know about U.S. Inflation?

Jane Ryngaert* (Wake Forest University)

This paper proposes an alternative measure of the implied mean of subjective probability distributions that has important implications for measuring the degree of anchoring of consumer inflation expectations. This method notes that consumer forecasters often report a point estimate consistent with a modal forecast rather than a mean forecast. Accordingly, I modify the distribution fitting method of Engelberg, Manski, and Williams 2009 to allow the mode of the probability distribution to fall at the agent's point forecast. This incorporates information from both point and histogram forecasts in deriving an individual's subjective probability distribution.

Inflation Expectations and Uncertainty from the Perspective of Firms

Xuguang Simon Sheng* (American University), Brent Meyer, Nicholas Parker

We rely on the Atlanta Fed's Business Inflation Expectations Survey to draw inference about firm's inflation perceptions, expectations, and uncertainty. Using methods grounded in the survey literature, we find evidence that the concept of "aggregate inflation" as measured through price statistics like the Consumer Price Index (CPI) hold very little relevance for business decision makers. This lack of relevance manifests itself through experiments (including randomized controlled trials) that show varying question wording researchers use to elicit inflation expectations and perceptions significantly changes firm's responses. Our results suggest firms have become rationally ignorant of a low inflation environment. Instead, we find that unit costs are the relevant lens with which to capture firms' views on the nominal side of the economy. We then investigate both firm-level (micro) and aggregated (macro) probabilistic unit cost expectations. On a firm-level, unit costs are an important determinant of firms' price-setting behavior. Aggregating across firms' beliefs, firms' unit cost perceptions strongly co-move with official aggregate price statistics and, importantly, firms' inflation expectations bear little in common with the "prices in general" expectations of households. Rather, firms' aggregated beliefs strongly covary with the inflation expectations of professional forecasters and market participants.

Extracting Information from Different Expectations

Andrew B. Martinez* (U.S. Department of the Treasury)

Long-term expectations are believed to drive future inflation. However, expectations are not directly observed and available measures present a range of values. To understand what drives these differences, we examine the evolution of survey and market-based measures. First, we show that inflation forecasts improve when incorporating the differences between them. Next, we decompose and extract the differentials in rigidity and information and find the information differential is most important. Finally, using machine learning methods, we find that around half of this differential is explained by changes in liquidity. This explains forecast improvements and predicts the divergence in expectations in 2020.

U.S. Government Interest Rates and Debt
Chair: Neil R. Ericsson (Federal Reserve Board)

The Historical Decline in Real Interest Rates and Its Implications for CBO’s Projections

Edward N. Gamber* (Congressional Budget Office)

The Congressional Budget Office’s interest rate forecast is an important input into the agency’s budget projections. In the United States and globally, real (inflation-adjusted) interest rates have trended downward since the early 1980s. Research on the factors leading to that decline points to demographic changes, such as slowing labor force growth and the aging of the populations; slower trend growth of real output; and a global saving glut. The policy responses to the financial crisis of 2007 to 2009 and the 2020 coronavirus pandemic also played a role in the downward movement in global interest rates. Additionally, over the past several decades, demand for safe liquid assets has markedly increased, driving down the interest rates on such assets in relation to the rates on risky assets. Many of the factors identified as causing interest rates to fall over the past four decades are expected to persist, albeit to a lesser extent. CBO’s forecasts of interest rates over the medium term (10 years) and long term (30 years) are based on the factors identified in the research literature. CBO expects interest rates to rise over the coming decade but to remain below the historical average levels. That forecast is highly uncertain.

Evaluating and Improving Government Budget Forecasts

Neil R Ericsson* (Federal Reserve Board), Andrew B. Martinez

This paper reviews the literature on the evaluation of government budget forecasts, outlines a generic framework for forecast evaluation, and illustrates forecast evaluation with empirical analyses of different U.S. government agencies’ forecasts of U.S. federal debt. Forecast accuracy depends on what data is available---and what data is missing---when the forecasts are made. This feature is illustrated by how lack of knowledge about the business cycle detrimentally affects debt forecasts. Techniques for forecast evaluation include comparison of mean squared forecast errors, forecast encompassing, tests of predictive failure, and tests of bias and efficiency. Recent extensions of these techniques utilize machine-learning algorithms to handle more potential regressors than observations, a characteristic common to big data. These techniques are generally applicable, including to forecasts of components of the government budget, to forecasts of budgets from municipal, state, provincial, and national governments, and to other economic and non-economic forecasts. Evaluation of forecasts is fundamental to assessing the forecasts’ usefulness; and evaluation can indicate ways in which the forecasts may be improved.

COVID-19 and Nowcasting

Chair: Brian W. Sloboda (U.S. Department of Labor)

Back to the Present: Learning about the Euro Area through a Now-casting Model

Danilo Cascaldi-Garcia* (Federal Reserve Board), Thiago Ferreira, Domenico Giannone, Michele Modugno

We build a model for simultaneously now-casting economic conditions in the euro area and its three largest member countries---Germany, France, and Italy. The model formalizes how market participants and policymakers monitor the euro area by incorporating all market moving indicators in real time. We find that area wide and country-specific data provide informative signals to now-cast the economic conditions in the euro area and member countries. The model provides accurate predictions of economic conditions in real time over a period that covers the past three recessions.

Advances in Nowcasting Economic Activity: Secular Trends, Large Shocks and New Data

Thomas Drechsel* (University of Maryland), Juan Antolín-Díaz, Ivan Petrella

A key question for households, firms, and policy makers is: how is the economy doing now? We develop a Bayesian dynamic factor model and compute daily estimates of US GDP growth. Our framework gives prominence to features of modern business cycles absent in linear Gaussian models, including secular movements in growth, time-varying uncertainty, and fat tails. We also incorporate newly available high-frequency data on consumer behavior. The model beats benchmark econometric models and survey expectations at predicting GDP growth over two decades, and advances our understanding of macroeconomic data during the COVID-19 pandemic.

Early Estimates of Services Trade During COVID-19

Jessica McCloskey* (Bureau of Economic Analysis)

This presentation will discuss adjustments to certain early estimates due to COVID-19. International trade in services statistics compiled by the BEA are based largely on business survey data. Traditionally, that data became available with a two-quarter lag, and relevant current period estimates were based on historical trends. Historical trends alone were not reasonable in the COVID-19 context. For certain component series, including intellectual-property-related services, for which company-level correlations between sales and service charges were expected and identified, preliminary estimates used company sales reports, available on a timelier basis. The presentation will compare resulting estimates.

Surveys and Sentiment Analysis
Chair: Fred Joutz (The George Washington University)

How to Deal With Missing Observations in Forecasting Surveys

Constantin Bürgi* (St. Mary's College of Maryland)

Survey forecasts are prone to entry and exit of forecasters as well as forecasters not contributing every period leading to gaps. These gaps make it difficult to compare individual forecasters to each other and raises the question of how to deal with the missing observations for the variables GDP and CPI inflation for the US. Several competing methods are tested and it is found that regression based models perform best based on a number of metrics. Not filling in missing observations and taking the previous value do not perform particularly well.

The Forecaster Who Cried Wolf: The Economic Cost of Recession Over-Forecasting

Dmitri Ryutov*, Argyn Kuketayev

Because the consequences of missing a recession are quite severe, it is puzzling why forecasters seem to be hesitant in predicting recessions. Multiple explanations were suggested, from the lack of courage to lack of information or lack of incentives. We propose another reason: the economic cost of Type II errors to investors. We review the past 50 years of the Survey of Professional Forecasters' recession predictions and consider hypothetical long-term retail investors who may react too readily to recession forecasts by switching to a defensive portfolio. Our findings suggest that such an investor will lose out compared to staying in the reference 60/40 portfolio. We then attempt to evaluate the dollar cost (i.e., foregone income) of reacting to false-positive recession forecasts.

Sentiment and Uncertainty about Regulation

Zhoudan Xie* (The George Washington University), Tara M. Sinclair

The U.S. government issues thousands of regulations a year. Regulations can create significant economic and social benefits, but poorly designed or excessive regulations may generate substantial adverse effects on the economy. In this study, we construct measures of sentiment and uncertainty about regulation in the U.S. over time and examine their relationships with macroeconomic performance. We construct the measures using lexicon-based sentiment analysis of an original news corpus, which covers 505,811 news articles related to regulation from seven leading U.S. newspapers. As a result, we build monthly indexes of sentiment and uncertainty about regulation from January 1985 to August 2020. To further explore what types of regulatory policy drive the connection between regulation and macroeconomic outcomes, we also construct categorical indexes for 15 regulatory policy areas. Our impulse response estimates indicate that a negative shock to sentiment about regulation is associated with large, persistent drops in future output and employment, while increased regulatory uncertainty reduces output and employment temporarily. These results suggest that sentiment about regulation plays a more important economic role than uncertainty about regulation. Furthermore, economic outcomes are particularly sensitive to sentiment around transportation, environmental, and energy regulations and to uncertainty around labor and workplace regulations.