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journal homepage: [www.elsevier.com/locate/jfec](http://www.elsevier.com/locate/jfec)Distilling the macroeconomic news flow<sup>☆</sup>Alessandro Beber<sup>a,b,\*</sup>, Michael W. Brandt<sup>c,d</sup>, Maurizio Luisi<sup>e</sup><sup>a</sup> Cass Business School, City University London, United Kingdom<sup>b</sup> CEPR, United Kingdom<sup>c</sup> Fuqua School of Business, Duke University, United States<sup>d</sup> NBER, United States<sup>e</sup> Bloomberg LP, United Kingdom

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## ABSTRACT

We propose a simple cross-sectional technique to extract daily factors from economic news released at different times and frequencies. Our approach can effectively handle the large number of different announcements that are relevant for tracking current economic conditions. We apply the technique to extract real-time measures of inflation, output, employment, and macroeconomic sentiment, as well as corresponding measures of disagreement among economists about these indices. We find that our procedure provides more timely and accurate forecasts of future changes in economic conditions than other real-time forecasting approaches.

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## 1. Introduction

Timely measurement of the state of the economy relies traditionally on low-frequency observations of a few economic aggregates referring to previous weeks, months, or even quarters. A prominent example is the advance estimate of Gross Domestic Product (GDP) released quarterly about a month after the end of the quarter. The low frequency and delayed observation of any such economic aggregate considered in isolation stands in sharp contrast

with the rich macroeconomic news flow that market participants observe almost daily. This news flow contains information that agents use to learn about the economy in the absence of private information. In particular, the finance literature has identified a large cross-section of dozens of different news releases that have significant and immediate effects on financial markets (e.g., Andersen, Bollerslev, Diebold, and Vega, 2003).

We distill the economic news flow observed by market participants into a small set of indicators describing four distinct aspects of the economy: inflation, output, employment, and macroeconomic sentiment. Specifically, we propose a simple cross-sectional technique to extract daily principal components from economic news releases associated with a given information type and observed at different times and frequencies. Our approach is simple, robust (no numerical optimization is required), and can effectively handle the large number of announcements that are relevant for tracking the evolution of economic conditions in real-time. At the same time, our empirical

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analysis shows that the output of our approach is more timely and informative than more sophisticated but also more difficult-to-implement statistical techniques. Intuitively, the potential disadvantage of a simpler modeling approach is more than compensated for by the sheer quantity of data our approach can effectively incorporate.

Our paper relates to the literature on measuring the state of the economy in a time-series setting based only on fundamental economic data [see [Banbura, Giannone, Modugno, and Reichlin, 2013](#) for a survey], commonly referred to as “nowcasting.” There are two general approaches to this problem. The first approach is to use a balanced panel regression, along the lines of the seminal paper of [Stock and Watson \(1989\)](#). The purpose of this first approach is to construct a coincident index of economic activity using factor models on a large set of macroeconomic releases, which basically amounts to constructing a weighted average of several monthly or quarterly indicators. The advantage of this technique is that the resulting index is based on many macroeconomic variables. However, this advantage also results in a relatively low measurement frequency, because the econometrician has to wait for the panel to be complete before the index can be constructed. A second general approach is to model macroeconomic data using a state-space model (e.g., [Evans, 2005](#)). The advantage of this second approach is to produce an indicator at a higher frequency, since a state-space model can effectively handle the sparse and delayed reporting of economic data and missing information on non-release days. However, this technique is impractical for large cross-sections of macroeconomic releases. For example, [Evans \(2005\)](#) only considers the set of different (preliminary, advance, and final) GDP releases. [Aruoba, Diebold, and Scotti \(2009\)](#) propose a business condition index, called the Arouba Diebold Scotti (ADS) index, constructed using four indicators at different frequencies, including a continuously observable financial markets variable. Finally, [Giannone, Reichlin, and Small \(2008\)](#) combine the two approaches by modeling factors extracted from a balanced panel of monthly releases in a state-space setting.

Our goal is to measure the state of the economy with a methodology that broadly retains the advantages of both approaches without their respective limitations. Specifically, we consider a large universe of macroeconomic announcements. This is a crucial aspect of our methodology, given the evidence of many influential releases from the macroeconomic announcement literature. At the same time, our approach can handle data released at different frequencies and missing observations to produce a real-time high-frequency measurement of the state of the economy.

Our methodology has several other differentiating features relative to the literature. First, we do not aim to estimate a real-time series of GDP, for example, but we rather leave the macroeconomic factor(s) truly latent and unspecified. In this sense, we do not impose any structure on the estimation and thus do not take a stand on what is the appropriate metric of the state of the economy. We simply let the data speak for itself. Second, our focus on a large cross-section of economic news releases allows us to

extract factors from four subsets of macroeconomic news (e.g., inflation, output, employment, and macroeconomic sentiment). We use these subset indicators to learn about the relations between different driving forces of the economy. Third, we utilize news flow data that are truly real-time and unreported, as opposed to approximately dated historical data that are often restated [e.g., [Koenig, Dolmas, and Piger, 2003](#); see also [Ghysels et al., 2012](#), for an illustration of the issues arising from restated macroeconomic data]. Fourth, we refrain from using any financial market-based data, as our aim is to objectively measure the macroeconomic news flow absent any of the market’s interpretation of the same. Finally, we also apply our methodology to the dispersion of economic forecasts as a new way to obtain a high-frequency measure of macroeconomic uncertainty based on the disagreement of a cross-section of economic experts. In summary, our fairly simple and data-driven method delivers a real-time, daily, unbiased, and objective reading of the state of the macroeconomy, which can be used for a number of purposes, most notably to study the relation between financial market and economic dynamics.

We find that an economic activity factor (which combines output and employment information, as they are highly correlated) as well as a macroeconomic sentiment factor, both extracted from the large cross-section of macroeconomic news, have sensible dynamics. The greatest dips in both series are well aligned with the ex post defined National Bureau of Economic Research (NBER) recession periods. The macroeconomic sentiment factor, obtained from consumer and business confidence releases, is highly correlated with economic activity, but appears to lead fundamentals especially around important turning points. Finally, our inflation factor exhibits dynamics that seem only weakly correlated with growth, with much more erratic variation, and has an unclear pattern in expansions versus recessions.

Our empirical proxy of economic uncertainty based on economic expert disagreement is interesting for at least two reasons. First, it shows little correlation with the estimates of the latent economic activity, macroeconomic sentiment, and inflation factors, suggesting that they are likely to contain different information. Second, and more importantly, macroeconomic uncertainty exhibits intriguing asymmetric dynamics. The peaks of disagreement correspond to the final stages of recession periods, while uncertainty is relatively subdued at the end of economic expansions. This evidence suggests that economists tend to disagree mostly on recoveries from prior contractions, whereas everyone seems to see the end of an economic expansion coming.

We formally relate a real-time factor of economic growth (which further aggregates the information relative to economic activity by combining information relating to output, employment, and macroeconomic sentiment) to vintages of the Chicago Fed National Activity Index (CFNAI), constructed by the Chicago Federal Reserve Board based on [Stock and Watson \(1989\)](#), on CFNAI release dates at the monthly frequency, and to the vintage version of the ADS index of [Aruoba, Diebold, and Scotti \(2009\)](#) at the weekly frequency. We find that our latent growth factor is

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