



# Research & Knowledge

Read the paper of Alberto Caruso, PhD at ECARES.

## Macroeconomic News and Market Reaction: Surprise Indexes meet Nowcasting

by Alberto Caruso

### Macroeconomic news and asset prices

Let's start from some facts: the macroeconomic information flow is constant and intense, and markets constantly monitor it. It is very important, in fact, to filter the new information and update the view of the current state of the economy, given that the most comprehensive measures of economic activity (e.g. GDP) have low frequency and are released only with a lag. Almost every day, public and private statistical agencies provide information about different aspects of the economy: for example, they release data at monthly frequency about industrial production, employment, retail sales, and many other indicators more timely than GDP; every release, if properly analyzed, provides us with a new piece of information about how the business cycle is going. Market operators form expectations about the most important variables and, if a data release has an unexpected, "surprise" component, they react and price it. Macro "news" move the markets. This fact has been extensively documented in the literature, looking at different asset classes (yields, stock prices, exchange rates) and different frequencies, from tick-by-tick data to quarterly frequency (see Andersen et al., 2007 and Faust et al., 2007 for some examples). To have an idea of the economic relevance of the phenomenon, macroeconomic news explain more than one third of bond yields fluctuations at low frequency, and their effect is statistically significant and persistent (Altavilla et al, 2017).

### Replacing experts by machines?

In this strand of literature, the "market-based" news is constructed as the difference between the actual macroeconomic release and market expectations, available through surveys among market participants. One way to aggregate this massive flow of heterogeneous information is to

assign some weights to the news, and to construct "surprise indexes" that synthesize the unexpected information released in a certain window of time. They are a cumulated weighted sum of these news, in which the weights are based on the effect of macroeconomic news on specific markets or on their predictive content for economic activity. Being a standard practice among practitioners (see the Citi Economic Surprise Index or the SIREN Index constructed by Deutsche Bank), the relevance of a meaningful surprise index has been recently acknowledged in the economic literature, since there is a good correlation with asset prices at low frequency. Given the recent advances in econometrics, can we replicate the process of pricing of macroeconomic news with an automatic machine based on macroeconomic data? A positive answer would provide us with another perspective to try to understand the importance of fundamentals in driving asset prices. Moreover, it can inform whether there is scope to invest further in studying algorithmic trading strategies based on macroeconomic news.

### A "Nowcasting Surprise Index" and its properties

The recent literature shows that market operators filter and price the new macroeconomic information, and in my paper I show that is indeed possible to replicate this market pricing of macroeconomic news (Caruso, 2018). A model-based index is more flexible than a market-based one, since it can be constructed for any country of interest as it does not need survey expectations, which in some cases can be not available; moreover, survey expectations can be costly, prone to sentiment or herding behavior, and could be affected by respondents giving strategic responses. Going a bit more in detail, in this paper I have constructed a fully real time, model-based surprise index for the United States, that summarizes how a short-term forecasting model has been surprised by macroeconomic

developments in a rolling window of time. The construction of news and weights is based on the "nowcasting" approach, an econometric technique (developed by former ECARES scholars!) widely used in many private and public institutions, for example central banks, which is capable to extract the real-time signal from a large set of economic variables to assess the current state of the economy (see Banbura et al., 2013 for a review). Importantly, the nowcasting approach provides us with a model-based expectation for any macroeconomic variable of interest. At any macroeconomic release, the "news" (difference between the model expectation and the actual value) triggers an update in the model assessment of the current state of the economy.

I process the releases and the model-based macroeconomic news taking into account their impact on model updates, aggregating them into a daily index which can be updated at any macroeconomic release. The index can be thought as a weighted average of the forecast errors of the macroeconomic variables that enters a nowcasting model and represents a rolling measure of the surprise component of the macroeconomic data flow, flexible and judgment free. The weights represent the importance assigned by the model to a macroeconomic release in updating the assessment of the business cycle at each point in time. In particular, I use the weights assigned to macroeconomic news by a nowcasting model in order to calculate its updates of the GDP nowcast (expectation of the GDP in the current quarter), forecast (next quarter), or backcast (last quarter, when the data has not been released yet). Then, to have a consistent rolling index, I weight these weights depending on the position of the index in the quarter. It is essential to remark that the weights refer to the macroeconomic news, which is what matters for market participants, and not to the variables. I analyze the properties of the model-based forecasts, showing that they replicate well market expectations. Moreover, I test the properties of bias and efficiency of model-based and market-based forecast, showing that they have similar properties and that the model is at least as efficient as market participants in forecasting individual macroeconomic variables.

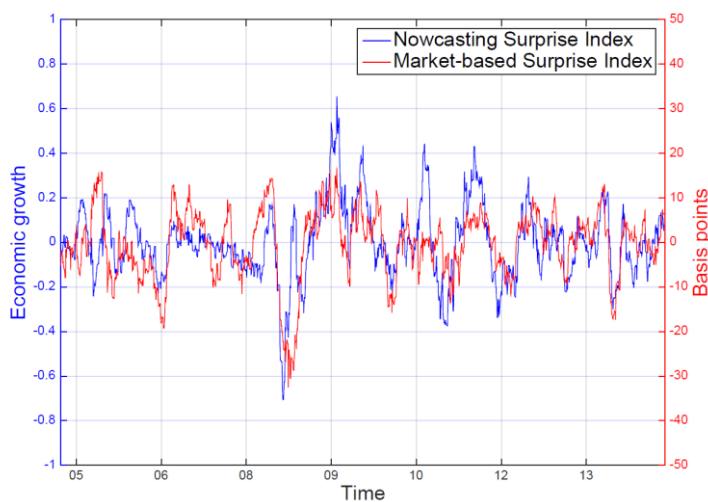


Figure 1 - A market-based surprise index and the Nowcasting Surprise Index.

The Nowcasting Surprise Index has a similar behavior to indexes constructed using market-based weights and news, as shown in Figure 1.

The fact that a model-based index can replicate market-based indexes is a remarkable result. On the one hand, that means that market news and model forecast errors are similar, meaning that a computer-based model fed with a large data set is able to replicate market expectations. Moreover, a model-based index is less costly than paying experts, and less susceptible to biases such as herding behavior. On the other hand, it is useful to understand, in a coherent statistical framework, whether financial market operators react because a series of news events triggers an update about the current state of the economy.

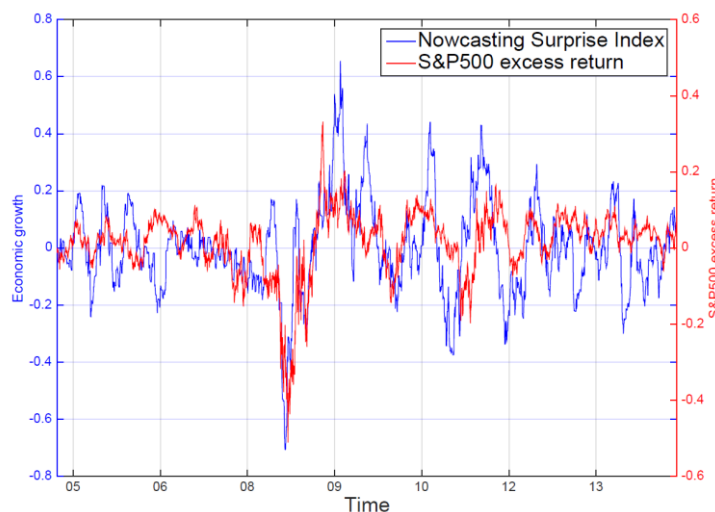


Figure 2 - Nowcasting Surprise Index and S&P 500 excess return at quarterly frequency

The second result is that the "Nowcasting Surprise Index" shows a good correlation with asset prices and in-sample predictive power, especially at quarterly frequency, explaining more than 40% of the S&P 500 excess returns. A similar result holds also for long term yields. These results could help understand the importance of fundamentals in driving asset prices and can be seen as a good signal that there is scope to invest further in studying algorithmic trading strategies based on macroeconomic news.

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