

## Can inaccurate information have value?

# The Paradox of Macroeconomic Announcements

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Statistical agencies collect, aggregate and release information about various aspects of the macro economy, providing a seemingly invaluable service to investors. It would be too costly for an individual to calculate inflation, new residential constructions, consumer confidence, or crop production. This aggregate information can in turn help market participants estimate the systematic risk faced by their portfolios. As a result, there is substantial media coverage when this information is released—the unemployment rate and GDP often make the front page of major newspapers. However, most initial announcements of macroeconomic data are highly inaccurate. They undergo significant revisions, sometimes by up to 200 percent, in subsequent months and years. Given this state of affairs, why does anyone pay attention to the release of inaccurate macroeconomic information? What information, if any, do these indicators provide to investors? What role do they play in the formation of investor expectations about economic conditions and the business cycle?

The paradox of macroeconomic announcements is that, while every investor, news agency and policy maker seems to pay attention to them, their release does not have any systematic impact on aggregate market prices. This suggests that “Joe the investor” is watching the news and trading accordingly, but that the market as a whole knows better than to focus on inaccurate public signals. So what’s the point of gathering and releasing this macroeconomic information? A new study of mine is demonstrating that there is information in market prices at the time of the announcement that predicts the future revision of the announcement. The inaccurate release of information actually acts as a catalyst to the aggregation of accurate information.

### Construction & Release of Macroeconomic Reports

The methodology used to construct, release and revise the various indicators is extremely thorough and careful. While the exact processes differ between statistical

agencies, the overall procedure is fairly consistent. Let’s use the Bureau of Labor Statistics (BLS) monthly nonfarm payroll announcement to illustrate the various levels of information aggregation and transmission.

First, the BLS sends surveys to a representative sample of firms, asking them about their payroll: total number of employees, number of new employees, employment status, race, age, etc. Next, the surveys submitted by a fixed deadline are aggregated and extrapolated to a national number using the latest available total number of firms and employees in the economy (benchmarks). Finally, a detailed report is compiled, containing all the various quantitative and qualitative components of the monthly employment situation.

To ensure transparency, the survey methodology and the many accompanying econometric details are publicly available on the agencies’ websites. However, different groups within the BLS work on different subparts of the full report so only a very select number of people have detailed knowledge of the full report ahead of the scheduled public release, thereby limiting the risk of leaks.

Every month, the release of macroeconomic information follows a regular schedule. The employment situation report is released on the first Friday of the month, followed by producer prices, industrial production, and consumer prices the following week, then durable goods orders and Gross Domestic Product (quarterly), factory orders, business inventories, trade balance, and finally consumer confidence, to name just a few.

### Revisions to Macroeconomic Data

A consequence of the methodology by which the reports are constructed is that the initial widely publicized estimates can be highly inaccurate. This is due to three main factors. The first source of revisions is reports that firms submitted after the collection deadline – this number, however, having significantly decreased over the last de-



Source: Real-Time Data Set for Macroeconomists by the Federal Reserve Bank of Philadelphia.

cade with the advent of electronic communication. Another source of revisions are national benchmark updates required because some firms might have gone out of business since the last benchmark calculations, the surveyed sample may not be representative anymore, etc. The third source of revisions is methodological changes. Examples range from the rescaling of price indices to the change in industry classification codes. While the informational content of these revisions is less clear, they generally represent valuable updates as the agencies attempt to reduce measurement errors.

The process of revisions can last for many months and even years – the Bureau of Labor Statistics, for example, updates its numbers for up to five years after each initial announcement. Each revision incorporates new information into the report that was not available at the time of the release, providing an increasingly accurate picture of the true state of the employment situation in a particular month. And the picture does change – sometimes drastically.

The figure above shows the magnitude of the BLS' final revisions to the monthly nonfarm

payroll announcements between 1965 and 2008. The final revisions are defined as the difference between the final available value (in December 2008) and the original announcement (dated along the horizontal axis). The main take-away from the figure is that the average final revision is about 234,000 employees. This implies that the BLS, in its initial announcements, on average underestimates the true change in national payroll by more than one quarter of a million employees. To put this into perspective, the average announced monthly change in payroll is about 125,000 employees over the same time period. The revisions therefore stand at almost 200% of initial announced values.

Such extreme revisions are not atypical. Other investment and real activity indicators, such as industrial production, factory orders, business inventories, and durable goods orders, undergo revisions of up to 100% on average. However, they are much smaller for price indicators, such as the CPI and PPI.

Statistical agencies attempt to draw the most precise picture of the economy they can given their limited resources. Since they ag-

gregate vast arrays of important and detailed information about the systematic risk of the economy, investors and the media seem to pay careful attention to their announcements. However, the extensive revisions that the initial releases undergo raise the obvious question: why would anyone pay attention to such inaccurate information?

### **The Link between Revisions and Market Prices**

While there are instances of significant market-wide price changes due to macroeconomic announcements, the systematic evidence is rather weak. While inflation and payroll data appear to be the only indicators with a strong impact, this only holds for about ten to fifteen minutes around the announcement time and even then, the effects are most prominent in the bond market and mainly insignificant in equity markets.

Taking into account the size of the revisions that most macroeconomic releases undergo and the fact that the announcements are always about prior months' realization of the economy, this evidence is not so surprising. Indeed, nobody should pay attention



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to the release of inaccurate and outdated information. The question then becomes: what type of information, if any, gets aggregated in prices on announcement day? In a working paper, “Information Aggregation around Macroeconomic Announcements: The Link between Revisions and Stock Reports,” I show that announcement-day market returns actually contain information about the future revisions to the just-released macroeconomic information. That is, market prices anticipate the eventual revision of the data. For instance, the S&P500 Index rises if the data released that morning is too low, meaning the future revision will be positive, and vice versa. The effect is independent of the size of the initial announcement surprise and strongest for investment and real activity variables, in particular for industrial production.

### **How the Market Knows Best**

From a classical standpoint where the statistical agencies aggregate information known to them only until the public release, this result is puzzling. It basically says that on announcement day, markets already know 1) that the publicly released data is inaccurate, and more importantly 2) in which direction the data will subsequently be revised. So markets seem to disregard the information released and aggregate more accurate private information about the macro economy.

However, viewed through the lens of a dispersed macroeconomic information framework that I develop in the paper, this result makes sense. Building upon a foundation layed by the economist Friedrich Hayek, my hypothesis posits that the individual pieces of information that make up the complete and accurate national payroll number are dispersed within the economy and get aggregated into prices by thousands of small firm owners, directors, entrepreneurs and investors who first observe them. If that is the case, then by the time the Bureau of Labor Statistics releases its own estimate-based on a limited, albeit representative, sample and past national benchmarks-there should be little information in the report that markets do not already know.

To illustrate this dispersed information framework, let’s take the example of a steel plant manufacturer in Indiana. He observes his mills on a daily basis and has first-hand information about his production capacity and the quality of his product. He also has private information about his order book, both current and expected. As a result, he may trade in the steel futures market in order to hedge his projected cash inflows and outflows. Of course, he is not the only manufacturer doing this – there are many thousands more making their own calculations and trading decisions. Such trades, not purely speculative in nature,

impound accurate and timely information into market prices about the current state of steel production, inventories, orders and shipments. However, by the time the Federal Reserve collects and aggregates the surveys sent to the sampled manufacturers, thereby estimating the national level of the steel industry, more accurate information is most likely already in prices.

The dispersed information hypothesis is consistent with the fact that, on announcement day, market prices already contain information about the future revisions of the macroeconomic information, hence the true state of the economy, even though the public signal may be highly inaccurate. But what if there is an incentive for investors to pay attention to the release, even inaccurate ones?

### **Information Coordination**

An alternative hypothesis developed by economists Morris and Shin concerning the impact of the public release of macroeconomic information stems from the coordination incentives of investors around these announcements. In order to estimate the expected resale value of their portfolios, market participants need to form expectations about the expectations of other investors. They need to evaluate, for example, the likelihood of being able to resell their assets at a higher price in the future, a de-

cision which is conditional on someone else being willing to buy at that price in the future. In order to perfectly evaluate other investors' future willingness, or expectations, one would need access to all of their information, public and private. Since this is clearly impossible, one can focus on the releases of macroeconomic information, which are observed by all investors.

The vicious circle driven by the need to forecast the expectations of others will lead to an excessive focus on public information. In turn, investors will therefore pay less attention to their own private information gathering. As a result, if the public announcements are imprecise, then this imprecise information will get a lot of attention at the expense of valuable private information, resulting in less informative prices.

Business cycle uncertainty and investor fear can drive such excessive focus on public information to the detriment of private information. In times of market turmoil, the interest rate decisions of the Federal Open Market Committee typically receive so much attention that investors might indeed coordinate their actions around every word of the committee's opinion, thereby abandoning all forms of private information analysis. Doing what everyone else does and listening to what everyone else listens to is not necessarily a profitable strategy, especially if the news is highly inaccurate.

Let's take the example of Joe the investor, who uses public macroeconomic announcements in order to estimate the likelihood of a recession. During the Fall of 2008, he receives bad news after bad news – the Bureau of Labor Statistics announcing losses of more than half a million employees every month being just one of them. He does not know how much the releases might get revised and he certainly does not know in which direction they will be revised. According to my research

results, he could look at the price movements around announcement times in order to estimate the inaccuracy of the announcements – the market gets it but many of the individual investors do not. If the number of investors acting based on inaccurate information becomes too large, then public announcements can exacerbate the downfall of the market.

### **Conclusion: Inaccurate but Nevertheless Useful Information**

Even though initial macroeconomic announcements are highly inaccurate, they still serve a purpose in the information aggregation process of prices. Whether it is through the dispersed information framework or via another mechanism, they do help investors form estimates and expectations of past and future business conditions. However, this process does not happen by simply taking the announcements at face value – it requires a careful analysis of the reports as well as private gathering of information, which remains the bedrock of our modern financial system.

#### **ABOUT THE AUTHOR**



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**Recent research** is developing tools that can provide investors and policy makers with a much more timely and accurate picture of the economy, such as a daily measure of GDP. The Aruoba-Diebold-Scotti (ADS) Business Conditions Index, maintained by the Federal Reserve Bank of Philadelphia, is the latest of such attempts. Using six underlying macroeconomic components released at different times and frequencies (weekly initial jobless claims, monthly industrial production, and quarterly GDP being three of the components) and a dynamic factor model, the indicator estimates and tracks the level of real macroeconomic activity at a high frequency. Each time one of the components is released and each time revisions to any of the components are released, the index is updated accordingly, thereby incorporating the most up-to-date information in the real-time estimate of the economy.

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