



Beware of the lies of history

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- The first release of economic data is usually based on incomplete information resulting in subsequent revisions
- Contemporary time series therefore overstate the timeliness accuracy and reliability of economic indicators and signals derived from them (look ahead bias)
- We illustrate this in the context of historical market crashes and provide investors with a flexible tool that allows them to analyse vintage data sourced from the Archival Economic Data platform of the St. Louis Fed. We will soon make this tool available publicly.

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History is a set of lies that people have agreed upon. This cynical comment is often attributed to Napoleon Bonaparte but also to Voltaire. We could add to this that the consensus seldomly last but are themselves subject to significant revisions, often driven by political agendas. Fortunately, there is a nobler motive behind the revision of economic data but this doesn't make them less dangerous for the incautious observer.

1 The trade-off between timeliness and accuracy

Central banks and other government agencies attempt to release economic indicators in a timely fashion. However this comes at the cost of accuracy as input data is often incomplete or missing, resulting in adjustments during subsequent periods. Most financial databases only report the most recently published time series but in fact, there is a range of vintages for every time series that is subject to revisions. These revisions can be substantial and are carried out over an extended period of time. The latest vintage by definition incorporates the most comprehensive set of data and can therefore be considered the most accurate description of the state of the economy at a given past point in time. However, it is also the least accurate reflection of the state of knowledge at this particular point in time. In other words, analysis using most recently published data will suffer from material look ahead bias. In fact, look ahead bias can be induced through two distinct issues. First of all, even the first estimate of an economic variable is always published with a lag meaning that analysts need to use the actual publication date when estimating correlations or lead/lag relationships. However, this issue is trivial and straight forward compared to the problem of subsequent data revisions which is why

we are focusing on the latter aspect here. Most importantly, the revisions problem is not only a concern to investors developing quantitative models. Who doesn't know the typical macro-charts consisting of two historically highly correlated time series that seemingly undoubtedly signal why you should jump on or out of the market immediately? Unfortunately, these charts are rarely based on vintage data resulting in overstated correlations and an inflated sense of the predictability of historical events. We have scratched some numbers to illustrate using the example of three well known and popular US indicators, namely US Industrial Production Index, the Philadelphia Fed's Leading Index for the United States and the Bureau of Labor Statistic's Temporary Help Services statistic. All data is sourced from ALFRED, the Archival Economic Data collection of the Federal Reserve Bank of St Louis. Unfortunately, for many indicators, the availability of vintage data on ALFRED is limited to a relatively short period of time. The industrial production time series though reaches back for almost a century thus allowing more in depth analysis.

2 Back in the summer of ... '15

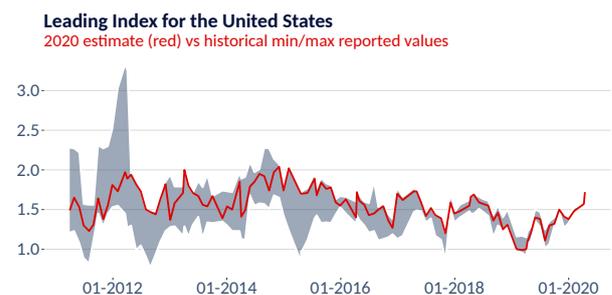


Figure 1: The magic disappearance of the 2015 crash

The attentive investor most likely remembers the shaky market conditions during the summer of 2015. In August, the SP 500 lost more than 11% of its value within a couple of days. The slump was initially triggered by a sell-off in Chinese equity markets that quickly spilled over to the Western world letting many market participants fear a new Global Financial Crisis. The gloomy outlook priced into equities and commodities was supported by seemingly weak economic data as Figure 1 illustrates. The chart shows the most recent vintage of the US Leading Indicator published by the Philadelphia Fed (in red) as well as the historical range based on prior vintages. Historical vintages clearly signaled an economic slowdown even in early 2015 contributing to the fear of an end of long lasting boom. However, estimates have been gradually revised upwards since then and in the most recent one, the slump has basically disappeared.

3 Relying on temporary work...

Figure 2 shows another example, the development of the number of temporary help services employees on nonfarm payrolls. The indicator tends to be strongly

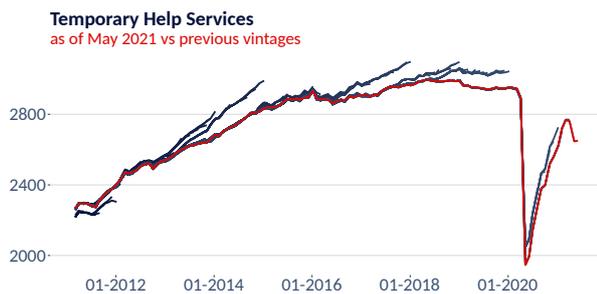


Figure 2: Initially released payroll data indicated a stronger outlook in early 2020 than visible today

correlated with the business cycle as firms hire temporary employees when they are facing strong demand and are quick to lay them off when the cycle turns. However, like many economic indicators, the index is subject to frequent revisions. Figure 2 illustrates this by directly comparing all vintages released since 2012 (the earliest date for which ALFRED reports data) with the most recent time series in red. The latter already declined before the Covid induced market crash, suggesting, the indicator may have had predictive power. This however can not be said about the vintage data that was available back then which showed much stronger performance in 2019 and early 2020.

4 Industrial Production - who is leading whom?

Setting aside global pandemics, the service industry tends to be relatively stable which is why industrial

production has been accounting for most of the volatility of the US GDP despite representing only roughly 10% of output. For this reason it is a popular business cycle indicator and a leading indicator of GDP. It's correlation with the stock market however can be delusive. Figure 3 shows the y/y growth of Industrial Production and the development of the SP 500 index during the Financial Crisis of 2007-2008. During the market



Figure 3: Revised Industrial Production data decreases significantly earlier than historically available numbers

meltdown the index shows a high correlation with the revised economic indicator (light blue). However, the originally published data clearly lags it at the end of 2008 and early 2009 making it rather ineffectual as a timing indicator. We have looked at a whole range of crisis, starting with the 1973-1974 stock market crash, with similar results. Revised time series tend to be smoothed and turn earlier, overstating the timeliness of signals.

5 Conclusion

Revisions of economic data can be substantial and can occur over an extended period of time. This results in final time series that differ significantly from initially released data. This can result in a flawed understanding of the timeliness, accuracy and reliability of signals generated by economic data. The problem is not only relevant for quantitatively oriented market participants but also extremely important for fundamental investors who form their investment view based on historical relationships between economic variables and financial markets. Unfortunately, many research publications are not based on vintage data and thus tend to overstate the historical accuracy of indicators and the reliability of recommendations derived therefrom. Investors need to understand what kind of data they are looking at and should be aware of the significant revisions it has often been subject to. Fortunately, there are databases such as ALFRED that allow the comparison of recently released data with historical vintages. To provide investors with a handy tool for the analysis of historical revisions especially with regard to business cycle turning points, we have created a small web application which we will soon make available publicly.

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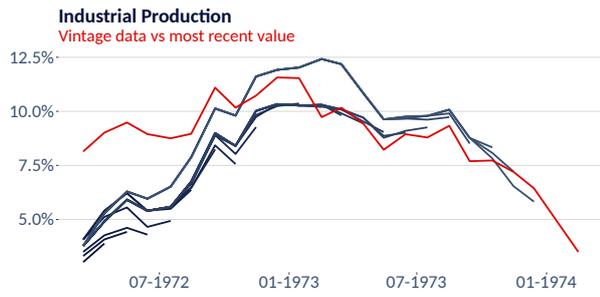


Figure 4: 1973-1974 Stock Market Crash

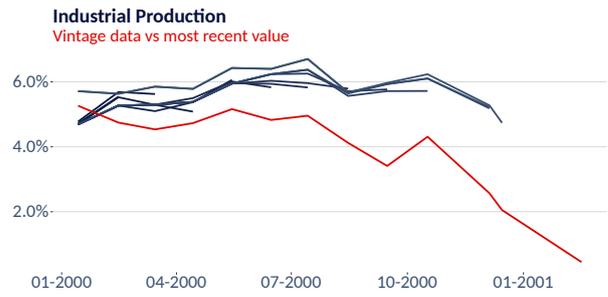


Figure 8: Dotcom Bubble

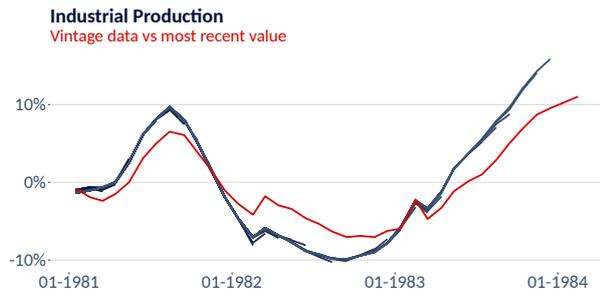


Figure 5: 1982 Bear Market

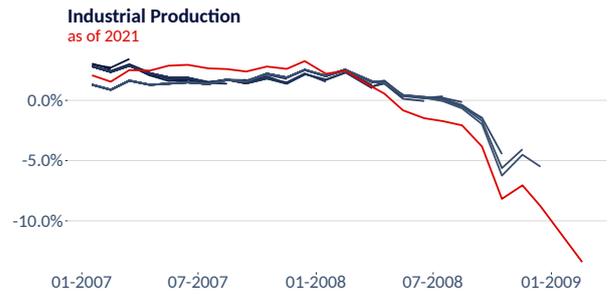


Figure 9: 2008 Great Financial Crisis

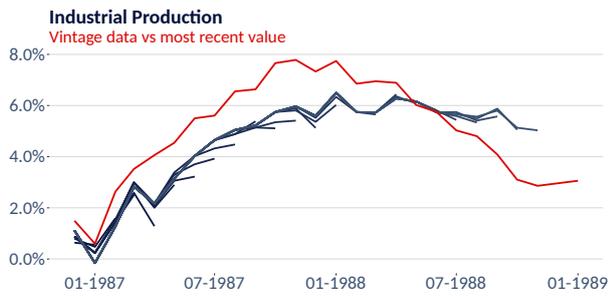


Figure 6: Black Monday

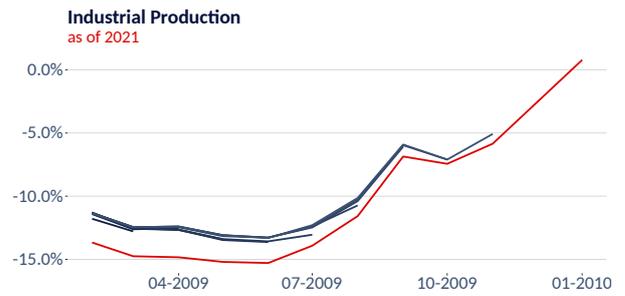


Figure 10: 2008 Great Great Financial Crisis Recovery



Figure 7: Black Monday Recovery

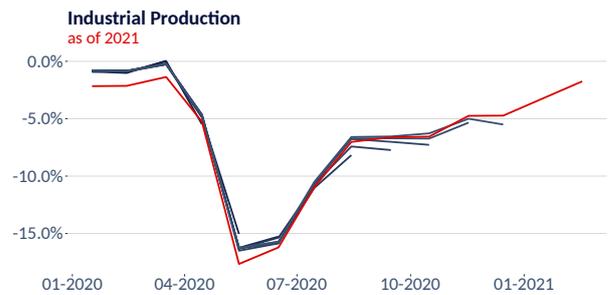


Figure 11: Covid Crisis