

Stronger data ahead: explanation and implication

We expect stronger data in coming weeks, but to some degree it will reflect the limitations in the current techniques used for seasonal adjustment.

A curious growth pattern has emerged...

Over the last two years, perceptions of the strength of the U.S. economy have gone through a similar annual cycle. Early in the year, strong data suggest a relatively robust recovery, only to disappoint in the late spring and summer. To a significant degree this pattern reflects specific events – an intensification of the problems in Europe, first in May of 2010, and again this summer, oil price increases earlier this year, and the supply-side disruptions flowing from the 11 March earthquake and tsunami in Japan (See “Contingency plans”, *US Economic Weekly*, Nomura, July 15, 2011).

... caused by limitations of seasonal adjustment

However, it appears that shortcomings in the methods used to seasonally adjust economic data have also contributed to this pattern. The standard empirical techniques used to seasonally adjust US economic data – such as the Census Bureau’s X11 and X12 programs – have interpreted some of the sharp contraction in the fourth quarter of 2008 and the first quarter of 2009 as a change in “seasonal” patterns. As a result, current techniques for seasonal adjustment tend to boost data in the fourth and first quarter of the year, relative to previous patterns, then depress data in the second and third quarters.

Important indicators next week may show an upward bias

Looking ahead, this apparent statistical “bias” should contribute to somewhat stronger data in the coming months, as we move into a period when those techniques tend to boost the adjusted data. Important, market-moving indicators to be released next week – the Chicago PMI on Monday, 31 October, and the ISM manufacturing index on Tuesday, 1 November – are likely to be supported by this effect.

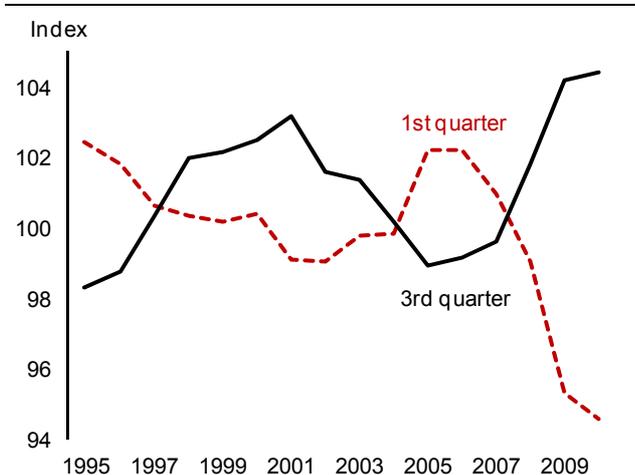
While some of the recent, and prospective, resilience in US economic indicators reflects a “bias” from seasonal adjustment, this should not obscure the fact that the underlying economy continues to grow at a steady pace in spite of recent challenges. Indeed, taking into account any seasonal bias suggests that the stop-go dynamics of the US economy over the last two years has not been as severe as some indicators might have suggested. Since the slowdown this spring, following the spike in oil prices and the earthquake in Japan, it appears the US economy continued to grow at a moderate pace. The recent tightening of financial conditions and the ongoing crisis in Europe are threats to the recovery going forward, but for now the US economy continues to expand, and we expect this will be reflected in the data over the coming weeks

Challenges for Seasonal Adjustment

Seasonal adjustment is important...

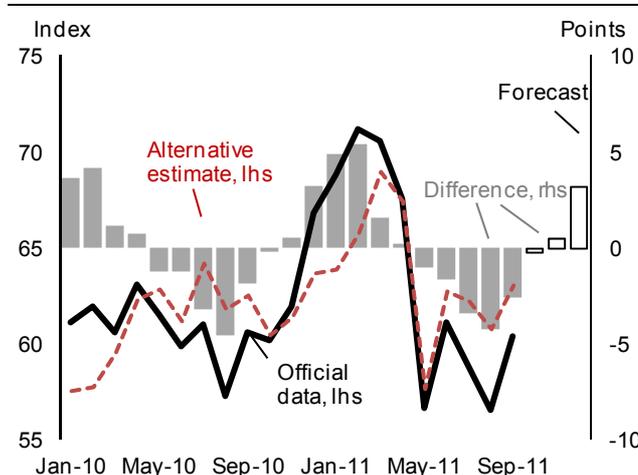
The challenge for seasonal adjustment is to distinguish “seasonal” influences, i.e., patterns that repeat in a predictable way each year, from other fluctuations in the raw data. Under normal circumstances, the standard techniques – the U.S. Census Bureau’s X-11 and X-12 programs, and other programs such as Tramo-Seats which is commonly used in Europe – do this relatively

Figure 1. Seasonal adjustment factors for Chicago PMI



Note: Seasonal factors are estimated using the Census X-11 program on data available up to the plotted.
Source: Kingsbury International, Nomura Global Economics.

Figure 2. Difference between Chicago PMI seasonal factors



Source: Kingsbury International, Nomura Global Economics.

well. But these programs can unduly affect results when the underlying data are more volatile.

... but is being distorted by the financial crisis

In particular, when there are sharp deviations in the raw data, seasonal adjustment programs tend to treat at least some of the deviation as a new seasonal pattern. This problem appears to have emerged in the wake of the severe contraction in late 2008 and early 2009. Estimated seasonal adjustment factors for a range of economic indicators we tested tend to anticipate weaker data in the fourth and first quarters relative to the patterns estimated prior to the crisis. And because seasonal adjustment, by design, is zero-sum over the year the additional anticipated weakness in the fourth and first quarters must be offset by anticipated strength in the second and third quarters. If the true seasonal patterns have not changed, then these crisis-driven changes in estimated seasonal factors will introduce a “bias” into the adjusted data. In particular, adjusted data will be biased upward in the fourth and first quarters, and biased downward in second and third quarters. Note that this “bias” is projected both forward and backward. That is, the standard program will tend to revise previous seasonal factors in the same way. Moreover, the impact from large shocks, such as what we experienced in 2008 and 2009, is likely to decline only gradually.

The Fed has adjusted IP for seasonal bias

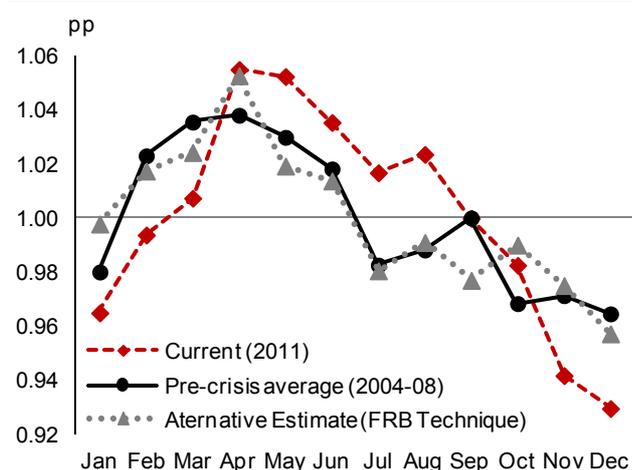
The Federal Reserve addressed this problem in the latest annual revisions to its estimates of industrial production. (See Maria Otoo, “Industrial Production and Capacity Utilization: The 2010 Annual Revision,” Federal Reserve Board, April 2011.) According to the Fed, “the recent recession seemed to have a systematic effect on the seasonal factors estimated using standard procedures” causing an abnormal shift in seasonal adjustment patterns that is “probably artificially induced by the recession”. In other words, it was apparent that standard seasonal adjustment techniques introduced the sort of bias described above, and therefore the Fed now alters its seasonal adjustment procedures to mitigate the problem.

Uncovering the seasonal bias in the Chicago PMI

Other data, however, remains subject to this sort of bias. For example, estimated seasonal factors for the Chicago Business Barometer, also known as the Chicago PMI, have changed notably since the economic contraction in 2008 and 2009. Figure 1 shows estimates of the average seasonal adjustment factors for the Chicago PMI in the first and third quarter based on data available at the time. (That is, the estimates shown for 2007 are based on unadjusted data available only through 2007). Since 2007, the seasonal adjustment factor for the first quarter has fallen sharply, while the seasonal adjustment factor for the third quarter has increased sharply. If these changes primarily reflect the impact of the recession, rather than true shifts in seasonal patterns, then the adjusted data will be biased.

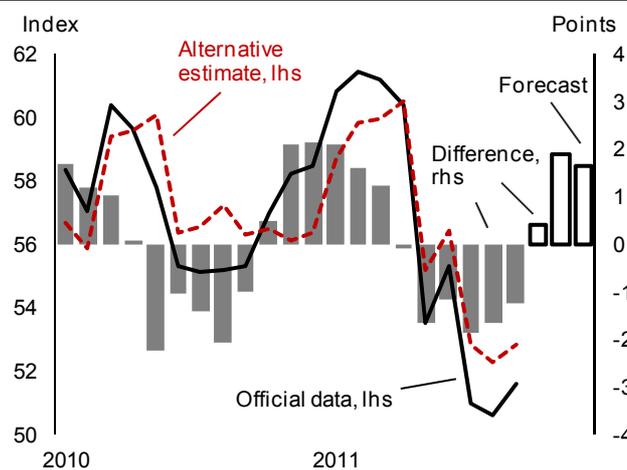
Figure 2 shows an alternative estimate of the Chicago PMI. The alternative estimate reflects changes to the standard seasonal adjustment factors in line with the modifications the Federal Reserve applied to certain components of industrial production (The Federal reserve reported that for some components of Industrial Production, such as raw steel, they first de-trend the raw data, and then they effectively exclude critical months from late 2008 through the fall of 2009 from the estimation of seasonal factors). The official Chicago PMI estimates are weaker than the alternative in the second and third quarters, and stronger in the fourth and first quarters. The magnitude in these differences is material, suggesting a swing of about 9 percentage points (pp) between February and August.

Figure 3. Different estimations of Chicago PMI seasonals



Source: ISM, Nomura Global Economics.

Figure 4. Comparison of ISM manufacturing seasonal adjustments



The ISM shows bias as well

The ISM manufacturing index also appears to be affected by this problem (Figure 3). The current seasonal factors anticipate weaker data in fourth and first quarter, and stronger data in the second and third, relative to both the pre-crisis period and an alternative estimated based on the techniques used by the Federal Reserve. Figure 4 presents the alternative estimate of the ISM manufacturing index, and it shows a similar pattern to the Chicago PMI. The estimated “bias” in the ISM manufacturing index implies a swing of 4pp from December to June.

The apparent “bias” in seasonal adjustment also helps to explain the pattern of forecasting errors over the last two years. Figure 5 shows the average market “surprises,” weighted by their standard deviation, for five-month indicators -- Philadelphia Business Outlook Survey, the NY FRB Empire State Survey, the Chicago PMI, and the ISM manufacturing and non-manufacturing survey – as well as the estimated seasonal “bias” for these series. The correlation between forecast errors and the estimated seasonal “bias” since the beginning of 2010 is 0.66.

Other important data are affected

Analyzing the changes in seasonal adjustment factors among the monthly surveys presented above is relatively straightforward, as the underlying unadjusted data is readily available. Analyzing other, more complicated data, is more difficult. For example, important aggregates, such as retail sales data available from the Census Bureau, are adjusted at a highly disaggregated level with great attention paid to very specific calendar and trading day effects. Moreover the Bureau of Economic Analysis has stopped publishing the unadjusted data for the underlying components of GDP.

More complicated data also may have been affected by this problem. For example, the average seasonal adjustment factors for retail sales excluding autos, a key input for GDP, have been revised in ways that may have been influenced by the recent recession. These changes imply that the current seasonal adjustment factors may tend to overstate the growth nominal retail sales in the fourth quarter by about 2 percent, at an annual rate, and understate growth in the second quarter by about 1-1/2 percent on the same basis. These differences are large enough to have a notable impact on our assessment of economic trends.

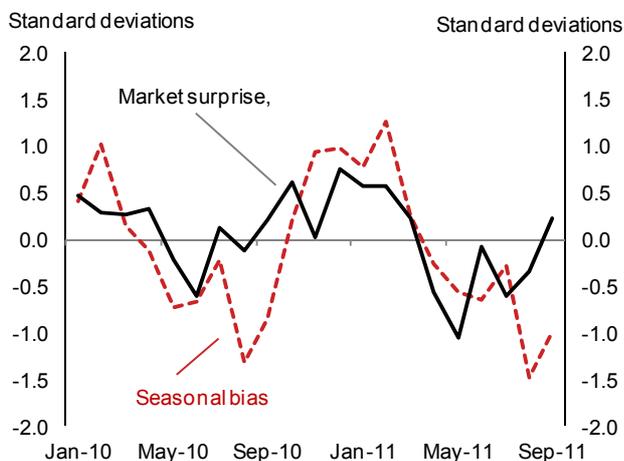
Implications for seasonal bias

Over the last two years, the ongoing crisis in Europe, the earthquake in Japan and policy dysfunction in Washington have all had a notable impact on the performance of the US economy. (See Figure 6) Going forward, many of these same factors will be dominant in determining the outlook for the United States economy.

Expectations should be adjusted accordingly

Nevertheless, short-comings in seasonal adjustments have impacted market perceptions on the underlying momentum of the economy and financial markets. In that context, it is important to recognize that these shortcomings are also likely to have an impact on future data. We are currently in a transitional period, between the time of year when standard seasonal adjustment techniques can bias key data downward, to the time of year when they provide an upward bias. Market participants should take this into account, both in how they continually reassess the state of the economy, and in how they evaluate prospects for future policy action.

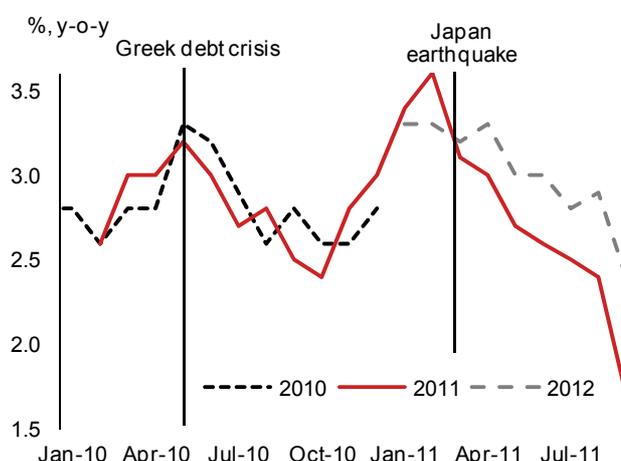
Figure 5. Market surprise and “bias” for business surveys



Note: Includes Philadelphia FRB index, the NY FRB Empire State index, the Chicago PMI, and the ISM manufacturing and non-manufacturing surveys.

Source: Haver Analytics, Nomura Global Economics.

Figure 6. Evolution of consensus GDP growth forecasts



Source: FX4casts, Haver Analytics, Nomura Global Economics.