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ANALYZING BUSINESS CYCLES

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At the time of this writing (June, 1989), some observers in the press believe that the business cycle is dead and recessions are a thing of the past. Others believe that the Federal Reserve has avoided a recession for the next year or two at least by bringing the economy in for a "soft landing." Under this theory, we are entering a period of slow growth that will allow the economy to catch its breath before resuming vigorous expansion.

I am skeptical. I believe the business cycle is alive and well and in particular I doubt the soft-landing theory. Why? To paraphrase David Wessel's Outlook column in the Wall Street Journal (Monday, June 5, 1989), when things look too good to be true, they probably are. During this time of economic uncertainty, a spreadsheet for analyzing cycles in business data may prove to be a valuable addition to your forecasting tool kit.

THE AIMS OF CYCLE ANALYSIS

A version of the cycle-analysis model in this article was originally developed by Parker Hannifin Corporation in the days before PCs and spreadsheets (see Industry Week, April 25, 1977). Today, cycle analysis is much easier to do in spreadsheet form. The aims are simple: to detect changes in the rate of growth in your data and to identify the turning points (peaks and troughs) of cycles. This kind of information is extremely valuable for business planning, especially when developing a budget, an inventory plan, or a production schedule. The model can be applied to any demand-related data collected at monthly time intervals. You can use the model to analyze company or industry sales, orders, shipments, inventories, production, and so on. As in all forecasting work, the more data the better, although you can get by with only a couple of years of history.

A CASE STUDY: METALWORKING MACHINERY IN THE 1973 - 1975 RECESSION

Turning points are almost never obvious in a graph of the raw data until some time has passed. To illustrate, look at Figure 1 on page 4, which shows new orders for the metalworking machinery industry in millions of dollars. The orders were logged during the years 1972-1974, a period of great economic uncertainty. The economy peaked in November, 1973, and then gradually declined through the official trough month of the recession: February, 1975. New orders for metalworking machinery were essentially flat from March, 1973, through January, 1974. In February and March of 1974, orders increased but fell off again from April through

August. Suppose you were forecasting in this industry during the first half of 1974. How do you interpret the behavior of new orders? Will growth pick up again? Has a turning point occurred?

1/12 PRESSURES

Figures 2-4 help answer these questions. Figure 2 is a graph of index numbers that compare orders for a given month to the same month a year ago. The first point plotted is

$$[(\text{Jan. '73 orders}) / (\text{Jan. '72 orders})] * 100$$

The second point plotted is

$$[(\text{Feb. '73 orders}) / (\text{Feb. '72 orders})] * 100$$

Multiplying each ratio by 100 forms an index number that is easy to interpret. If the index for a given month is 100, orders for that month are unchanged from a year ago. If the index is greater than 100, orders have grown from a year ago. If the index is less than 100, orders have declined. In the jargon of forecasting, such index numbers are called "1/12 pressures." The number 1 means that the index numbers are based on monthly totals and the number 12 means that the totals are separated by 12 months.

The 1/12 pressures decline in an erratic pattern during 1973. All pressures are greater than 100, meaning that orders grew compared to the same month a year ago. But the key point is that growth was slowing because the trend in pressures was negative. Using pressures analysis, Parker-Hannifin spotted the slowdown in growth early and wisely cut back on inventories. The result is that the company was not hurt as badly during the recession as most of its competitors.

In January, 1974, a turning point occurred when the 1/12 pressures bottomed out at near 100. That is, orders in January, 1974, were about the same as a year ago. Starting in February, growth picked up again, reaching a pressure level of more than 175 by September.

3/12 PRESSURES

By including more data in the totals used in the pressure calculations, you can get additional evidence to verify turning points. In general, the more data used in the totals, the more reliable the results. Figure 3 shows "3/12 pressures," consecutive three-month totals compared to the same totals a year ago. The first point plotted is

$$[(\text{Jan. - Mar. '73 orders}) / (\text{Jan. - Mar. '72 orders})] * 100$$

The second point plotted is

$$[(\text{Feb. - Apr. '73 orders}) / (\text{Feb. - Apr. '72 orders})] * 100$$

Note that the 3/12 pressures suggest a turning point in March rather than January, 1974.

12/12 PRESSURES

Finally, Figure 4 shows "12/12 pressures," consecutive twelve-month totals compared to the same totals a year ago. The first point plotted is

$$[(\text{Jan. - Dec. '73 orders}) / (\text{Jan. - Dec. '72 orders})] * 100$$

The second point plotted is

$$\frac{[(\text{Feb. '73 - Jan. '74 orders}) / (\text{Feb. '72 - Jan. '73 orders})] * 100}$$

The 12/12 pressures are always smoother and easier to read than the others. In Figure 4, they mark a dramatic turning point in March, 1974, the same month marked by the 3/12 pressures. The implication is that a new period of growth started around April, 1974.

INTERPRETING THE PRESSURES

Why did the 1/12 pressures disagree with the others about the timing of the turning point? This outcome simply reflects randomness in the data. So long as the timings of the turning points based on different pressures are in the same ball park, you can have some confidence that things will get better (or get worse if you sight a turning point at the top of a cycle). If the timings of the possible turning points are substantially different, you should be more cautious about the future. Pressures analysis is not foolproof and randomness may prevent seeing any definite patterns. 1/12, 3/12, and 12/12 are the most used pressures in practice, but you may also want to look at 6/12 and 9/12 pressures when your results are ambiguous.

I recommend that you get in the habit of adding pressures to your forecasting worksheets, especially when your projections extend more than a few months into the future. You may want to temper or boost your projections when a turning point appears in the pressures. You should also keep an eye on the trends in pressures. For example, projections of strong growth in sales are less likely when the recent trend in pressures is down.

