HoustonBusiness

A Perspective on the Houston Economy

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A New Index of Coincident Economic Activity for Houston

This article introduces a new tool to monitor the Houston economy. It is a coincident index of local economic activity based on new methods to combine and weight key economic indicators.

No matter what your level of expertise, following the movements of the local economy can be a difficult and sometimes frustrating experience. Numerous data series are reported, and they often provide conflicting signals of the economy's direction. Data are reported by different frequencies—monthly, quarterly, annually. And they are often revised, changing our picture of where we have been, as well as where we are or where we are headed. Some data lag changes in general economic activity, while other data lead and some are contemporaneous, or coincident.

One way to cut through the noise and discern the economy's current status is to build an index of coincident economic activity. At the national level, gross domestic product (GDP) is reported months after events are over. At the metro or substate level, we don't get a report on such broad aggregates, except for an annual report on personal income. To build a guide to the current state of the economy, key data series or indicators are selected and combined into an index as a weighted average.

This article introduces a new tool to monitor the Houston economy. It is a coincident index of local economic activity based on new methods to combine and weight key economic indicators. The Houston indicators are establishment employment, unemployment rate, real wages and real retail sales. The index extracts from each series the information relevant to the current state of the Houston economy and combines that information into an index that reflects overall economic conditions.

Coincident Indexes

In 1937, Wesley C. Mitchell and Arthur F. Burns of the National Bureau of Economic Research (NBER) developed a list of 487 indicators that led, lagged or were coincident with the business cycle. The project embraced the concept that there is a business cycle, or reference cycle, that cannot be observed directly but can be measured

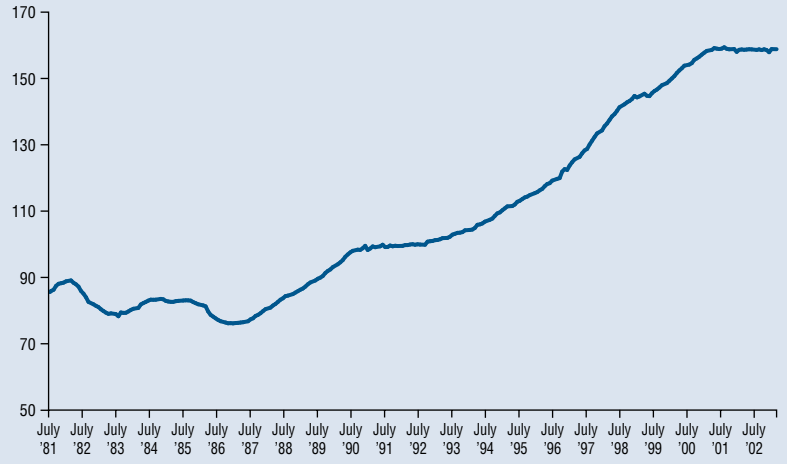
by the consistent movement of many economic variables as the phases of growth change.

In the 1950s and 1960s, NBER researchers extended the concept by constructing indexes from these indicators, weighting and adding together variables that consistently led, lagged or kept pace with the business cycle. The Index of Leading Indicators became the most widely followed of the indexes, probably because of its ability to forecast change in the business cycle from growth to contraction and vice versa. But for many years, the Conference Board (and before that the Bureau of Economic Analysis) has regularly published leading, lagging and coincident indexes. The coincident index has developed a good track record of having its peak value fall within three months of the official business peaks selected by NBER's Business Cycle Dating Committee. Its ability to match the committee's troughs is even better. The coincident indicators point to a likely trough in the 2001 recession in November 2001 and expansion through much of 2002, although the index has been flat over the past six months. Similar indexes have been built for states, regions and metro areas.

In recent years a new approach, suggested by the academics Stock and Watson,[1] has evolved for the construction and interpretation of leading and coincident indexes. Mathematically sophisticated, the general approach will be familiar to many social scientists as a variant of principal components or factor analysis—statistical techniques designed to extract a measure of some underlying, unobservable characteristic from a number of closely related variables. For example, if we give a battery of tests to 100 people to measure various aspects of their mental agility and cognitive powers, the intercorrelation among these tests may suggest a single, weighted average of these tests called intelligence.

The principle used to build an index of coincident economic activity is similar, except the unobservable variable is the current state of the economy, and we substitute for the administered tests the intercorrelation of various economic indicators measured through time. Just as for intelligence, the intercorrelation of economic indicators suggests the weighting of the indicators that best represents the state of the economy. Indicators will have behavior that reflects their contribution to the business cycle as well as behavior that is idiosyncratic and unrelated. Further, because the procedure is dynamic, estimates can be extracted of the underlying statistical process, telling us about the stability of the local economy in the face of external shocks.

Figure 1
Coincident Index of Economic Indicators for Houston, 1981–2003



An Index for Houston

The Stock–Watson methodology has been widely applied at the state and substate levels.[2] Four seasonally adjusted variables were selected to build a coincident index for Houston: establishment employment, unemployment rate, real wages and real retail sales. The two employment variables are reported monthly with a lag of about one month, while the wage and sales variables are reported quarterly with a lag of approximately three quarters. The different frequencies cause no significant problem for history, but, as discussed below, they affect interpretation of the most recent economic observations.

Figure 1 shows the computed index of coincident economic activity for Houston. The curve has been retrended and scaled to historical growth in metro-area regional personal income, which is the broadest available measure of substate economic activity and is reported with a delay of two years. The most recent movements of the selected indicators are all found to coincide except for the unemployment rate, which moves one month later. Higher lagged values of all variables demonstrate significant idiosyncratic noise unrelated to current economic conditions.

Cumulative weighted multipliers suggest the following weighting scheme for the variables: employment, 0.468; real wages, 0.341; unemployment rate, 0.110; and real retail sales,

0.081. The model's dynamic properties are based on the assumption that the business cycle is driven by random shocks to the local economy, and the Houston economy shows great persistence or stability as the shocks slowly die out. Over the first quarter after a shock occurs (such as a large bankruptcy or an oil price change), only 30 percent of the shock is absorbed by the local economy. The smoothness of the curve in Figure 1 is a product of this persistence.

Interpreting Results

The curve broadly reflects economic history as we understand it: the double-dip oil recessions of the 1980s, the long period of stagnation in the early 1990s and the current slowdown, which has been under way since early 2001. Table 1 shows the dates of Houston's business cycle peaks and troughs indicated by the new index. The 1980s saw two distinct and well-defined cycles. The March 1982 peak occurred as OPEC failed in an attempted oil price increase and the rig count began to collapse. The 1984 peak and the following recession were exacerbated by the collapse of both Texas real estate and banking.

In the 1990s and early 2000s, the story is one of two prolonged pauses in economic growth, with the second perhaps being a mild recession.[3] The first pause began in December 1990 in anticipation of a peak in oil prices following the first Gulf War. It was prolonged by weak natural gas prices and poor oil field conditions. Expansion resumed in February 1992 after about 14 months of no significant expansion or contraction in the local economy.

The current slowdown began with a pause (or perhaps a peak) in April 2001, and after 22 months there is no clear sign of resumed progress. If April 2001 is a peak, indicating that Houston has entered its first recession since the 1980s, the following recession has been very mild. At no time has the index declined by more than 0.8 percent from the peak. However, unlike the pause of the early 1990s—when the index waffled back and forth, first above and then below the previous peak—the current index has been below the April 2001 value since the pause began.

The index reported here contains revised North American Industry Classification System (NAICS) employment and wage data back to 1996, as well as the rebenchmarked establishment employment data for Houston made available each spring. Our mix of monthly and quarterly data, with the quarterly data available only with a lag of several quarters, does not affect the computations significantly and certainly does not change our interpretation of history. The most recent data are affected, however. For example, our index's current estimates contain employment and unemployment data through February of this year but retail sales data only through the third quarter of 2002 and wage data only through the first quarter of 2002. We operate on less and less information as the estimate becomes more current.

The most widely followed series on the Houston economy is the establishment employment data, released each month along with the unemployment rate. This is all the information available in the computed index since the third quarter of 2002, and based on the weighting scheme, the index contains only about 55 percent of the information we will eventually integrate into it. In the second and third quarters of 2002, we still have only 63 percent of the information ultimately available and must go back to the first quarter of 2002 to arrive at a full index. So as you look at the flat line stretching out since early 2002, it is essential to remember that the picture can still be modified by additional information and revision.

Whatever the shortcomings in the data, the Houston index of coincident economic activity is a valuable tool to summarize what we know about the state of the local economy. It systematically integrates the latest data available, allows the entry of additional data as they become available and weights the data according to their ability to help us interpret current conditions.

—Jesús Cañas
Robert W. Gilmer
Keith Phillips

Table 1
Dating the Business Cycle in Houston

March 1982	Peak
August 1983	Trough
November 1984	Peak
January 1987	Trough
December 1990	Pause Begins
February 1992	Growth Resumes
April 2001	Peak? Pause?

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Notes

[1] James H. Stock and Mark W. Watson (1989), "New Indexes of Coincident and Leading Economic Indicators," in *NBER Macroeconomics Annual*, ed. Olivier J. Blanchard and Stanley Fischer (Cambridge, Mass.: MIT Press), pp. 351–95.

[2] Alan Clayton-Matthews and James H. Stock (1998/1999), "An Application of the Stock/Watson Index Methodology to the Massachusetts Economy," *Journal of Economic and Social Measurement*, Vol. 25, Issue 3/4, pp. 183–233.

[3] Robert W. Gilmer and Iram Siddik (2003), "The Houston Business Cycle Since the Oil Bust," Federal Reserve Bank of Dallas *Houston Business*, January.

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The end of winter brought lots of action in Houston's energy sector—war in the Persian Gulf, depleted inventories, and soaring oil and natural gas prices. The result has been a mix of good and bad news for different energy sectors, but the outlook for domestic drilling has definitely improved. Perhaps a rapid expansion of domestic drilling can finally lead Houston's economy upward after 22 months of no growth.

Retail Sales and Autos

Retailers are still not seeing large purchases, with buying confined to necessities. Department, sporting goods and clothing stores all continue to run behind plan, with any good news coming out of discount chains. War seemed to have little effect on consumer purchases.

Auto sales picked up sharply in February, averaging 12.3 percent higher than the same month last year. However, combined with a weak January, sales were up only 1.2 percent for the first two months of the year. Through March, the combined 1.2 percent increase seemed a better indicator of the market's current direction.

Oil and Natural Gas Prices

Spot prices for West Texas Intermediate stayed above $35 per barrel from mid-February until the outbreak of war in Iraq. The situation had lots of moving parts—the hangover from the Venezuelan general strike, civil unrest in Nigeria and OPEC's overproduction in advance of war. Prices quickly moved under $30 with signs of a quick resolution to the war, the arrival of an armada of tankers from Saudi Arabia and clear indications that crude inventories are being rebuilt.

Cold weather played havoc with natural gas prices, briefly pushing them as high as $16 per thousand cubic feet (Mcf) and pulling inventories to levels 50 percent below the five-year average. Natural gas prices have now settled into a range of $4–$5, and lower inventories seem to have finally convinced oil and gas producers that higher prices are here to stay.

Oil and Gas Services and Machinery

Over the past quarter, the domestic rig count has broken out of the 850 range it had held for nearly a year and has now added over 100 rigs. Oil service respondents seemed convinced that the upward trend would last a while longer, with as many as 1,200 rigs working before year-end. Drilling so far has been directed to natural gas, and projects are relatively inexpensive—shallow and onshore. But calls from customers are now indicating riskier and more expensive projects ahead. International work, largely directed to oil, has not picked up; the downside risks for oil markets are seen as much greater than for natural gas.

Refining

Refiners have run at high levels of capacity utilization. Reluctant to lose their excellent margins, they postponed or minimized the normal spring maintenance. Margins spiked to high levels in February and fell back slowly in March. Gasoline prices have come down but are expected to remain high through the summer as low inventories slowly rebuild. Gasoline demand was strong throughout the winter.

Petrochemicals

High energy prices hit the chemical industry hard. A number of plants briefly shut down in the face of high natural gas prices, and all struggled to pass through the higher energy costs. As energy prices rose, price increases occurred up and down the product chain for plastics. As natural gas prices fell back to $5 per Mcf in early April, a number of plants came back on-line.

Housing

Sales of both new and existing homes eased early in the year, with sales flat to down slightly compared with the previous year. War jitters, combined with concerns about the economy, left respondents unsure of the housing market's near-term direction. The apartment market continues to deteriorate, as low interest rates make home ownership more attractive. Flat rents, falling occupancy and barely positive absorption all indicate the apartment market's struggles.

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