A New Index of Coincident Economic Activity for Houston

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 sub-state 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.

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,
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Interpreting Results
The curve broadly reflects
economic history as we under-
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cessions 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 follow-
ing 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 pro-
longed pauses in economic
growth, with the second perhaps
being a mild recession.
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 signifi-
cant 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 Hou-
ton has entered its first reces-
sion since the 1980s, the fol-
lowing recession has been very
mild. At no time has the index
declined by more than 0.8 per-
cent from the peak. However,
unlike the pause of the early
1990s—when the index waf-
flled 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 con-
tains revised North American
Industry Classification System
(NAICS) employment and wage
data back to 1996, as well as
the rebenchmarked establish-
ment 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 computa-
tions significantly and certainly
does not change our interpreta-
tion 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 avai-
lable 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 infor-
mation we will eventually inte-
grate into it. In the second and
third quarters of 2002, we still
have only 65 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 system-
atically 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

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Notes
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2 Alan Clayton-Matthews and James H.
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January.
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.