



# HoustonBusiness

*A Perspective on the Houston Economy*

FEDERAL RESERVE BANK OF DALLAS • HOUSTON BRANCH • MARCH 2012

## Energy Leads the Way as Houston Surges into 2012

*Looking forward, we find lower stimulus for Houston in the year ahead and higher risks, but the door remains open to another year of solid local expansion.*

**H**ouston put the Great Recession behind it in 2011, growing strongly and returning to the prior peak levels of activity it enjoyed in 2008. Local growth far outstripped the pace of the U.S. expansion by taking advantage of torrid growth in emerging markets. Exports to China, Brazil and India were important, but more important to Houston was the ability of these developing countries to drive the price of oil. High crude oil prices and extraordinary changes taking place in drilling technology opened the door for Houston's energy sector to lead the city's growth in 2011.

Taking a look at these economic drivers and the U.S. economy, along with prospects for 2012, could energy repeat its phenomenal 2011 performance? Looking forward, we find lower stimulus for Houston in the year ahead and higher risks, but the door remains open to another year of solid local expansion.

### Recent Growth in Houston

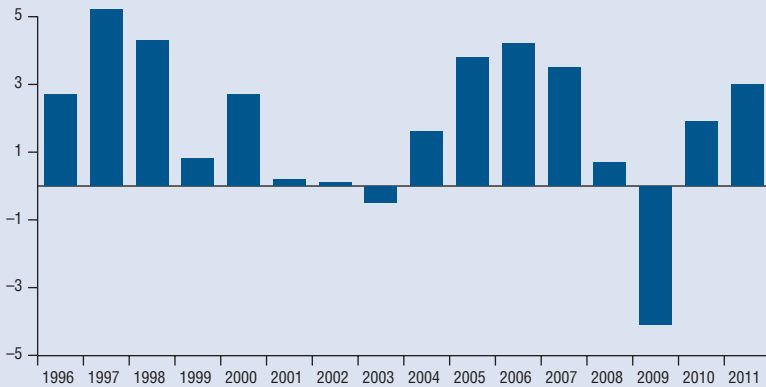
Between December 2003 and December 2008, Houston added a remarkable 340,800 payroll jobs, more than the total employment of a medium-sized metropolitan area such as El Paso. During this same period, the U.S. saw moderate growth turn to recession by late 2007, and annual job growth averaged only 0.6 percent, compared with 2.8 percent for Houston (*Figure 1*).

As always, the difference in performance between the U.S. and Houston—for better or worse—is the price of oil and natural gas. Between 2003 and 2008, the growth of emerging countries surged, and the rapid expansion of economies including Brazil, China and India worked to push up the prices of agricultural raw materials, food, metals and especially petroleum. For the first time, the price of crude moved above \$100 per barrel. Houston's oil producers and service companies responded by adding nearly 26,000 well-paid jobs, as the energy sector strongly led local expansion.

The Great Recession and the credit crunch that accompa-

**Figure 1**  
**Houston Employment, 1996–2011**

Percent change (December to December)



SOURCE: Bureau of Labor Statistics, adjusted by the Federal Reserve Bank of Dallas.

nied it spared virtually no industry or region of the country, and Houston was no exception. The U.S. economy slipped into a mild recession in December 2007 and, with the onset of the financial crisis, fell into a severe downturn in 2008. The global economy followed, commodity prices tumbled and Houston's energy boom came to an abrupt end. The Houston metro area lost 106,000 jobs in 2009, briefly matching the U.S. rate of job loss at the height of the crisis.

The Metro Business-Cycle Indexes computed by the Federal Reserve Bank of Dallas provide a broad measure of the local business cycle for Houston and other major Texas metro areas. These indexes include payroll employment, as well as the unemployment rate, real wages and real retail sales, and are explicitly designed to track the real business cycle. According to this measure, Houston was the last major Texas metro to enter the downturn, but the local recession was deeper than in all other metros but Austin (Table 1). Houston's recession ended in December 2009, timed with much of the rest of the state and six months after the U.S. recession officially ended in June 2009.

Houston's recovery is now complete, in the sense that

losses to recession are restored and the economy has surpassed prior peak levels. The previous peak number of jobs was passed last October, and the broader Metro Business-Cycle Index recovered even earlier, in May 2011.

Houston's job growth more or less matched that of the U.S. in the beginning stages of recovery, but by early 2010 Houston surged ahead. From December 2009 to December 2011, Houston's annual rate of job growth was 2.4 percent, far ahead of the 1.0 percent rate registered by the U.S. economy.

Why has Houston outperformed the U.S. in the recovery? Primarily, it has been due to the return of many of the same conditions that prevailed from 2003 to 2008. Emerging countries

are again the engine of global growth, pushing oil and other commodity prices upward and providing rapidly growing markets for local exports. Oil and gas exploration and production, petrochemicals and refining are all reaching beyond a slow-moving U.S. economy and tapping into a global market that is expanding much more quickly. These emerging markets are giving the Texas Gulf Coast an economic impetus that many other parts of the country lack.

### Growth in Emerging Markets

Rapid expansion of emerging countries such as Brazil, China and India is essential to Houston's near-term prospects. First, these countries provide a market for oil services and machinery, petrochemicals, refined products and a variety of nonoil products shipped from the region. Having surpassed California a decade ago, Texas is the leading export state, and the Gulf Coast is one of the most important exporting regions. Second, growth in these countries has returned oil and other commodity prices to high levels.

Figure 2 illustrates how the global recession pulled down energy prices in 2008–09 before they revived quickly. High oil prices are crucial to Houston's energy sector, as many of the technological advances driving U.S. energy development are

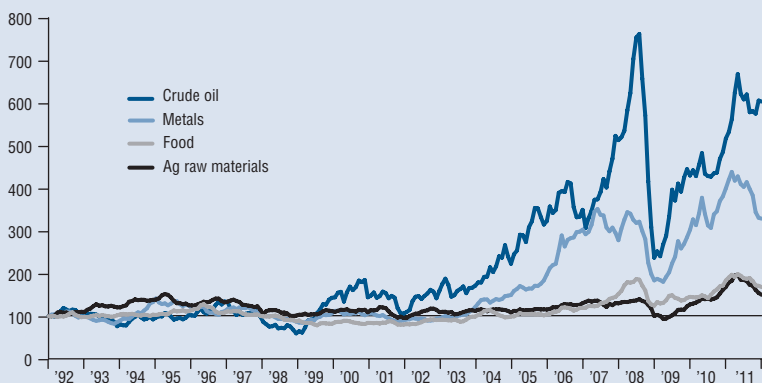
**Table 1**  
**Houston's Great Recession Was Shorter But Deeper than Other Major Texas Metros'**

Metro area	Peak	Trough	Decline (percent)	Trough to 2012 (percent)
Texas	July 2008	November 2009	-5.2	5.1
Austin	February 2008	January 2010	-7.4	6.2
Dallas	February 2008	December 2009	-6.4	3.7
Fort Worth	May 2008	November 2009	-5.5	4.9
Houston	August 2008	December 2009	-7	10.6
San Antonio	April 2008	September 2009	-3.5	2.2

SOURCE: Federal Reserve Bank of Dallas.

**Figure 2**  
**Oil Is Part of a Wider Boom in Commodity Prices**

Index, January 1992 = 100



SOURCE: International Monetary Fund.

dependent on oil prices of \$70 per barrel or higher.

High oil prices are often attributed to a variety of causes, including low interest rates and a depreciating dollar. But there is little doubt that the growth of emerging countries is the dominant factor. The International Monetary Fund found that from 2001 to 2007 these countries accounted for more than half of the increase in oil consumption, all of the increase in aluminum and copper consumption and nearly all of the growth in the consumption of major food crops. (The rest of the increased demand for food was mostly for its conversion

to energy, for example, ethanol and biodiesel.)<sup>1</sup> As these countries have raised their standard of living, they compete with the developed world for scarce resources, pushing commodity prices upward.

Table 2 is a recent economic forecast from the Organization for Economic Cooperation and Development's (OECD) *Economic Outlook* published in December.<sup>2</sup> Note how quickly the emerging countries of Brazil, China and India bounced back in 2010 and 2011 from the global downturn, while the developed countries limped out of the recession. In the 2012 and 2013 forecasts, the same

fast/slow pattern continues, except that Brazil sees growth cut in half after 2010. Even so, its 3.0–4.0 percent growth rate is better than any of the developed regions listed in the table.

Some potential risks to the global economy—and to Houston—can also be read into Table 2. First, there is no recession forecast for Europe. Some countries in the euro zone are forecast to fall into or continue in recession, but the entire region skirts a downturn. But a crisis in Europe—a messy default by Greece or a freezing of credit markets—would imply a much deeper decline. This has serious implications for all Europe's trading partners, including the emerging nations. For example, 22 percent of China's exports go to Europe versus 19 percent to the U.S.

Second, 2012 is a second year of slowdown for the emerging countries. Some of this is deliberate. Their central banks reacted to rising inflation and have engineered slower growth through higher interest rates. These forecasts assume that this policy leads to a soft landing, not slowing these economies too much, and that no real estate or banking bubbles could yet burst in response to tighter credit.

Big risks aside, the OECD outlook points to less global stimulus for Houston in 2012. The continued risk of a crisis in Europe will keep the dollar relatively strong, lowering oil prices and hurting Gulf Coast exports. The modest slowdown in developing countries is already taking some of the air out from under commodity prices, as shown in Figure 2. Lower oil prices could reduce cash flow for oil producers and reduce their capital spending.

### The Energy Boom

The past three years have been a remarkable period

**Table 2**  
**Global Growth Slows in 2012 Forecast**

	GDP growth (percent)			
	2010	2011	2012*	2013*
<b>Developed economies</b>				
Europe	1.4	0.9	0.6	1.7
Japan	1.6	0.8	1.7	1.6
U.S.	2.5	1.5	2	2.7
<b>Emerging economies</b>				
Brazil	7.5	3.4	3.2	3.9
China	10.4	9.3	8.5	9.5
India	9.9	7.7	7.2	8.2

\*These numbers are forecasts.

SOURCE: "OECD Economic Outlook No. 90," OECD Economic Outlook: Statistics and Projections database, December 2011.

for the energy industry and for Houston. They have been marked by high oil prices, the rapid development of technology to take advantage of these high prices, and extraordinary differences between high oil and low natural gas prices. All this has worked to produce significant profits for upstream oil producers and service companies, as well as for downstream petrochemical producers.

Drilling outside the U.S. and Canada is primarily directed to oil, and as oil demand and price improved with the global economy, so did the international rig count. International drilling bottomed out in June 2009, returned to the prior peak by July 2010 and has expanded steadily since. This international work generates high revenues and is important to Houston's service and machinery companies.

In recent months, the domestic rig count also has returned to its prior peak levels of drilling activity, but the route to recovery in the U.S. was much more complicated. In many ways, the rig count of 2012 is simply not comparable to the rig count of 2008. What happened?

- New technology using horizontal drilling and

fracturing was applied to shale to produce natural gas. It proved enormously successful in bringing new supplies of natural gas online (*Figure 3*). Natural gas is not widely traded internationally like oil, and large new supplies of gas trapped in a weak U.S. economy quickly brought the price of natural gas down to \$3–\$4 per thousand cubic feet. Natural gas became a bargain to the consumer and a drag to the producer because oil at \$80 per barrel is 3.4 times more valuable than natural gas at \$4 per thousand cubic feet.

- High oil prices invited new technology for its production, and (along with other new approaches) horizontal drilling and fracturing have proved successful in producing large quantities of crude from shale, as well as natural gas liquids like ethane, butane and propane. Since January 2007, horizontal drilling has tripled its share of total activity to 59 percent of all active U.S. rigs. The

multilateral horizontal wells and multiple completions now being used are expensive, and they increasingly have left the rig count of 2012 disconnected from service company revenues.

- The strong financial incentives to drill for oil, and the new technology to do so, have prompted U.S. drilling to swing from gas-directed to oil-directed rigs. Between December 1999 and December 2008, 83 percent of active U.S. rigs drilled for natural gas. Today, only 39 percent of working rigs are directed to natural gas, and recent low natural gas prices have accelerated the trend to more U.S. oil exploration and production.

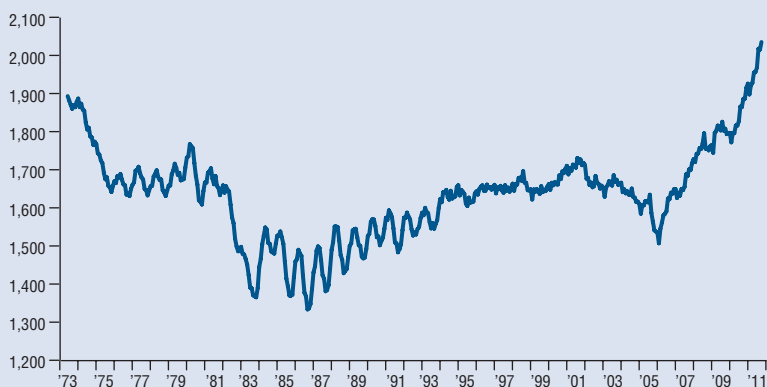
In summary, drilling has gravitated to oil away from natural gas, technology to horizontal away from vertical, and as a result, revenues for service companies are much higher than the recovery of the rig count might indicate. The key to sustaining the current level of activity and revenues is a high oil price.

Downstream, refiners have also been handicapped by a weak domestic market. A major expansion of refining capacity in the U.S. in recent years, plus weak U.S. demand, has turned U.S. refiners into significant exporters. Strong demand for oil products abroad has made this possible, with Asia and Europe as the major destinations. Exports of finished petroleum products from the Gulf Coast have more than doubled since 2005 to over 576 million barrels by 2010. By far the strongest growth has been in distillates, followed by exports of conventional gasoline.

The petrochemical industry has been revitalized by *low* natural gas prices. Five years ago,

**Figure 3**  
U.S.-Marketed Natural Gas Production Has Grown Rapidly Since 2005

Billion cubic feet\*



\* Six-month average.

SOURCE: Energy Information Administration, Department of Energy.

petrochemicals were thought to be a dying U.S. industry, slowly shrinking back into the Houston area. It was widely believed that we would never see another major petrochemical plant built in the U.S. Today, the growing supplies of natural gas from shale, coupled with the low price, have made the U.S. a highly competitive producing region. The rest of the world outside North America uses oil-based naphtha to produce petrochemicals, while the U.S. uses natural gas liquids. The price advantage for natural gas over oil gives the U.S. a definite edge and opens many new export opportunities.

Announcements have been made recently of 10 major U.S. ethylene projects—plant expansions or new construction—with eight on the Gulf Coast and two of those in the Houston area. These projects will be supported by new fractionation plants, pipelines and other facilities. A wave of heavy construction is just ahead for the petrochemical industry in Texas and Louisiana.

### U.S. Provides Little Stimulus to Houston

The U.S. economy's recovery from the Great Recession has been slow and uneven. The best and broadest measure of the U.S. economy is gross domestic product (GDP), and through 10 consecutive quarters of recovery, the annual average growth rate has been only 2.4 percent. Before the crisis, the potential long-term U.S. growth rate was put at 3.0 percent or more, which is slower than what a postrecession economy with so many slack resources—8.5 percent of the workforce unemployed and 35 percent of factory capacity unused—should be capable of producing.

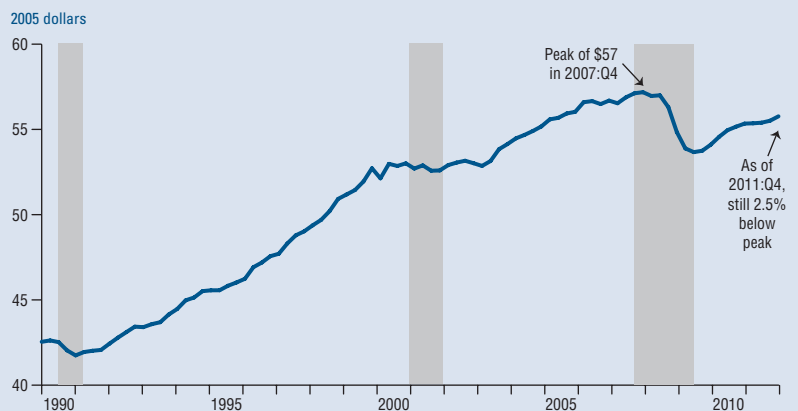
Although GDP has reached recovery levels in the sense of having returned to the prior peak, it is still debatable

whether a healthy economic expansion is under way. Simply allowing for population growth in the more than four years since the previous GDP peak, GDP per capita is still 2.5 percent short of recovery (*Figure 4*). Further, the National Bureau of Economic Research (NBER) tracks the business cycle using an index composed of four indicators that are coincident with the business cycle: payroll employment, personal income less transfer payments, industrial production, and manufacturing and trade sales (*Figure 5*). That index is used by the NBER to date the beginning and end of

recessions, but it offers no date for completing a recovery and beginning a new expansion. However, the coincident index is still 4.5 percent short of the prior peak, meaning only 40 percent of the gap between the June 2009 trough and the prior peak has been closed. Only one of the four coincident components has reached recovery levels—manufacturing and trade sales—while the other three remain 4.0–5.0 percent short of recovery.

What should our expectations for recovery be? A recent article by Mark A. Wynne examined 88 countries that had expe-

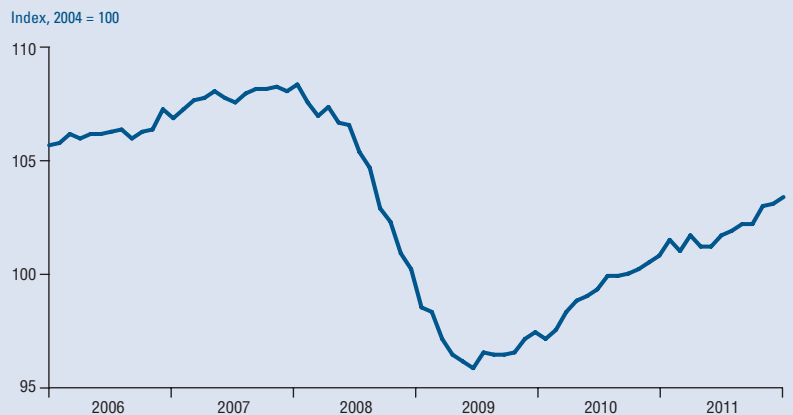
**Figure 4**  
U.S. Real GDP per Capita



NOTE: Shaded bars indicate U.S. recessions.

SOURCES: National Bureau of Economic Research; Bureau of Labor Statistics; author's calculations.

**Figure 5**  
U.S. Coincident Index Hits Bottom in June 2009, Recovery Is Slow



SOURCE: Conference Board.

rienced a financial crisis and the path of GDP that followed the crisis.<sup>3</sup> There was a strong tendency for these countries *not* to quickly revert to trend growth, but to fall behind trend over a period of several years and by an average of about 8 percent.

The U.S. has now experienced its first real financial crisis since the Great Depression, and Wynne shows that the behavior of U.S. GDP since the crisis has closely tracked the average of those other 88 countries, meaning that our pattern of frustratingly slow growth is quite likely what should have been expected.

We can look closely at the U.S. and see large segments of the economy still trying to work through the aftermath of 2008. For example, we should be building a million or more new homes per year in the U.S. in a healthy economy, and today we are building only 400,000. With high rates of foreclosures and home prices still falling in many markets, a near-term turnaround in construction seems unlikely.

Or look at the U.S. consumer, with a debt-to-income ratio of 90 percent in 2000, peaking at 130 percent in 2008, and so far only worked down to about 110 percent. This means continued constraints on household spending as deleveraging continues.

Finally, before the crisis, we were selling 16 million vehicles per year; today, we are selling 13 million, with forecasts of 16 million still several years in the future.

Thus, Houston can count on only limited economic stimulus from the U.S. economy in 2012, as the nation continues to make significant repairs in the wake of the Great Recession. Consensus forecasts such as the Blue Chip place 2012 U.S. GDP growth at less than 2.5 percent, slowly accelerating to 2.7 per-

cent by early 2013. Continued strong growth in Houston must come from rapid growth abroad or from energy.

## Conclusion

The four pillars of Houston's economy have traditionally been aerospace, medicine, and upstream and downstream oil. For the present, aerospace has been sidelined by the end of the shuttle program, continued layoffs in the Clear Lake area and uncertainty about the future for manned space flight. Construction at the Texas Medical Center has come to a halt as we wait for rules to clarify health care reform. Hence, energy has been the key driver of economic activity for Houston in 2011 and will likely continue that role in 2012.

There is less external stimulus for Houston's growth in 2012. The U.S. economy seems unlikely to gain momentum, and the global economy will again cool in 2012. A mild recession in Europe, a stronger dollar and a modest cooling of the emerging markets would take some of the steam out of oil prices. None of this would close the door on another solid year of local growth.

But still looming are bigger problems, such as a financial crisis in Europe, a sharper slowdown in emerging markets or a steep decline in oil prices. These are the risks that can halt even the strong momentum Houston has built up over the past two years.

—Robert W. Gilmer and  
Jesse B. Thompson III

*Gilmer is a senior economist  
and vice president at the Fed-*

*eral Reserve Bank of Dallas,  
and Thompson is a business  
economist at the Bank's Houston  
Branch.*

## Notes

- <sup>1</sup> "Riding a Wave", by Thomas Helbling, Valerie Mercer-Blackman and Kevin Cheng, *Finance and Development*, vol. 45, no. 1, 2008.
- <sup>2</sup> "OECD Economic Outlook No. 90," OECD Economic Outlook: Statistics and Projections database, December 2011.
- <sup>3</sup> "The Sluggish Recovery from the Great Recession: Why There Is No 'V' Rebound This Time," by Mark A. Wynne, Federal Reserve Bank of Dallas *Economic Letter*, vol. 6, no. 9, 2011.



For more information or copies of this publication, contact Bill Gilmer at 713-483-3546 or [bill.gilmer@dal.frb.org](mailto:bill.gilmer@dal.frb.org), or write Bill Gilmer, Houston Branch, Federal Reserve Bank of Dallas, P.O. Box 2578, Houston, TX 77252. This publication is also available on the Internet at [www.dallased.org](http://www.dallased.org).

The views expressed are those of the author and do not necessarily reflect the positions of the Federal Reserve Bank of Dallas or the Federal Reserve System.