

# Estimating Residential Construction Cycles

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 July 21, 2015

Publication 2105



**T**he recent boom and bust in home prices and residential construction and their impact on the global financial crisis has highlighted the need for up-to-date economic indicators that can help analyze the residential construction sector. While various measures of residential construction are available, what is needed is a comprehensive measure of the direction of this important sector because various indicators can at any point in time move in different directions. Historically, the residential construction sector has played an important role in the U.S. business cycle as exemplified by the use of residential building permits in the Conference Board U.S. Leading Index.

## The Takeaway

The Texas Residential Construction Coincident Index is based on the movements in three direct measures of residential construction activity: real contract values, real wages paid and number of jobs. This index should be a useful tool for understanding the current direction of Texas residential construction activity. With data through May 2015, the index is signaling a healthy expansion that is showing signs of slowing.

While the timing of the residential construction cycle may not always match the overall business cycle, its size and volatility make it an important sector in the overall economy's growth. This is true at the regional level as well.

A coincident index seeks to measure the underlying comovement among various broad measures of an economy or sector that is consistent with the business cycle. The index can be used to define precise peaks and troughs in the cycle and thus the timing and length of expansions and recessions. Indices are constructed from variables that represent broad measures of the economy or sectors of interest but come from different sources or measure different types of activity such as labor, capital, consumption or production. For example, while real gross domestic product (RGDP) is a broad measure of economic activity, the Conference Board estimates a U.S. coincident index that includes measures such as employment, income, production and sales. The underlying comovement of these variables is likely to better represent the business cycle than simply the movements in RGDP.

Research on business cycle indices has expanded through the years to regional economies. Such widespread acceptance of indices is explained by their recognized ability to measure the overall direction and timing of broad movements in the overall economy or in specific sectors. This is especially critical in the absence of a timely measure of state and local gross state product (GSP) and the lack of high-quality historical time series. Regional coincident indicators have done a good job of providing a timely and accurate overall picture of the current state of a local economy.

To date, there is no reliable summary indicator to measure the residential construction cycle at a regional level. Here, a methodology is applied to calculate a single underlying unobserved variable that represents the coincident index. The approach allows the data to define the component weights that best define the underlying comovement in the component variables.

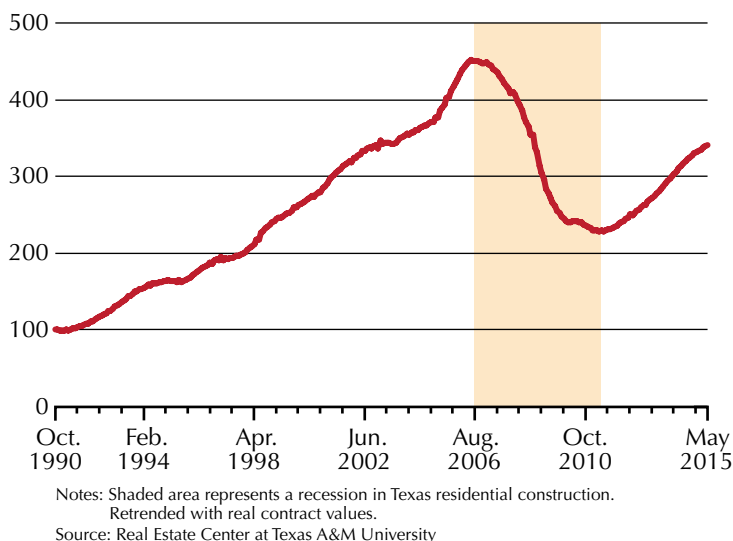
There is no single indicator that best estimates the timing and length of the broad upswings and downturns in Texas residential construction. Even real residential construction contract values by themselves do not capture the underlying state of the sector, as contracts can be canceled, and the timing of construction activity can vary between contract signing and building activity.

### Texas Residential Construction Coincident Index

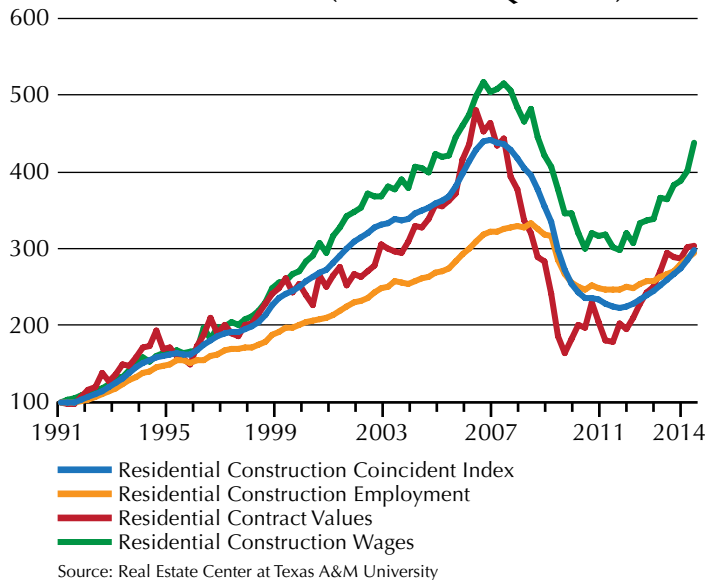
The estimation period for this coincident index is January 1990 to May 2015. The period of economic contraction as defined by the coincident index is shaded (Figure 1). The coincident index moves smoothly upward during expansion and downward during contraction, thus minimizing the number of false signals of business cycle turning points. The index provides a smooth and clear signal of the state of residential construction from the three input variables: real contract values, real wages paid and the number of jobs (Figure 2).

Research economists at the Real Estate Center at Texas A&M University identified the turning points of Texas residential business construction independent of this index. These turning points serve as a benchmark to evaluate the performance of the residential construction coincident index (Table 1). Center researchers applied the same methodology as the National Bureau of Economic Research business cycle dating committee for the U.S. economy. This consists of identifying economic activity based on a range of indicators while at the same time defining contractions and expansions based on their knowledge of the Texas residential market. They identified three troughs and two peaks in the Texas residential construction business cycle between January 1970 and May 2015. The Texas residential construction

**Figure 1. Texas Residential Construction Coincident Index (Index 1990: 10 = 100)**



**Figure 2. Components of Texas Residential Construction Coincident Index (Index 1990: Q4 = 100)**



coincident index matched the designated turning points for the peak achieved between September 2006 and January 2007 and the trough between April and June 2011 (Table 2). No other peaks and troughs were identified by the coincident index besides the aforementioned from October 1990 to May 2015. The coincident index performs well, replicating the features of the Texas residential construction business cycle for the sample period.

The Texas coincident index estimated by the Dallas Federal Reserve matched the designated turning points for the state's economy and is widely used as the major reference for the regional business cycle (Table 2). However, the Texas residential construction index did not conform with the timing of the turning points in the overall Texas economy. For example, residential construction did not register a downturn in 2001, but it did register a slowdown two years later (Figure 3).

This reflects the differences between the aggregate economy's business cycle and residential construction. In particular, it shows how residential investment can lead the business cycle, whereas a fall in residential investment can be a foreteller of a recession, as was observed during 2007. The differences also indicate that the 2001 technology downturn did not affect residential construction in Texas. The residential construction recovery has been slower than the Texas economy's recovery. This is because of the constraints on construction after the crisis, such as securing financing for tract developments for single-family homes.

The same methodology was applied to estimate a residential construction coincident index for the United States to compare the national residential construction cycle with Texas' (Figure 4). Observations reveal a difference in timing and magnitude, as in 2000 and 2001, when the U.S. coincident index reflects a mild recession compared with the Texas index, which represents

**Table 1. Chronology of Texas Residential Construction Business Cycle**

Peak Date	Trough Date	Months Contraction, Peak to Trough	Months Expansion, Trough to Peak
September 1979	August 1982	36	—
May 1984	March 1989	59	22
January 2007	June 2011	54	215

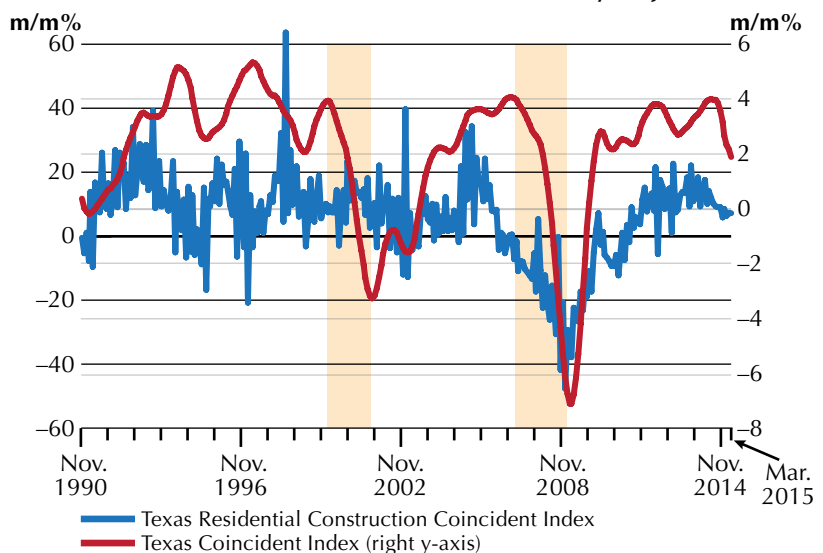
Source: Real Estate Center at Texas A&M University

**Table 2. Chronology of U.S. and Texas Business Cycles**

Peak Date	Trough Date	Months Contraction, Peak to Trough	Months Expansion, Trough to Peak
<b>United States</b>			
December 1969	November 1970	11	106
November 1973	March 1975	16	36
January 1980	July 1980	6	58
July 1981	November 1982	16	12
July 1990	March 1991	8	92
March 2001	November 2001	8	120
December 2007	June 2009	18	73
<b>Texas</b>			
February 1982	March 1983	14	—
October 1985	January 1987	16	32
March 2001	June 2003	28	171
June 2008	November 2009	18	61
<b>Texas Residential Construction Coincident Index</b>			
September 2006	April 2011	55	192

Notes: The coincident index from the Dallas Federal Reserve does not identify an economic downturn for Texas during the 1970s. The Texas Residential Construction Coincident Index starts in October 1990.  
Sources: National Bureau of Economic Research (NBER) and Dallas Federal Reserve

**Figure 3. Texas Residential Construction Coincident Index and Texas Business Cycles (Month-to-Month % Annualized, Seasonally Adjusted)**



Notes: Shaded Areas represent recessions as defined by Yucel and Thompson, and Phillips' Texas coincident index.  
Source: Real Estate Center at Texas A&M University

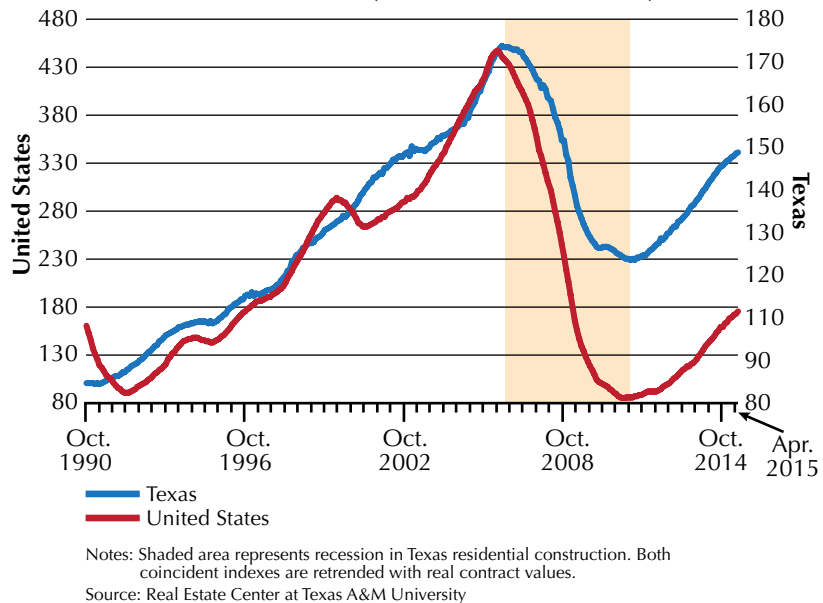
more of a slowdown. Also, between 2006 and 2010, residential construction in Texas recorded a downturn later than the nation, while recovering earlier than the nation (Figure 5). This confirms past findings regarding the heterogeneity of business cycles in both timing and magnitude at different levels of disaggregation, where differences are present not only from national to regional but from aggregate to industry or sector.

The Texas residential construction index indicates broad directional changes in residential construction in a timely manner. Its estimates of economic turning points are sharp and agree with dates determined by experts at the Real Estate Center. It defines one brief slowdown in residential construction from 2001 to 2002 and a steep, long recession from 2007 to 2011. It shows that the residential construction cycle differs in timing from the Texas business cycle and the U.S. residential construction cycle.

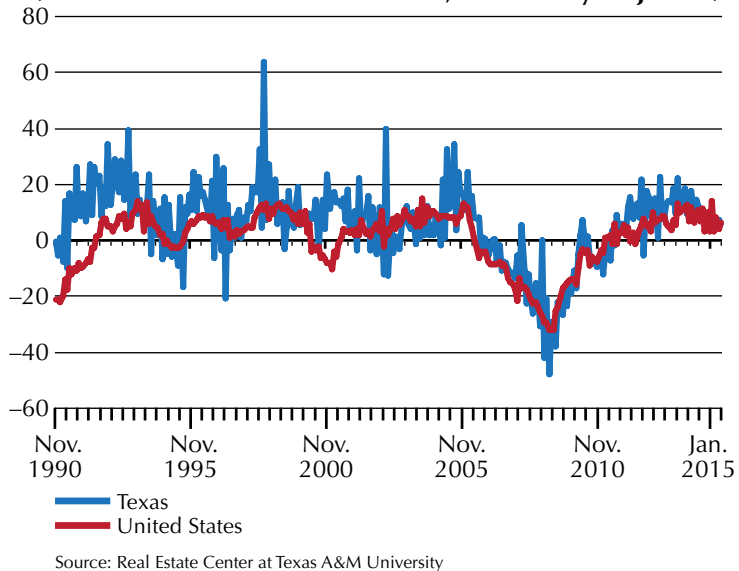
Although the index performed well since 1990, this is a relatively short period by which to judge the coincident business cycle indicator. Currently, with data through May 2015, the index is signaling a healthy expansion accompanied by a slowdown in Texas residential construction activity with a low probability that the sector is entering a downturn. The usefulness of this indicator to signal directional changes in Texas residential construction will be monitored in real time in the future. 🇺🇸

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**Figure 4. Texas and U.S. Residential Construction Coincident Index (Index 1990: 10 = 100)**



**Figure 5. Texas and U.S. Residential Construction Coincident Index (Month-to-Month % Annualized, Seasonally Adjusted)**



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