



The theory of mean reversion holds that prices and returns eventually tend toward means or averages. Applied to home prices, the theory suggests that local and regional home prices will move toward national average prices over long horizons.

# MEAN REVERSION

Over Time, Texas Prices Mirror Nation's

By Ali Anari

In a robust economy in which people and businesses can freely move from one region to another, many move from regions with higher costs of living and costs of doing business to more affordable regions.

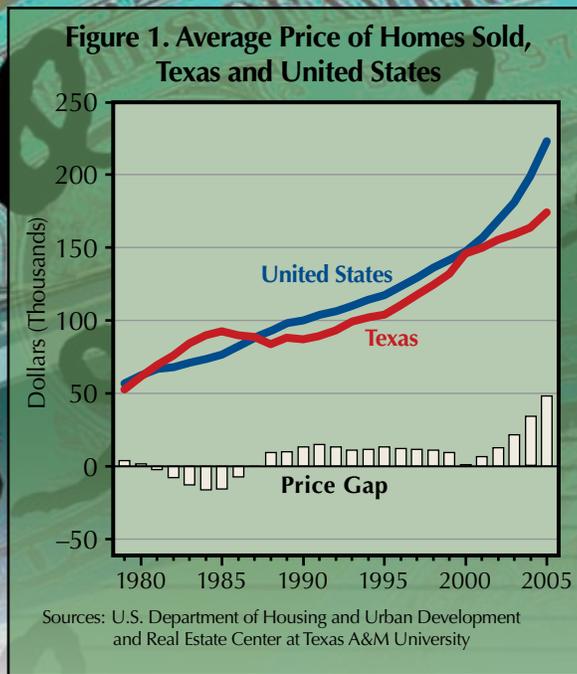
When people consider new jobs or think about creating new businesses, they compare expected compensation and other benefits from jobs and anticipated profits from businesses, along with other factors such as housing costs in the community. Those whose income does not depend on employment, such as retirees, have more freedom to choose where they live.

Housing costs (whether renting or owning) constitute about 32 percent of total consumer expenditures and play a major role in the decision to live or do business in a particular area.

This movement of people and resources from one area to another results in a tendency for house prices to revert to national averages.

## 30 Years of Mean Reverting Prices

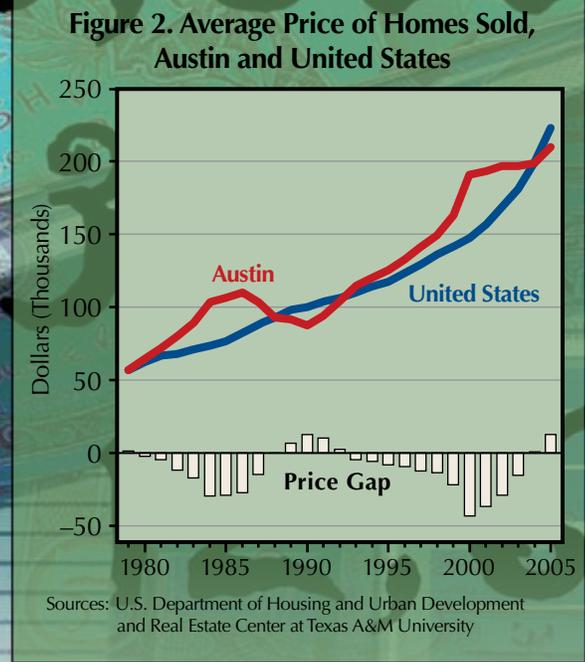
Real Estate Center research on Texas house prices finds that the forces of mean reversion have been working in the Texas residential market for the past three decades.



The average price of homes sold in Texas in 1980 was \$61,300, close to the national average of \$62,571 (Figure 1). From 1981 to 1984, while the economies of Texas and other oil-producing states experienced a rapid expansion fueled by higher oil prices, the rest of the U.S. economy suffered from high energy costs.

By 1984, the average Texas home price (AHP) climbed to \$90,000, \$16,200 higher than the U.S. average (see table). The subsequent recession in the Texas economy, spurred by falling West Texas intermediate crude oil prices (from \$39.50 per barrel in June 1980 to \$11.57 per barrel in July 1986) reduced the Texas AHP from \$93,000 in 1985 to \$88,700 in 1987. By that time, the U.S. economy was recovering, and the U.S. AHP had risen to \$88,600. It took seven years for the Texas and U.S. AHPs to converge.

From 1988 to 1991, the gap between U.S. and Texas average home prices widened, and by 1991 the U.S. average exceeded Texas' by \$14,700 (see table). During the U.S. economy's longest expansion (1992 to 2000), the gap between the averages



gradually narrowed. By 2000, the U.S. AHP exceeded that of Texas by just \$1,000 (see table). This time, mean reversion took 13 years, from 1987 to 2000.

The current business cycle, which began its expansion phase in 2002, has widened the price differential between U.S. and Texas AHPs from \$6,200 in 2001 to \$48,400 in 2005 (see table).

**Home Price Gap Between U.S., Texas and Major Texas Metros (in Dollars)**

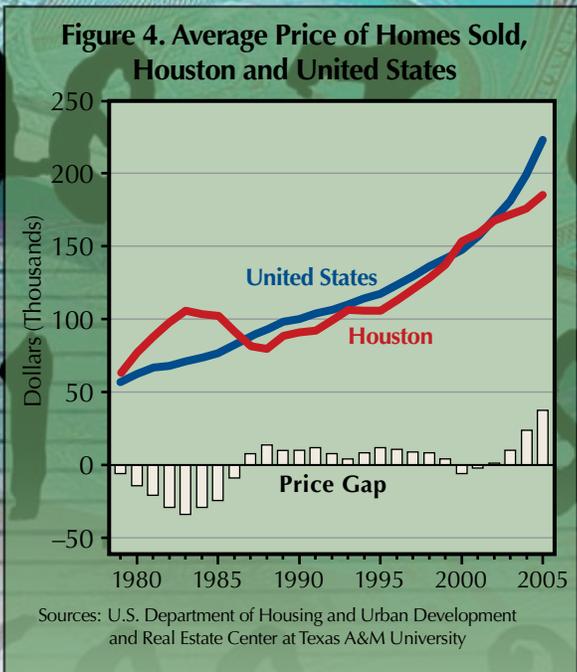
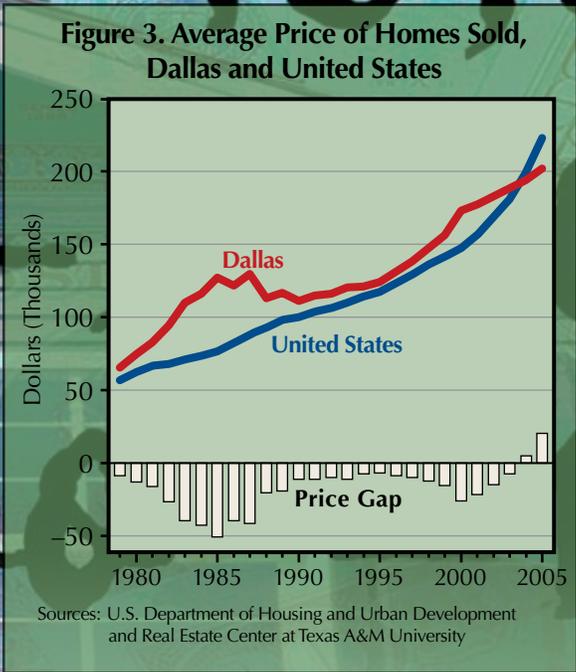
Year	Texas	Austin	Dallas	Houston
1979	3,900	800	-8,500	-5,900
1980	1,200	-2,400	-12,600	-14,300
1981	-2,400	-5,100	-16,100	-20,900
1982	-8,000	-12,200	-26,500	-29,700
1983	-13,200	-17,700	-39,100	-34,200
1984	-16,200	-29,700	-42,500	-29,500
1985	-15,900	-29,400	-50,100	-24,800
1986	-7,300	-27,800	-39,300	-9,100
1987	0	-14,900	-41,200	7,300
1988	9,100	0	-20,300	13,200
1989	9,900	6,600	-18,800	10,000
1990	12,900	12,600	-11,200	9,600
1991	14,700	10,200	-11,000	11,700
1992	13,200	2,300	-9,600	7,600
1993	10,800	-4,700	-10,600	3,600
1994	11,600	-6,300	-6,900	8,100
1995	13,000	-8,200	-6,700	11,700
1996	12,200	-9,800	-8,300	10,300
1997	11,200	-12,600	-9,600	8,400
1998	11,000	-14,000	-12,300	7,700
1999	9,100	-22,000	-15,300	4,100
2000	1,000	-43,900	-26,000	-6,000
2001	6,200	-37,100	-21,300	-2,200
2002	12,700	-29,100	-14,600	600
2003	21,600	-15,700	-7,200	9,700
2004	35,000	0	5,100	23,400
2005	48,400	12,400	20,500	37,300

Sources: U.S. Department of Housing and Urban Development and Real Estate Center at Texas A&M University

### Price Reversion in Major Texas Metro Areas

Austin's AHP has been more in step with the U.S. average than Texas' has. Since 1979, Austin's AHP has reverted to the U.S. AHP four times (Figure 2). The shortest separation between the two was four years, from 1988 to 1992; the longest was 11 years, from 1993 to 2004. The largest price gap between the AHPs of Austin and the United States occurred in 2000, when Austin's average exceeded the U.S. average by \$43,900 (see table). Lower-than-national-average home price appreciation in Austin narrowed the price gap to almost zero in 2004, and since then the U.S. AHP has exceeded Austin's by more than \$12,000 (see table and Figure 2).

For more than two decades, the Dallas AHP has been higher than that of the United



States. The largest price gap occurred in 1985, when Dallas' AHP was \$50,100 more than the United States' (Figure 3 and table). The oil price bust of 1986 flattened home price appreciation in Dallas for ten years and narrowed the gap between the Dallas and U.S. AHPs to \$6,700 in 1995. From 1995 to 2003, U.S. home price appreciation exceeded that of Dallas, and by 2004 the U.S. AHP was more than \$5,000 above the Dallas average. The price gap widened further in 2005 to more than \$20,000.

Houston's AHP has converged with the U.S. AHP three times since 1979 (Figure 4). In 1983, during the heyday of the oil boom, the Houston AHP exceeded the national average by more than \$34,000 (see table). The oil price bust of 1986 hit the local economy hard, however, and the area's AHP fell from \$105,500 in 1983 to \$79,700 in 1988. It took seven more years for the Houston residential market to recover the home price losses. By 1995, the area's AHP was roughly back to its 1983 level (Figure 4).

From 1995 to 1999, Houston's AHP rose faster than the national average; by 2000, it exceeded that of the United States by \$6,000. Since then, Houston's AHP growth rate has lagged the U.S. AHP growth rate. In 2005, the U.S. AHP exceeded Houston's by more than \$37,000 (see table).

The Center's research program for modeling mean reversion processes in Texas home prices found that prices in major regional markets have a significant tendency toward national average prices over long periods. The speed of mean reversion varies from three to seven years for the Austin metro area, seven to ten years for the Houston metro area, and five to ten years for the Dallas metro area.

The mean reversion process suggests that AHP growth rates for the United States over the next few years will decelerate

while Texas home prices are expected to continue growing at their current pace.

### Mean Reversion and Investment Strategies

Mean reversions in asset returns and prices have important practical implications for those who invest in financial markets. Contrarian investors (those who buy when others are selling and sell when others are buying) buy or sell stocks based on whether average returns are expected to be lower or higher than long-run average returns.

Homes are purchased mainly as residences, but the investment aspect of homeownership is also important. Home equity now constitutes the biggest portion of household wealth in the United States.

Mean reversion in Texas home prices suggests that the rate of return on these investments over long periods would not be less than national average rates, despite the fact that Texas home prices have been growing more slowly over the past few years. ♣

*Dr. Anari (m-anari@tamu.edu) is a research economist with the Real Estate Center at Texas A&M University.*

*Prices in major regional markets have a significant tendency toward national average prices over long periods.*

### THE TAKEAWAY

The average price of a home sold in Texas and in the state's major metropolitan areas tends toward national average home prices over time. The mean reversion tendency in local home prices has important implications for investing in residential real estate markets.



MAYS BUSINESS SCHOOL

Texas A&M University  
2115 TAMU  
College Station, TX 77843-2115

<http://recenter.tamu.edu>  
979-845-2031

**Director**, Gary W. Maler; **Chief Economist**, Dr. Mark G. Dotzour; **Communications Director**, David S. Jones; **Associate Editor**, Nancy McQuiston; **Associate Editor**, Bryan Pope; **Assistant Editor**, Kammy Baumann; **Art Director**, Robert P. Beals II; **Graphic Designer**, JP Beato III; **Graphics Assistant**, Whitney Martin; **Circulation Manager**, Mark Baumann; **Typography**, Real Estate Center.

#### Advisory Committee

Douglas A. Schwartz, El Paso, chairman; David E. Dalzell, Abilene, vice chairman; James Michael Boyd, Houston; Catarina Gonzales Cron, Houston; Tom H. Gann, Lufkin; Celia Goode-Haddock, College Station; D. Marc McDougal, Lubbock; Barbara A. Russell, Denton; Jerry L. Schaffner, Dallas; and John D. Eckstrum, Montgomery, ex-officio representing the Texas Real Estate Commission.

**Tierra Grande** (ISSN 1070-0234) is published quarterly by the Real Estate Center at Texas A&M University, College Station, Texas 77843-2115. Subscriptions are free to Texas real estate licensees. Other subscribers, \$20 per year. Views expressed are those of the authors and do not imply endorsement by the Real Estate Center, Mays Business School or Texas A&M University. The Texas A&M University System serves people of all ages, regardless of socioeconomic level, race, color, sex, religion, disability or national origin.