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# Texas Housing Affordability Index 1989-94

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**Solutions Through Research**

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This edition of the new Texas Housing Affordability Index (THAI) includes 1994 data. The Real Estate Center originally developed the THAI in the 1970s to measure the average Texas household's financial capacity to buy a home. While similar to the National Association of Realtors (NAR) index, the THAI measures only Texas markets. The THAI has been used to compare affordability among locales as well as to track change over time.

The method for calculating the index was modified in 1993 to better reflect contemporary mortgage lending practice. Quarterly values of the THAI based on the new methodology from 1989 through 1994 are included in this report. The expanded index enhances interpretation of housing data.

### **Measuring Affordability**

Housing affordability is multi-dimensional. Being able to afford a home means not only ability to purchase one but also to maintain it. Because maintenance costs are difficult to estimate accurately, most affordability measures focus on the financial requirements of the initial purchase. Even this limited task is not simple.

Buying a home means satisfying a mortgage lender's requirements for approved financing and acquiring sufficient cash for the down payment and closing costs (plus any moving expenses). The necessary data on personal wealth to measure ability to make down payments are not available on a timely nor local basis. These limitations restrict the scope of any practical affordability measure to the problem of mortgage loan qualification.

For these reasons, the THAI and similar indexes are patterned on lenders' qualifying criteria based on the borrower's income (Appendix A compares other affordability measures). Lenders require borrowers to have sufficient, verifiable income to serve mortgage debt, with adequate leeway to cover other reasonable living expenses. Basically, the THAI measures how adequately the income of the typical household qualifies for a loan to buy the typical home on the local market.

To calculate the index, a fraction of the median household income for the area is divided by the monthly payment required to purchase a median-priced home based on recent local sales data. The fraction applied to income coincides with current mortgage qualifying practices. Loan payments are based on current mortgage interest rates (using the average interest rate on all mortgage loans closed during the last five days of each month).

When the typical household has exactly the income to qualify for the typical home, the index has a value of 1.00. This value might be interpreted as indicating that supply and demand of homes are well matched or that affordability is more or less normal. Index values less than 1.00 signal that homes are less affordable and that home purchase is difficult for most households. Conversely, values more than 1.00 indicate relatively affordable housing. The higher the index, the more affordable the housing.

These interpretations are most valid when one market area is viewed at various times. Comparisons between different market areas are not as meaningful. The value of the THAI at any one time in a locality reflects not only housing market conditions but also the way income is distributed among resident households.

**If significant segments of the population (such as college students) do not participate actively in the housing market, the THAI values tend to be relatively low. Therefore, comparative values of the THAI do not necessarily mean that housing is more affordable in one area than in another.**

### **Index Modifications**

Certain changes in the THAI methodology were necessitated by data supply problems. These changes affect two components of the formula: household income and mortgage interest rates.

Income data used for the THAI are supplied by Market Statistics, Inc. The actual statistic used is called Effective Buying Income (EBI), an estimate of disposable, or after-tax, income. Each September, an estimate of median household

EBI as of the end of the previous year is reported for every metropolitan area and county in the country.

In addition, Market Statistics projects EBI for the end of the current year. This projection is available at mid-year for a fee. From these two figures, quarterly average EBIs can be estimated by interpolation (for the first quarter, EBI must be extrapolated from the previous year's data). The new THAI method uses this simple interpolation technique, resulting in mid-quarter estimates of median household income (see Appendix B).

The demise of the Federal Home Loan Bank Board diminished reporting of mortgage loan terms. The old Interest Rate Survey was picked up by the Federal Home Finance Board. However, the board no longer reports information for all Texas metropolitan areas. Data are available for Dallas-Fort Worth and Houston, as well as for the district that contains Texas.

As a matter of expediency, all areas outside the Dallas and Houston areas are assumed to have interest rates equal to the district average. Actually, this assumption is not as gross as it may appear because interest rates no longer vary as widely from one place to another. The domination of home mortgage finance by national secondary markets has greatly diminished regional disparities.

Originally, the THAI was calculated by using average loan-to-value ratios and terms for each market area, as well as local interest rates. Most prospective homebuyers must take a loan at the prevailing rate of interest. However, they are not required to accept the average ratio and term on loans originated at the time. Therefore, the new formula assumes borrowers can obtain financing at the standard 80 percent loan-to-value ratio and 30-year term. In addition, the new formula uses the average contract rate of interest rather than the effective rate used in the old formula. The effective rate reflects discount points charged as part of the loan, but these points usually are not used to qualify borrowers, so the THAI calculation need not reflect them.

Another data change involves the house price variable. The original methodology used average sales price as reported by the Multiple Listing Services (MLSs) of respective Boards and Associations of Realtors. Comparing median income to average prices is statistically inconsistent. In 1989, the Center began collecting information on the distribution of sales prices and now can calculate median prices for most of the reporting MLSs. The revised method uses these median prices. For that reason, **revised THAI values cannot be calculated for periods prior to 1989.**

To revise the THAI, the fraction of income used in the formula was changed. The old formula allowed one-third of median household income to be applied against the required principal and interest payment. This proportion was assumed to correspond to the criteria used for FHA loans and adjusted for the formula not including escrow payments for taxes and insurance.

Given that conventional lenders typically allow no more than 28 percent of gross income to be applied against monthly loan payments, the percentage previously used in the formula seemed too high. An analysis of typical escrow payments, taking into account that the formula uses EBI rather than gross income, suggested that 27 percent of EBI is more consistent with contemporary lending practice.

### **Expanded Index**

In addition to these revisions, the index has been expanded to provide additional insights into affordability conditions. Each index value now includes an estimate of how many households in the area can afford the typical home. Also, supplemental THAI's are computed for borrowers who lack sufficient cash to obtain a standard loan.

A THAI of 1.00 means that half of the households in the area could qualify, on the basis of income, to buy the median-priced home. However, values of the THAI often differ from 1.00, and the interpretation of those values is not straightforward. For example, a THAI value of 1.10 means that more than half of the households can afford a home. From this information alone, however, it is impossible to tell how many more.

To quantify the extent of affordability, the distribution of income in the area must be known. Fortunately, Market Statistics provides information on the distribution of EBI in its annual *Survey of Buying Power*. The current estimate of affordability uses this information.

First, the distribution is extrapolated to fit the subject time period, assuming that the distribution shifts intact by the same amount as the median EBI. Then it is converted into a cumulative distribution (percentage of all households making more than a specified income). The income required to exactly qualify for the median-priced home is calculated, and the cumulative income distribution indicates what percentage of households earn at least this amount of income. This percentage is the number reported.

If the income distribution is flat (little difference between the richest and poorest households), a relatively small increase in the THAI will affect a large number of families. If distribution is steep, the same increase in the THAI will not have much effect. (See Appendix D for more detail on how this percentage is estimated.)

The concept of affordability, as measured by the THAI, has special relevance for first-time buyers. Few of them have accumulated adequate savings for the required down payment and, therefore, do not use conventional financing. In most cases, higher ratio loans are readily available with the application of FHA or private mortgage insurance. However, these loans have larger principal balances than comparable standard loans (because more of the cost is being financed), and they require payment of insurance premiums. Often, as in the case of FHA, the premiums are charged as part of the closing costs (although they may be rolled into the loan) and part of the monthly payment. Therefore, qualifying for a high-ratio loan requires more income.

To indicate the effects of these more stringent qualifying requirements on affordability, additional THAI values are calculated for financing with 90 and 95 percent loan-to-value

ratios. Because of the variety of private mortgage insurance terms, FHA requirements are used to compute these indexes. In addition to the higher principal amounts, the loans require an additional 3 percent of loan amount for an up-front premium (included in the loan amount). In addition, the 95 percent loan includes a monthly premium equal to one quarter of 1 percent of the initial loan balance divided among the 12 payments for the year. (Appendix E describes the assumptions underlying these indexes.)

These additional indexes indicate affordability for the typical first-time buyer, even though they assume the entire population is composed of first-time buyers. NAR reports an index specifically aimed at first-time buyers. The index incorporates high-ratio financing but also uses income figures reflecting young households and home prices similar to the "starter" home typically purchased by first-timers. However, these figures are estimated by discounting by a fixed amount the median income and price used in the NAR's more general index.

### **Improved THAI**

The following tables contain all the indicators associated with the revised THAI for 1989 through 1994. The general index for the state has greatly improved. In 1989, the THAI hovered around 1.00. As interest rates dropped steadily, the index grew rapidly. By 1993, almost three-quarters of the households in the state could afford the median-priced home. In early 1994, the state-wide index reached its highest level within the revision period. Given that recent interest rates are lower than they have been since the mid-1970s, Texas housing probably has never been more affordable. The new indexes, based on low down payment financing, have made similar gains. With 90 percent financing, the median-priced Texas home became affordable in 1990 and, even with 95 percent financing, it was affordable in 1991. In response to these affordability gains, the number of homes sold through Texas MLSs grew by nearly 25 percent. The revised THAI provides a valuable indicator of the state of housing markets.

Table 1. Texas Housing Affordability Index, 1989-94

MSA	1989				1990				1991			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	1.35	1.17	1.29	1.37	1.51	1.89	1.78	1.97	2.28	1.98	1.96	2.20
Amarillo	1.32	1.32	1.01	1.56	1.49	1.42	1.33	1.30	1.36	2.04	1.50	1.65
Austin	1.00	1.04	0.99	1.05	1.08	1.17	1.13	1.20	1.26	1.31	1.25	1.36
Beaumont	1.37	1.27	1.30	1.40	1.57	1.41	1.47	1.42	1.47	1.40	1.48	1.44
Port Arthur	1.68	1.74	1.65	1.75	2.00	1.56	1.81	2.00	1.75	1.82	1.63	1.47
Brazoria	1.88	1.92	1.97	1.83	1.99	1.97	1.97	2.37	2.26	2.35	2.25	2.46
Brownsville	1.00	0.91	na	na	na	na	na	na	na	na	na	na
Harlingen	1.20	1.11	1.02	1.14	1.27	1.09	1.18	na	na	na	na	na
Bryan-College Station	1.03	0.98	0.98	1.05	1.12	1.00	1.07	0.91	1.06	1.14	1.05	1.30
Corpus Christi	1.10	1.10	1.10	0.96	1.22	1.32	1.19	1.25	1.29	1.43	1.36	1.53
Dallas	0.98	0.95	0.98	1.02	1.02	0.96	0.98	1.06	1.06	1.08	1.17	1.26
Irving	1.01	1.18	1.16	1.17	1.21	1.14	1.10	1.27	1.37	1.33	1.30	1.41
El Paso	1.05	0.89	0.94	1.06	1.02	1.02	1.03	0.97	1.09	1.18	1.18	1.29
Fort Worth	1.10	1.06	1.19	0.87	1.31	1.24	1.23	1.38	1.49	1.49	1.44	1.50
Arlington	1.19	1.19	1.30	1.26	1.35	1.35	1.40	1.45	1.65	1.69	1.73	1.73
NE Tarrant County	0.96	0.98	1.10	1.12	1.19	1.12	1.17	1.24	1.38	1.43	1.46	1.44
Galveston	1.23	1.11	1.34	1.22	1.48	1.10	1.20	1.29	1.32	1.80	1.20	1.08
Houston	1.44	1.27	1.30	1.40	1.40	1.34	1.34	1.56	1.46	1.43	1.59	1.71
Killeen-Ft. Hood	na	na	na	0.89	na	na	na	na	na	na	na	na
Temple-Belton	1.11	1.03	1.11	1.15	1.21	1.12	1.14	1.27	1.25	1.38	1.32	1.45
Longview	1.19	1.10	1.39	1.35	1.41	1.24	1.26	1.33	1.57	1.46	1.58	1.61
Lubbock	1.12	1.09	1.04	1.17	1.20	1.21	1.18	1.16	1.33	1.30	1.33	1.44
McAllen	na	na	na	0.81	na	na	na	na	na	na	na	1.10
Midland	1.38	1.48	1.24	1.43	1.41	1.39	1.31	1.45	1.71	1.51	1.64	1.66
Odessa	1.94	1.90	1.80	1.73	2.41	1.89	1.99	1.96	2.02	1.68	1.60	1.62
San Angelo	1.38	1.30	1.31	1.39	1.39	1.56	1.49	1.53	1.45	1.54	1.60	1.65
San Antonio	1.17	1.12	1.08	1.21	1.21	1.23	1.18	1.26	1.45	1.39	1.41	1.46
Sherman-Denison	1.30	1.23	1.40	1.40	1.51	1.78	1.46	1.79	1.88	1.74	1.99	na
Texarkana	1.26	1.22	1.25	1.23	1.55	1.35	1.41	1.30	1.52	1.53	1.61	1.40
Tyler	na	na	na	na	na	1.28	1.33	1.45	1.46	1.38	1.29	1.40
Victoria	1.35	1.52	1.41	1.39	1.46	1.69	1.43	1.52	1.44	1.53	1.72	1.61
Waco	na	na	na	1.22	na	na	na	na	na	na	na	na
Wichita Falls	1.25	1.19	1.26	1.37	1.60	1.46	1.40	1.48	1.47	1.66	1.60	1.65
Texas	1.03	0.97	0.99	1.05	1.18	1.16	1.16	1.26	1.32	1.48	1.30	1.37
United States	0.91	0.86	0.86	0.91	0.90	0.90	0.94	0.99	1.03	1.00	1.04	1.17

Source: Real Estate Center at Texas A&M University



Table 1. Texas Housing Affordability Index, 1989-94 (continued)

MSA	1992				1993				1994			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	2.49	2.50	2.08	2.07	2.34	2.07	2.18	2.12	2.04	1.94	2.00	2.19
Amarillo	1.82	1.64	1.90	1.92	1.97	1.91	1.95	1.97	2.00	1.88	1.91	1.98
Austin	1.43	1.41	1.50	1.46	1.52	1.49	1.54	1.55	1.54	1.50	1.46	1.46
Beaumont	1.54	1.51	1.64	1.65	1.79	1.79	1.83	1.84	1.77	1.70	1.72	1.77
Port Arthur	1.72	1.55	1.63	1.51	1.81	1.58	1.86	1.81	1.68	1.65	1.53	1.89
Brazoria	2.28	2.30	2.19	2.46	2.40	2.50	2.53	2.54	2.67	2.56	2.42	2.44
Brownsville	1.83	1.33	1.37	1.31	1.60	1.37	1.26	na	na	na	1.35	1.54
Harlingen	na	na	na	na	na	na	na	na	na	na	na	na
Bryan-College Station	1.24	1.23	1.33	1.24	1.42	1.29	1.41	1.32	1.42	1.28	1.29	1.29
Corpus Christi	1.75	1.69	1.72	1.68	1.85	1.78	1.89	1.91	1.93	1.81	1.70	1.77
Dallas	1.31	1.30	1.39	1.43	1.53	1.48	1.52	1.57	1.57	1.48	1.54	1.64
Irving	1.47	1.42	1.67	1.73	1.73	1.68	1.72	1.64	1.90	1.70	1.77	2.05
El Paso	1.42	1.38	1.44	1.46	1.56	1.53	1.58	1.58	1.64	1.55	1.48	na
Fort Worth	1.70	1.78	1.87	1.92	2.02	2.00	1.99	2.08	2.00	2.08	2.19	2.23
Arlington	1.85	1.90	2.03	2.04	2.19	2.20	2.23	2.26	2.25	2.13	2.21	2.33
NE Tarrant County	1.65	1.59	1.68	1.70	1.79	1.86	2.04	2.02	1.94	1.94	1.88	2.01
Galveston	1.30	1.38	1.37	1.85	1.73	1.25	1.44	1.64	1.78	1.38	1.54	1.49
Houston	1.70	1.69	1.80	1.77	1.85	1.94	1.99	2.08	2.15	1.97	1.95	2.10
Killeen-Ft. Hood	na	na	na	1.67	1.73	1.77	1.73	1.86	1.77	1.68	1.63	1.74
Temple-Belton	1.65	1.60	1.69	1.69	1.65	1.72	1.78	1.82	1.73	1.71	1.72	1.75
Longview	1.68	1.66	1.64	1.77	1.91	1.78	1.85	1.95	2.04	1.86	1.92	1.81
Lubbock	1.58	1.51	1.60	1.65	1.71	1.74	1.83	1.79	1.82	1.81	1.76	1.93
McAllen	1.20	1.21	1.30	1.34	na	1.27	1.25	1.42	1.38	1.39	1.25	1.28
Midland	1.83	1.80	1.84	1.84	2.19	2.08	2.04	2.14	2.36	2.02	2.11	1.91
Odessa	2.11	2.11	2.15	2.15	2.70	2.33	2.13	2.25	2.29	2.12	2.25	2.72
San Angelo	1.92	1.94	1.81	2.26	2.18	2.06	2.05	2.19	2.11	2.21	1.99	2.11
San Antonio	1.57	1.54	1.53	1.64	1.69	1.63	1.65	1.78	1.76	1.65	1.63	1.66
Sherman-Denison	2.57	2.12	2.02	2.16	2.35	2.09	2.35	2.63	2.62	2.46	2.17	2.79
Texarkana	1.57	1.76	1.75	1.81	2.05	2.04	1.88	1.99	2.13	1.82	1.83	1.83
Tyler	1.57	1.36	1.45	1.73	1.39	1.84	1.96	1.75	1.85	1.64	1.65	1.98
Victoria	1.88	1.84	1.97	1.98	1.95	2.10	2.23	2.16	2.10	2.21	2.10	2.05
Waco	na	na	na	na	na	na	na	na	na	na	na	na
Wichita Falls	1.99	1.92	2.04	2.07	2.12	2.10	2.17	2.24	2.20	2.10	2.04	2.08
Texas	1.53	1.50	1.57	1.61	1.69	1.69	1.75	1.79	1.81	1.71	1.69	1.77
United States	1.13	1.14	1.28	1.27	1.32	1.33	1.36	1.43	1.42	1.34	1.32	1.34

Source: Real Estate Center at Texas A&M University

Table 2. Median-Priced Home Affordability by Percentage of Households, 1989-94

MSA	1989				1990				1991			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	64	58	62	65	69	76	74	77	80	77	77	81
Amarillo	63	62	51	69	68	67	64	64	64	77	67	70
Austin	50	52	50	52	54	57	55	57	60	61	59	61
Beaumont	62	59	59	62	66	63	64	62	64	62	64	63
Port Arthur	68	69	67	69	72	66	70	72	69	70	68	65
Brazoria	76	77	77	76	78	78	78	82	81	82	81	82
Brownsville	50	47	na	na	na	na	na	na	na	na	na	na
Harlingen	59	56	52	57	62	55	52	na	na	na	na	na
Bryan-College Station	52	49	49	52	56	50	53	47	52	55	51	60
Corpus Christi	54	54	53	47	59	62	57	59	61	64	61	66
Dallas	50	48	49	51	52	50	50	55	53	53	56	59
Irving	51	59	58	58	61	58	55	62	67	65	64	67
El Paso	53	45	46	52	51	50	51	48	53	56	56	59
Fort Worth	54	53	57	43	62	59	58	63	67	66	64	65
Arlington	59	59	63	61	65	64	66	67	73	74	74	74
NE Tarrant County	47	48	54	54	58	55	56	59	65	65	65	64
Galveston	59	55	62	58	66	54	58	61	62	72	58	53
Houston	66	61	62	64	65	63	63	69	67	65	69	71
Killeen-Ft. Hood	na	na	na	43	na	na	na	na	na	na	na	na
Temple-Belton	55	51	54	56	58	55	55	60	59	63	60	64
Longview	57	54	63	62	64	58	59	61	68	65	68	68
Lubbock	56	54	51	57	59	59	57	56	63	61	61	64
McAllen	na	na	na	41	na	na	na	na	na	na	na	53
Midland	65	68	61	66	66	65	63	67	73	68	71	71
Odessa	76	75	74	72	82	75	77	76	77	72	70	71
San Angelo	64	62	62	64	65	69	67	68	66	68	69	70
San Antonio	57	55	53	58	59	59	57	60	66	64	63	64
Sherman-Denison	62	59	64	64	67	73	66	73	74	72	76	na
Texarkana	60	59	59	58	67	62	63	60	66	66	67	62
Tyler	na	na	na	na	na	60	62	65	65	63	60	63
Victoria	63	67	64	63	66	71	65	67	65	67	71	69
Waco	na	na	na	58	na	na	na	na	na	na	na	na
Wichita Falls	61	58	60	64	70	67	65	67	67	71	69	70
Texas	52	49	49	52	57	56	56	59	61	65	60	62
United States	46	43	43	45	45	45	47	49	51	50	51	55

Source: Real Estate Center at Texas A&M University

Table 2. Median-Priced Home Affordability by Percentage of Households, 1989-94 (continued)

MSA	1992				1993				1994			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	83	83	78	78	82	78	80	79	78	76	77	79
Amarillo	74	71	75	75	76	75	76	76	76	74	75	76
Austin	66	66	67	66	77	67	68	68	74	67	66	66
Beaumont	67	66	68	69	71	70	71	71	70	69	69	70
Port Arthur	69	66	67	65	70	66	71	70	68	67	65	71
Brazoria	82	82	81	83	83	84	84	84	85	84	83	83
Brownsville	72	62	63	62	68	63	60	na	na	na	62	67
Harlingen	na	na	na	na	na	na	na	na	na	na	na	na
Bryan-College Station	58	58	60	58	63	59	62	59	62	58	59	58
Corpus Christi	71	70	71	70	73	71	73	73	74	72	70	71
Dallas	63	63	66	67	73	68	69	70	72	68	69	71
Irving	71	69	76	77	77	76	77	75	80	76	77	82
El Paso	66	64	66	66	69	68	69	69	70	68	66	na
Fort Worth	72	74	75	76	77	77	76	78	76	77	79	79
Arlington	78	79	81	81	83	83	83	84	83	82	83	84
NE Tarrant County	74	72	73	74	76	77	79	79	80	80	79	81
Galveston	61	63	62	72	70	59	64	68	70	62	66	64
Houston	73	72	74	73	75	76	77	78	79	76	76	78
Killeen-Ft. Hood	na	na	na	76	78	78	77	80	78	76	75	77
Temple-Belton	69	68	70	70	69	70	71	72	70	70	70	70
Longview	70	70	69	72	74	71	72	74	74	71	72	70
Lubbock	69	67	69	70	71	71	73	72	72	72	71	74
McAllen	58	58	61	62	na	60	59	64	63	63	59	59
Midland	74	74	74	74	79	77	77	78	80	76	77	74
Odessa	78	78	78	78	83	80	78	79	79	77	78	83
San Angelo	76	76	74	80	79	78	78	79	78	79	76	78
San Antonio	69	69	68	71	72	70	70	73	73	70	70	70
Sherman-Denison	82	78	76	78	80	77	80	82	82	81	78	83
Texarkana	68	71	71	72	75	75	73	74	77	72	73	72
Tyler	69	64	66	72	64	73	75	72	73	70	69	75
Victoria	73	73	74	75	74	76	77	77	76	77	76	75
Waco	na	na	na	na	na	na	na	na	na	na	na	na
Wichita Falls	77	76	77	78	78	78	79	80	79	78	77	77
Texas	68	67	68	69	71	71	72	72	73	71	70	72
United States	59	56	61	60	63	63	64	65	65	63	62	63

Source: Real Estate Center at Texas A&M University

Table 3. Median-Priced Home Affordability with 90 Percent Financing by Percentage of Households, 1989-94

MSA	1989				1990				1991			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	57	50	55	57	63	71	69	72	77	72	71	75
Amarillo	56	56	43	62	62	60	58	57	57	73	60	63
Austin	44	45	43	45	48	51	49	51	54	55	52	55
Beaumont	56	53	53	56	61	57	58	57	58	57	59	58
Port Arthur	63	64	62	64	69	61	65	68	65	66	63	61
Brazoria	72	72	73	70	74	73	73	78	77	78	77	79
Brownsville	44	40	na	na	na	na	na	na	na	na	na	na
Harlingen	53	49	44	50	55	47	51	na	na	na	na	na
Bryan-College Station	46	44	44	46	49	45	47	41	47	48	46	53
Corpus Christi	48	47	47	40	52	55	51	53	54	57	55	60
Dallas	41	39	41	43	44	42	43	48	46	46	50	51
Irving	41	50	49	49	52	48	45	53	59	57	55	59
El Paso	45	38	40	45	45	44	45	42	47	50	50	52
Fort Worth	48	46	51	35	55	53	52	57	60	60	58	59
Arlington	51	50	55	53	57	57	58	59	67	68	68	68
NE Tarrant County	37	38	45	45	50	46	50	52	58	58	58	56
Galveston	53	48	56	51	60	48	51	54	55	67	52	48
Houston	60	54	55	58	59	57	56	63	60	59	63	65
Killeen-Ft. Hood	na	na	na	37	na	na	na	na	na	na	na	na
Temple-Belton	48	45	48	49	51	48	49	53	53	56	54	57
Longview	51	47	57	56	58	52	53	55	62	59	62	62
Lubbock	48	47	45	49	51	52	51	49	56	54	55	57
McAllen	na	na	na	34	na	na	na	na	na	na	na	44
Midland	59	62	54	60	60	59	56	60	67	62	65	65
Odessa	71	70	68	67	78	70	72	71	73	66	65	65
San Angelo	58	55	55	58	58	63	60	61	59	61	63	63
San Antonio	50	49	47	51	52	53	51	53	59	57	57	58
Sherman-Denison	55	53	58	57	61	68	60	68	70	66	71	na
Texarkana	54	52	53	52	62	56	57	54	61	60	62	56
Tyler	na	na	na	na	na	54	55	59	59	57	54	57
Victoria	56	61	58	57	60	65	59	61	59	61	66	63
Waco	na	na	na	51	na	na	na	na	na	na	na	na
Wichita Falls	53	51	53	57	64	60	58	61	60	65	63	63
Texas	45	42	42	45	51	50	50	53	55	59	53	55
United States	38	35	34	36	37	36	38	41	43	41	42	50

Source: Real Estate Center at Texas A&M University

Table 3. Median-Priced Home Affordability with 90 Percent Financing by Percentage of Households, 1989-94 (continued)

MSA	1992				1993				1994			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	79	79	74	74	78	74	76	75	73	71	72	75
Amarillo	69	65	71	71	72	70	71	71	72	69	70	71
Austin	60	59	61	60	70	61	62	62	67	61	60	60
Beaumont	61	61	63	63	66	66	66	66	65	64	64	65
Port Arthur	64	61	63	60	66	61	67	66	63	63	60	67
Brazoria	78	78	77	80	80	80	81	81	82	81	79	80
Brownsville	68	56	57	55	64	57	53	na	na	na	56	61
Harlingen	na	na	na	na	na	na	na	na	na	na	na	na
Bryan-College Station	52	52	54	52	57	53	56	54	57	54	54	54
Corpus Christi	66	65	66	65	68	66	69	69	69	67	65	66
Dallas	56	56	59	60	66	62	63	64	66	61	63	65
Irving	63	61	69	71	71	69	70	68	75	70	71	77
El Paso	59	58	60	60	63	62	63	63	65	62	61	na
Fort Worth	67	68	70	71	73	72	72	73	72	73	75	75
Arlington	73	74	76	76	79	78	79	79	79	77	78	80
NE Tarrant County	67	66	67	68	70	71	74	74	75	75	74	76
Galveston	54	57	57	68	65	53	58	63	66	56	60	59
Houston	67	67	69	68	70	71	72	74	75	72	71	74
Killeen-Ft. Hood	na	na	na	70	72	72	72	75	73	70	69	72
Temple-Belton	64	62	64	64	64	65	66	67	65	64	65	65
Longview	65	64	64	67	69	66	68	69	69	66	67	65
Lubbock	63	61	63	64	66	66	68	67	68	67	66	69
McAllen	51	51	55	56	na	53	53	58	57	57	53	53
Midland	69	69	69	69	75	73	72	74	76	71	73	69
Odessa	74	74	74	74	80	76	74	75	75	72	74	79
San Angelo	71	72	69	76	75	73	73	75	74	75	72	74
San Antonio	64	63	63	65	67	65	65	68	68	65	65	65
Sherman-Denison	79	73	72	74	76	73	76	79	79	77	73	80
Texarkana	62	66	66	67	71	71	68	70	73	68	68	68
Tyler	63	57	60	66	59	68	71	67	69	64	65	71
Victoria	68	68	70	70	70	72	73	72	72	73	71	70
Waco	na	na	na	na	na	na	na	na	na	na	na	na
Wichita Falls	72	71	73	73	74	74	75	76	75	73	72	73
Texas	62	61	63	64	66	65	67	67	68	66	66	67
United States	52	48	55	53	56	56	57	59	60	56	56	56

Source: Real Estate Center at Texas A&M University

Table 4. Median-Priced Home Affordability with 95 Percent Financing by Percentage of Households, 1989-94

MSA	1989				1990				1991			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	53	46	50	53	58	68	65	69	74	68	67	72
Amarillo	52	52	37	58	58	56	54	53	53	69	56	59
Austin	39	41	38	40	43	46	44	46	50	51	48	51
Beaumont	52	49	50	52	57	54	55	53	55	53	55	54
Port Arthur	60	61	59	61	66	57	62	65	62	63	60	57
Brazoria	68	69	70	66	70	70	69	76	74	76	74	77
Brownsville	40	37	na	na	na	na	na	na	na	na	na	na
Harlingen	48	44	40	45	47	42	46	na	na	na	na	na
Bryan-College Station	42	41	40	43	46	41	44	37	43	46	42	50
Corpus Christi	44	43	43	35	48	51	47	48	50	54	51	55
Dallas	36	34	35	37	38	36	38	43	41	40	43	46
Irving	35	44	42	42	46	42	39	47	53	51	50	53
El Paso	42	34	36	41	41	40	41	37	43	46	45	50
Fort Worth	44	42	47	30	52	49	48	53	57	56	54	55
Arlington	45	44	50	47	52	51	53	54	63	63	64	63
NE Tarrant County	32	33	39	39	45	41	42	44	53	53	53	51
Galveston	48	44	51	47	56	44	48	50	52	64	48	44
Houston	56	50	50	53	54	52	52	59	56	54	58	61
Killeen-Ft. Hood	na	na	na	33	na	na	na	na	na	na	na	na
Temple-Belton	44	41	44	45	48	44	45	49	49	52	50	53
Longview	47	43	53	52	54	48	49	51	58	55	58	58
Lubbock	45	43	40	45	48	48	47	45	52	50	50	53
McAllen	na	na	na	30	na	na	na	na	na	na	na	41
Midland	54	58	49	56	55	54	51	56	64	58	61	60
Odessa	68	67	65	63	75	67	69	68	69	63	61	61
San Angelo	53	51	51	53	54	58	56	57	56	57	59	60
San Antonio	47	44	42	47	48	49	47	49	55	53	53	54
Sherman-Denison	51	49	53	53	57	64	56	64	66	63	67	na
Texarkana	49	48	48	47	58	52	53	50	57	56	58	52
Tyler	na	na	na	na	na	50	51	55	56	53	50	53
Victoria	52	57	54	53	56	62	55	57	55	58	62	59
Waco	na	na	na	47	na	na	na	na	na	na	na	na
Wichita Falls	48	47	48	52	60	56	54	56	56	60	58	59
Texas	41	37	37	40	47	46	45	49	51	56	50	51
United States	32	30	30	32	33	32	34	35	37	37	38	41

Source: Real Estate Center at Texas A&M University

Table 4. Median-Priced Home Affordability with 95 Percent Financing by Percentage of Households, 1989-94 (continued)

MSA	1992				1993				1994			
	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4	qtr 1	qtr 2	qtr 3	qtr 4
Abilene	77	77	71	70	75	70	72	71	70	68	69	72
Amarillo	65	61	67	67	68	67	67	68	68	66	67	68
Austin	56	55	57	56	64	56	58	58	61	57	55	55
Beaumont	58	57	60	60	62	62	63	63	62	60	61	62
Port Arthur	61	57	59	56	63	57	63	62	60	59	56	64
Brazoria	75	75	74	77	77	78	78	78	79	78	76	77
Brownsville	64	52	53	51	60	52	48	na	na	na	52	57
Harlingen	na	na	na	na	na	na	na	na	na	na	na	na
Bryan-College Station	49	49	51	48	53	50	53	51	54	50	51	50
Corpus Christi	63	62	62	61	65	63	65	65	66	64	62	63
Dallas	51	50	54	55	61	57	58	59	61	56	58	61
Irving	58	55	64	66	67	64	65	62	70	65	67	73
El Paso	55	54	56	56	59	58	59	59	61	58	57	na
Fort Worth	63	65	66	67	69	69	68	70	69	70	71	72
Arlington	68	69	72	72	75	75	75	76	76	73	75	76
NE Tarrant County	63	61	63	64	66	67	70	69	72	71	70	72
Galveston	51	53	53	64	62	49	54	59	62	53	56	55
Houston	63	63	65	64	66	68	69	70	71	68	68	70
Killeen-Ft. Hood	na	na	na	65	68	68	67	70	68	66	64	67
Temple-Belton	60	59	61	61	60	61	62	63	62	61	61	62
Longview	61	61	60	63	66	63	64	66	66	63	64	62
Lubbock	59	57	60	60	62	62	64	63	64	64	63	66
McAllen	47	48	50	51	na	49	49	53	53	53	49	50
Midland	66	65	66	66	72	70	69	70	73	68	69	66
Odessa	70	70	71	71	78	73	70	72	72	69	71	77
San Angelo	68	68	66	73	72	70	70	72	71	72	69	71
San Antonio	60	59	59	61	63	61	61	64	64	61	61	61
Sherman-Denison	76	70	69	71	73	69	73	76	76	74	70	78
Texarkana	58	63	62	63	68	67	65	66	70	64	65	64
Tyler	59	53	56	63	54	65	67	63	65	61	61	67
Victoria	65	64	66	66	66	68	70	69	68	70	68	67
Waco	na	na	na	na	na	na	na	na	na	na	na	na
Wichita Falls	69	67	69	70	71	70	71	72	72	70	69	69
Texas	58	57	59	60	62	62	63	64	64	62	62	63
United States	46	43	50	47	51	51	52	54	55	51	51	51

Source: Real Estate Center at Texas A&M University

## Appendix A

### Other Housing Affordability Measures

#### **NAR Housing Affordability Index**

The National Association of Realtors publishes an index on a monthly basis similar to the THAI. A value of 100 indicates a perfect match between median qualifying income and the monthly principal and interest payment required to purchase the median-priced home.

**Qualifying assumption:** P&I payment must be no larger than 25 percent of income.

**Down payment assumption:** 20 percent of purchase price.

**House price data:** Median sales price of existing homes during period.

**Loan terms:** Average effective interest rates on loans closed; 30-year term.

**Income:** Median household income.

#### **NAR First-Time Buyer Housing Affordability Index**

In conjunction with its regular index, NAR also constructs an index indicating affordability for young, first-time buyers. The structure is identical to the regular index except the variables are modified to mirror young renter households.

**Qualifying assumption:** P&I payment must be no larger than 25 percent of income.

**Down payment assumption:** 10 percent of purchase price.

**House price data:** 85 percent of the median sales price of existing homes during period to simulate the price of typical starter home.

**Loan terms:** Average effective interest rates on loans closed plus .25 percentage point to account for mortgage insurance; 30-year term.

**Income:** Estimated median household income for 25- to 44-year-old nonowners.

#### **CAR Housing Affordability Index**

The California Association of Realtors estimates the proportion of households in California cities that can afford the median-priced home.

**Qualifying assumption:** P&I payment plus tax and insurance escrow payment (PITI) must be no larger than 30 percent of income.

**Down payment assumption:** 20 percent of purchase price.

**House price data:** Median sales price of existing homes during period.

**Loan terms:** Average effective interest rates on loans closed; 30-year term.

**Income:** Distribution of household incomes.

#### **NAHB Index**

The National Association of Home Builders constructs an index based on the percentage of new homes built that could be purchased by a household with median income.

**Qualifying assumption:** P&I payment must be no larger than 25 percent of income.

**Down payment assumption:** 10 percent of purchase price.

**House price data:** Distribution of prices for newly built homes.

**Loan terms:** Average contract interest rates on loans closed; 30-year term.

**Income:** Median family income.



## Appendix B

### Household Income Estimates

The equation for housing affordability requires a current measure of median household income for each housing market covered. The THAI uses median Effective Buying Income (EBI) estimated by Market Statistics, Inc. End-of-the-year EBI estimates are reported for each county, metropolitan statistical area and major city in the nation as well as for states and the nation in the annual *Survey of Buying Power*. The survey is available in September of the following year. In addition, the Center purchases a customized forecast of end-of-the-year EBI for all Texas MSAs. This forecast is available in June. For example, in June 1993, the forecast for December 31, 1993, becomes available, and in September, the estimate for December 31, 1992, is reported.

Consequently, estimating THAI values for quarters on a timely basis requires some manipulation of income estimates. For the second, third and fourth quarters of the year, mid-quarter estimates are obtained by interpolating between the estimate for the end of the previous year ( $INCe[y-1]$ ) and the forecast for end of the current year ( $INCf[y]$ ):

$$\text{Quarter 2 INCOME} = INCe[y-1] + .375 (INCf[y] - INCe[y-1])$$

$$\text{Quarter 3 INCOME} = INCe[y-1] + .625 (INCf[y] - INCe[y-1])$$

$$\text{Quarter 4 INCOME} = INCe[y-1] + .875 (INCf[y] - INCe[y-1])$$

Note that the interpolation is set to provide mid-quarter estimates to match the other quarterly averaged figures in the equation.

The method for the first quarter differs because no current estimate or forecast is available when the index must be estimated. First-quarter income is extrapolated from the previous two years' forecast ( $INCf[y-1]$ ) ( $INCe[y-2]$ ):

$$\text{Quarter 1 INCOME} = INCe[y-2] + 1.0125 (INCf[y-1] - INCe[y-2])$$

In essence, the methodology assumes the rate of growth in income during the previous year continues through the first quarter of the next year. In addition, the method assumes that income growth is constant during the year.

## Appendix C

### Support for Revised THAI Equation

The revision of THAI includes a fundamental change in the equation used to compute the index. This change is made to better reflect the criteria used by mortgage lenders in today's market.

Mortgage lenders, when underwriting conventional mortgage loans, commonly apply the ratios mandated by the Federal National Mortgage Association for loans purchased by that agency. This means that a borrower, with relatively little long-term debt, can qualify for a loan if the payments are no more than 28 percent of monthly income. In this case, the payment includes the tax and insurance escrow payment in addition to loan principal and interest payments (PITI). For THAI, the percentage of income applied is adjusted to account for the use of principal and interest (PI) payments instead of PITI and for the use of Effective Buying Income (EBI) instead of gross income.

At the time of publication, the most current information on housing costs was contained in the American Housing Survey of 1991, published by the U.S. Census Bureau. For the South region (includes Texas), the following median monthly housing costs were reported:

Principal and interest	\$433
Insurance	32
Taxes	40
Total PITI	\$505

Therefore, at the median, PITI is approximately 17 percent higher than PI.

As reported by Market Statistics, Inc., EBI is intended as an after-tax, disposable income measure. The 1990 Census of Population reports the median household gross income for Texas as \$27,016. For the same period (December 1989), Texas median household EBI is reported as \$23,975. Based on these figures, gross income is approximately 13 percent higher than EBI.

From these relationships, a new ratio can be calculated:

$$\text{THAI} = \frac{.28 \text{ Income}}{\text{PITI}}$$

$$\text{Income} = 1.13 \text{ EBI}$$

$$\text{PITI} = 1.17 \text{ PI}$$

$$\text{THAI} = \frac{.28 \times 1.13 \text{ EBI}}{1.17 \text{ PI}} = \frac{.27 \text{ EBI}}{\text{PI}}$$

The substantial change in the ratio means that new values for THAI are much lower than the original values, indicating that housing has not been as affordable as once thought. Some of the change is offset by the use of contract interest rates to calculate PI (making payments lower than those based on effective rates) and the use of median house prices, which are generally lower than average prices.

## Appendix D

### Method for Estimating Median-Priced Home Affordability by Percentage of Households

One new feature of the revised THAI is an estimate of the percentage of households in the market area that could qualify to buy the median-priced home. This estimate is based on the distribution of household incomes in the area. An estimate of this distribution is reported annually in the *Survey of Buying Power*, the same source used for median household income in the THAI equation. The distribution is expressed as the percentage of all households having EBI within specified brackets. The income brackets used in the survey are \$10,000-\$19,999; \$20,000-\$34,999; \$35,000-\$49,500; and \$50,000 and greater. This information is converted to a cumulative income distribution showing the percentage of households earning more than \$10,000; \$20,000; \$35,000 and \$50,000, respectively. The income needed to qualify for the median-priced home is calculated, and this cumulative distribution is used to indicate how many households earn at least that amount of EBI.

The following example provides more detail. Suppose, for the subject market area, EBI is distributed as:

EBI	Percentage of Households
\$10,000 - \$19,999	25
20,000 - 34,999	20
35,000 - 49,999	22
50,000 or more	18

This can be converted into a cumulative distribution:

EBI	Percentage Earning at Least This Amount
\$10,000	85
20,000	60
35,000	40
50,000	18

Now, suppose the median-priced home, at prevailing mortgage interest rates, requires a monthly payment of \$720. The monthly payment, divided by 27 percent and annualized, calls for a qualifying EBI income of \$32,000 (applying the THAI criteria). The problem becomes to estimate the percentage of households having an EBI of at least \$32,000. This is done by interpolating between known points on the cumulative income distribution. The simplest method is to assume the distribution curve is straight between the \$20,000 and \$35,000 points (actual data from census years shows this to be a reasonable assumption). Because \$32,000 is .8 of the distance between \$20,000 and \$35,000, the percentage should be .8 of the distance from 60 and 40 percent, or 44 percent.

The EBI distributions are intended to represent the same period as the median EBI figures, that is, the end of the previous year. To match the distributions to the mid-point of the current quarter, they must be updated. The method used for THAI purposes assumes that no fundamental change in the shape of the distribution occurs during the year. In other words, the distribution at the beginning of the year is simply shifted by the same amount as the median.

An example illustrates. First, the distribution reported in the *Survey of Buying Power* is converted to a cumulative distribution. The amount of shift in the median is calculated by dividing the new median EBI by the end-of-the-year EBI figure and subtracting 1.0. For the example, suppose the median has shifted upward by 10 percent (.10) by the mid-point in the current quarter. Also suppose the distribution in the example is the same as in the previous example. The percentage of households in the \$10,000-\$19,999 bracket is multiplied by 10 percent (in this case, the result is 2.5 percent). This amount is added to the old cumulative distribution for those making

\$10,000 or more. The new distribution is 85 percent plus 2.5 percent, or 87.5 percent. The other brackets of the distribution are updated similarly:

Bracket	Percentage	Shift of 10%
\$20,000 - \$34,999	20	2.0
35,000 - 49,999	22	2.2
50,000 +	18	1.8

Bracket	Old cumulative	New cumulative
\$20,000 - \$34,999	60	62.0
35,000 - 49,999	40	42.2
50,000 +	18	19.8

## Appendix E

### Low Down Payment Indexes

Two additional affordability indexes were created to reflect the difficulties of home buying with insufficient liquidity to qualify for a loan requiring a 20 percent down payment. The THAI is based on a mortgage loan covering 80 percent of the price of the home, whereas the new indexes assume loan-to-value ratios of 90 and 95 percent, respectively. The 90 percent index indicates the affordability of homes if all households had to qualify for loans covering 90 percent of cost. The 95 percent index should be interpreted similarly, except that all financing is assumed to cover 95 percent of cost. The purpose of these indexes is to indicate how affordability is affected by limitations on available cash for home purchase.

The following assumptions were incorporated into the indexes:

1. All loans are FHA insured. The reason for this assumption is that FHA rules are well known and uniform. To the extent that conventional, privately insured loans are more affordable than FHA, the indexes will understate actual affordability.
2. FHA loans require payment of a mortgage insurance premium (MIP) when the loan is closed, as well as a

periodic premium for loans covering more than 90 percent of value. Before 1993, MIP was 3.8 percent of the loan amount. In 1993, it dropped to 3 percent and is scheduled to be reduced to 2.25 percent in 1995. The new indexes use this schedule and assume the entire MIP is financed into the loan. For practical purposes, this means that the 90 percent index is based on a loan of 93 percent (for 1993 and 1994), and the 95 percent index is based on a loan amount of 98 percent of median home price.

3. The 95 percent index incorporates an FHA periodic premium of .5 percent of the outstanding principal per year, divided equally among monthly payments.
4. The index value indicates what the THAI would be if all households had to use a 90 or 95 percent loan, just as the regular THAI value indicates affordability assuming all households have access to enough cash to make a 20 percent down payment. These assumptions underlie the estimated percentage of households that can afford the median-priced home.

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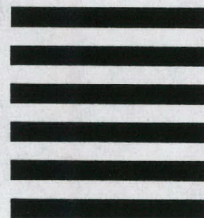
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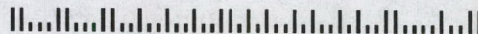
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