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## Steady-as-She-Goes? An Analysis of the San Antonio Business Cycle

**S**an Antonio has historically enjoyed a stable economy, thanks to the large presence of cyclically stable sectors, such as the military and health care, and the lack of dependence on more volatile ones, such as construction, oil and gas production, and manufacturing.

The San Antonio metropolitan statistical area (MSA) is home to more than 1.6 million people, making it the fourth-largest MSA in Texas and the 29th largest in the nation.<sup>1</sup> San Antonio has historically enjoyed a stable economy, thanks to the large presence of cyclically stable sectors, such as the military and health care, and the lack of dependence on more volatile ones, such as construction, oil and gas production, and manufacturing.

The 1990s, however, brought significant changes to the local economy, as the military presence declined and such sectors as high tech and biotech grew in prominence. Because of this, San Antonio may have become more vulnerable to economic swings. Economic volatility can impact businesses' investment and inventory decisions as well as workers' saving and spending.

One way to measure economic volatility is to calculate the standard (or typical) deviation of the growth rate in some aggregate measure of the economy, such as employment or output. Several data series can be used to analyze volatility. Monthly data include nonfarm payroll employment and the unemployment rate; quarterly data include retail sales and total wages.

Businesses and workers may also be interested in whether the

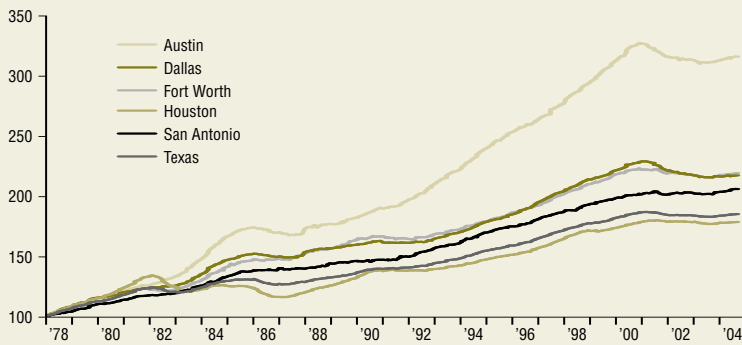
economy is likely to experience prolonged or steep declines. Regardless of overall volatility, areas that experience frequent, large and persistent swings in economic activity present a high risk of temporary unemployment for workers and insolvency for businesses. To gauge this risk for the San Antonio MSA, it is useful to identify past periods of economic recession and expansion and compare their frequency with those of other MSAs. To do this, we've created a coincident index of San Antonio's economic activity that combines changes in employment, the unemployment rate, retail sales and wages to give us a picture of the local economy.

### Data Availability

Nonfarm payroll employment is one of the most timely and reliable measures of the San Antonio economy. The primary data are retrieved from the Current Employment Statistics, published by the Bureau of Labor Statistics (BLS) in cooperation with the Texas Workforce Commission. The Current Employment Statistics data are drawn from two sources, annual unemployment insurance tax records and the BLS establishment survey. The accuracy of the employment data is increased using two adjustments.<sup>2</sup> The first is a two-step procedure that adjusts for seasonal patterns in the unem-

**Chart 1**  
**Job Growth Differs Across Texas**

Index, January 1978 = 100



SOURCES: Texas Workforce Commission; Federal Reserve Bank of Dallas.

ployment insurance data and the establishment survey. The second incorporates quarterly unemployment insurance estimates from the Texas Workforce Commission that the BLS includes only annually.

Another monthly indicator is the unemployment rate. These BLS data measure the number of unemployed, divided by the number in the labor force. The data are released at the same time as nonfarm employment figures each month.

Although it's easy to get the impression that employment and the unemployment rate measure essentially the same thing, they don't. Employment is the total number of jobs in an economy, whereas the unemployment rate is the slack in the labor force. This means that when jobs are increasing, the unemployment rate can fall or rise, depending on if and how fast the labor force is growing or shrinking. The unemployment rate is influenced by such factors as the number of discouraged workers, duration of unemployment insurance benefits and extent of self-employment.

In addition to the jobs data, the San Antonio coincident index uses quarterly retail sales data compiled by the Texas comptroller's office and wage data from

the Quarterly Census of Employment and Wages, produced by the BLS and Texas Workforce Commission. Retail sales, particularly in durable goods, can be a good indicator of consumer confidence, so changes in retail sales can lead to changes in the economy. Total wages reflect not only the utilization of labor but also its productivity, because in theory the wage rate equals the marginal product of labor. Thus, total wages represent a closer approximation to value-added than employment does. The biggest weaknesses of both the sales and wage data are their quarterly periodicity and their timeliness, since they generally are released about six or seven

months after the end of the reporting quarter. We adjust both kinds of data for inflation using the national Consumer Price Index and then seasonally adjust them.

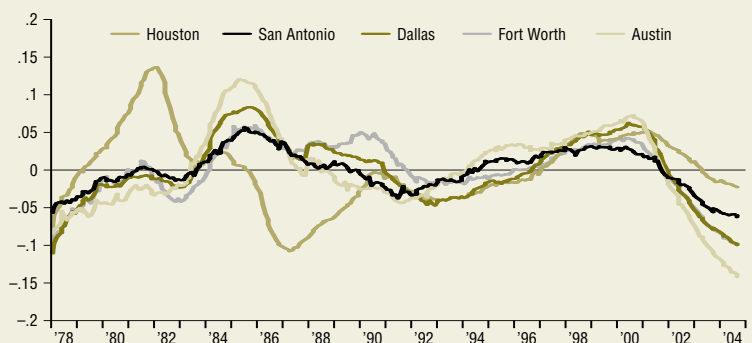
## Defining Volatility and the Business Cycle

San Antonio has a reputation for a more stable economy than the other large Texas MSAs—Austin, Houston, Dallas and Fort Worth. But is that reputation warranted? Chart 1 shows that on average, while San Antonio's job growth exceeded the state's over the period from 1978 to September 2004, it lagged that of Austin, Dallas and Fort Worth. However, the number of jobs appears to fluctuate less in San Antonio than in most of the other large MSAs. These differences are particularly evident in the employment swings of the early and mid-1980s. To focus on volatility, in Chart 2 we extract the long-run average growth rate from each MSA's employment and plot the resulting deviation from the trend. The trend is defined as the level of the indicator if it grew at exactly its long-run average growth rate. Once again, it appears San Antonio has less volatile employment than most of the state's other large MSAs.

We use two methods to measure the volatility of employ-

**Chart 2**  
**Employment More Stable in San Antonio Than in Other Large MSAs**

Percent



SOURCES: Texas Workforce Commission; Federal Reserve Bank of Dallas.

Table 1  
**Economic Indicators Are More Stable in San Antonio**

**Log Difference Trend Adjustment  
(1978–September 2004)**

MSA	Variances			
	Employment	Unemployment	Retail sales	Wages
San Antonio	0.00000961	1.80	0.001589	0.000304
Austin	0.00002080	1.60	0.000830	0.000631
Dallas	0.00001116	1.60	0.000661	0.000407
Houston	0.00001620	3.33	0.001624	0.000449
Fort Worth	0.00001496	1.57	0.002047	0.000484
Statistical Significance of Difference from San Antonio*				
Austin	<b>2.16</b>	1.12	1.92	<b>2.07</b>
Dallas	1.16	1.12	2.40	1.34
Houston	<b>1.69</b>	<b>1.85</b>	1.02	<b>1.48</b>
Fort Worth	<b>1.56</b>	1.15	1.29	<b>1.59</b>

**Deviation from Trend  
(1978–September 2004)**

MSA	Variances			
	Employment	Unemployment	Retail sales	Wages
San Antonio	0.000719	1.24	0.00602	0.00222
Austin	0.002996	1.55	0.00854	0.00884
Dallas	0.001903	1.56	0.00510	0.00546
Houston	0.002469	3.31	0.01198	0.00789
Fort Worth	0.001411	1.54	0.00257	0.00147
Statistical Significance of Difference from San Antonio*				
Austin	<b>4.17</b>	1.25	1.42	<b>3.99</b>
Dallas	<b>2.65</b>	1.26	1.18	<b>2.46</b>
Houston	<b>3.43</b>	<b>2.67</b>	<b>1.99</b>	<b>3.56</b>
Fort Worth	<b>1.96</b>	1.24	2.34	1.51

\* The *F* statistic is calculated as the ratio of the larger variance divided by the smaller variance. The italic *F* statistics indicate MSAs that have a statistically smaller variance than San Antonio, while the bold indicate MSAs with a statistically larger variance. The *F* test is performed at a 95 percent level of significance.

SOURCE: *The Practice of Business Statistics*, by David S. Moore, George P. McCabe, William M. Duckworth and Stanley L. Sclove. W.H. Freeman and Co., 2003, pp. 488–89.

ment, unemployment, retail sales and wages. The first is to calculate the variance of the percentage changes (measured as the first difference of the natural log). This measure is calculated for employment, total wages, unemployment rate and retail sales for all five large Texas MSAs for the period 1978 through September 2004. The second measure of volatility, which focuses less on month-to-month changes and more on broad movements, is the variance of the percentage differences in the series from its trend. (For employment, it is the variance of the series shown in Chart 2.)

As Table 1 shows, from 1978 through September 2004, the variance in San Antonio employment growth was statistically significantly smaller than that of Austin, Fort Worth and Houston (as indicated by the bold *F* test statistics shown in the table). When using the deviation from the long-run average, San Antonio employment is statistically significantly less volatile than all but one (Fort Worth) of the four other large MSAs during this period. The deviation from the average unemployment rate also shows San Antonio's smaller variability, although it differs significantly only from Houston's.

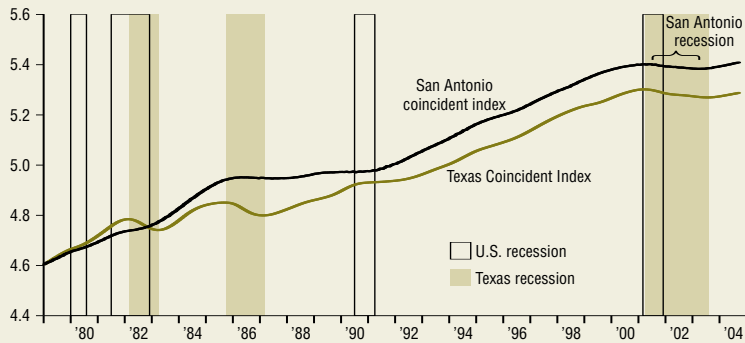
San Antonio's wage variation is also smaller than that of all but the Fort Worth MSA, and it is particularly significant in the deviation from trend. Retail sales have mixed results, with half the variances greater than San Antonio's and half less. Generally, however, these results confirm that San Antonio has had a more stable economy than the state's other large MSAs.

Aside from the economy's overall volatility, many businesses and workers are concerned with the likelihood of recession because recession may increase the chances of business failures and layoffs. One way to identify recessions is to take a broad measure of economic activity, such as nonfarm employment, and find periods in which the indicator generally rises (expansions) and falls (recessions). The main weakness of this method is that there are several broad measures of the economy, and looking at any one of them might give different results. To avoid this, we employ a statistical technique that takes a weighted average of the movement in the component series.<sup>3</sup>

The San Antonio coincident index is based on movement in the four economic indicators in Table 1: employment, unemployment rate, total wages and retail sales. The new index is shown in Chart 3. The long-run trend in the index is set equal to the trend in inflation-adjusted personal income for San Antonio. Personal income data, which come from the Bureau of Economic Analysis (BEA), offer a broad measure of the local economy, and while they cannot be used in the coincident index because of their annual periodicity, they can be used to set the index's long-run trend. The chart also indicates the beginning and end of recessions for both the nation and Texas. (It may still be too early to pinpoint the exact end of the 2001 recession in

**Chart 3**  
**San Antonio Economy Is Less Cyclical Than the Texas Economy**

Log of Index, Oct. 1978 = 100



SOURCES: National Bureau of Economic Research; Federal Reserve Bank of Dallas.

Texas, but it appears that it was sometime around August 2003.)

Since 1979, the San Antonio economy has experienced fewer recessions than either the state or the nation. San Antonio continued to grow through the 1980, 1981 and 1990 national recessions but declined during the one in 2001. A similar pattern is apparent when comparing San Antonio with Texas. San Antonio continued to grow through the 1982 Texas recession, remained nearly flat during the 1985–86 recession and declined during the 2001 recession. We define recession in San Antonio as a persistent, statistically significant decline in the coincident index of at least six months.

Although the San Antonio coincident index declined from April 1986 to June 1987, the magnitude was so slight (–0.45 percent annualized) that it was statistically insignificant. This period, and the one that extends from it to early 1991, may best be described as a time of economic stagnation, or as a growth recession. The second time the index fell was from June 2001 to March 2003. The annual rate of decline during this period was statistically significant, making it an economic recession.

Overall, it appears from this new measure of the San Antonio

business cycle that the local economy has been very recession resilient, even when the nation and state have turned downward. The mild recession in San Antonio that began in 2001, however, raises the question of whether structural change in the city’s economy has increased its cyclical sensitivity.

### A Changing Industry Structure

The most recent recession may be an indication of San Antonio’s evolution toward a more cyclical economy. For example, the employment composition may have shifted from more stable jobs, like those in the federal government, to more volatile jobs, like those in construction and information services. The beta coefficient can be used as a measure of how much a particular industry increases or decreases the overall volatility of jobs in a region, similar to how a stock’s beta indicates its volatility relative to the overall stock market. For our purposes, the beta coefficient takes into account not only the industry’s volatility but also its co-movement with other area industries.

For example, if an industry was very volatile but always grew when most industries were declining and declined when most were growing, the growth of this in-

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dustry would reduce overall volatility rather than increase it. If a beta value is greater than one, employment in the industry increases a region's overall job volatility. If it is less than one, the industry reduces overall volatility.

Analyzing industry job betas in conjunction with the change in job share can give an idea of changes in the underlying volatility in the San Antonio labor market over the past 10 years. Table 2 lists the San Antonio economy's major industry classifications, the market share of each industry for January 1990 and September 2004, and a beta for the entire period in each classification.

One sector that shows increasing volatility for San Antonio employment is professional and business services, which increased from about 8 percent of employment in January 1990 to about 12 percent in September 2004. This sector has a beta coefficient of almost 2.2, implying a high degree of volatility and a positive correlation with most other industries in the area. In addition, government employment, which has a beta of only 0.38, declined from about 23 percent of total area employment in 1990 to only about 18 percent today.

We also created an industry-share beta, which is the average of industry betas weighted by their share of jobs. This industry-share beta represents the underlying cyclical propensity of the economy, based on its industry share. The industry-share beta estimate for January 1990 is 0.991; the beta for September 2004, the most recent data available, is 1.052. This implies about a 6 percent increase in the underlying volatility of the region's employment.

### A Fortuitous Shift

Since 1978 San Antonio's economy has not grown as fast as that of Austin, Dallas or Fort Worth, but it also has not been as variable and recession-prone. However, San Antonio's industry structure has changed since 1990, as the government share of the economy has shrunk and more cyclically volatile industries such as professional and business services, information services and construction have grown. The changing industry structure may be one reason the most recent downturn in Texas appears to have been felt in San Antonio more than those at other times in the past, such as in the mid-1980s.

The San Antonio coincident index shows that the city's econ-

**T**he city's economy grew steadily and strongly from 1979 to 1986 but then stagnated from 1986 to early 1991. The rest of the 1990s marked a long period of economic growth.

**Table 2**  
**Shifting Job Shares Suggest Growing Economic Volatility in San Antonio**

	Percent of total employment		
	Jan. 1990	Sept. 2004	Beta
Natural resources and mining	0.42	0.32	-1.51
Construction	4.41	5.48	2.05
Manufacturing	8.54	5.98	2.24
Trade, transportation and utilities	19.38	17.88	0.99
Information	2.66	3.18	1.43
Financial activities	8.27	8.15	0.00
Professional and business services	8.10	12.22	2.18
Educational and health services	10.69	13.62	0.96
Leisure and hospitality	10.54	11.14	0.79
Other services	4.09	3.72	0.91
Government	22.85	18.35	0.38
Industry-share beta	0.991	1.052	

SOURCES: Texas Workforce Commission; Federal Reserve Bank of Dallas; authors' calculations.

omy grew steadily and strongly from 1979 to 1986 but then stagnated from 1986 to early 1991. The rest of the 1990s marked a long period of economic growth. This growth ended in June 2001 with San Antonio's first recession since at least 1979, when the index begins. The mild recession persisted through March 2003 and was somewhat shorter and less steep than what the state overall experienced. Since March 2003, the San Antonio economy has grown at an annual rate of 1.7 percent, below the long-run average of 3.2 percent but slightly above the state's 1.5 percent pace.

San Antonio's economic growth in the 1990s was concentrated in the private sector, primarily in the high-tech, biotech and related industries, while the government sector represented a declining share of employment. Nationally, the BLS projects that through 2012, private-sector job growth is likely to exceed that in the government sector.

This bodes well for San Antonio. The larger share of private-sector jobs may mean stronger growth in the future

than if the city's industry structure had not changed. However, the prospects for stronger job growth also come with the likelihood of increased economic volatility. In the future, the San Antonio economy may be a little less steady-as-she-goes and a little more rock 'n' roll.

— Keith R. Phillips  
Kristen T. Hamden

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### Notes

<sup>1</sup> This MSA ranking is found at [www.census.gov/population/www/cen2000/phc-t29.html](http://www.census.gov/population/www/cen2000/phc-t29.html), Table 3a. It differs from the city ranking, which puts San Antonio in eighth place ([www.census.gov/Press-Release/www/releases/archives/population/001856.html](http://www.census.gov/Press-Release/www/releases/archives/population/001856.html)). MSAs are a county breakdown that doesn't change frequently and is considered to best represent population growth. City boundaries change frequently to include new suburbs and additions to the city definitions, so an increase in city population may represent population growth or an increase in the amount of land.

<sup>2</sup> See two articles by Franklin D. Berger and Keith R. Phillips, "Reassessing Texas Employment Growth," Federal Reserve Bank of Dallas *Southwest*

*Economy*, July/August 1993, and "Solving the Mystery of the Disappearing January Blip in State Employment Data," Federal Reserve Bank of Dallas *Economic Review*, Second Quarter 1994.

<sup>3</sup> The methodology is detailed in "A New Monthly Index of the Texas Business Cycle," by Keith R. Phillips, Federal Reserve Bank of Dallas Working Paper no. 0401, [www.dallasfed.org/research/papers/index.html](http://www.dallasfed.org/research/papers/index.html).

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