

El Paso Business Frontier



FEDERAL RESERVE BANK OF DALLAS EL PASO BRANCH ISSUE 1 • 2003

Composite Index: A New Measure of El Paso's Economy

*The El Paso index
of coincident
economic activity
is a valuable
new tool for
understanding
local economic
performance.
The index
systematically
integrates the latest
movements in four
broad regional
economic indicators—
employment,
unemployment rate,
wages and retail sales.*

How's the economy doing?

This is a common question, although it is not always clear which economic measure provides the best answer. Should we look at the unemployment rate or at employment growth? Perhaps a broader measure such as gross domestic product or personal income may be a better indicator, even if it is less timely. Further, different measures often send conflicting signals about current economic conditions. No matter what your level of expertise, following movements of the local economy is a difficult and sometimes frustrating experience.

One way to solve this dilemma is to design a composite index that aggregates the movements of several key economic indicators and thus represents a single summary statistic that tracks the current state of the economy. The composite index allows researchers to identify when the economy is in an expansionary or recessionary phase of the business cycle.

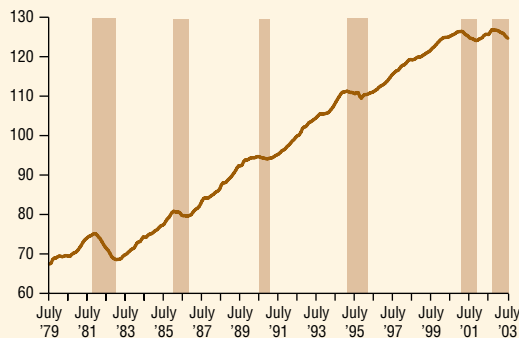
This article introduces a coincident index of the El Paso economy based on new methods to combine and weight key economic indicators. The El Paso indicators used in the index are nonagricultural employment, the unemployment rate, inflation-adjusted wages and inflation-adjusted retail sales. The statistical technique we use chooses the weights on each indicator based on its comovement with the other indicators and combines that information into an index that best reflects overall economic conditions.

COINCIDENT INDEXES

In 1930, the National Bureau of Economic Research (NBER) pioneered business cycle research, sponsoring a team led by Wesley C. Mitchell and Arthur F. Burns. They studied 487 economic variables to see if turning points in the variables persistently led, coincided with or lagged turning points in the U.S. business cycle. In later research, conducted in the 1950s and 1960s, NBER

Chart 1
Coincident Index of Economic Indicators
for El Paso, 1979–2003

Index, July 1992 = 100



SOURCE: Authors' calculations.

researchers combined the best series into composite indexes of leading, coincident and lagging economic indicators. In the early 1960s, the U.S. Department of Commerce took over the production of the composite indexes, and since 1995 the Conference Board, a business membership and research organization, has regularly published leading and coincident indexes for the U.S. economy.

In the late 1980s, NBER economists James Stock and Mark Watson developed new composite indexes of coincident and leading indexes for the nation.¹ The main contribution of their research was the use of a statistical technique called the Kalman filter, which estimated the optimal weights on the component indicators. The traditional composite index methodology did not attempt to estimate optimal weights but simply applied equal weights once the volatility in each series was standardized. In contrast, Stock and Watson advance the notion of the business cycle by statistically estimating the weights on the component series that best identifies a single underlying factor that is time dependent and that best represents the co-movement in the components. Thus, the index provides a better definition of the underlying state of the economy.

Mathematically sophisticated, the general approach will be familiar to many social scientists as a variant of principal components or factor analysis—statistical techniques designed to extract a measure of some underlying, unobservable characteristic from a number of closely related variables. For example, if we give a battery of tests to 100 people to measure various aspects of their mental agility and cognitive powers, the intercorrelation among these test scores may suggest a single, weighted average of these scores that may reveal an underlying or latent commonality called intelligence.

The principle used to build an index of coincident economic activity is similar, except the unobservable variable is the current state of the economy, and we substitute for the administered tests the intercorrelation of various economic indicators measured through time. Just as for intelligence, the intercorrelation of economic indicators suggests the weighting of the indicators that best represents the state of the economy. Indicators will have behavior that reflects their contribution to the business cycle as well as behavior that is idiosyncratic and unrelated. Further, because the procedure is dynamic, estimates can be extracted of the underlying statistical process, telling us about the stability of the local economy in the face of external shocks.

AN INDEX FOR EL PASO

The Stock–Watson methodology has been widely applied at the state and substate levels.² These indexes were constructed using different components based on data availability and reliability. For El Paso, the broadest, most reliable measures of the economy are nonfarm employment, unemployment rate, real wages and real retail sales. Employment and the unemployment rate are reported monthly with a lag of about one month, while the wage and sales variables are reported quarterly with a lag of approximately three quarters.

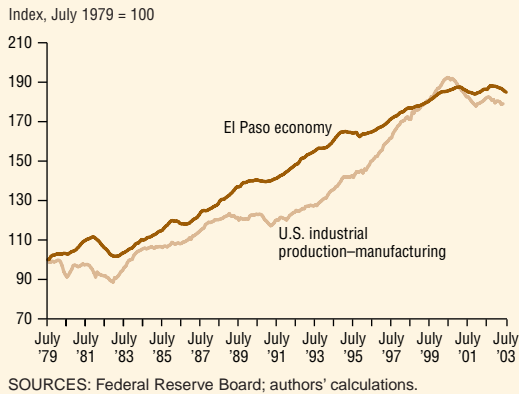
Chart 1 shows the computed index of coincident economic activity for El Paso. The Stock and Watson methodology that we use creates an index that defines business cycle swings in the economy but not the long-term trend in economic growth. To estimate the trend rate of growth, we simply set the trend in the index to equal the historical growth in personal income. The movements in all economic indicators but unemployment coincide with the estimated coincident index. The unemployment rate, however, lags the economy by one month.

The model's optimal weighting process results in employment and the unemployment rate getting the greatest weight. Changes in employment represent 54.5 percent of the movement in the index, while changes in the unemployment rate get a weight of 32.5 percent. Given the reliability of the employment series and the timeliness of both employment and the unemployment rate, these weights are perceived as a positive for the model and should reduce the impact of revisions caused by the later incorporation of the quarterly data values for retail sales and wages.

INTERPRETING RESULTS

At the national level, the Stock and Watson coincident index has had turning points that match almost exactly with the official turning points of the U.S. business cycle as determined indepen-

Chart 2
El Paso Economy Reflects U.S. Industrial Production Double-Dip



dently by the NBER Business Cycle Dating Committee.³ If the same relationship holds between turning points in the El Paso Coincident Index and the true turning points in the El Paso economy, then the index can be used to define local recessions and expansions.

According to broad movements in the coincident index, El Paso has experienced at least five recessionary periods in the last 24 years. While the economy turned down in October 2002, the data are still subject to revision, so we hesitate to define this period as a recession until the data are revised in early 2004. Historically, El Paso has followed the nation's downturns: the oil recessions of the 1980s, the long period of stagnation in the early 1990s, and the current recessions and slow recovery, under way since early 2001. It is also true that the Sun City has experienced some business cycle events of its own.

Regional business cycles are often caused by their national counterparts, but for an international economy like El Paso's, a number of factors can influence local expansion or decline. For example, in the 1980s, recession in the Texas economy combined with financial and economic crises in Mexico to adversely affect El Paso, as did another Mexican peso crisis in 1995. The loss in value of the peso relative to the dollar during these crises kept Mexican shoppers at home. This is important in El Paso, where in 2000 Mexican shoppers accounted for \$500 million, or 7.6 percent of local retail sales.⁴

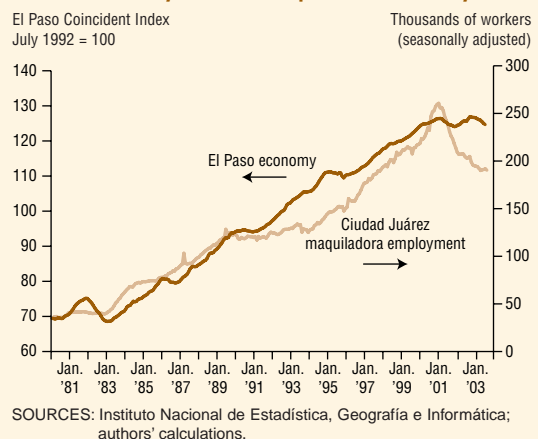
The most recent downturn in El Paso is largely a product of the national economic downturn that began in March 2001. The combination of national recession and a strong dollar took a serious toll on the U.S. industrial sector, and manufacturing was by far the most seriously damaged of all sectors during the current downturn. Damage to the ma-

quiladora sector across northern Mexico followed quickly on the heels of the U.S. industrial recession. El Paso is the second largest U.S. land port, handling about 20 percent of total U.S.-Mexico land trade—some \$39 billion in 2002. Cross-border traffic has been hurt by the maquiladora downturn, as well as by both countries being in recession, and damage to the El Paso economy has come primarily through the maquiladora downturn.

The U.S. recession began in March 2001 and ended in November of the same year. U.S. industrial production, however, entered a second stage of decline in 2002, severe enough to pull the national economy down again, not into recession but into a prolonged period of slow growth. The double-dip pattern of the El Paso economy, however, bears a striking resemblance to the twice-negative pattern set by the industrial sector (*Chart 2*). So far, there is no indication of recovery in the El Paso Coincident Index, although recent stabilization in both the U.S. industrial sector and Mexican maquiladora employment offer hope for recovery in the near future.

The maquiladora industry is of special importance to the El Paso economy. Over the last decade a rising number of rubber and plastics, electronic and electrical equipment, and primary metals companies have opened operations in El Paso to serve as suppliers for the maquiladora industry. Manufacturing activity south of the border has also positively influenced employment in transportation, business and legal services.⁵ One estimate is that a 10 percent increase in maquiladora output in a Mexican border city increases employment on the U.S. side of the border by 3 to 4 percent.⁶ Unfortunately, the formula works equally well in reverse during periods of maquiladora decline (*Chart 3*).

Chart 3
El Paso Economy Follows Maquiladora Industry



SUMMARY

The El Paso index of coincident economic activity is a valuable new tool for understanding local economic performance. The index systematically integrates the latest movements in four broad regional economic indicators—employment, unemployment rate, wages and retail sales. Though the basic data are still subject to revision, currently the index suggests that after a recession in 2001 the El Paso economy began a recovery that, like the U.S. industrial sector, may have stalled in late 2002. After weakness in the first half of 2003, the El Paso economy is likely to improve in the second half if and when the U.S. industrial sector picks up.

—Jesus Cañas
Robert W. Gilmer
Keith Phillips

All authors are with the Federal Reserve Bank of Dallas: Cañas is an economic analyst (El Paso Branch), Gilmer a senior economist and vice president (El Paso Branch) and Phillips a senior economist (San Antonio Branch).

Maquiladora Downturn

Structural Change or Cyclical Factors?

A conference sponsored by the
El Paso and San Antonio Branches
Federal Reserve Bank of Dallas



Mexico's maquiladora industry saw its biggest decline ever over the past two years. Are structural changes or cyclical factors the cause of this weakness? This conference will examine the long-term outlook for this important industry.

November 21, 2003

**Sheraton Hotel
South Padre Island, Texas**

Watch our web site for more information
www.dallasfed.org

NOTES

The authors would like to thank Robert Crawley of the Texas Workforce Commission for providing wage data for our coincident index, thus making it possible.

¹ James H. Stock and Mark W. Watson (1989), "New Indexes of Coincident and Leading Economic Indicators," in *NBER Macroeconomics Annual*, ed. Olivier J. Blanchard and Stanley Fischer (Cambridge, Mass.: MIT Press), pp. 351–95.

² Alan Clayton-Matthews and James H. Stock (1998/1999), "An Application of the Stock/Watson Index Methodology to the Massachusetts Economy," *Journal of Economic and Social Measurement*, Vol. 25, Issue 3/4, pp. 183–233.

³ The NBER Business Cycle Dating Committee determines the official dates for the beginning and end of national recessions. The peaks and troughs of the Conference Board's coincident index correspond exactly to the official recession dates since 1973. The peaks and troughs of Stock and Watson's index correspond to the official dates except for one month's difference at the trough in 1982.

⁴ Keith Phillips and Carlos Manzanares (2001), "Transportation Infrastructure and the Border Economy," in *The Border Economy*, Federal Reserve Bank of Dallas (June). Data updates by Roberto Coronado.

⁵ Jesus Cañas (2002), "A Decade of Change: El Paso's Economic Transition of the 1990s," Federal Reserve Bank of Dallas *Business Frontier*, Issue 1.

⁶ Gordon H. Hanson (2001), "U.S.–Mexico Integration and Regional Economies: Evidence from Border-City Pairs," *Journal of Urban Economics* 50 (September), pp. 259–87.

El Paso BusinessFrontier

Business Frontier is published by the El Paso Branch of the Federal Reserve Bank of Dallas. 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.

Subscriptions are available free of charge. Please direct requests for subscriptions, back issues and address changes to the Public Affairs Department, El Paso Branch, Federal Reserve Bank of Dallas, 301 E. Main St., El Paso, TX 79901-1326; call 915-521-8235; fax 915-521-8228; or subscribe via the Internet at www.dallasfed.org.

Articles may be reprinted on the condition that the source is credited and a copy of the publication containing the reprinted material is provided to the Research Department, El Paso Branch, Federal Reserve Bank of Dallas.

Business Frontier is available on the Bank's web site at www.dallasfed.org.

Editor: Bill Gilmer
Copy Editor: Kay Champagne
Art Director: Gene Autry
Graphic Designer: Ellah K. Piña