

2023 Q4
Southeast Texas
Economic
Index



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OVERVIEW

The US economy continues to shake off challenges and add jobs. Gross product expansion has been exceeding projections, and consumer sentiment remains favorable. However, geopolitical tensions have in some cases worsened.

Wars in Gaza and Ukraine continue, and at times show signs of escalating. On a potentially positive note, there have also been signals that negotiations could move forward to curtail the conflicts. In addition, Houthi rebels in Yemen have been attacking commercial vessels in the Red Sea. About 40% of cargo between Asia and Europe (12% of total world trade) travels through the Suez Canal and Red Sea, and these disruptions have the potential to set off problems ranging from inflationary pressure to shortages and supply chain disruptions. The major effects will likely be concentrated in Europe, though some US importers are already being affected and with the interconnected nature of the global economy, virtually all areas will see some fallout over time if the problems in the Red Sea persist.

The Federal Reserve has indicated that rate decreases will likely be coming this year. As long as inflation signals continue to indicate movement in the right direction, the Fed can begin to consider looser monetary policy. Lower interest rates would provide a boost to the economy, but the pace of reductions will depend on ongoing growth and pricing patterns.

For Texas, the labor market reached historic highs in 2023, breaking records in employment growth and civilian labor force. The state's employment growth rate for 2023 outpaced the nation by a full percentage point, with 2.7% annual growth in the state from December 2022 to December 2023, compared to the nation's 1.7%.



SOUTHEAST TEXAS

The Southeast Texas region continues to see uneven performance, with expansion in some industries more than offset by contraction in others.

The Southeast Texas Economic Index was down in the fourth quarter to 106.7, a loss of -1.3. Most sectors expanded, led by retail (+2.8), professional and business services (+0.7), and hospitality and tourism (+0.6). However, a sharp decline in the construction segment (-45.7) and losses in energy (-1.7) and real estate (-0.9) more than offset the gains.

SOUTHEAST TEXAS ECONOMIC INDEX

RECENT RESULTS (2012=100)

Current Index Reading	106.7
Change from Previous Month	Down -1.3

SOUTHEAST TEXAS ECONOMIC INDEX

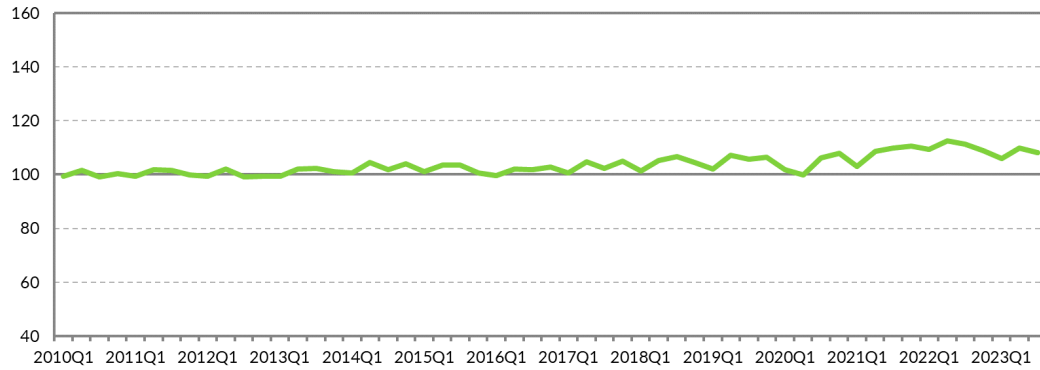
RESULTS BY INDUSTRY (2012=100)

Industry	2023 Q3	2023 Q4	Change
Energy	63.5	61.8	-1.7
Construction	197.1	151.4	-45.7
Manufacturing	101.1	101.3	+0.2
Retail	99.7	102.5	+2.8
Financial Services	202.5	202.8	+0.3
Real Estate	127.9	127.0	-0.9
Professional & Business Services	102.5	103.2	+0.7
Health Care	101.8	102.1	+0.3
Hospitality & Tourism	98.7	99.3	+0.6
Other Activity	97.7	102.7	+5.0
Composite Index	108.0	106.7	-1.3

Note: Industries are not weighted equally in calculating the composite index; see the Appendix for further explanation. Southeast Texas contains Hardin, Jasper, Jefferson, and Orange counties. **Source:** The Perryman Group



Southeast Texas Economic Index
 (Index adjusted such that 100 represents economic status in 2012)

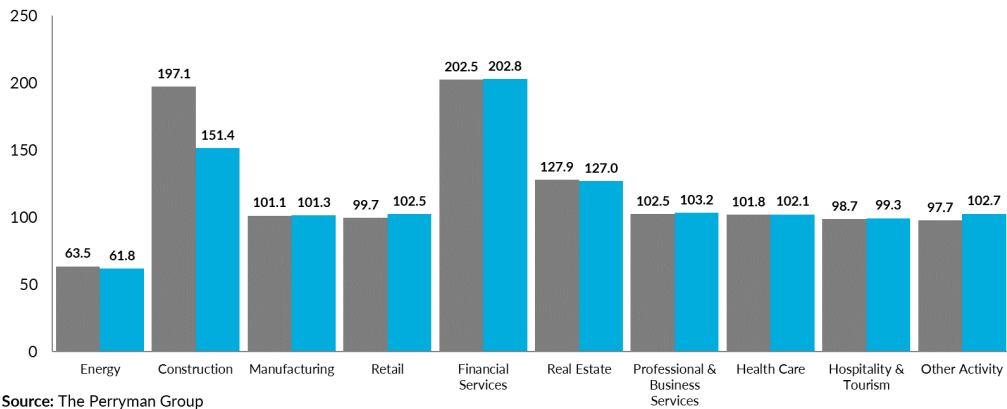


Source: The Perryman Group

Southeast Texas Economic Index

Recent values by sector
 (Index adjusted such that 100 represents economic status in 2012)

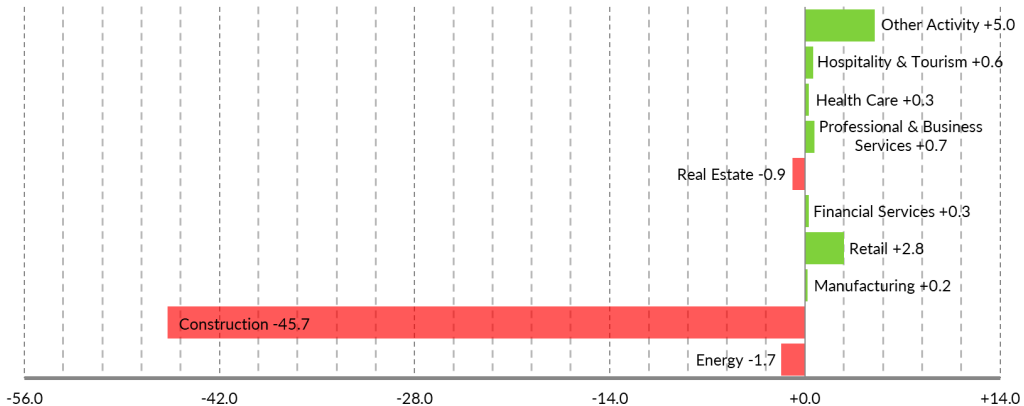
■ 2023Q3 ■ 2023Q4



Source: The Perryman Group

Southeast Texas Economic Index

Change from previous month by sector



Source: The Perryman Group

METHODOLOGY

The goal of this economic index is to encapsulate, in a single measure, the current status of the area economy, how it is changing, and what is driving the change. The index includes measures of industrial performance, with sub-indices for the various components to indicate the role they play in overall performance. The index is based on complex economic modeling processes, but it provides a simple measure of the health of the area economy and how and why it is changing.

The index reflects shifts in key industries and performance. The relative weights of each component were determined based on typical patterns in the relationships of variables to overall economic performance (measured by real gross area product). A number of variables describing the evolving status of key industries are included, providing numerous indicators of the level of activity and how it is changing.

The index was developed and is maintained by The Perryman Group, an economic and financial analysis firm based in Waco, Texas with decades of experience in analyzing the local and regional economies. Dr. M. Ray Perryman, President and CEO of The Perryman Group, has more than 40 years of experience in index construction and regional economic modeling. In particular, Dr. Perryman derived the indices of monetary policy that are used by the Federal Reserve System and more than 60 other central banks around the world. He also developed regional and small-area indices of Industrial Production and Unit Labor Costs that are widely used on a global basis, as well as measures of systematic risk for non-homogenous assets and the degree of trade

integration among nations. Dr. Perryman has been an advisor to the US Department of Labor on the Consumer Price Index as well as numerous other governmental entities on index-related issues. He has also developed the world's largest regional econometric modeling system and has been analyzing local economies across Texas on an ongoing basis since the mid-1970s. The firm produces indices for regional banks, media outlets, and other clients throughout the state.

Index Construction

Economic indices are typically constructed in one of two ways, both of which are widely used and have been successfully employed by Dr. Perryman over the course of his career. One common method is to identify a set of relevant variables and then use principal component analysis (PCA) or a variation (such as a factor rotation) to assign weights to the individual components on an empirical basis. In essence, this process converts a set of variables into an equal number of new measures such that each of the new variables is (1) a linear combination of the original ones and (2) orthogonal to each of the others. The new measures also have the property of collectively containing all of the information in the original variables. When this approach is used, the first principal component (the one which explains the largest percentage of the variation) is typically used to determine the weights in the indices. This approach has advantages in that (1) weights are empirically generated based on their explanatory power and (2) it is relatively simple to implement. Its major disadvantages are (1) in many instances, particularly where a large number of variables are being examined (as in the current analysis), spurious correlations with relatively minor factors that are

unlikely to be sustained over time can occur; (2) the first principle component, despite exhibiting the largest explanatory power, often accounts for only a small amount of the total variation, thus failing to incorporate a substantial portion of the available information.

The second approach is to rely on economic data, theory, and models to develop an index of the desired phenomena. The primary difficulty with this method is the fact that it can become complex in its execution. The advantages are the ability to (1) systematically incorporate very large sets of variables without loss of underlying information, (2) develop sub-indices to provide a focus on specific index elements, and (3) incorporate specific economic content in a detailed and systematic manner.

The second option was found to be more appropriate in this instance because the complex multi-dimensional framework allows both individual and integrated consideration of a variety of segments spanning multiple sectoral components. Nonetheless, a principal components model was originally attempted for purposes of completeness and to meet the conditions for statistical efficiency. As anticipated, the resulting assessment across a broad spectrum of variables across industries resulted in both weighting on relatively minor variables which were not stable across sub-periods and relatively little (less than 10 percent) information capture by the primary principal components. Consequently, The Perryman Group's index was developed using a more formal and comprehensive data and modeling effort as described below.

Industrial Variations



As noted, the indices seek to encapsulate, in a single measure, the many facets of the area economy. Sub-indices are also generated for key industries in order to examine the various components and the role that they play in overall performance. Aggregates available on a monthly or quarterly basis are incorporated into the indices in order to permit regular monitoring of changes in business activity. Broader measures (such as total expenditures and gross product by industry) which have greater information content but less frequent periodicity are used in defining the relative weights. In this manner, it is possible to enhance the comprehensiveness of the indices.

The segments of the economy that are included are:

- Energy,
- Construction (residential and non-residential),
- Manufacturing,
- Retail,
- Financial Services,
- Real Estate,
- Professional & Business Services,
- Health Care,
- Hospitality & Tourism, and
- Other Activity

The relative weights to be applied to each segment were derived based on the stabilized percentage of each sector of a relevant overall aggregate (gross area product).

The next phase of the analysis is the construction of the various sectoral indices. Measures that were available on a monthly or quarterly basis were employed and were selected based on their role in being reflective of aspects of the relevant segment. They were then tested relative to one another to assure that they were not subject to excessive multicollinearity. Once

the final set was determined, each series was transformed into a common format in which 2012 was defined as equal to 100. The base year is consistent with most official economic series that are presented either as indices or on a constant-dollar basis. All monetary values were similarly expressed in constant 2012 dollars to avoid artificial growth generated by inflation. If required, quarterly series were converted to monthly aggregates using a regression approach developed by Dr. Perryman that is widely utilized throughout the world.

The variables utilized in the indices include items such as oil and gas prices, rig counts, retail sales, single and multi-family housing permits and values, housing sales and values, bank loans and deposits, employment by detailed industrial category, and numerous other factors. Where appropriate, inputs were adjusted to eliminate seasonal patterns that are not reflective of underlying economic conditions.

In each of the indices, the weights assigned to the individual components are determined based on the relative standard errors of the normalized values. This approach allows greater weight to be assigned to those measures which exhibit more pronounced fluctuations to influence industry performance. These individual sectoral indices were aggregated into an overall Composite Index using the weighting described above. It should be noted that the indices always use the latest available economic data. Because much of the information normally is subject to both short-term revisions and periodic benchmarking, historical values will often change from month to month. These variations are typically minor, although they can be more

substantial when major revisions are implemented.

Conclusion

The Perryman Group's economic indices provide a measure of changes in the economy that are easy to grasp and compare over time. Although the modeling process that went into the indices was complex, the result is a simple and straightforward assessment of the direction of patterns in business activity and the reasons for changes in overall performance.



THE PERRYMAN GROUP



The Perryman Group is a focused team of analysts who know how to address complex economic information tasks and present our findings effectively.

Our in-house professionals bring expertise in economics, finance, statistics, mathematics, real estate, valuation, systems analysis, engineering, technical communications, and marketing. Dr. Ray Perryman, President and CEO, has 40 years of experience in developing systems, analyzing complex problems, and communicating effectively. We have considerable pride in what we do. Our enthusiasm is both unbridled and contagious; every day brings a new opportunity for us to tackle a different problem or create a product or service specifically tailored to our clients.

OUR SERVICES

IMPACT ASSESSMENT

We have developed and continually maintain an extensive set of economic impact evaluation models that can be applied in a variety of contexts.

EXPERT TESTIMONY

We help clients analyze and communicate complex information in common-sense terms through comprehensive, objective analyses and clear, concise expert reports and presentations.

FORECASTING

We are at the cutting edge of econometrics and other advanced statistical methods and have provided innovative approaches for many complex applications.

SPEECHES

Dr. Perryman addresses dozens of audiences throughout the world every year, catering to a wide variety of events.

M. RAY PERRYMAN, PH.D.

Dr. Ray Perryman is President and CEO of The Perryman Group, an economic research and analysis firm based in Waco, Texas. His firm has served the needs of more than 3,000 clients, including two-thirds of the Global 25, over half of the Fortune 100, the 12 largest technology firms in the world, 12 US Cabinet Departments, the 9 largest firms in the US, the 6 largest energy companies operating in the US, and the 5 largest US banking institutions.

Dr. Perryman was named Outstanding Young Person of the World for Business and Economic Innovation in 1987 and was designated Texan of the Year by the Texas Legislative Conference in 2012. He received the Baylor University Distinguished Service Medal in 2013, was inducted into the Texas Leadership Hall of Fame in 2014, received the Cesar E. Chavez Conscience Builders Award in 2016 for his

humanitarian efforts, and received the Lifetime Achievement Award for philanthropy from the Association of Fundraising Professionals in 2023. He

dedicates a significant portion of his time to pro bono work aimed at helping to solve pressing social problems such as hunger, indigent healthcare, poverty, and child maltreatment.

