



Annual Report 2015

AFTER THE BOOM

Texas Economy Downshifts
in Energy Bust



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Letter from the President

Robert S. Kaplan | Annual Report 2015

The Eleventh District economy proved to be highly resilient in 2015 despite substantial declines in oil prices and related capital spending. This resiliency is a testament to the diversification of the Texas economy as well as the resourcefulness of the citizens of this region.

I became president and chief executive officer of the Federal Reserve Bank of Dallas in early September 2015. In this role, I have been enormously impressed with the quality, rigor and dedication of the staff who work in the Eleventh District and throughout the entire Federal Reserve System. They are truly outstanding.

I have also been gratified by the warm welcome and hospitality of the people of the Eleventh District. They have gone out of their way to help me integrate into the community and more effectively do my job. I have learned the essential role of the private sector in informing our economic research and policy work. I am grateful for the dedication of our board members, survey respondents and other advisers who consistently answer our requests for time, information and advice.

This year's annual report chronicles how we have advanced as a region and institution. The collection of economic essays, "After the Boom: Texas Economy Downshifts in Energy Bust," discusses the remarkable resilience of the Texas

economy and its path forward along several key dimensions—energy, banking, housing, labor markets and international trade.

The energy industry now accounts for approximately 2 percent of Texas employment and 9 percent of GDP. This is a good deal lower than the 1980s when the downturn in energy helped drag the state into a severe recession.

The region's transformation into a more highly diversified economy has been aided by a steady migration of people and firms to Texas. Since 2000, the state's average rate of population growth has been almost a full percentage point higher than the U.S. as a whole. As a result, despite the headwinds from energy, Texas job growth was 1.3 percent in 2015. Dallas Fed economists expect between .5 and 1 percent growth in 2016.

As we look beyond 2015 and 2016, I am very optimistic about the future of this district. As the headwinds from energy begin to fade I believe our great strengths will come to the fore. Our central location, favorable business and regulatory climate, skilled workforce and numerous ports are all key elements of this optimism. While there are various challenges relating to educational attainment levels, income inequality and access to health care, I am confident that the Texas can-do attitude will meet these issues head on.

I am honored to serve the people of this district and the nation. I look forward to getting to know you better and working with you to help build our future success.

Robert S. Kaplan

President and CEO
Federal Reserve Bank of Dallas

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Slow Growth in Texas After Energy and Trade Ebb

Pia M. Orrenius and Keith R. Phillips | Annual Report 2015

The sudden reversal in Texas' economic outlook in 2015 is the focus of five essays in this annual report.

State job growth downshifted from 3.7 percent in 2014 to 1.3 percent in 2015. Declining oil prices were the main culprit, but a stronger dollar also played a role, helping reduce state exports. The end result has been a recession in the goods-producing sectors of energy extraction and manufacturing, which together lost 113,000 jobs last year. The service-providing and construction sectors, meanwhile, continued to expand, gaining 271,000 jobs in 2015.

In the wake of this shift, Federal Reserve Bank of Dallas economists assess what's next as Texas' economy moves forward.

In their essay, Michael Plante and Mine Yücel lay blame for the oil price downturn on an excess supply of crude oil. Texas rode the shale oil boom for several years until a global bust made the domestic oil industry a victim of its own success. U.S. crude production had soared with the adoption of hydraulic fracturing, or fracking, of shale formations, from 5.5 million barrels per day in 2010 to 9.4 million barrels per day in 2015. The U.S. became the world's third-largest producer of crude. Once oil prices began sinking, the Organization of the

Petroleum Exporting Countries didn't act to restrict supply, and prices dropped further. Balance in the market—defined as the point at which inventories stabilize—is at best two years away, Plante and Yücel suggest.

For many Texans, the collapse in oil prices brings back haunting memories from the 1980s recession and banking crisis. Oil prices fell 70 percent between 1982 and 1986, and one-third of Texas banks failed or needed Federal Deposit Insurance Corp. assistance, as Kory Killgo and Robert Moore remind us in their essay on the state's banking sector. While they caution that the current oil bust will be no repeat of the 1980s, early warning signs confront area banks. Commercial and industrial loan performance deteriorated sharply in the second half of 2015, and new lending slowed. Texas banks are also heavily exposed to commercial real estate, which has continued to do well even while remaining vulnerable to flagging demand from energy and related firms. While loan demand has receded from its lofty highs—with additional slowing likely in the near term—institutional buffers installed since the 1980s, such as the introduction of interstate banking, make a repeat of the past state banking crisis highly unlikely, Killgo and Moore conclude.

John Duca's essay focuses on Texas housing markets and the failure of the supply of new housing to keep up with soaring demand during the shale oil boom. In a state with a historically responsive housing supply, this unusual scenario led to a record run-up in Texas house prices. By comparing prices with rents and incomes, Duca concludes areas vulnerable to the energy downturn, such as Houston, may experience mild declines in house prices while other large Texas metros may simply experience slower price appreciation. The decline in affordability, meanwhile, is unlikely to completely recede; the state may have permanently lost some of its cost-of-living edge relative to the rest of the nation.

Pia Orrenius surveys state labor markets in the wake of the shale oil boom, pointing out that the boom's end may exacerbate widening wage inequality in coming years. Commodity run-ups tend to create relatively high-paying jobs without raising the skill premium, funneling good jobs to blue collar workers. Without the countervailing force that an energy boom brings, Texas is exposed to

the long-run national trend of labor market polarization, which disproportionately creates jobs at the bottom and top of the wage distribution while the middle stagnates.

Mark Wynne's essay discusses the large and growing volume of Texas exports and addresses the impact of China's economic slowdown. By some measures, up to one-third of global economic growth in recent years can be attributed to China—a worrisome statistic given that Chinese authorities expect much weaker growth in the next several years. While Texas exports to China have grown at an annual rate of more than 15 percent over the past two decades, China only comprises 5 percent of state exports. Wynne concludes that this small share will limit the impact of China's economic slowing and the depreciation of its currency.

From 2010 to 2014, the Texas economy grew strongly, fueled in part by the booming energy sector and increased exports. This expansion occurred across the entire wage distribution, with much stronger job growth than the nation in middle- and high-wage jobs. The oil price collapse and strengthening dollar in 2015 sharply slowed economic growth. Still, relative to the 1980s and other energy-producing states, Texas performed remarkably well.

Heading into 2016, weak oil and natural gas prices and a still-strong dollar suggest challenges remain. Growing numbers of bankruptcies in the oil and gas sector and softening trade with China will likely provide a backdrop that will remind some of the state's bust three decades ago.

Dallas Fed economists who have analyzed the state's economy over the past several decades conclude that, despite the significant challenges, Texas will continue adding jobs and probably avoid sharp declines in nonenergy sectors such as banking and residential real estate. While job growth will likely be weak—with activity concentrated at the low and high end of the pay distribution—a more diversified Texas economy will help the state avoid a repeat of the 1980s.

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The Texas Energy Industry: From Boom to Gloom

Michael D. Plante and Mine K. Yücel | Annual Report 2015

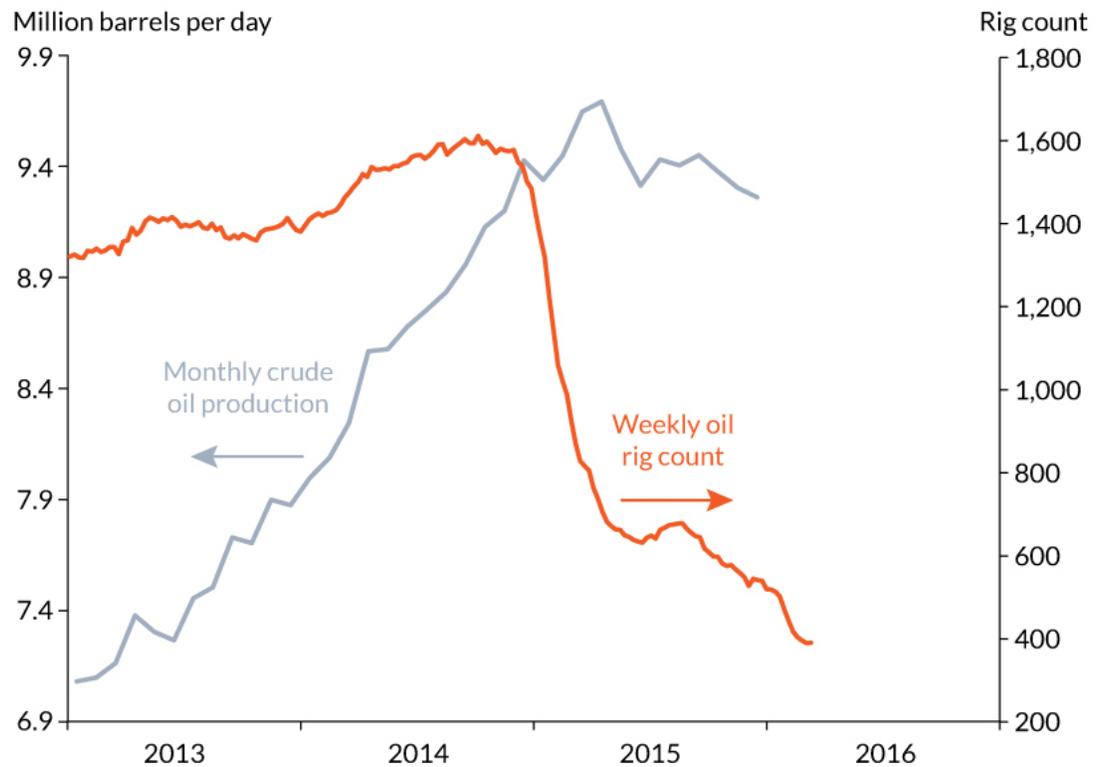
Horizontal drilling and hydraulic fracturing of shale formations have transformed Texas' oil and gas sector.

The shale boom contributed to robust growth in the state after the Great Recession by boosting oil production more than threefold from 2010 to 2015. However, Texas economic growth weakened markedly in 2015 due to falling oil and gas prices, and the state faces another challenging year in 2016.

Ironically, the energy sector's success helped create the current low-price environment. The new technology dramatically increased crude production in Texas and elsewhere in the U.S. Combined with more supply from countries such as Iraq, Brazil and Canada, the market found itself unexpectedly awash in oil. Saudi Arabia, the major swing producer, was forced to confront a difficult choice. It chose to maintain production levels instead of cutting output to bolster prices. A sharp crude oil price decline followed in late 2014.

Lower oil prices have made it less profitable to drill in shale areas, sharply curtailing drilling activity. Rig counts nationwide have fallen 75 percent (*Chart 1*). Output, however, has remained incredibly resilient; production peaked at almost 9.7 million barrels per day in April 2015 and remained relatively high throughout the year. The story is similar for Texas.

Chart 1: U.S. Crude Oil Production Resilient Despite Drilling Cutbacks



SOURCES: Baker Hughes; Energy Information Administration.

Drilling productivity is a major factor in the lagged response of oil output. As prices fell, firms focused on the most productive areas, working to reduce costs and increase efficiency. As a result, production remained stubbornly high in several areas despite sharply reduced rig counts.

Low oil prices have hurt the financial status of numerous oil companies, and a large number of them face uncertain prospects in 2016 even after achieving efficiency gains.¹ Many companies are also affected by extremely low U.S. natural gas prices, another result of the shale boom. At least 69 U.S.-based oil and gas companies went bankrupt in 2015; more are likely to do so in 2016.

The low oil price environment will continue challenging the Texas economy, especially in Houston and the oil-producing regions of the Permian Basin in West Texas and the Eagle Ford Shale in South Texas. The industry has lost nearly 60,000 jobs since the price collapse and may see further cuts if prices remain low. The carnage has spilled over into Texas manufacturing, which has faced the added

impediment of a strong U.S. dollar that has increased the foreign currency cost of exports. Overall Texas employment grew only 1.3 percent in 2015, less than half the 2014 pace.

On the bright side, while Texas is best known as an oil and gas producer, it is also home to significant petrochemical and refinery sectors that have benefited dramatically from the shale boom.

Unfortunately, the outlook for the petrochemical sector has also become less rosy due to lower oil prices—though it is not nearly as pessimistic as for oil and gas producers. The petrochemical sector has benefited from low domestic prices for natural gas. Over time, as global oil prices have fallen, the cost advantage has eroded for U.S. petrochemical companies vis-à-vis their foreign competition. Dimmer prospects may diminish new petrochemical sector investment along the Gulf Coast, although current projects will likely keep construction active through 2017. The strong dollar and weaker global demand are not helping, either.

At the same time, refiners have benefited from the recent oil price decline. Lower gasoline prices have helped spur increased demand from U.S. consumers, bolstering refining margins. The shale boom has also led to significantly larger exports of refined products, with volumes from the Gulf Coast more than doubling between 2008 and 2014.

Some expected the end of the U.S. crude oil export ban in December 2015 to herald a surge in exports. Such a scenario is unlikely, at least in the short to medium term. The ban became less relevant as production fell. Prices for benchmark West Texas Intermediate and Brent crude oil are quite close, creating less of an incentive for large-scale exports. In the long term, if oil prices move up and Texas oil production increases, the implications of access to the global market will be more significant.

The shale boom revolutionized the oil and gas industry in Texas but has not helped the state avoid the almost inevitable busts that seem to follow such booms. The industry, and the areas in Texas intimately connected with it, will likely continue to

face significant challenges until oil prices recover. The state's ability to continue growing in this challenging environment is a testament to the diversity and resiliency of its economy.

NOTE

1. "OPEC Tips Crude Oil Markets over the Cliff," by Navi Dhaliwal and Martin Stuermer, *Quarterly Energy Update*, Federal Reserve Bank of Dallas, Fourth Quarter, 2015.

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Texas Banks Enter This Downturn on Better Footing

Kory Killgo and Robert R. Moore | Annual Report 2015

The oil price plunge that began in mid-2014 is reminiscent of the state's big bust nearly three decades ago, when oil prices declined more than 70 percent in real terms.

More than 700 banks and savings and loans, including nine of the 10 largest, failed in Texas from 1986 through 1990.

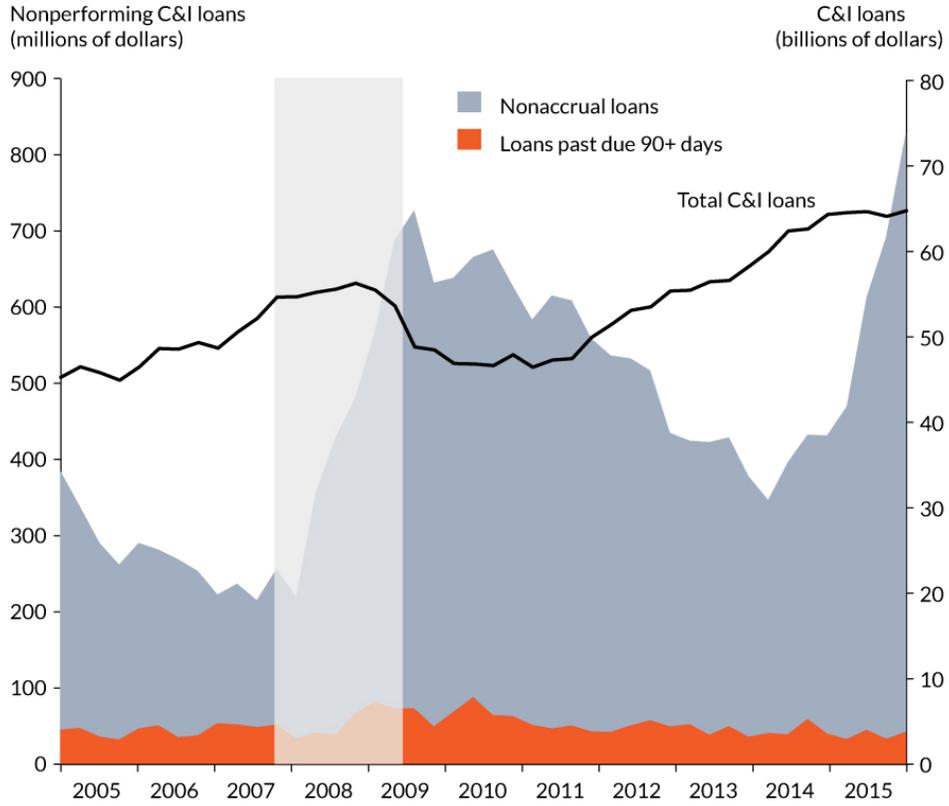
The recent price decline of 65 percent through the end of 2015 raises the specter of history repeating itself. That is a disturbing prospect given that the 1980s banking crisis, whose roots extended beyond energy woes, entailed substantial cost to the Federal Deposit Insurance Corp. and likely contributed to the worst recession in Texas since the Great Depression.

By most measures, Texas banks are on sound footing today. Noncurrent loans as a percent of total loans are roughly 40 percent lower and profitability is higher for institutions in the state relative to those in the rest of the country. But some clouds are gathering. While past-due commercial and industrial (C&I) loans remained low as a percent of total C&I loans in 2015, they increased from 1.08 percent in September to 1.28 percent in December.

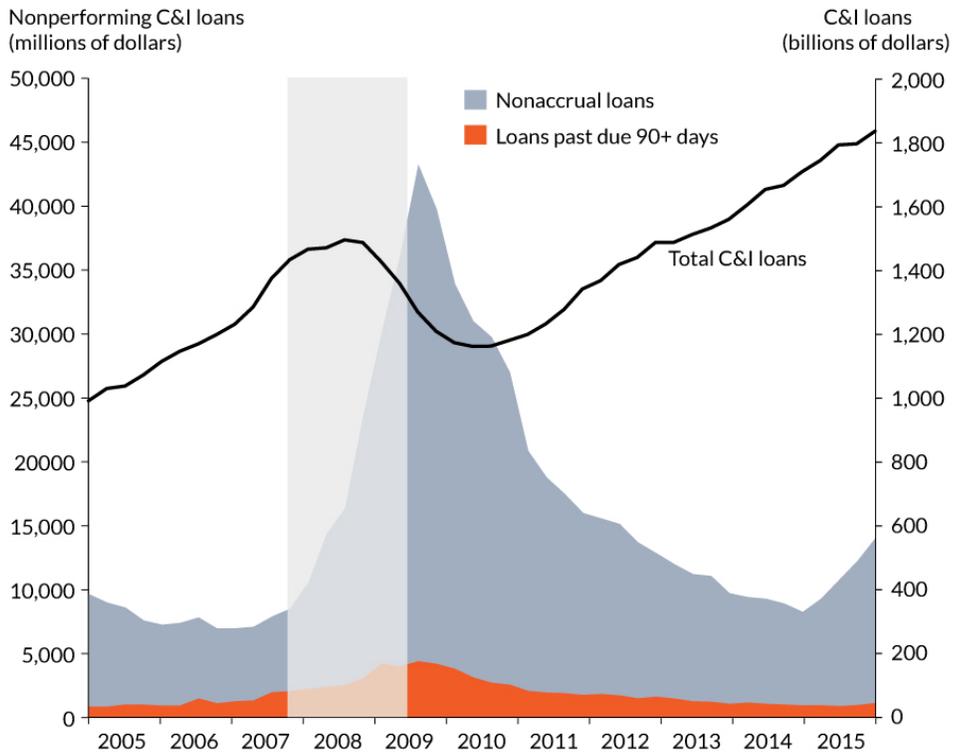
Noncurrent C&I loans—those 90 or more days past due, plus those no longer accruing interest—began increasing at Texas banks in 2014 and were up 92 percent year over year through fourth quarter 2015 (*Chart 1A*). A total of \$829 million in C&I loans were noncurrent as of Dec. 31, somewhat more than after the Great Recession. By comparison, noncurrent C&I loans increased 70 percent and were at only 31 percent of their postrecession high in the U.S., where the Great Recession’s impact was far greater than in Texas (*Chart 1B*).

Chart 1: Commercial and Industrial Loan Performance a Marker of Bank Health

A. Texas Loan Quality Slips as Oil Retreats...



B. ...While U.S. Quality Remains Relatively Stable



NOTE: Shaded bar indicates U.S. recession.

SOURCE: Quarterly Reports of Condition and Income, Federal Financial Institutions Examination Council.

C&I loans include those to energy producers, whose repayment prospects are tied to energy prices. More broadly, bank loan portfolios could be impacted by energy prices indirectly. Many businesses not in that sector have important energy industry customers and operate in geographic areas where energy firms are major drivers of economic activity.

Another cloud on the horizon is the relatively heavy concentration of commercial real estate (CRE) lending. Capital exposure to CRE is 60 percent larger at Texas banks than at banks nationally. And while vacancy rates and banks' past-dues generally remain low, they are moving in the wrong direction and concentrations bear watching.

Despite the unsettled outlook, Texas banks are better positioned today than during the 1980s oil price collapse. The state economy is more diversified, with energy playing a smaller role. The energy sector accounts for about 2 percent of Texas jobs, down from a high of 4.7 percent in 1982. Additionally, risk-management practices have improved considerably at Texas banks since the 1980s, better positioning them to confront economic shocks.

Beyond these important mitigating factors, significant changes in the banking industry's structure since the 1980s have bolstered Texas banks' ability to weather low oil prices. Arguably, the most important of these involves the ability to conduct business across state lines. In the 1980s, Texas-based institutions could not establish branches outside the state; their counterparts from outside Texas could not open branches here.

These restrictions have since loosened, allowing a level of geographic diversification that did not exist in the 1980s.

Today, 18 percent of deposits in banks headquartered in Texas are held outside the state. The freedom to operate in other states allows area banks to limit their exposure to the Texas economy and its associated energy industry ties. Moreover, only 38 percent of deposits in Texas bank branches belong to institutions headquartered in the state.

These structural changes, coupled with the current strength of the regional banking industry, suggest that the clouds on the banking horizon are unlikely to unleash a storm of 1980s proportions.

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Will Oil Decline Lead to a House Price Bust?

John V. Duca | Annual Report 2015

The correlation between house prices and oil booms raises concerns because oil prices have fallen nearly as much from their 2014 peak (about 66 percent) as they did during the mid-1980s oil collapse (70 percent). That 1980s collapse preceded a long housing bust.

Texas house prices barely rose before the 2008-09 financial crisis even as housing markets boomed elsewhere in the U.S. But after the crisis, prices increased faster in Texas than the nation amid rapid expansion of shale oil production.

How vulnerable are Texas house prices this time? Two gauges provide insight—the ratio of house prices to apartment rents, and home affordability in terms of income and monthly house payments.

OIL-INTENSIVE TEXAS CITIES SOMEWHAT VULNERABLE

A high price-to-rent ratio suggests that house prices are expensive relative to the alternative cost of renting, and that future prices are likely to grow slowly or possibly fall. The ratio of house prices to rents is a relative cost measure akin to a

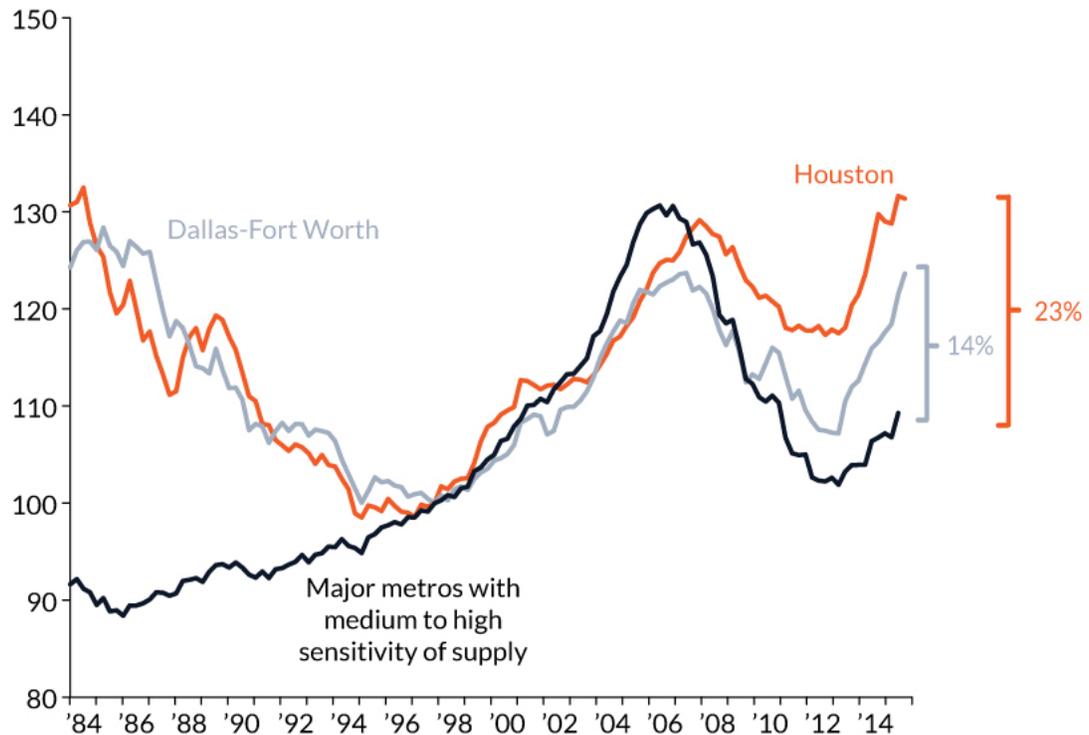
stock's price-to-earnings ratio. The price-to-rent ratio tends to be higher when inflation-adjusted interest rates—including mortgage interest rates—are low and boost the demand for relatively inexpensive owner-occupied housing.

In the short run, the price-to-rent ratio tends to swing less with demand in areas where the housing supply is very responsive to prices, reflecting regulations and geography that keep construction costs low. Housing supplies in Texas cities, for example, have historically been less constrained than in northeastern U.S. cities. Thus, local house prices are best compared to those of cities with similar supply characteristics.¹ Even then, industry fortunes can affect individual cities differently.

In Dallas and Houston, price-to-rent ratios were elevated during the energy boom of the late 1970s and early 1980s, fell during the oil bust of the late 1980s and early 1990s and aligned with comparable cities from the 1990s through 2009 (*Chart 1*). Since then, the ratio has risen about 14 percent in Dallas and 23 percent in Houston.

Chart 1: House Price Valuations in Houston, Dallas Elevated Relative to Comparable Cities

Price-to-rent ratio, 1997:Q4 = 100



SOURCES: Bureau of Labor Statistics; Federal Housing Finance Administration; "The Long-Awaited Housing Recovery," by John V. Duca, Federal Reserve Bank of Dallas 2013 Annual Report, 2014; "The Geographic Determinants of Housing Supply," by Albert Saiz, *Quarterly Journal of Economics*, vol. 125, no. 3, 2010, pp. 1,253-96; author's calculations.

Because house prices are slow to fall following modest overvaluations, Dallas could experience sluggish growth in house prices relative to rents. Houston is more exposed to energy and could see house prices decline moderately and then flatten, leading to a fall in prices relative to rents, which are likely to rise.²

Another valuation gauge is the National Association of Home Builders/Wells Fargo Housing Opportunity Index (HOI), which tracks the share of homes sold that a median-income household can afford. Affordability is defined as mortgage payments no greater than 28 percent of income, assuming a 10 percent down payment with conforming mortgage interest rates.

Typically, HOI data imply that consumers can more easily afford housing in Texas than elsewhere in the nation. However, third quarter 2015 figures indicate this is no longer the case for three large Texas cities. The share of homes sold that a median-income family could afford was 54 percent in Dallas, 59 percent in Austin

and 60 percent in Houston. That compares with 62 percent in San Antonio and the nation. Furthermore, HOI readings for the three cities are below averages seen during more normal housing market conditions in 1993–2000, with the averages down 9 percentage points in Dallas, 5 percentage points in Austin and 8 percentage points in Houston.

Nevertheless, the downside risk to Texas house prices may be less than these measures suggest. Before the bust of the late 1980s to early 1990s, homebuilders created a significant supply overhang fueled by excessive local lending. During the recent oil boom, the housing supply response was much more restrained, limiting overbuilding and inventories of unsold homes that could later depress house prices.

Indicators suggest that Texas cities less exposed to energy, such as Dallas, could see below-normal price growth in coming years before returning to more usual levels, while areas more exposed to energy, such as Houston, face a somewhat greater risk of modest house price declines.

NOTES

1. We use a classification of cities based on Albert Saiz's estimates for large U.S. cities and available CPI rent data. Sources include "The Geographic Determinants of Housing Supply," by Saiz, *Quarterly Journal of Economics*, vol. 125, no. 3, 2010, pp. 1253–96, and "The Long-Awaited Housing Recovery," by John V. Duca, Federal Reserve Bank of Dallas 2013 Annual Report, Federal Reserve Bank of Dallas, 2014.
2. See "Texas Metros' Rapid Growth Likely to Slow Following Energy Price Drop," by Amy Jordan, Federal Reserve Bank of Dallas *Southwest Economy*, First Quarter, 2015.

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Energy Bust Bad News for Job and Wage Growth

Pia M. Orrenius | Annual Report 2015

Texas labor markets logged remarkable gains during the 2005–14 shale oil and gas boom but are beginning to buckle under an intensifying oil bust.

The state unemployment rate stood at 4.6 percent in December 2015, up from a low of 4.4 percent four months prior. Job growth slowed to 1.3 percent in 2015, less than half its 2014 rate of 3.7 percent and below national job growth, something that hasn't happened since 2003. The Dallas Fed is forecasting less than 1 percent job growth in 2016, well below Texas' long-run trend and a figure likely to be revised down if oil prices slide further.

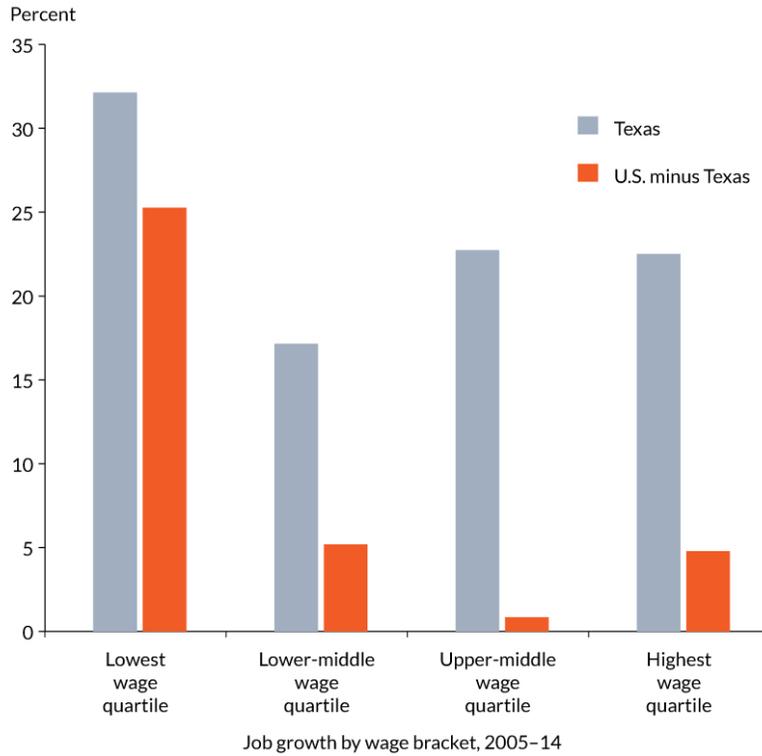
With the oil-driven boom came plenty of jobs, both low- and high-paying. Texas employment grew fastest (32 percent) in the bottom pay quartile—jobs paying \$10 per hour or less—followed by 23 percent growth in the top two quartiles—jobs paying over \$16 and \$26 per hour, respectively (*see gray bars in Chart 1A*).¹ Second-quartile jobs—which pay between \$10 and \$16 per hour—grew the slowest, expanding 17 percent.

Texas job growth looks truly remarkable when compared with growth in the rest of the country over the same period (*see orange bars in Chart 1A*). Despite widespread claims that Texas created primarily low-wage jobs, this was actually

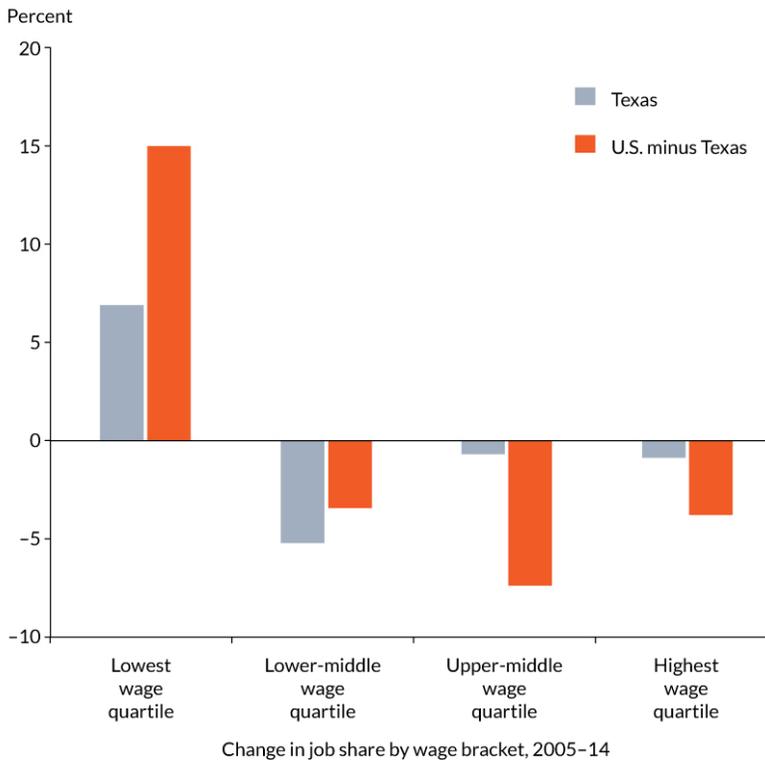
more the case in the rest of the U.S. rather than in the state over this period.²

Chart 1: Oil Boom Recharges Employment in Texas

A. Industry Revival Helps Fuel Job Growth Across Wage Groups



B. Labor Demand Mitigates Shrinking Share of High-Wage Jobs



NOTES: Calculations include workers over age 15 but exclude the self-employed. Wage quartiles and employment growth based on the Texas and U.S. wage distributions from the 2005 and 2014 American Community Survey (ACS).
SOURCE: American Community Survey, 2005 and 2014.

While the causes driving such broad-based job growth in Texas are many and varied, the shale oil and gas boom likely played an important role.³ The fastest-growing sectors from 2005 to 2014 also paid the highest hourly wages. Oil and gas employment grew at an 8.1 percent annual rate and, in 2014, paid an average hourly wage of \$31.

Professional and business services averaged 3.1 percent annual growth and paid \$29 per hour in 2014. Construction expanded at a 1.8 percent annual rate and, in 2014, paid an average hourly wage of \$27. In 2015, when oil prices fell to below half their 2014 levels, employment gains became concentrated in industries with lower average wages—leisure and hospitality, paying roughly \$14 per hour, and education and health, \$25 per hour.

Strong growth in high-paying sectors during the shale oil boom likely lent stability to the Texas wage distribution; in contrast, the middle and upper wage quartiles shrank markedly in the rest of the nation. Chart 1B shows the change in the share of employment represented by each wage quartile. Whereas each wage quartile accounted for 25 percent of employment in 2005, the two middle quartiles shrank over time by 3 percent and 7 percent, respectively, in the U.S. By 2014, they accounted for just 47 percent of employment. The top U.S. quartile contracted by 4 percent. The bottom quartile, meanwhile, grew by 15 percent and accounted for more than 28 percent of jobs by 2014. The changes in Texas were similar in direction but of lesser magnitude.

Absent the shale boom, cyclical dynamics and secular trends helped account for the concentration of national job growth in the lowest wage quartile over the period. The Great Recession wreaked havoc on the U.S. job market, destroying both blue- and white-collar jobs. However, low-wage jobs recovered faster than high-wage jobs after the recession, accounting for some of the patterns observed in the data and implying the high-skill labor market will continue to improve.⁴

The most pronounced of the secular trends is labor market polarization, the hollowing out of the wage distribution as job opportunities grow disproportionately at the extremes. The loss of middle-class jobs—defined here as

the one-half of all jobs that are in the middle of the wage distribution—remains ongoing.

Labor economist David Autor of the Massachusetts Institute of Technology documented the polarization trend in a 2010 study.⁵ He showed that, since 1980, the share of jobs in the middle of the skill distribution has been declining, while the shares at the bottom and top have been growing. The media refer to this phenomenon as the “shrinking middle class.” The drivers of polarization include technology and globalization. With advances in technology, routine tasks have been automated. With globalization, some work is now performed in countries with access to cheaper labor.

A primary reason energy booms may defy polarization trends is that they create well-paying jobs that cannot be offshored and do not require college degrees. Blue-collar booms, thus, temporarily restore some of the jobs lost due to automation (technological change) and globalization. For the time being, that counteractive force has gone the way of oil prices, and we can expect recent Texas labor market trends to look a little more like those in the nation as the energy sector continues to decline.

NOTES

1. Wage quartiles are constructed at the beginning of the period by dividing all workers into quartiles based on their hourly wage. In Texas, the first quartile includes jobs paying less than \$9.96; the second, \$16.23; the third, \$26.37; and the fourth, above \$26.37. The wage cutoffs are slightly higher for the remainder of the U.S. (\$11.46, \$18.03 and \$28.71). Once the quartiles are constructed, overall job growth is measured by quartile, and the percent change in the quartile's share of employment is plotted.
2. See "Employment Growth and Labor Market Polarization in the United States and Texas," by Melissa LoPalo and Pia M. Orrenius, in *Ten Gallon Economy: Sizing Up Economic Growth in Texas*, by Orrenius, Jesus Cañas and Michael Weiss, eds., New York: Palgrave Macmillan, 2015.
3. Texas typically grows about twice as fast as the nation; favorable factors include rapid population growth, strategically located land and seaports, low taxes and light business regulation.
4. See "[The Low Wage Recovery: Industry Employment and Wages Four Years into the Recovery](#)," National Employment Law Project data brief, April 2014.
5. See "The Polarization of Job Opportunities in the U.S. Labor Market: Implications for Employment and Earnings," by David Autor, Center for American Progress and the Hamilton Project, 2010.

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China Slowdown: Little Headwind for Texas

Mark A. Wynne | Annual Report 2015

The much-heralded slowdown of growth in China presents a limited challenge to Texas' growth because of the state's relatively small direct trade exposure.

However, deceleration in China that morphs into a broader global drag and spills over to Texas' main trading partners—namely, Mexico and Canada—would pose a more significant risk.

Texas has been the top U.S. exporting state since 2002. Overseas sales of petroleum products, manufactured goods and agricultural commodities exceeded \$287 billion in 2014. Since 1998, the dollar value of Texas exports has risen at an average annual rate of more than 8.5 percent, or about 3 percentage points faster than the U.S. rate, making exports an important contributor to the state's growth over the past two decades.

The upside of this global orientation is that when the global economy is doing well, Texas benefits. The downside, however, is that when global growth is weak or faltering, Texas growth suffers.

The big story in the international arena over the past quarter century has been the emergence of globalization—the increased economic integration of the various nations of the world—which has taken the form of greater cross-border flows of capital, labor and goods.

To many people, globalization is shorthand for one thing: the extraordinary expansion of the Chinese economy. By opening to international trade and liberalizing markets, living standards in China have gone from 2.5 percent of U.S. levels in 1980 to 25 percent of U.S. levels today, according to recent International Monetary Fund (IMF) estimates.

China is already the world's largest economy, at least when measured on a purchasing power parity basis, which attempts to correct for differences in price levels between rich and poor countries. And by virtue of its size and rapid increase in recent years, about one-third of global gross domestic product growth in recent years can be attributed to China.

At a very basic level, Texas export growth is driven by two factors: the state's exports' global competitiveness and how rapidly growth is occurring in world markets, including the Texas market itself. With regard to China's impact, we must also consider that country's share of Texas exports.

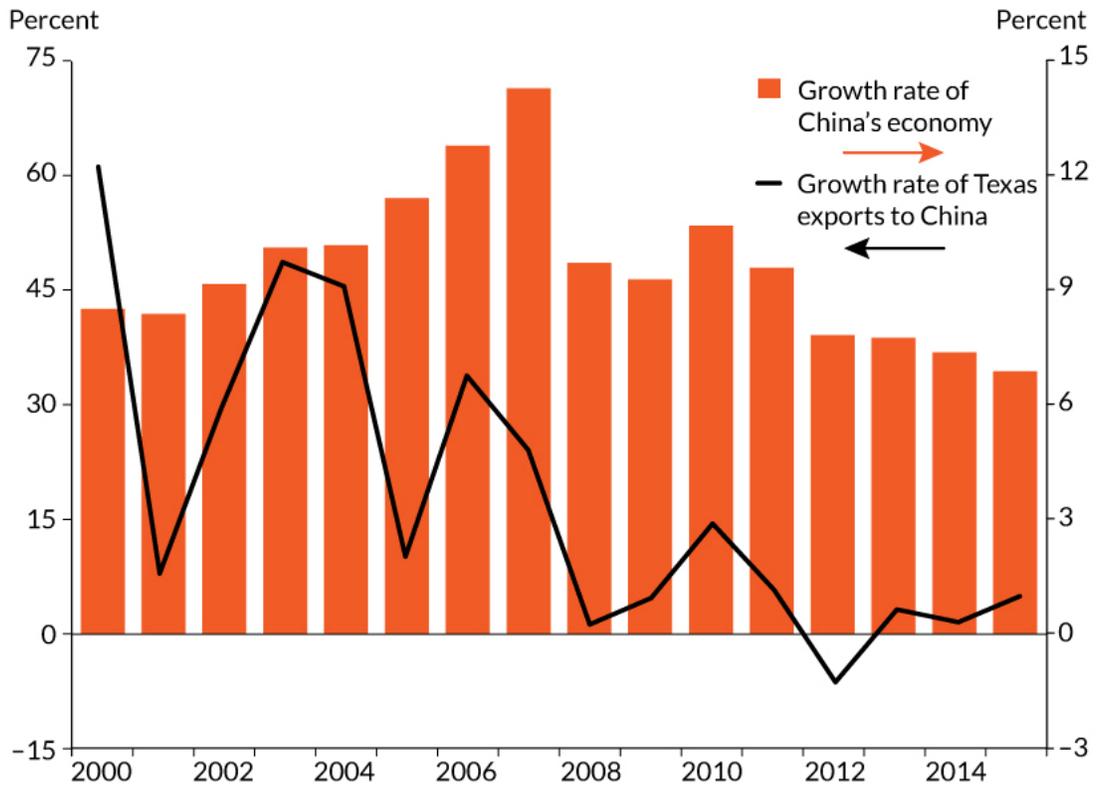
Texas export competitiveness is determined by the dollar price of its goods and services and also the exchange rate between the dollar and the currencies of the nations to whom it exports. As of 2014, Texas exported to 166 countries, almost all with currencies whose value fluctuates against the dollar.

The other key determinant of Texas export growth prospects is the rise in demand in target markets.

Two key developments in China during 2015 gave rise to concerns that Texas exports to that country may be somewhat weaker going forward. First, there is the widely noted slowing of China's growth rate. For several decades, China's economy climbed at unsustainable rates as it caught up with the rest of the world.

In November 2015, the Chinese government leadership suggested a growth target for 2016–20 of 6.5 percent, well below the double-digit rates in the years prior to the 2007–09 global financial crisis (*Chart 1*).

Chart 1: Texas Exports to China Decline as Nation’s Growth Slows



SOURCES: International Monetary Fund; Census Bureau.

The second key development was the loosening of the link between the Chinese renminbi and the dollar. Historically, the People’s Bank of China (PBoC) has tried to manage the exchange value of the renminbi to limit fluctuations against the dollar. For many years, this led to accusations of currency manipulation to obtain an unfair competitive advantage in international markets.

Measured in real terms against all of its trading partners, which is what ultimately matters for international trade, the renminbi appreciated by about 26.4 percent between 2005 and 2015.¹ The IMF, at the conclusion of its Article IV consultation mission to China in 2015, noted that the real effective appreciation of the renminbi over the preceding year had brought it to a level that is no longer undervalued.²

But what matters for Texas' trade prospects with China is the bilateral exchange rate between the dollar and the renminbi. From July 2014, when the dollar began its recent upward trend, through the end of 2015, the renminbi depreciated only 3 percent against the dollar. By contrast, the Mexican peso, the Canadian dollar, the euro and the yen depreciated by more than 20 percent.

While the value of Texas' exports to China has increased at an average annual rate exceeding 15 percent over the past two decades, the rate of expansion has slowed markedly in recent years. Exports to China increased just 5.7 percent in 2015, and, despite earlier rapid growth rates, accounted for only 4.6 percent of total Texas exports. This small trade exposure to China will limit the impact of a slowdown there on Texas' expansion.

On the other hand, recent policy developments in China will make trade with that country more sensitive to exchange rate movements. In December, the PBoC launched a new trade-weighted index for the renminbi that tracks its value against 13 currencies, including the dollar. There are growing expectations that the PBoC will seek to manage the value of the renminbi against this new basket rather than against the dollar, which will potentially mean greater future volatility in the dollar-renminbi exchange rate.

NOTES

1. As measured by the JPMorgan Chase & Co. broad real trade-weighted index deflated by the producer price index.
2. See "[IMF Staff Completes the 2015 Article IV Consultation Mission to China](#)," International Monetary Fund press release, May 26, 2015.

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Year in Review

The Federal Reserve Bank of Dallas in 2015 continued to make significant contributions toward fulfilling its mission of serving the American public by informing and influencing the nation's monetary policy, fostering financial stability and delivering high-quality services to the U.S. government and financial institutions in the Eleventh District.

One milestone for the Dallas Fed was the naming of Robert S. Kaplan as the Bank's 13th president and CEO. Before assuming the role of Bank president, Kaplan was senior associate dean at Harvard Business School and Martin Marshall Professor of Management Practice. Prior to joining Harvard, Kaplan was vice chairman of Goldman Sachs Group Inc. He is the author of several books on management and leadership. He represents the Eleventh Federal Reserve District on the Federal Open Market Committee (FOMC) and oversees the 1,200 employees of the Dallas Fed.

Since taking office in September, Kaplan has spent time meeting with business, banking and community leaders throughout the district. He delivered his first public speech as president at the University of Houston, where he discussed topics ranging from the impact of low oil prices on the district to the prospects of a slowdown in economic growth in China.

DISTINCTIVE RESEARCH

As declining oil prices continued to make headlines in 2015, the Dallas Fed played a leading role in disseminating timely and authoritative analysis on the subject. In addition to its *Quarterly Energy Update*, the Bank devoted an issue of *Southwest Economy* to the impact of low oil prices on Texas. Several subsequent articles and a [YouTube video](#) provided further analysis.

The Bank's research economists in 2015 authored 24 articles that were published in peer-reviewed journals and provided 10 chapters in books or conference volumes. Of particular prominence was the publication of *Ten-Gallon Economy: Sizing Up Economic Growth in Texas* by Palgrave MacMillan. Edited by Pia M. Orrenius, Jesús Cañas and Michael Weiss, the book details the many factors behind Texas' outsized economic growth and challenges for the future. The book's publication marked the culmination of a multiyear research project.

The Bank organized seven research events, including the conference "[Vistas from Texas: An Economic Outlook](#)," which featured regional economic updates and an expert panel on key business sectors of the Eleventh District, and the "[10th Border Economic Forum](#)," which examined the national, local and cross-border trends that impacted business conditions in the vibrant Paso del Norte region of El Paso, Texas; Las Cruces, New Mexico; and Ciudad Juárez, Mexico. Other events included "[U.S.–Mexico Manufacturing: Back in the Race](#)," which focused on changes in the global manufacturing landscape. In addition, the Dallas Fed sponsored two events as part of the Bank's Globalization and Monetary Policy Institute speaker series—one featuring economist Lars Christensen and another with Roger Lowenstein, author of *America's Bank: The Epic Struggle to Create the Federal Reserve*.

Another initiative in 2015 focused on increasing public awareness of the Dallas Fed's [Texas Employment Forecast](#). Starting in August, the Bank began posting the forecast monthly on DallasFed.org. The forecast provides a valuable resource for constituents interested in the state's economy.

In addition to the expertise provided by the Bank's research economists, the Dallas Fed gathers valuable insight from the Bank's [boards of directors](#), advisory councils and business and community leaders, who provide a grassroots perspective on the regional economy. This feedback, in turn, helps inform monetary policy through the Bank's participation in the FOMC.

FINANCIAL SERVICES

The Dallas Fed supplies currency and coin to meet demand. In 2015, the Bank paid and received 6.5 billion notes, valued at \$124 billion, and conducted transactions with more than 4,000 financial institutions and branches.

To help maintain the quality and integrity of currency and coin in circulation, the Dallas Fed destroys currency no longer fit for circulation. In 2015, the Bank destroyed about 37 million notes, valued at over \$840 million, per month. During the same period, it detected more than 700 counterfeit bills per month.

ELECTRONIC PAYMENTS

The Federal Reserve provides payments services to financial institutions to foster the integrity, efficiency and accessibility of the U.S. payments system. As new forms of electronic payments have emerged, the Reserve Banks and the Board of Governors have partnered in the role of convener, bringing the industry together to work toward consensus on a faster and more secure payments system.

To increase awareness of the advances in payments technologies and their impact on financial institutions, the Dallas Fed has conducted outreach and education related to the rapidly evolving payments landscape. In 2015, Dallas Fed experts gave 60 presentations on payments to a variety of banking, business education and consumer groups. The Bank also gained feedback on payments issues from its Corporate Payments Council, which is composed of representatives of corporations headquartered in the Eleventh District.

BANKING SUPERVISION

The Federal Reserve helps ensure a strong, stable banking system for all Americans through its bank supervision function. The Fed is responsible for the oversight of U.S. bank holding companies, foreign banking organizations operating in the U.S. and state-chartered member banks of the Federal Reserve System.

The Dallas Fed has taken a progressive approach to leveraging technology and revising processes to enhance examination efficiency. As more financial institutions store data and documents electronically, collecting the digital data has become a standard part of performing bank examinations as examiners securely exchange the electronic files with the financial institution and perform the analysis in the office. As a result, the time and number of examiners required for an exam have decreased and the disruption to bankers is minimized.

Feedback from bankers in the district has been positive regarding the off-site examination process.

ECONOMIC EDUCATION

In 2015, the Bank published *Navigate: Exploring College and Careers*, a free classroom resource for schools and community-based organizations to guide seventh- through ninth-grade students in exploring career and college opportunities. Teacher training sessions were provided for the Dallas, Houston, Katy, Round Rock, Tyler, Socorro and El Paso school districts in Texas, among others. The Bank has widely distributed the student workbook as well as a companion teacher handbook in response to demand for this much-needed tool.

A new interactive version of *Building Wealth*, the Bank's personal financial education resource, was provided online. The Bank redesigned and modernized the publication, resulting in an improved user experience that continues to help the public build personal wealth. The publication received national recognition in the annual American In-House Design Awards competition for graphic design and communication projects.

COMMUNITY DEVELOPMENT

The Bank released *Las Colonias in the 21st Century: Progress Along the Texas–Mexico Border*. The report—which marks the culmination of three years of study—examines infrastructure, housing, economic opportunity, education and health in the Texas colonias, communities that may lack some of the most basic living necessities. The Bank also hosted a conference in McAllen, Texas, launched a [website](#), and provided numerous presentations on the report.

Universities are now incorporating the colonias report and video into classroom syllabi. The Dallas Fed was invited to hold a symposium on the topic at the Woodrow Wilson International Center for Scholars in Washington, D.C.

In keeping with its mission of promoting programs and policies that improve the financial stability of low- and moderate-income households, the Dallas Fed has assumed the role of convener in an innovative approach that is reducing demand for high-priced payday lending. Collectively known as the Community Loan Centers of Texas, this network of small-dollar loan providers enables employers to offer an alternative to payday and car title loans. In October, the Dallas Fed hosted a gathering of these providers to highlight the scalability and growth of this model.

FINANCIAL INSTITUTION OUTREACH

Recognizing the importance of community bankers in promoting a stable, healthy economy, the Dallas Fed launched an initiative in partnership with the Independent Bankers Association of Texas and the Texas Bankers Association. The Banking on the Leaders of Tomorrow (BOLT) program is designed to promote understanding of the Fed among community banking's future leaders. The first BOLT seminar was held in San Antonio, with speakers that included leaders from the banking industry and the Dallas Fed, who shared insights on leadership and the Federal Reserve.

RECRUITING AND EMPLOYMENT

The Dallas Fed is committed to diversity, inclusion and mutual respect in all aspects of business. This is exemplified in the Bank's partnerships with organizations to identify and recruit employment candidates in support of its efforts to maintain a diverse workforce.

In 2015, on behalf of the Federal Reserve System, the Dallas Fed piloted a diversity career fair with a science, technology, engineering and mathematics (STEM) focus. Staff met and conducted on-site interviews with candidates from the technology and engineering fields. In addition, the Bank participated in more than 60 career fairs, conferences and engagements, and partnered with universities and other organizations to identify candidates for job openings.

TREASURY SERVICES

The U.S. Treasury announced its All-Electronic Treasury Initiative in 2010, setting a 2013 deadline for monthly federal benefit payments such as Social Security made via check to be converted to an electronic alternative. The effort is expected to save taxpayers \$1 billion over 10 years. On behalf of the Treasury, the Dallas Fed operates the U.S. Electronic Payment Solution Center, which includes a call center and website through which people can sign up for direct deposit of their federal benefit checks. The Dallas Fed continues to support this initiative because all recipients haven't yet been converted and baby-boomer retirements are expanding the pool of benefit recipients.

The Dallas Fed's Treasury Services program continued to provide exceptional support for this initiative, earning the highest possible rating from the Treasury for its call center and website operations. In 2015, efforts to improve the customer experience included implementing a more efficient call flow and introducing speech analytics, which convert spoken conversations to searchable text. Dallas Treasury Services also coordinates the design and printing of the 1.5 million monthly inserts that are included with federal benefit checks to inform recipients about the need to enroll in electronic payment.

While the operations of the Dallas Fed are complex, its mission is simple: to serve the interests of the American people. In 2015, the Bank continued to fulfill that mission, providing valuable insight on the district economy, protecting the stability of the banking system, and helping communities and individuals find solutions to economic problems in a rapidly changing world.

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Examinations of the Reserve Bank

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The Reserve Banks and the consolidated limited liability company (LLC) entity are subject to several levels of audit and review.

The combined financial statements of the Reserve Banks as well as the annual financial statements of each of the 12 Banks and the consolidated LLC entity are audited annually by an independent auditing firm retained by the Board of Governors. In addition, the Reserve Banks, including the consolidated LLC entity, are subject to oversight by the Board of Governors, which performs its own reviews. The Reserve Banks use the Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) to assess their internal controls over financial reporting, including the safeguarding of assets. Within this framework, the management of each Reserve Bank annually provides an assertion letter to its board of directors that confirms adherence to COSO standards.

The Federal Reserve Board engaged KPMG to audit the 2015 combined and individual financial statements of the Reserve Banks and Maiden Lane LLC.¹

In 2015, KPMG also conducted audits of internal controls over financial reporting for each of the Reserve Banks. Fees for KPMG services totaled \$6.7 million, of which \$0.4 million was for the audit of Maiden Lane LLC. To ensure auditor

independence, the Board requires that KPMG be independent in all matters relating to the audits. Specifically, KPMG may not perform services for the Reserve Banks or others that would place it in a position of auditing its own work, making management decisions on behalf of the Reserve Banks, or in any other way impairing its audit independence. In 2015, the Bank did not engage KPMG for any non-audit services.

The Federal Reserve Bank of Dallas' financial statements as of and for the years ended December 31, 2015 and 2014 and the independent auditors' report can be found at the following link:

<http://www.federalreserve.gov/monetarypolicy/files/dallasfinstmt2015.pdf>.

NOTE

1. In addition, KPMG audited the Office of Employee Benefits of the Federal Reserve System (OEB), the Retirement Plan for Employees of the Federal Reserve System (System Plan), and the Thrift Plan for Employees of the Federal Reserve System (Thrift Plan). The System Plan and the Thrift Plan provide retirement benefits to employees of the Board, the Federal Reserve Banks, the OEB and the Consumer Financial Protection Bureau.

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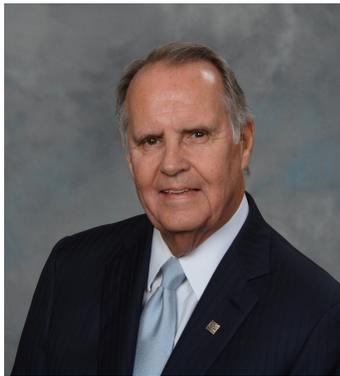
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