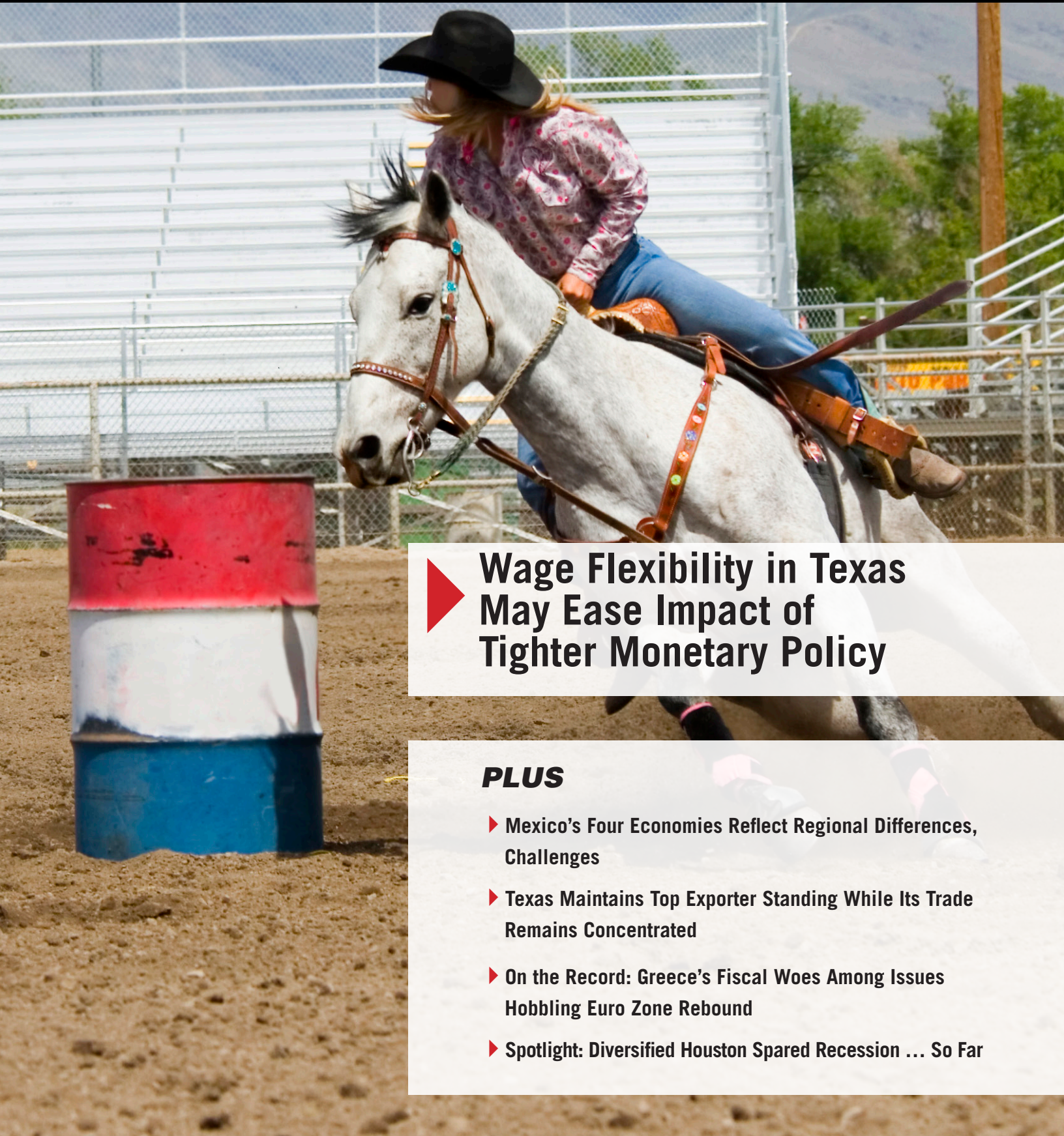


Southwest Economy



▶ **Wage Flexibility in Texas
May Ease Impact of
Tighter Monetary Policy**

PLUS

- ▶ **Mexico's Four Economies Reflect Regional Differences, Challenges**
- ▶ **Texas Maintains Top Exporter Standing While Its Trade Remains Concentrated**
- ▶ **On the Record: Greece's Fiscal Woes Among Issues Hobbiling Euro Zone Rebound**
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▶ *In the great laboratory of the 50 united states—with its diversity of institutions, business climates and geographies—economic forces play out in different ways.*

While I was growing up in Kansas, my parents often stressed to me that hard work breeds success. My father was a jewelry salesman serving small and mid-sized stores in Texas and the Southwest. During school vacations, I frequently joined him on his travels and learned about the challenges of running a small business. My mother worked as a real estate agent and taught me the importance of helping people reach their objectives.

Those experiences helped make me who I am and stayed with me during my careers in financial services and academia, which regularly brought me back to Texas. They certainly guide me as I begin as president of the Federal Reserve Bank of Dallas.

I strongly believe jobs are central to economic well-being, a point reaffirmed in this issue of *Southwest Economy*. In the great laboratory of the 50 united states—with its diversity of institutions, business climates and geographies—economic forces play out in different ways. One important dynamic is the tradeoff between wage growth and unemployment, as Anil Kumar writes in “Wage Flexibility in Texas May Ease Impact of Tighter Monetary Policy.”

The work of economist A.W. Phillips and his Phillips curve suggests that as unemployment falls and slack is wrung out of the labor market, wages tend to rise, boosting inflationary pressures. This relationship is one of the indicators Federal Reserve policymakers take into account when considering whether to change the short-term federal funds interest rate.

Wages tend to be more flexible in Texas than in other states, Kumar finds. There are a number of reasons for that—among them, a lower minimum wage here and more unionization and greater labor market regulation elsewhere. Thus, during economic weakness, Texas workers accept less for their efforts and employers resort to fewer layoffs. In better times, that flexibility helps wages climb faster here.

Kumar’s article, along with the others in this issue, underscores the importance of regional differences in understanding economic change and the implications for monetary policy.

This research is one example of the terrific work being done here at the Dallas Fed. I look forward to meeting and learning from you as I begin this new chapter and help guide the Eleventh District through the exciting period ahead.

A handwritten signature in black ink that reads "Robert S. Kaplan". The signature is written in a cursive, flowing style.

Robert S. Kaplan
President and Chief Executive Officer
Federal Reserve Bank of Dallas



Wage Flexibility in Texas May Ease Impact of Tighter Monetary Policy

By Anil Kumar

ABSTRACT: Because wages are more flexible in Texas than in other parts of the U.S., the state's unemployment rate will be less prone to rise when interest rates increase.

At times of rising unemployment, wage growth tends to slow.

This inverse relationship is one of economics' most enduring tenets and is captured in the work of economist A.W. Phillips and his Phillips curve.¹

The Phillips curve helps determine the amount of expected price or wage inflation for a given change in the unemployment rate.²

The Phillips curve also remains an important tool for gauging the responsiveness of real (inflation adjusted) wages to unemployment. The steeper the curve, the more flexible or responsive are wages to unemployment rate shifts. The degree of wage rigidity helps policymakers assess the ability of monetary policy to affect output and unemployment.

The Phillips curve for Texas is steeper than the one for the U.S., based

on a review of state-level unemployment rate data from the Bureau of Labor Statistics (BLS) and hourly wages from the Census Bureau's Current Population Survey (CPS) (*Chart 1*).³ The steeper Phillips curve and greater wage flexibility suggest that when interest rates rise, unemployment will increase less in Texas than elsewhere.

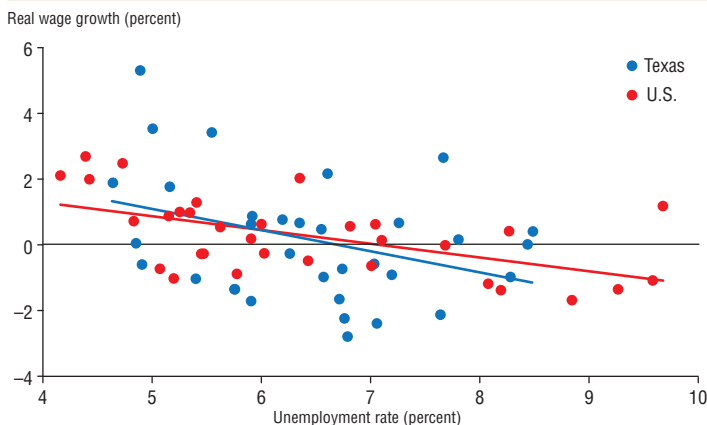
Monetary policy can affect individual states differently because they vary widely in the timing, duration and stage of their business cycles and in the extent of labor availability, or slack.⁴ Moreover, states' economies differ significantly with regard to industry composition, the presence of small versus large banks, and firm size—factors that can cause states to respond differently to monetary policy shocks.⁵

Because monetary policy is formulated at the national level, the sensitivity of wage growth to unemployment rate change generally focuses on activity across the country. But this national viewpoint often masks significant local differences. Conversely, state-level information yields more precise measurement of the Phillips curve relationship nationally. It also helps us understand the local effects of monetary policy changes in places such as Texas.

Texas Phillips Curve

Real wage growth tends to accelerate more rapidly in Texas than the nation when unemployment is low and decelerate more sharply when unemployment is high, as depicted in *Chart 1*. The graphic is drawn from aggregated CPS data for Texas and the U.S. from 1982 to 2013. The unemployment rate is calculated as the number of unemployed as a percent of all workers in the labor force. The real wage

Chart 1 Steeper Phillips Curve Indicative of Flexible Labor Markets



NOTE: Each dot represents annual average real wage growth and unemployment rate for a particular year from 1982 to 2013 for the U.S. and Texas.

SOURCES: Bureau of Labor Statistics' Current Population Survey; Census Bureau; author's calculations.

measure excludes overtime pay and fringe benefits.

The linear fit on the chart shows that the relationship between real wage growth and the unemployment rate has a steeper slope in Texas than in the nation, indicating that wages are more flexible in Texas. A percentage-point decline in the unemployment rate leads to real wage growth of 0.65 percentage points in Texas, compared with 0.42 percentage points for the U.S. The response of inflation-adjusted wage growth to a given change in the unemployment rate is therefore about 0.23 percentage points stronger than in the nation.

The heightened flexibility of Texas wages means they are more responsive to changes in the unemployment rate and adjust more freely. Texas ranks high among states on this measure of wage flexibility and is in the top quintile of responsiveness of wage change to movements in the unemployment rate (*Chart 2*).

Greater Wage Flexibility

The presence of wage rigidity is fundamental to the existence and persistence of unemployment. In standard economic models that assume flex-

ible wages, unemployment arises only because workers are in the process of a job search or transitioning between jobs. Wages adjust instantaneously to clear the labor market. When such models are extended to incorporate real wage rigidity, structural or involuntary unemployment arises because the number of job seekers exceeds the number of workers firms are willing to hire at the prevailing real wage. An oversupply of labor is created.

Why can't wages adjust freely so that supply and demand of workers is in balance? There are several potential explanations.

First, a job can be viewed as an implicit contract between workers and firms in which risk-averse employees trade greater job security for more stable, though less lucrative, pay.⁶ Second, many firms voluntarily pay above market-clearing wages to encourage worker effort rather than engage in costly labor monitoring to prevent shirking.⁷ Such efficiency wages also limit worker turnover, helping firms save on new-employee training. Third, labor market imperfections such as internal labor markets—typically, the filling of positions from within companies rather than through open compe-

tion—also prevent wages from fully adjusting.⁸

Additionally, some government policies prevent wages from falling enough to clear the surplus of workers over jobs. For example, more generous unemployment benefits raise the wage at which workers are willing to accept a new job. Indeed, higher jobless benefits raise the wage a firm must offer to attract available workers. Minimum-wage laws similarly hinder free adjustment of pay.

The degree of wage rigidity is correlated with other characteristics of labor markets. The prevalence of unions in certain industries is an important impediment to full adjustment of wages. Wage rigidity is further correlated with manufacturing's share of the economy and the concentration of public sector employment.

The presence of immigrant labor with less bargaining power than native workers often mitigates wage rigidity. Such workers are also less likely to be covered by union agreements. Moreover, undocumented immigrants may be more willing than others to work for less than the minimum wage.

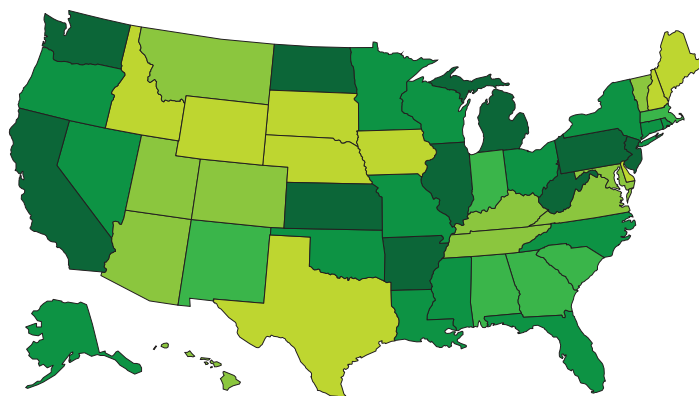
Finally, wages tend to be more rigid in large companies than in small firms that can monitor worker effort more easily without having to pay efficiency wages to induce effort.

Given these explanations for wage rigidity, it is not surprising that wages in Texas are more flexible. The state has a lower minimum wage than other large states, provides less-generous unemployment benefits than the national average and has less union participation than the rest of the country. Immigrant workers are more common in Texas, where right-to-work rules and lighter government regulation help the state rank high on business-climate indicators.

Assessing Policy Implications

The consequence of wage rigidity can become particularly apparent during an economic downturn, when firms often choose between two options to reduce labor costs: cut wages and hours or lay off workers. If lowering wages is difficult, layoffs become the preferred choice. Because the supply of workers

Chart 2 | Texas Ranks High Among States in Real Wage Flexibility



Lighter shades indicate more flexible wages.*

■ -1 to -.6 ■ -.6 to -.48 ■ -.48 to -.38 ■ -.38 to -.3 ■ -.3 to -.2

*Shades represent quintiles of states ranked by wage flexibility on the basis of the slope of the Phillips curve; for example, the lightest shade (-1 to -.6) indicates that the 20 percent of states with the most flexible wages have slopes between .6 and 1.

SOURCES: Bureau of Labor Statistics' Current Populations Survey; Census Bureau; author's calculations.

then exceeds demand at the prevailing pay, such wage rigidity is correlated with unemployment and other measures of labor market slack.⁹ Inflexible wages can also contribute to unemployment persistence—when joblessness in one period fails to disappear in the next, a phenomenon called “hysteresis.”¹⁰

Wage rigidity not only has a direct effect on the unemployment rate, it plays a key role in monetary policy’s impact on employment and output. Economists have long suggested that monetary policy shocks can affect the real economy only if wages and prices are inflexible. The greater the wage rigidity, the more pronounced the impact of monetary policy on real personal income, gross domestic product and unemployment.

A contractionary monetary policy shock—for example, higher interest rates—could produce larger and more persistent increases in unemployment in states with significant wage rigidity. States with more flexible wages, such as Texas, will more easily adjust to an interest rate change. Previous research has also suggested that because of relatively stronger economic conditions in Texas than in the rest of the U.S., short-term interest rates could have been higher here than the near-zero rate that policymakers installed after the Great Recession began.¹¹

Comparing Texas, U.S.

Measuring the response of wages to the unemployment rate over time helps draw the distinction between the U.S. and Texas. The depiction of the Phillips curve relationship in Chart 3 suggests that wages in the state were more sensitive to changes in unemployment than they were nationally during the period studied, 1999 to 2013.

The Phillips curve’s slope—the change in wage growth for a given change in the unemployment rate—is estimated in decimal form for each year, using data from 1982 through the year shown. For example, the slope for 1999 is based on 19 years of data from 1982 to 1999; the slope for 2013 was based on data from 1982 to 2013.¹² Wages have become less flexible in

recent years in both Texas and the U.S., with the slope edging closer to zero.

For the nation, the predicted decline in real wage growth for a 1-percentage-point increase in the unemployment rate—in absolute-value terms—peaked at 0.44 percentage points in 2006 and declined to 0.36 in 2013. The decline in Texas was even sharper—from 0.88 to 0.67. Increased wage rigidity is thought to be a key explanation for a surprising lack of wage stagnation during the Great Recession and for weak real wage growth during the recovery.¹³

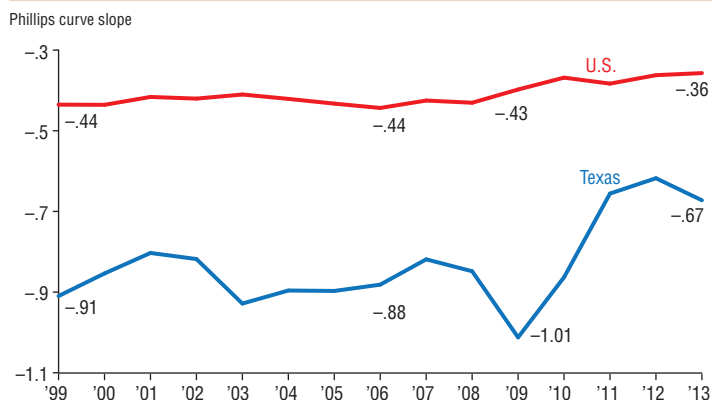
If employers cannot sufficiently lower wages when the economy slumps, they will be slow to increase wages when conditions improve. Several factors may have contributed to generally heightened wage rigidity nationally and in Texas since 2008.

First, wage rigidity tends to be countercyclical, and increased rigidity during downturns typically lingers before subsiding.¹⁴ Another possible explanation is the phased increase in the federal minimum wage, from \$5.15 to \$7.25 per hour, between 2007 and 2009. Apart from the national impact, the higher minimum wage may also have contributed—with some lag—to the post-2009 spike in wage rigidity in Texas.

The minimum wage increase mattered more in Texas than in the U.S.,

▶ *While lower unemployment rates lead to greater wage growth, higher unemployment rates do not lead to proportionately lower wage growth due to the relative inability of firms to reduce wages.*

Chart 3 | Real Wages More Flexible in Texas Even as Flexibility Declines



NOTE: The slope of the Phillips curve for the U.S. and Texas is estimated using a regression of real wage growth on the unemployment rate since 1982. The estimation accounts for other factors that differ across states and over time. SOURCES: Bureau of Labor Statistics’ Current Population Survey; Census Bureau; author’s calculations.

on average, because many other states already had a higher minimum wage than the federal level. Additionally, Texas has a larger share of hourly paid workers who were likely affected by the increase. That said, the sharper spike in the state's wage rigidity vis-à-vis the nation may simply reflect more volatile labor market data at the state level.

Wage Growth Feeding Inflation

The Phillips curve slope also may vary with the unemployment rate. When economic conditions deteriorate and unemployment is high, firms have an incentive to lower pay to cut labor costs. While raising wages when the economy is hot and unemployment is low presents no particular challenge for firms, lowering wages when unemployment is greater is more difficult and results in a relatively flatter Phillips curve. Though this characteristic is difficult to detect at the state level, its presence can be easily established nationally and has important monetary policy implications.

The national Phillips curve slope is significantly steeper when the unemployment rate is below its long-term average than when it is above the average (*Chart 4*). An important implication is that continued declines in unemployment when the rate is already low may lead to significantly stronger real wage growth that can feed into overall inflation.

The Phillips curve slope at below-average unemployment has been stable at about -0.5, except for a period between 2003 and 2006 when wage flexibility at lower levels of unemployment hit a high. A potential explanation is a decline in public sector employment during those years that likely enabled wages to adjust more easily.

The slope of the Phillips curve at above-average unemployment remained largely stable until the onset of the Great Recession, although it has drifted toward zero since then, becoming less negative. This is not surprising because the data since 2008 correspond with a period when the unemployment rate was high and real wage growth was rather subdued.

Additionally, the downward movement in the Phillips curve slope following 2008 may partly reflect the effect of the minimum-wage increase that was fully phased in during 2009. The extended availability of unemployment benefits coming out of the Great Recession also may have impeded adjustment of wages because the payments effectively raised the wage firms needed to pay to attract potential workers.

Another reason real pretax wages may be more rigid post-2009 is that the “payroll tax holiday”—a temporary reduction in the payroll tax from 6.2 to 4.2 percent—was in effect between 2011 and 2013. This may have induced firms to limit increases in the pretax wage as worker take-home pay rose because of the tax-rate cut.

Differences Among States

The varied responses of wages in high- and low-unemployment rate situations have important implications for wage growth, particularly if there are significant differences in joblessness among states. Indications of a widening gap between high- and low-unemployment scenarios heightens the probable effect on wage growth.

Using data through 2000, previous research reveals that cross-state differences in labor market slack amplify

the wage-growth response of a given change in the unemployment rate.¹⁵

If unemployment rates are uniform across states and equal the national long-term average of about 6 percent, the model used for *Chart 4* implies modest real wage growth of about 0.1 percent in 2013.¹⁶

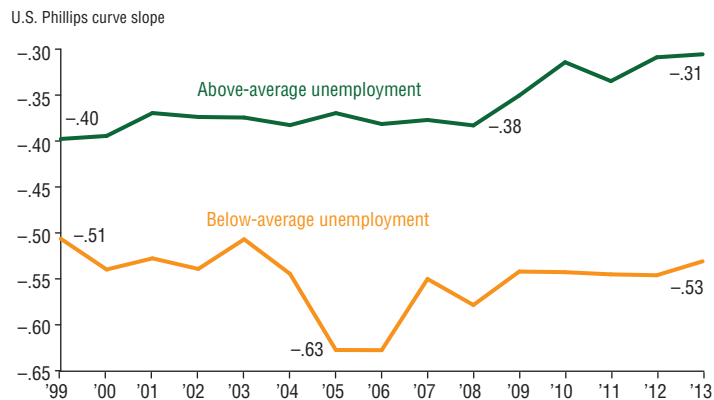
If the unemployment rate is 5 percent in half the states and 7 percent in the rest, the national average remains at 6 percent, the model predicts real wage growth of 0.66 percent for low-unemployment states and real wage deflation of 0.19 percent for high-unemployment states, making average real wage growth 0.24 percent.

Clearly, predicted wage growth when the unemployment rate differs across states is higher than when the unemployment rate is uniform. Thus, for a given national unemployment rate, greater divergence in labor market slack is associated with higher wage pressure.

The economic explanation for why cross-state diversity in unemployment rates yields higher wage growth stems from downward wage rigidity. While lower unemployment rates lead to greater wage growth, higher unemployment rates do not lead to proportionately lower wage growth due to the relative inability of firms to reduce wages.

A measure of unemployment rate variability across states shows that it is

Chart 4 Phillips Curve Steeper When Unemployment Is Low



NOTE: The slope of the Phillips curve for the U.S. is estimated using a regression of real wage growth on the unemployment rate on data since 1982. The estimation accounts for other factors that differ across states and over time.

SOURCES: Bureau of Labor Statistics' Current Population Survey; Census Bureau; author's calculations.

significantly below the levels of the late 1980s and has remained largely stable since 1990 (Chart 5).¹⁷

The jobless recovery that followed the 2001 recession appears to have affected most states similarly, mitigating cross-state variability in unemployment rates. As a result, state-level differences account for wage pressures to a much smaller extent than in the 1980s. But insofar as modest cross-state differences in labor market slack persist, they remain a source of wage pressure.

Prospect of Higher Wages

Despite consistent tightening of labor market slack, wage growth has been remarkably restrained during the long recovery. One explanation is that unemployment rates haven't fallen far enough. But as the economy gains more steam and the unemployment rate drops further, the traditional responsiveness of wages—illustrated by the Phillips curve relationship—should reappear and begin to spur wage growth.

Tighter monetary policy may be warranted if and when wage growth picks up and starts feeding into consumer prices. A steeper Phillips curve and more flexible wages in Texas relative to the nation suggest that, all else equal, the state will experience a smaller increase in labor market slack when interest rates rise.

Kumar is a senior research economist in the Research Department at the Federal Reserve Bank of Dallas.

Notes

¹ The inverse relationship between unemployment and wages was originally found in "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957," by A.W. Phillips, *Economica*, vol. 25, no. 100, 1958, pp. 283–99.

² Closely linked to the Phillips curve is the concept of the natural rate of unemployment—a jobless rate consistent with stable inflation. ³ Hourly wages were measured following the procedure in "Creating a Consistent Hourly Wage Series from the Current Population Survey's Outgoing Rotation Group, 1979–2002," by John Schmitt, Center for Economic and Policy Research, 2003, p. 64.

⁴ See "Business Cycle Phases in U.S. States," by Michael T. Owyang, Jeremy Piger and Howard J. Wall, *Review of Economics and Statistics*, vol. 87, no. 4, 2005, pp. 604–16.

⁵ See "The Differential Regional Effects of Monetary Policy," by Gerald Carlino and Robert DeFina, *Review of Economics and Statistics*, vol. 80, no. 4, 1998, pp. 572–87.

⁶ For details, see "Implicit Contracts and Underemployment Equilibria," by Costas Azariadis, *Journal of Political Economy*, vol. 83, no. 6, 1975, pp. 1,183–202.

⁷ For details, see "Efficiency Wage Models of Unemployment," by Janet L. Yellen, *American Economic Review*, vol. 74, no. 2, 1984, pp. 200–05.

⁸ For more on wage rigidity explanations, see *Fundamentals of Labor Economics*, by Thomas Hyclak, Geraint Johnes and Robert Thornton, Mason, Ohio: South-Western/Cengage Learning, 2012.

⁹ See "The Determinants of Real Wage Flexibility," by Geraint Johnes and Thomas J. Hyclak, *Labour Economics*, vol. 2, no. 2, 1995, pp. 175–85.

¹⁰ See "Hysteresis and the European Unemployment Problem," by Oliver J. Blanchard and Lawrence H. Summers, in *NBER Macroeconomics Annual 1986, Volume 1*, ed. Stanley Fischer, Cambridge, Mass.: MIT Press, 1986, pp. 15–90.

¹¹ See "Would a Texas Central Bank Set Rate Higher?" by Janet Koech and Mark A. Wynne, Federal Reserve Bank of Dallas *Southwest Economy*, no. 2, 2014, p. 15.

¹² See "A Closer Look at the Phillips Curve Using State Level Data," by Anil Kumar and Pia Orrenius, Federal Reserve Bank of Dallas Working Paper no. 1409, May 2014.

¹³ See "Why is Wage Growth So Slow?" by Mary C. Daly and Bart Hobijn, Federal Reserve Bank of San Francisco *Economic Letter*, no. 1, 2015.

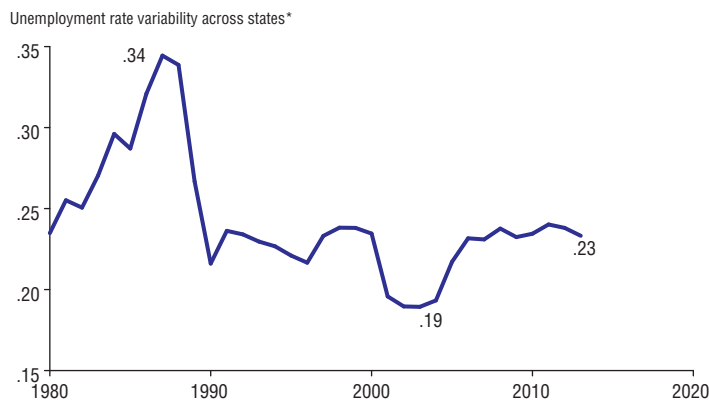
¹⁴ See "The Path of Wage Growth and Unemployment," by Mary C. Daly, Bart Hobijn and Timothy Ni, Federal Reserve Bank of San Francisco *Economic Letter*, no. 20, 2013.

¹⁵ See "U.S. Regional Business Cycles and the Natural Rate of Unemployment," by Howard J. Wall and Gylfi Zoega, Federal Reserve Bank of St. Louis *Review*, vol. 86, no. 1, 2004, pp. 23–31.

¹⁶ Although real wage growth predicted by the model appears low, data from the Bureau of Labor Statistics show that average hourly earnings grew just 0.3 percent in 2013.

¹⁷ Variability across states is measured using the coefficient of variation, which equals the standard deviation of the unemployment rate across states divided by its mean.

Chart 5 Dispersion in Unemployment Rates Falls, Stabilizes



* Standard deviation of the unemployment rate across states divided by its mean.

SOURCES: Bureau of Labor Statistics' Current Population Survey; Census Bureau; author's calculations.

A Conversation with Mark A. Wynne

Greece's Fiscal Woes Among Issues Hobbling Euro Zone Rebound

While the U.S. has emerged from the global economic downturn, the path for the euro zone has proven bumpier. Senior economist Mark A. Wynne, vice president and director of the Globalization and Monetary Policy Institute in the Research Department at the Federal Reserve Bank of Dallas, explores the reasons and outlook.

Q. Why has the euro zone's economic recovery from the global financial crisis lagged behind the U.S. recovery? Is the situation improving?

The euro area suffered two big shocks in recent years: first, the shock associated with the global financial crisis that was centered in the United States, and second, a euro-area-specific shock due to problems in a number of geographically peripheral countries (Cyprus, Portugal, Ireland, Greece and Spain).

Economic activity in the euro zone significantly contracted between first quarter 2008 and second quarter 2009. After the economy resumed growing, it stalled in early 2011 before it could attain its precrisis level of economic output. The second contraction lasted through early 2013. Although the euro zone economy has since been in recovery, the latest estimates show real gross domestic product (GDP) remains below first quarter 2008 levels.

Some of the hardest-hit countries are doing better—Ireland, Spain and Portugal, in particular. Italy has taken longer to turn around but seems to have done so this year. Of all the peripheral countries, Greece has experienced the biggest collapse. There were signs that it was beginning to come back, but recent developments seem to have snuffed out the fragile recovery.

Q. What contributed to the European sovereign debt crisis?

In 2011, different countries got

into difficulty for different reasons. In Ireland and Spain, public finances were in very good shape in the run-up to the financial crisis, but both countries experienced enormous housing booms fueled by low interest rates that dwarfed the boom we experienced in the U.S. In the cases of the U.S., Ireland and Spain, loans linked to real estate development went bad, creating problems in the banking sector.

In Ireland, the government guaranteed the liabilities of the banking system and nationalized two of the largest banks in the country. This in turn put public finances on a dangerous trajectory and eventually necessitated a bailout from the European Union and the International Monetary Fund (IMF). A similar situation arose in Spain, although in that instance it was the Spanish banking system rather than the Spanish government that was bailed out.

In Greece, the problems stemmed from a pattern of public spending and taxation that was simply unsustainable. In 2009, Greece ran a government budget deficit equal to more than 15 percent of its GDP, which is more than five times the supposed maximum of 3 percent for euro zone members. The absence of a formal fiscal or banking union as concomitants to the monetary union launched in 1999 complicated dealing with these problems.

Q. Has Europe's malaise harmed the U.S. economy?

It probably contributed to the

sluggish pace of recovery in the United States by reducing demand for U.S. exports. For all its problems, Europe remains one of the more important and wealthier economic regions in the world and, as such, is an important trading and investment partner of the United States. In addition to slow growth impacting demand, financial volatility in the euro area can lead to capital flows out of the area to "currency safe haven" countries such as Switzerland and the United States. This tends to increase the value of our currency, making it harder for our exporters to compete globally.

Q. Is there anything the U.S. can do to aid the euro zone recovery?

Not really. The Europeans need to figure out for themselves what form they want their monetary union to take. In its original conception, there was to be no banking or fiscal union and no bailouts. Potential members had to meet specific criteria to join, and once in, had to adhere to certain rules. For a variety of essentially political reasons, the rules were bent to admit some countries and then subsequently broken by others.

Q. Is recent improvement in Europe the result of quantitative easing by the European Central Bank (ECB) earlier this year or have there been structural changes?

I think quantitative easing—the purchase of bonds and addition of euros to the monetary supply—has helped. But perhaps more important was the promise in mid-2012 by ECB President Mario Draghi to "do whatever it takes" to preserve the single currency, and the subsequent announcement of the so-called Outright Monetary Transactions—a plan to buy sovereign debt of euro zone countries under specific circumstances—to back up that promise.

There have also been structural reforms. For example, in Spain it is now easier to register new companies. Similar steps have been taken in Portugal and Greece. But the payoff from structural reforms takes time. In the short run, such reforms may even temporarily depress economic activity as capital and labor are reallocated to more productive activities.



► *For all the problems that the euro has experienced in recent years, it has nevertheless brought real benefits.*

Q. The euro area includes the richest nations in the world, yet the challenges seem unending. Could it be that adopting a common currency—the euro—was a bad idea?

I think it is fair to say that most North American economists (and a good number of European economists as well) felt that the idea of such a diverse group of countries sharing a common currency was doomed to fail at some point because the countries in question did not constitute what economists refer to as an “optimum currency area.” This is an idea that is more than a half-century old and originated with Robert Mundell (who won a Nobel Prize for his work) asking the question: When is it a good idea (from an economic perspective) to stipulate the use of a currency within a geographic boundary that coincides with a political boundary?

In North America, an east-to-west border determines where U.S. and Canadian dollars are used. But one could just as easily imagine drawing a north-to-south line that would demarcate currency zones independent of the political boundary. Under what conditions might it make more sense for the eastern U.S. and eastern Canada to share a common currency, and for the western U.S. and western Canada to share another currency?

As economists began thinking about these issues, they highlighted a number of considerations key to a successful monetary union between a group of sovereign nations—things such as the degree of integration between the nations, mobility of labor and capital, the similarities and differences in the structure of their economies and the flexibility of wages and prices.

On the economic side, advocates of the single currency pointed to the fact that a single internal market within the U.S. functions a lot better because all 50 states use the dollar. One of the long-term economic goals of the European project was to create a common single market in Western Europe that would be as integrated and seamless as in the U.S. But there was always an important political dimension, an idea that by sharing a common currency, a shared European identity would emerge independent of national identities, thereby advancing the goal of “an ever-closer union” among the peoples of Europe.

The architects of the treaty that provides the legal and institutional basis for the euro were well aware of the concerns expressed by many economists, and to that end they specified a set of rules governing which countries could join the single currency and how those countries were to behave once they were in. Unfortunately, these rules were not rigorously enforced, and this contributed to the recent crisis. Skeptics also pointed to the absence of a fiscal union to accompany the monetary union as a key design flaw. The argument was that the U.S. monetary union works so well in part because of the insurance provided to individual states by the federal government.

For example, when Texas experienced the oil bust in the 1980s, the adjustment here was eased by the fact that we paid in less in taxes to the federal government as economic activity contracted, and we received more in the way of benefits. In addition, the burden of bailing out depositors in the many financial institutions that failed was shared among all 50 states rather than falling on just Texas. There is no comparable arrangement in Europe. Another factor that makes the U.S. monetary union work well is the high degree of labor mobility between individual U.S. states, facilitated in no small part by the fact that we all speak the same language. Legally, there are no barriers to labor mobility in

Europe, but informal barriers due to differences in language and culture remain.

But what the crisis really revealed was that the absence of a banking union to accompany the monetary union was an even bigger design flaw and, surprisingly enough, not one that many of the skeptics seemed to have anticipated. For all the problems that the euro has experienced in recent years, it has nevertheless brought real benefits, and even in some of the hardest-hit crisis countries, support for the shared currency remains relatively high.

Q. What is the outlook for Greece?

The Great Depression was the most traumatic event in our nation’s history. At the Depression’s depth, the unemployment rate approached one-quarter of the U.S. labor force. Greece is experiencing a comparable economic trauma.

Earlier, I mentioned that the architects of the monetary union had established a set of rules for euro membership. One of these is a limit on government deficits of no more than 3 percent of GDP. Greece did not get to join the euro in 1999 when the project was launched because it failed to meet this condition and various other criteria for membership. But it was admitted in 2001. Just three years later, Greece’s public accounts were revised to show deficits exceeding the 3 percent limit every year from 2000 to 2003. But the proximate cause of the crisis was the revelation in late 2009 following a general election that the deficit for that year would not be the 3.7 percent of GDP originally reported but instead would be closer to 12.5 percent of GDP—more than four times the euro-area treaty limit. Greece has been in a state of crisis since then.

Is there a scenario in which Greece leaves the euro? Yes. But it would do little to fix the deeper problems Greece is wrestling with and could prove to be destabilizing for the rest of the euro area and for the global economy.

Mexico's Four Economies Reflect Regional Differences, Challenges

By Jesus Cañas and Emily Gutierrez

ABSTRACT: The economic potential of Mexico's four regions is defined by their industrial makeup, income per capita and how much of the labor force operates outside the formal economy. Recent government reforms could promote growth and reduce regional inequality.

Mexico is a country of contrasts, its geography varying from deserts to jungles, mountains to beaches. Such differences extend to the economic characteristics of Mexico's four regions: the manufacturing north, the agrarian north-central, the service-based central and the energy-producing south (*Chart 1*).

Such economic specialization has contributed to significantly different levels of development—evident in persistent and often worsening disparities in standards of living.¹

Regional Diversity, Growth

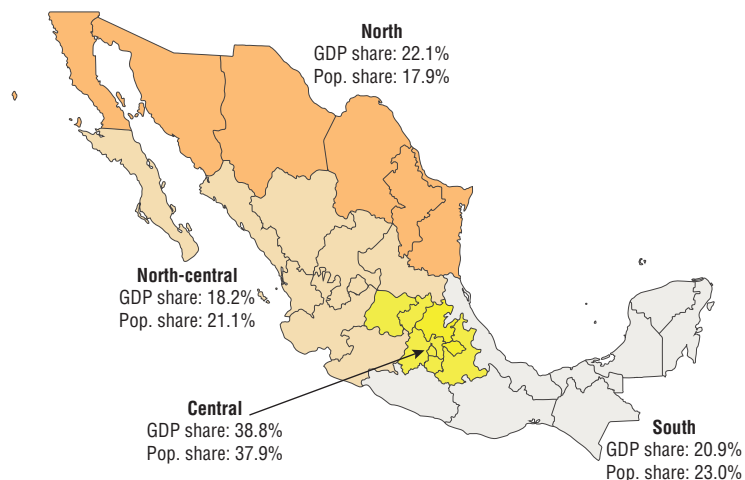
Mexico's affluent north is characterized by a large manufacturing base, which sharply diverges from the poverty-stricken south, a hub of energy activity. The central region benefits from the sprawling reach of Mexico City, one of the world's largest metropolitan areas

and the heart of the Mexican economy, while the agriculturally driven north-central zone makes a much smaller economic contribution.²

Each region's industrial base helps explain these regional income and growth disparities. Researchers use location quotients (LQs) as a means of identifying dominant or prominent industries in an area.³ An LQ is a region's share of output in a specific industry divided by the national share of output in that same industry. When an industry's LQ exceeds 1, the industry accounts for a larger portion of output in the region than in the nation as a whole; the larger the LQ, the greater the industry's importance.

For instance, agriculture in the central region has an LQ of 0.5, indicating the industry's share of gross domestic product (GDP) is half the national average. The north-central

Chart 1 | Mexico's Four Economic Regions Are Diverse



NOTE: 2013 values were used to create shares.

SOURCES: Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography); Consejo Nacional de Población (National Council of Population).

region has an LQ of 2.2 for the same sector, indicating a GDP share more than twice the national average. Taken together, LQs highlight what makes a region unique.

LQ analysis of the northern economy shows a high concentration in manufacturing, which isn't surprising given that it's home to almost 3,000 manufacturing plants (Table 1). The north has capitalized on the manufacturing symbiosis between Mexico and the U.S., posting the highest regional economic growth between 2003 and 2013.

The northern region—particularly the states of Chihuahua and Coahuila—boasts a world-class automotive industry that includes General Motors and Ford operations. It is also home to a cluster of auto parts manufacturers that have made Mexico the No. 1 supplier of parts to the U.S. market since 2001. Additionally, the north has a highly competitive electronics manufacturing industry in Baja California and has solidified its aerospace manufacturing sector in Sonora and Chihuahua.⁴

The north-central region specializes in agriculture—Sinaloa is a major tomato producer, and about 80 percent of the avocados consumed globally are produced in Michoacán. This region is

also the transportation hub of Mexico. Tourism, as reflected in a high LQ for leisure and hospitality, is an important economic engine in the region, driven by attractions in Jalisco (Puerto Vallarta) and Baja California Sur (Cabo San Lucas). The north-central region grew at about the same rate as the central region over the 10-year period.

Central Mexico, which includes Mexico City, also performed well, with its GDP growing on average 2.7 percent annually in inflation-adjusted terms over the period. As the high LQs across most of the service industries suggest, the central region is the country's financial center and provides business services to the domestic market and to international companies and investors.

This densely populated region is home to more than 45 million people within a 200-mile radius of the nation's capital. It has first-class road and rail networks and is only a few hours' drive from major ports on the Pacific and Gulf of Mexico. In addition, major transnationals such as Nestlé and Telmex and strategic government-owned enterprises like Pemex have major offices in this region.

The south is the slowest-growing region, expanding 1 percent annually

► *This densely populated central region is home to more than 45 million people within a 200-mile radius of the nation's capital. It has first-class road and rail networks and is only a few hours' drive from major ports on the Pacific and Gulf of Mexico.*

Table 1 Industry Location Quotients by Region

	North	North-central	Central	South
Annual average growth rate (2003–13)	3.0	2.7	2.7	1.0
Goods-producing industries				
Agriculture	0.9	2.2	0.5	1.0
Mining	0.6	0.4	0.1	3.7
Construction	1.1	1.2	0.8	1.2
Manufacturing	1.4	1.0	1.0	0.6
Service-providing industries				
Trade, transportation & utilities	1.0	1.1	1.1	0.8
Information	0.9	0.8	1.5	0.5
Financial activities	0.9	1.0	1.2	0.8
Professional & business services	0.9	0.5	1.6	0.5
Education & health services	0.9	1.1	1.1	0.9
Leisure & hospitality	0.7	1.2	0.9	1.3
Other services	0.8	0.9	1.3	0.8
Government	0.8	1.0	1.2	0.8

NOTE: Location quotients greater (less) than 1 represents a gross domestic product concentration higher (lower) than the national average in a given region.

SOURCES: Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography); authors' calculations.

► *The south heavily relies on energy-related activity, with most of it concentrated in two states: Campeche and Tabasco. A big factor behind the south's anemic growth is the steady decline in oil production since 2004.*

in real (inflation-adjusted) terms over the 10-year period. The south heavily relies on energy-related activity, with most of it concentrated in two states: Campeche and Tabasco. A big factor behind the south's anemic growth is the steady decline in oil production since 2004. Moreover, the Mexican energy industry is wholly controlled by Pemex—the national monopoly—whose energy revenues flow to the federal government and largely bypass the local area. That is in contrast to energy-dependent regions in the U.S., which benefit directly from oil and gas production.

Although Mexico has implemented initiatives to overhaul its oil industry, Pemex continues to control operations, beginning with exploration and extending to transport, refining and retail sales.⁵

Additionally, the south is the region with the lowest levels of education and highest concentration of poverty, labor informality and social unrest.⁶

Regional Income Gaps

The north and central regions are diverging from the north-central and south, recent data show. The contrast with the southern region is even more pronounced when discounting the oil-rich states (*Chart 2*).

The uneven regional growth rates go back many years and have allowed the north and central regions to grow

richer relative to the rest of the country (*Table 2*).

GDP per capita was \$12,627 in the north and \$10,415 in the central region in 2013. Output per capita in the north-central (\$8,777) and south (\$8,573), meanwhile, trailed the nation as a whole. When the oil-producing states of Campeche and Tabasco are excluded from the south, output is significantly lower, \$6,583 per capita.

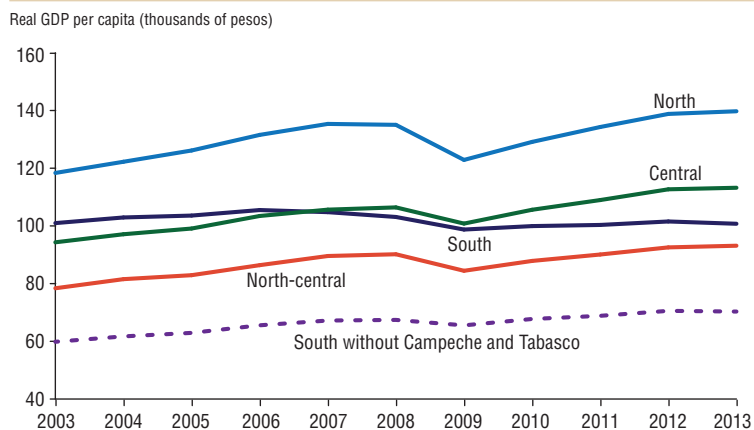
Table 2 also shows labor informality and poverty rates by region. Generally, where labor informality is found, poverty abounds. The southern region, where close to 70 percent of the labor force works in the informal sector, is also the poorest area of Mexico.

Role of Reforms

Recent labor, energy, financial and fiscal reforms could contribute to a reduction in regional inequality.

Federal labor law includes increased flexibility in hiring and payment of wages that could help workers move from informal to formal employment. Energy reform aims to introduce competition in refined products and electricity markets, allowing private investment to flow into the sector, particularly into oil and gas exploration. The reform also will allow private participation in the sale, transport and distribution of energy products. Changes that allow more competition and foreign

Chart 2 | Income Divergence in Mexico Remains the Norm



SOURCES: Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography); authors' calculations.

**Table
2**

Labor Informality Tied to Poverty in Mexico

	Per capita GDP (dollars)	Informal labor (% of labor force)	Poverty rate (% of total population)
Total Mexico	10,193	60	46
North	12,627	43	30
Central	10,415	63	49
South	8,573	68	55
South without Campeche and Tabasco	6,583	69	57
North-central	8,777	57	43

NOTE: Data are from 2013.

SOURCES: Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography); Consejo Nacional de Población (National Council of Population); Consejo Nacional de Evaluación de la Política de Desarrollo Social (National Council for the Evaluation of Social Development Policies).

investment could spark regional growth in energy-dependent areas similar to that seen in recent years in Texas regions such as the Eagle Ford Shale.⁷

Comprehensive reform of the financial sector includes improving small-business access to the financial system and increasing credit availability. Finally, fiscal reform designed to increase the tax base could accelerate government revenue diversification, allowing public investment to flow into needed areas. However, some evidence suggests that existing regional public investment has gone to “pork barrel” projects—those satisfying a political debt—rather than to redistribution or efforts to boost regional growth.⁸

Looking Forward

Regional inequality continues to haunt Mexico. The dynamic north and central regions contrast with the lackluster north-central region and dismally performing south. Economic growth over the past decade, mainly due to external factors such as high oil prices and strong global demand, has proven insufficient to mitigate inequality.

As long as the U.S. economy continues expanding, it’s likely the north will grow faster than the rest of the country. Mexico manufacturing is highly dependent on U.S. demand, with 80 percent of exports going to the U.S. market. Growth in the north-central and central regions will continue to be more closely tied to the national average because both predominantly serve the domestic market.

The central region benefits from greater diversification because of its access to bigger and wealthier areas of the country.

Economic expansion in the south, with its high poverty levels and labor informality, will continue to lag behind the nation. However, recent labor, energy, financial and fiscal reforms could help close the gap in the medium to long term by increasing investment and labor mobility.

Cañas is a business economist and Gutierrez is a research analyst in the Research Department of the Federal Reserve Bank of Dallas.

Notes

¹ For purposes of this analysis, Mexico’s 32 states are divided into: north (Baja California, Chihuahua, Coahuila, Nuevo León, Sonora and Tamaulipas); north-central (Aguascalientes, Baja California Sur, Colima, Durango, Jalisco, Michoacán, Nayarit, San Luis Potosí, Sinaloa and Zacatecas); central (Distrito Federal, Estado de México, Guanajuato, Hidalgo, Morelos, Puebla, Querétaro and Tlaxcala); south (Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatán).

² There is no official regional classification system in Mexico’s national statistics. The grouping of states used here is based on Banco de México’s regional economic report series.

³ Banco de México’s criteria for the grouping of the states and the location quotient (LQ) technique were followed to determine the economic base of each region. Output was aggregated by industry and region to obtain a regional numerator for the LQ calculation.

⁴ See “The Maquiladora’s Changing Geography,” by Jesus Cañas and Robert W. Gilmer, Federal Reserve Bank of Dallas *Southwest Economy*, second quarter, 2009.

⁵ See “Reforma Energética: Mexico Takes First Steps to Overhaul Oil Industry,” by Michael D. Plante and

Jesus Cañas, Federal Reserve Bank of Dallas *Southwest Economy*, second quarter, 2014.

⁶ More specifically, informal labor is defined as private sector workers who are not reported to the government and thus do not pay employment taxes or receive government-mandated benefits and pensions.

⁷ For more information, see “Oil Boom in Eagle Ford Shale Brings New Wealth to South Texas,” by Robert W. Gilmer, Raúl Hernandez and Keith R. Phillips, Federal Reserve Bank of Dallas *Southwest Economy*, second quarter, 2012.

⁸ For more information, see “Political Competition and Pork Barrel Politics in the Allocation of Public Investment in Mexico,” by Joan Costa-i-Font, Eduardo Rodríguez-Oreggia and Darío Luna Plá, *Public Choice*, vol. 116, nos. 1-2, 2003, pp. 185–204.



EDUCATION: Texas Near Bottom in Spending for Public Schools

Texas ranked 45th nationally in kindergarten through 12th grade public education spending per pupil, according to the recently released 2013 U.S. Census Bureau Public Education Finances report. The state spent \$8,299 per student compared with a national average of \$10,700. While greater expenditures do not guarantee better outcomes, schools with more resources tend to have students with higher educational attainment.

Following the recession, Texas expenditures per student declined in 2011 and 2012 from a high of \$8,746 in 2010. State spending picked up in 2013, though Texas' rank has slipped steadily since 2010. Relative to per-pupil spending in other states and the District of Columbia, California ranked 36th (\$9,220), while New York was first (\$19,818). There are about 5 million students in Texas public schools—the second-largest enrollment after California. Of the Texas total, 13 percent are black, 30 percent are white and 51 percent are Hispanic.

Texas public education received 11 percent of its funding from the federal government, 39 percent from the state and 50 percent from local resources in 2013. Nationally, including Texas, about 60 percent of per-pupil expenditures was spent on instruction and roughly 35 percent on support services. The remaining 5 percent in Texas funded items such as textbooks, transportation and employee retirement.

—Emily Gutierrez



TAXATION: Dallas County Property Values Rise 7.5 Percent in 2015

The Dallas Central Appraisal District—Texas' second-largest appraisal district by market value (behind Harris County)—reported a 7.5 percent increase in the taxable value of property, totaling \$188 billion this year. This follows a 6.7 percent increase in 2014.

While residential makes up the largest of the three categories of Dallas County property values (45 percent), commercial property rose the most in 2015, accounting for almost half of the overall increase. Property taxes, typically accounting for more than 60 percent of Dallas County government revenues, are expected to rise 5.3 percent in the current fiscal year. A steeper increase is likely next year.

Of the school districts located entirely within Dallas County, Sunnyvale Independent School District recorded the largest percentage increase in property values—10.8 percent—while the Dallas Independent School District had the highest total property value.

The appraisal district determines the value of properties—preliminary values are released in May and the final valuations in July—located within Dallas County; taxes are collected by the Dallas County tax assessor and then distributed to cities, school districts and other local jurisdictions. Proposals for how to spend the additional dollars abound and include more funds for schools, hospitals, jails and animal control.

—Sarah Greer



INCOME: Obama Plan to Give More Managers Overtime Pay

Workers sometimes find that becoming a manager means a little extra pay and many more hours. An Obama administration plan may change that. It would almost double the Fair Labor Standards Act minimum weekly salary of \$455, allowing management employees to become salaried and excluded from overtime. Retail and hospitality industries generally pay managers less and have them work longer hours than many other businesses and, thus, the change may affect them most.

The act, approved in 1935, exempts “executive, administrative and professional” employees from overtime—generally 1.5 times the hourly wage—provided their pay exceeds the threshold.

The president's plan, which requires U.S. Labor Department rulemaking after a public comment period, comes at a time of relatively low unemployment. The retail and accommodation and food services sectors account for more than a quarter of employment in San Antonio, compared with just over a fifth in Dallas and Houston, according to data compiled by the Federal Reserve Bank of Dallas. Overall, wage rates in Texas tend to trail nationwide averages.

The U.S. Chamber of Commerce predicts that employers may respond by promoting fewer managers and reducing hours worked. Some firms could use more part-time workers. However, in a still-tight labor market, those options may be limited.

—Michael Weiss

Diversified Houston Spared Recession ... So Far

By Jesse Thompson

Oil and gas exploration, production and services firms nationwide drastically cut spending and employment after oil prices plunged 40 percent in the second half of 2014. Thousands subsequently lost their jobs as the U.S. rig count leveled off at 861 in June 2015—1,064 fewer than in October 2014. The industry's capital expenditures, typically for equipment and facilities, have been cut.

In Houston, headquarters of the energy industry, manufacturing was the first sector to respond, losing 15,000 jobs by June (after peaking at 261,300 in December)—the largest decline since the Great Recession. Fabricated metals was particularly hard hit, with employment falling at an annual rate of 16.4 percent in the first half of 2015; support activities for mining slid at an annualized 17 percent during the period.

Still, negative spillover to the rest of the Houston-area economy has appeared only slowly. Despite significant losses in manufacturing and oilfield services, total jobs in Houston only declined by an annualized rate of 0.6 percent in the first half of 2015. While not a large reduction, this represents a reversal from the 4.1 percent pace of job growth last year.

Three factors may be limiting the impact of the exploration and production downturn.

First, Houston is the center of the nation's refining and petrochemical industries, which benefit from low oil and gas prices. Petrochemical production is booming. Construction of new facilities by firms such as Chevron Phillips Chemical and Dow Chemical, and the thousands of workers needed for the build-out, will help prop up employment until at least 2017. Second, conservative bank lending practices, increased hedging against oil price declines and a low "opportunity cost" for investing in the energy industry have arguably kept the rate of bankruptcies

and mergers and acquisitions relatively low among exploration and production companies. Third, the region's industry mix has become more diversified.

An index measuring how Houston's industry composition is similar to the nation's shows that from 1982 to 2004, Houston became more like the U.S. (see chart). Of particular importance, professional and business services and health services, as a share of Houston employment, grew 6.5 percentage points to 26 percent from 1990 to 2014.

Above-average wages in these industries helped real (inflation-adjusted) per capita income grow 63 percent locally between 1990 and 2013, compared with a 43 percent increase nationally. The housing boom of the mid-2000s boosted construction's share of the region's economy. The proportion of manufacturing and wholesale trade employment also grew during the period, and the shale revolution allowed the energy industry to expand after the Great Recession. Mining's share of Houston employment—which tumbled from a peak of 7 percent in 1982 to a low of 2.6 percent in 2000—stood at 3.8 percent in 2014. Energy sector growth spurred a flurry of commercial and residential real estate development as

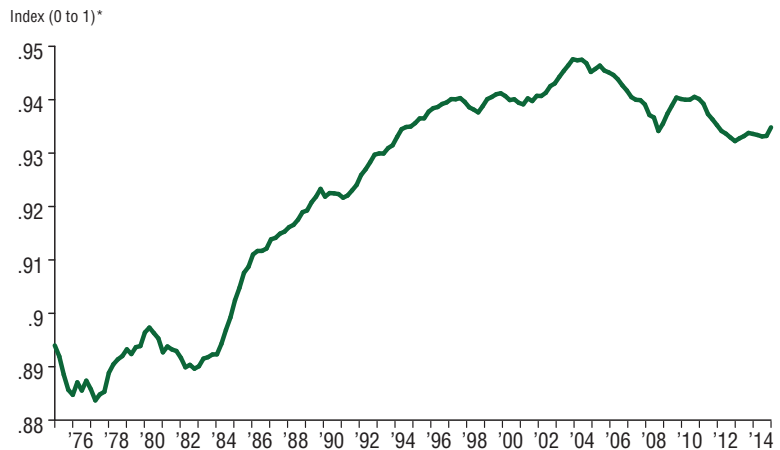
the energy sector consolidated into the region.

With so much recent economic development tied to oil and gas, some have questioned how diversified Houston has become, especially since exploration and production firms outsource many legal, professional and financial services.

In an econometric model that incorporates real U.S. gross domestic product (GDP), exploration and production firms' real capital expenditures and Houston employment from 1991 through 2014, a 30 percent decline in exploration and production capital expenditures—such as occurred in first quarter 2015—yields a 1 percent drop in Houston employment (about 30,000 jobs) by year end, holding all else constant.

That is *one-quarter* of the 3.9 percent employment loss that would have occurred in the pre-1990 era. The model also suggests that Houston's reaction to U.S. GDP growth was 68 percent *larger* post-1990—meaning that even serious oil industry declines can now be mostly offset by economic growth elsewhere. On balance, these changes indicate that Houston's oilfield connection, while strong, has weakened. By becoming more like the U.S. economy, the region can better weather oil market volatility.

Diversification Makes Houston Industry Mix More Like U.S.



*Higher values mean regional industry mix resembles national industry mix.

NOTE: Industry definitions changed in 1990.

SOURCES: Bureau of Labor Statistics; seasonal and other adjustments by the Federal Reserve Bank of Dallas.

Texas Maintains Top Exporter Standing While Its Trade Remains Concentrated

By Janet Koech and Mark A. Wynne

ABSTRACT: While Texas has become the nation's top-exporting state, benefiting from trade of intermediate goods to Mexico and a global presence as an energy hub, its export activity remains concentrated relative to the U.S. and other states.

Texas exports more goods than any other state and is a big recipient of foreign investment. The state is the third-most globalized in the U.S. based on foreign-owned companies' employment and export-based manufacturing, according to globalization scorecards.¹

Texas has become increasingly integrated with the rest of the world and dependent on foreign markets for its economic growth. Exports equal 17 percent of Texas' total output, almost twice the nation's average of 9 percent. Manufactured goods exports supported more than 1 million jobs in Texas in 2014—about 17 percent of all export-related jobs in the nation.²

With greater international linkages comes greater international exposure. Increased interconnectedness of world economies means that the effects of economic booms as well as slowdowns spread across geographical boundaries. Dependence on a few export partners and products can make exports and exporting states sensitive to developments in the recipient countries. A state with a diverse range of export products and export destinations is typically more likely to withstand shocks to particular industries or countries.

Diversification of Texas' trade with the rest of the world may be viewed along two dimensions. The diversity of Texas export destinations provides one guide. Do most of our exports go mainly to our neighbor to the south or do we trade with a range of countries? The composition of the state's export basket is another measure. Are Texas' exports comprised primarily of energy and related products, or are a range of products involved?³

State's Largest Trade Partners

Texas, after surpassing California as the top exporting state in 2002, sold \$288 billion worth of goods overseas in 2014.⁴ From 2000 to 2014, the state's real (inflation-adjusted) exports increased

at an average annual rate of about 7 percent, faster than the nation's annual average of 4 percent.

Perhaps not surprisingly given Texas' geographic proximity to Mexico and preferences under the North American Free Trade Agreement, the state heavily exports south of the border. Mexico accounts for about 36 percent of Texas' foreign sales (*Chart 1*). Much of this trade involves intermediate goods; U.S. companies have plants in Mexico that manufacture and assemble products from the intermediate inputs for reexport to the U.S. By one estimate, the U.S. content in imports from Mexico is 40 percent.⁵

Texas' top three foreign markets accounted for more than half its total exports in 2014 compared with 42 percent for the U.S. and 35 percent for California. Over the past decade, however, Texas expanded its sales abroad to new destinations including to rapidly growing emerging market economies. Real exports to China increased 17 percent on average in 2000–14, while those to Brazil expanded at an average annual rate of about 14 percent during that period. Emerging markets' demand for petroleum and coal products has been a boon for Texas exports.

Trade Activity Index

For the purpose of comparing Texas' trade patterns with other states and the U.S. as a whole, it is useful to summarize them in a single number. The Herfindahl index is a widely used measure of industry concentration and is calculated as the sum of the squares of export shares of each country constituting a state's total exports. High values indicate that a state's exports are highly concentrated; low values suggest that a state exports to a wide variety of countries.

This measure of the degree of concentration of Texas exports has evolved over time (*Chart 2*). Perhaps not surprisingly, Texas' exports are highly

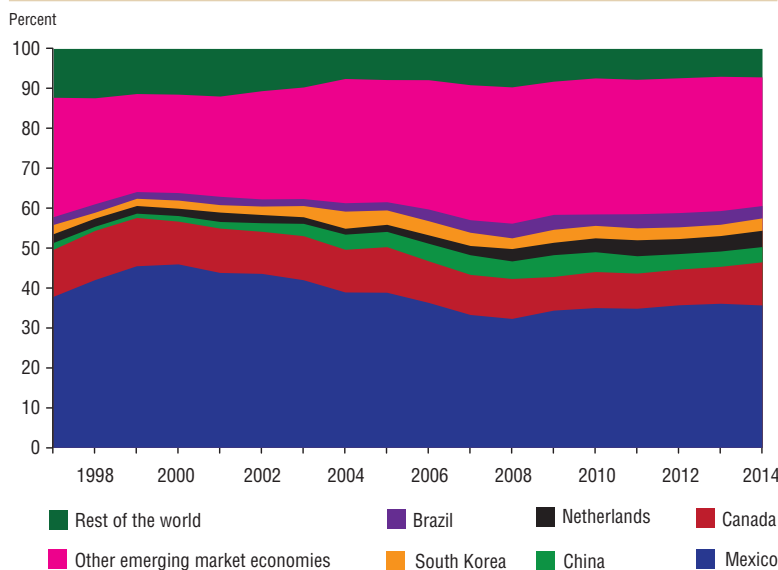
concentrated, much more so than the national average or No. 2 exporter, California. The increase in diversification in the 2000–07 period is notable. Texas’ diversification by export destination index decreased to 0.13 in 2007 from 0.23 in 2000 (a decline in the index implies an increase in diversification). This coincides with the state’s increased exports to many emerging market economies. Since 2007, the diversification index has mostly held steady because of the Texas boom in shale oil, which led to addi-

tional exports to Latin American countries. Mexico is the single biggest market accounting for more than one-fifth of the state’s petroleum product exports.

Texas ranked 37th among the states in terms of diversification of trading partners in 2014, compared with California at No. 6. Florida is the most diversified state, while North Dakota is the least diverse. Texas and California both inched up one spot in the diversification ranking between 1997 and 2014 (Table 1).

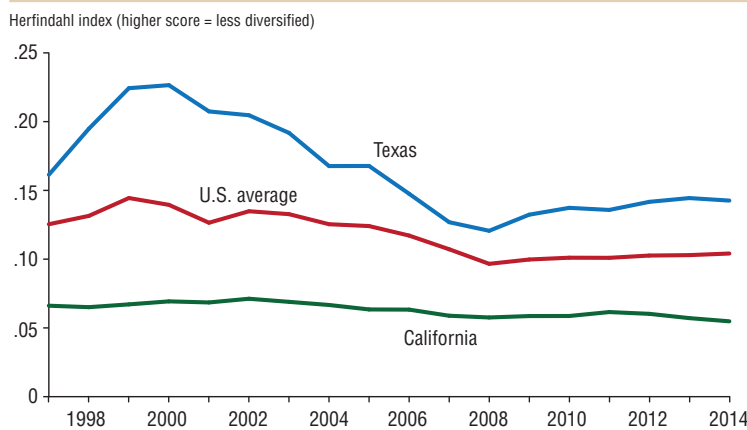
▶ Texas ranked 37th among the states in terms of diversification of trading partners in 2014, compared with California at No. 6. Florida is the most diversified state, while North Dakota is the least diverse.

Chart 1 Mexico Is Texas’ Main Export Destination



SOURCES: World Institute for Strategic Economic Research (WISER) state export data; authors’ calculations.

Chart 2 Export Destinations More Concentrated in Texas than U.S.



NOTE: The average U.S. index is computed as the export-weighted average of all states’ Herfindahl indexes.
SOURCES: World Institute for Strategic Economic Research (WISER) state export data; authors’ calculations.

► *Strong growth in emerging economies, especially in Asia, generated demand for energy products, which now account for a much larger share of the state's exports than a decade ago.*

Table 1		Diversification Rankings by Export Destination					
	2014 state ranking	State	2014 Herfindahl index	2014 total state exports (billions of U.S. dollars)	1997 state ranking	1997 Herfindahl index	1997 total state exports (billions of U.S. dollars)
Most diversified states	1	Florida	0.027	57.30	1	0.036	23.23
	2	Maryland	0.043	11.97	4	0.058	5.21
	3	Louisiana	0.043	65.05	2	0.036	18.73
	4	Georgia	0.046	38.75	9	0.067	12.95
	5	Massachusetts	0.053	27.22	14	0.081	16.53
	6	California	0.055	170.72	7	0.066	99.16
	37	Texas	0.143	287.60	38	0.161	76.18
Least diversified states	46	New Mexico	0.218	3.71	41	0.190	1.78
	47	Michigan	0.248	55.64	48	0.359	32.25
	48	South Dakota	0.249	1.59	39	0.165	0.52
	49	Maine	0.303	2.73	36	0.157	1.72
	50	North Dakota	0.631	5.26	47	0.310	0.78

NOTE: An increase in the index shows a decrease in export diversification.

SOURCES: World Institute for Strategic Economic Research (WISER) state export data; Haver Analytics; authors' calculations.

Products Sold

The types of goods Texas exports provide another measure of diversification. The state's largest exports are petroleum and coal products (19 percent), computers and electronics (17 percent) and chemicals (16 percent).⁶ Petroleum products and chemicals use oil and gas as inputs and are highly sensitive to oil price changes.

After the 1980s oil price collapse and ensuing recession, Texas diversified its economy away from oil and gas, marked by the rise of the high-tech and telecommunications industries in the 1990s. By 2000, computers and electronics constituted 29 percent of Texas exports and petroleum and coal products had fallen to 4 percent. Since then, as a result of oil prices that were rising and technological innovations in drilling, the energy sector reappeared as a major driver of Texas growth. Moreover, strong growth in emerging economies, especially in Asia, generated demand for energy products, which now account for a much larger share of the state's exports than a decade ago.

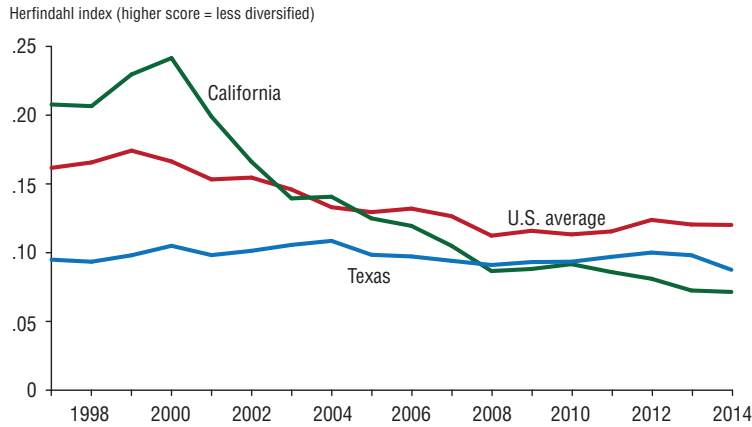
The Herfindahl index can also quantify the degree of concentration of

Texas' exports in particular products. Texas' exports are less concentrated in particular product categories than the nation's average (*Chart 3*). The degree of product concentration has remained remarkably constant over time. While California's exports are more diversified in terms of destinations, they are more concentrated in terms of products, at least until recently. In 1997, computer and electronic products accounted for 48 percent of California's total exports. In 2014, that share had fallen to 25 percent, and the combined export shares of the state's top three products in that year amounted to 45 percent of total exports.

Virginia and Pennsylvania are the most diversified states in terms of product composition of their export baskets, while Wyoming and Vermont, which admittedly have very few exports, are the most specialized (*Table 2*). While Washington state exported more than \$90 billion worth of merchandise in 2014, exports of transportation and equipment (primarily aircraft, engines and parts assembled by Boeing) accounted for 57 percent of total exports, making its export mix one of the nation's most concentrated. Texas ranked 18th

**Chart
3**

Export Products Less Concentrated in Texas than U.S.



NOTE: The average U.S. index is computed as the export-weighted average of all states' Herfindahl indexes.
 SOURCES: World Institute for Strategic Economic Research (WISER) state export data; authors' calculations.

**Table
2**

Diversification Rankings by Export Products

	2014 state ranking	State	2014 Herfindahl index	2014 total state exports (billions of U.S. dollars)	1997 state ranking	1997 Herfindahl index	1997 total state exports (billions of U.S. dollars)
Most diversified states	1	Virginia	0.043	19.04	11	0.081	12.76
	2	Pennsylvania	0.048	40.09	5	0.064	16.07
	3	North Carolina	0.050	31.14	2	0.041	16.40
	4	Maine	0.057	2.73	15	0.096	1.72
	5	Illinois	0.058	67.85	19	0.102	26.45
	8	California	0.071	170.72	37	0.207	99.16
	18	Texas	0.087	287.60	14	0.094	76.18
Least diversified states	46	New Mexico	0.277	3.71	49	0.672	1.78
	47	Washington	0.305	90.48	46	0.333	32.75
	48	Alaska	0.348	5.15	33	0.158	2.72
	49	Wyoming	0.363	1.75	50	0.753	0.56
	50	Vermont	0.410	3.64	48	0.658	3.81

NOTE: An increase in the index shows a decrease in export diversification.
 SOURCES: World Institute for Strategic Economic Research (WISER) state export data; Haver Analytics; authors' calculations.

in the country, performing better than most U.S. states.

Diversification or Specialization

Lack of diversification of export products and destinations can expose a state to increased export earnings volatility. Plunging oil prices, for example, have

contributed to a 10 percent decline in Texas exports over the last year.

Export volatility can be mitigated by expanding the variety of products and countries. However, there are also gains from specializing in products in which a state has comparative advantage and can produce most efficiently. Indeed, the

data suggest a small but negative correlation between the importance of exports to a state's economy and the level of product diversification.⁷ Exports tend to be less diversified for those states where foreign sales account for a larger share of state output.

Research shows that Texas' comparative advantage in energy-related industries has increased in recent years, which is consistent with the shale oil and gas boom that dominated state economic growth. The state has also increased competitiveness in heavy machinery and transportation equipment industries.⁸ The state's comparative advantage in select industries might explain why the products Texas exports have remained fairly concentrated.

Texas Trade Arrangements

Rapid internationalization of the U.S. economy has spread unevenly across regions and states. Similarly, diversification of states' exports varies across the nation, evolving over time. While Texas is one of the most globalized states, it is also one of the least diversified in terms of with whom it trades.

Mexico is the destination for more than one-third of the state's total exports. Increased mobility for goods, labor and capital generally entails greater exposure to global economic pressures and risks.

However, U.S. exports to Mexico are largely intermediate goods, assembled or processed into final goods and reimported back to the U.S. for consumption.

Studies show that trade flows associated with such production sharing tend to be closely related to the economic activity in the source country of intermediate goods.⁹ U.S. exports to Mexico are, therefore, more tied to U.S. demand than to changes in demand in Mexico, and Texas exports to Mexico may be sheltered from economic fluctuations in Mexico.

Texas export products are more diversified than the national average but more concentrated than California and 16 other states. The state largely relies on exports of chemicals, computers and electronic products and petroleum and coal products, which collectively account for over half of total Texas exports.

(Continued on back page)

Texas Maintains Top Exporter Standing While Its Trade Remains Concentrated

(Continued from page 19)

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Notes

¹ See "The 2014 State New Economy Index: Benchmarking Economic Transformation in the States," by Robert D. Atkinson and Adams B. Nager, Information Technology and Innovation Foundation, June 2014.

² Data on jobs supported by state exports are produced by the U.S. Department of Commerce's International Trade Administration.

³ For a similar analysis of Texas exports see "Globalizing Texas: Exports and High-Tech Jobs," by Anil Kumar, Federal Reserve Bank of Dallas *Southwest Economy*, September/October 2007.

⁴ State exports data are from the Census Bureau's Origin of Movement exports series. These data measure exports based on where the goods began their journey of exit from the United States. The transportation origin of exports is not always the same as the location where the goods were produced, so data should be interpreted with caution.

⁵ "Give Credit Where Credit is Due: Tracing Value Added in Global Production Chains," by Robert Koopman, William Powers, Zhi Wang, Shang-Jin Wei, National Bureau of Economic Research, Working Paper no. 16426, September 2010.

⁶ Values for second quarter 2015.

⁷ The correlation between the diversification of state exports as measured by the Herfindahl index and the shares of exports in total state output is -0.26.

⁸ For more details on Texas comparative advantage, see "Texas Comparative Advantage and Manufacturing

Exports," by Jesus Cañas, Luis Bernardo Torres Ruiz, and Christina English in *Ten-Gallon Economy, Sizing Up Economic Growth in Texas*, Palgrave Macmillan, 2015.

⁹ "Trade, Production Sharing, and the International Transmission of Business Cycles," by Ariel Burstein, Christopher Kurz, and Linda Tesar, National Bureau of Economic Research, Working Paper no. 13731, January 2008.

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