

Southwest Economy



The Effect of High Oil Prices on Today's Texas Economy

Texas and oil. These two words have gone hand in hand since 1889, when the state started producing oil. Since then, the Texas economy has often been driven by volatile energy prices—suffering with low oil prices and benefiting with high oil prices.

The effects of energy prices on the Texas economy were particularly evident during the 1970s and 1980s (*Chart 1*). As energy prices rose, the Texas economy expanded at a rapid pace, with strong employment and income growth. Although the Texas economy continued to expand until 1986, the oil and gas sector began to slip as energy prices slid from their 1981 heights. The oil price collapse in July 1986 touched off a statewide recession and significant job losses.

Since the early 1980s, however, the Texas energy industry has shrunk and other sectors of the Texas economy have grown. Despite these changes, Texas remains the top oil and natural gas producer in the United States and exports most of its production of these two commodities to other states. Consequently, the energy industry remains

(Continued on page 2)

*INSIDE:
Globalization:
Myths and Realities*

Is the Pension System a Liability?

In recent months United Airlines has joined the list of companies whose survival has been pitted against its defined benefit pension plan. As firms struggle to bail themselves out of bankruptcy, worker retirement plans are often thrown overboard in a last-ditch effort to return the firm to profitability.

Businesses faced with such a drastic situation have insufficient assets to pay the expected costs of pension promises. In the case of United Airlines, the company has been able to secure bankruptcy financing by agreeing to suspend payments to its already severely underfunded pension plans. The defined benefit plans are one of many factors weighing down the airline's cost structure because United must compete against carriers offering less expensive plans.

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Chart 1

Texas Employment Tracks Oil Prices in 1970s and 1980s



The energy industry remains an important driver of the Texas economy.

an important driver of the state economy.

The diversification of the Texas economy away from energy and this sector's continuing importance to the state prompt us to consider: How much do swings in energy prices affect the Texas economy today? How much has that relationship changed since the energy boom years of the 1970s and 1980s?

Oil Production in Texas: A Brief History¹

The first economically significant oil in Texas was discovered in Corsicana in 1894. Discoveries in Navarro County followed. By 1901 the Spindletop oil field was producing 75,000 barrels per day and had contributed to the first Texas oil boom.

In the early 1900s, Texas produced relatively little oil and gas—crude oil production was only about 1.3 percent of total U.S. production, and natural gas was 0.1 percent of U.S. production. By 1952, Texas' shares of total U.S. crude oil and natural gas production peaked at 45 and 52.2 percent, respectively. Crude oil and natural gas continued to increase in the state, with peak production for both coming in 1972.

As oil and gas production increased in Texas, so did their importance to the state economy. The creation of OPEC in 1960 and subsequent oil price increases

in the 1970s and early 1980s gave rise to a boom in the Texas economy. Oil and gas output became an increasing share of Texas output (*Chart 2*). In 1981, at the height of world oil prices, oil and gas extraction was about 20 percent of total Texas gross state product.

After reaching \$38 per barrel in 1981, oil prices began softening. Gradually sliding during the next few years, prices finally collapsed to \$11.82 per barrel in July 1986. This led to a recession in Texas that lasted 17 months and had a devastating effect on state employment.

The number employed in the Texas mining industry (which is mostly oil and gas extraction) rose from about 7,000 in 1900—0.7 percent of total state employment—to 90,000 by 1950—a 3.1 percent share. At the oil and gas industry's peak in 1981, Texas employment in oil and gas extraction and oilfield machinery reached 366,200—6 percent of total non-farm employment in the state (*Chart 3*). By the time the oil industry bottomed out in 1987, 175,000 jobs had been lost in the oil and gas extraction and oilfield machinery sectors.

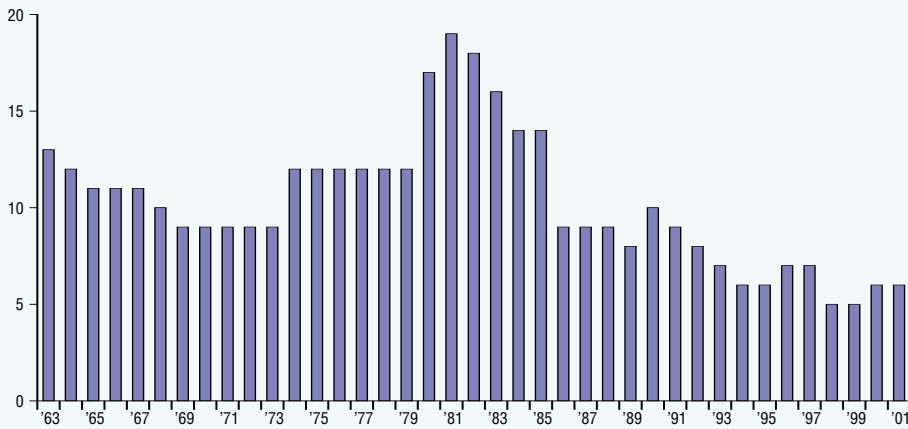
Refining and Petrochemicals

After the first Texas refinery opened in the Corsicana oil field in 1898, the petroleum refining and petrochemical industries flourished in the state. In 1939 (the earliest data available from the U.S.

Chart 2

Oil and Gas Extraction's Share of Texas Output Peaks in 1981

Percent of Texas GSP



SOURCE: Federal Reserve Bank of Dallas.

The refining and petrochemical industries provide some counterbalance to the effects of changing energy prices.

Census of Manufacturers), the chemical industry employed about 6,800 production workers, and the petroleum refining industry employed 19,000 (accounting for 5.5 and 15 percent of total manufacturing employment, respectively). Refining's share of state output was highest in 1939 at 28 percent of total manufactured goods. By 1958, the Texas petroleum refining industry reached its zenith with 43,000 employees.

Today, the refining industry contributes about 11 percent of Texas manufacturing output and 1.5 percent of total

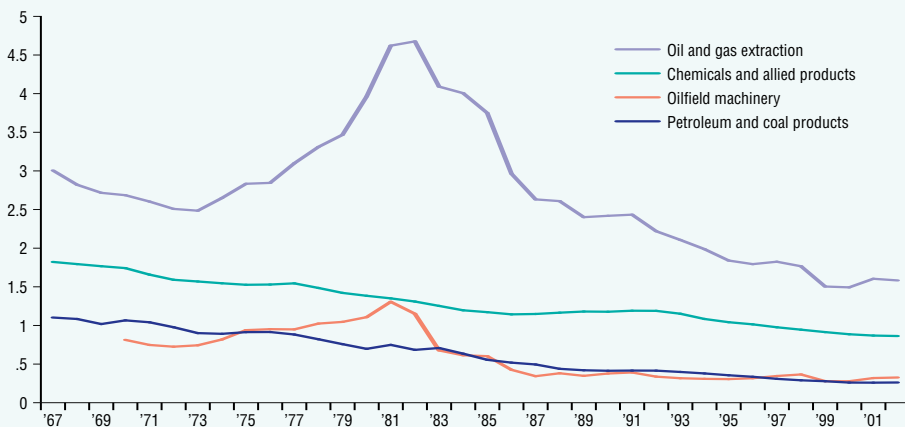
Texas output. Employment has also steadily declined to less than 0.3 percent of total Texas employment (*Chart 3*). The petrochemical industry provides about 12 percent of Texas manufacturing output, 1.6 percent of total Texas output and less than 0.9 percent of total Texas employment.

The refining and petrochemical industries provide some counterbalance to the effects of changing energy prices on the Texas economy. These two industries generally are hurt by rising oil and natural gas prices.

Chart 3

Energy Sector Employment Declines After Early 1980s

Share of Texas nonfarm employment (percent)

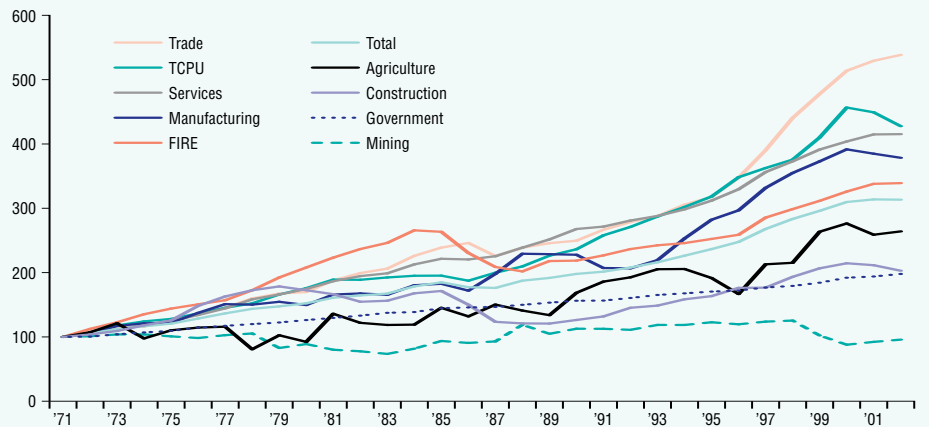


SOURCES: Bureau of Labor Statistics; Federal Reserve Bank of Dallas.

Chart 4

Texas Economy Diversifies Away from Mining After Mid-1980s

GSP Index, 1971 = 100



NOTE: TCPU is transportation, communications and public utilities; FIRE is finance, insurance and real estate.
SOURCES: Bureau of Labor Statistics; Federal Reserve Bank of Dallas.

As output in the Texas mining industry shrank, output in other Texas industries continued to grow.

Diversification of the Texas Economy

As output in the Texas mining industry shrank, output in other Texas industries continued to grow after the mid-1980s. Texas saw output gains in manufacturing, construction, agriculture and the service-producing sectors—wholesale and retail trade; transportation, communications and public utilities (TCPU); services; finance, insurance and real estate (FIRE); and government (*Chart 4*). Growing at a faster rate than total Texas gross state product, manufacturing, trade, TCPU, services and FIRE accounted for increasing shares of Texas output. In contrast, agriculture, construction and government posted decreasing shares.

A similar picture emerges for Texas employment since the mid-1980s. Services, construction and trade grew faster than total employment and accounted for increasing shares of Texas nonfarm employment (*Chart 5*). Employment shares for TCPU and FIRE remained relatively constant, while those for manufacturing and government decreased along with mining.

Oil and the Texas Economy

Even without a rigorous analysis, it's evident the relationship between energy prices and the Texas economy has changed since the 1980s. Oil and gas

production accounted for 19.4 percent of Texas output in 1981 and only 6 percent in 2002. Similarly, output and employment in energy-related industries, such as oil and gas field machinery, claim a smaller share of the Texas economy today than in the early 1980s.

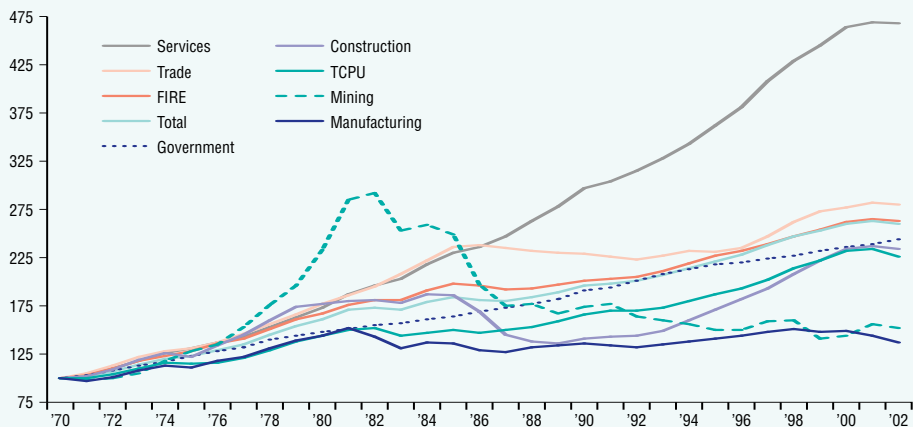
To examine in more detail how the Texas economy's diversification away from energy-producing industries has affected its response to volatile energy prices, we developed an econometric model that captures the effects of oil price shocks on the Texas economy for the period 1970–2002.² We find that the relationship between oil prices and the Texas economy is considerably different today than it was during the oil boom and bust years of the 1970s and 1980s.

Our analysis reveals that the relationship between oil prices and the Texas economy breaks between 1987 and 1988, which indicates that the effects of changing oil prices on the economy were different in 1970–87 than in 1988–2002. To determine just how this relationship differed across the two periods, we analyze the data in two different ways. We examine how much of the actual fluctuation in Texas output and employment arose from oil price shocks and other causes in each of the two periods. We also estimate and compare by how much Texas output and employ-

Chart 5

Texas Employment Shifts Away from Mining After Early 1980s

Texas Employment Index, 1970 = 100



NOTE: TCPU is transportation, communications and public utilities; FIRE is finance, insurance and real estate.
SOURCES: Bureau of Labor Statistics; Federal Reserve Bank of Dallas.

Oil prices accounted for a much higher percentage of fluctuations in the Texas economy in 1970–87 than in 1988–2002.

ment would have responded to a 10 percent oil price shock in each of the two periods.

We find changes in oil prices accounted for a much higher percentage of fluctuations in the Texas economy in 1970–87 than in 1988–2002. In the earlier period, nearly half the fluctuation in Texas output (46 percent) arose from changing oil prices. In the latter period, however, less than 10 percent of Texas output fluctuations arose from oil price shocks. In contrast, the fluctuations in U.S. GDP accounted for about 40 percent of the fluctuations in Texas output in the latter period.

The Response to Oil Price Shocks

The Texas economy’s response to an oil price shock is significantly different in the two periods (*Table 1*). For 1970–87, we estimate that an oil price increase would have led to sustained gains in both output and employment. In partic-

ular, a 10 percent increase in oil prices would have led to a 2.6 percent increase in Texas gross state product and about a 1 percent increase in employment.³ An oil price increase of 10 percent also would have temporarily boosted the growth rate of the Texas economy, with output growing 1 percent faster during the next few quarters and employment growing 0.1 percent faster over the next three to four months, then a little slower thereafter.

The economy was much less responsive to oil prices in the period 1988–2002, and the nature of the response was different. In the second period, a 10 percent increase in oil prices would have led to only about a 0.4 percent gain in gross state product. The net response of employment to a rise in oil prices is basically nil. The negligible result in employment may arise from the energy sector’s greatly muted response to oil price fluctuations in the latter period and the inability or reluc-

Table 1

Effect of a 10 Percent Increase in Oil Prices on Texas Economy

	Texas GSP	Texas nonfarm employment	Rig count	Oil and gas employment
1970–1987	+2.6%	+1.0%	+20%	+9.5%
1988–2002	+0.4%	0	+6.6%	+1.1%

*Oilfield activity
has become less
sensitive to
fluctuations in
energy prices.*

tance of oil companies to hire new employees as energy prices rose.

To further examine the channels through which oil price shocks affect the Texas economy, we examined the effects of oil price shocks on the rig count and oil and gas employment in both periods. We found that the rig count responded much more strongly to oil price increases in the first period than in the second. For 1970–87, we estimate that a 10 percent increase in oil prices would have boosted the rig count by 20 percent. In contrast, the same percentage increase in oil prices in 1988–2002 would have yielded only a 6.6 percent increase in the rig count.

Similarly, oil and gas employment showed a much smaller response in the second period. We estimate that a 10 percent increase in oil prices would have generated a 9.5 percent increase in Texas oil and gas employment for 1970–87 but only a 1.1 percent employment increase in 1988–2002.

One reason for the weaker response in the rig count and employment may be changes in technology. After the 1986 crash in oil prices, companies improved oilfield technology and produced more oil with fewer rigs. Therefore, the same rise in oil prices brings forth fewer rigs and oilfield workers in the latter period. In addition, contacts in the industry say there are fewer prospects for new drilling in Texas, and companies are increasingly shifting their drilling overseas.⁴

Oil Price Effects on the Texas Economy

Over the past 20 years, the Texas energy industry has shrunk while other sectors of the Texas economy have grown. Nonetheless, Texas produces more oil and gas than any other state in the nation. Texas accounts for 20 percent of crude oil and 26 percent of natural gas production in the United States (excluding federal offshore). Texas also exports oil and natural gas to the rest of the nation. Consequently, higher energy prices still benefit the state—even if it is by less than in the boom years of the 1970s and early 1980s.

Our estimates confirm the Texas economy has become less sensitive to oil price fluctuations, but it still responds

favorably to higher energy prices. During the 1970–87 period, a 10 percent increase in oil prices would have boosted Texas gross state product by 2.6 percent and employment by 1 percent. During the 1988–2002 period, a 10 percent increase in oil prices would have raised Texas gross state product by 0.4 percent with no significant net effect on employment.

We find evidence for two ways in which the Texas economy has become less sensitive to fluctuations in oil prices than it was in the 1970s and 1980s. The first is that oilfield activity has become less sensitive to fluctuations in energy prices. The second is that the energy industry makes up a smaller share of the Texas economy than it used to. Together these factors have meant that Texas output is about 15 percent as sensitive to oil price fluctuations as it was from 1970 to 1987. Texas nonfarm employment no longer seems to be affected by oil price fluctuations.

—Stephen P. A. Brown
Mine K. Yücel

Brown is director of energy economics and microeconomic policy analysis and Yücel is a vice president and head of regional research in the Research Department of the Federal Reserve Bank of Dallas.

Notes

¹ See “Oil and Gas Industry,” *The Handbook of Texas Online*, www.tsha.utexas.edu/handbook/online/.

² We use a vector-autoregressive model with oil prices, U.S. GDP, Texas gross state product, Texas nonfarm employment, Texas employment in oil and gas extraction, and the Texas rig count as variables.

³ These results are similar to those found in “Energy Prices and State Economic Performance,” by Stephen P. A. Brown and Mine K. Yücel, Federal Reserve Bank of Dallas *Economic Review*, Second Quarter 1995. Using input–output analysis, Brown and Yücel estimate that a 10 percent increase in oil prices would have boosted Texas employment by 1.37 percent in 1982 and by 0.3 percent in 2000.

⁴ Drilling has shifted toward natural gas in the United States and Texas, but because natural gas prices generally moved with oil prices during the estimation periods, the shift may not alter the rig count’s weakening response to oil prices.

Is the Pension System a Liability?

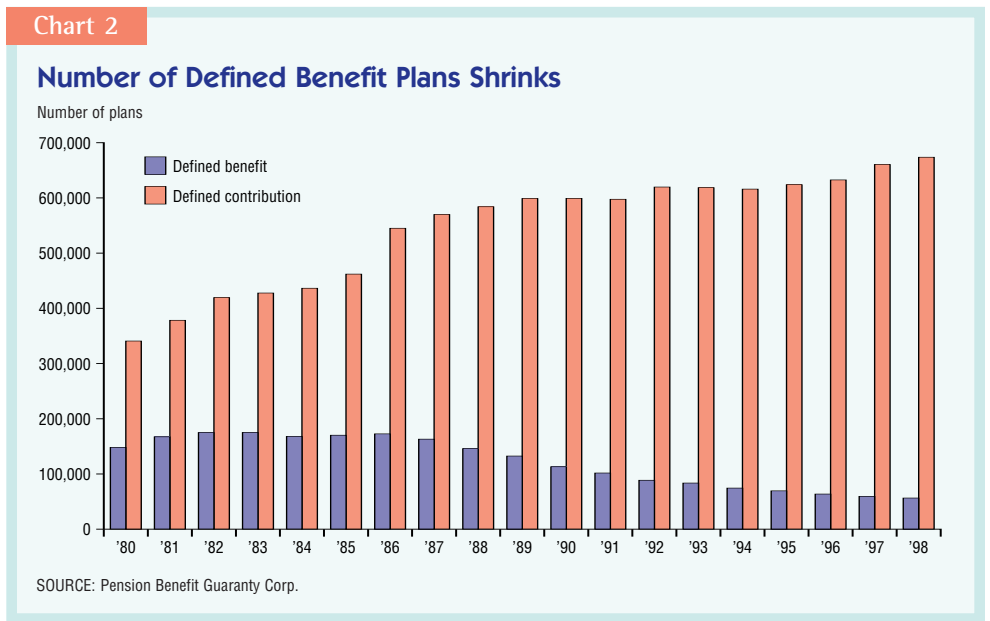
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Aside from sometimes adversely affecting retirees and employees, termination of United's pension plans would increase the financial burden on the Pension Benefit Guaranty Corp. (PBGC)—the government-established insurance fund that will continue to pay at least a portion of pension benefits. Over the past couple of years, the PBGC has assumed responsibility for a number of severely underfunded plans. As a result, the agency's balance sheet has transformed from large surpluses to even larger deficits (*Chart 1*). If United is unable to meet its pension obligation, the PBGC would assume responsibility for more than \$6 billion owed to current and future retirees.¹

The press coverage afforded companies whose pension plans are at risk, such as United, combined with the mounting deficits at the PBGC, has caused many to doubt the viability of the private pension system. However, the system's prospects are looking up. The economic rebound and temporary legislative relief will help all but the most troubled pensions revive, and this bodes well for the PBGC's long-term survival.

Differences Between Pension Plans

Prior to the 1980s, most employer-sponsored pension plans were tradi-



tional defined benefit plans. With a defined benefit pension plan, a firm guarantees a monthly or lump sum payment to workers after retirement. The dollar amount of this payment depends on a predetermined formula, typically based on a worker's salary during the last few years of employment and the number of years on the job.

Companies completely fund defined benefit plans, and all aspects of the plan are solely under the firm's control. Unless the firm goes bankrupt, monthly payments to retirees are not tied to the quantity of funds set aside by the firm. Therefore, the company bears the entire risk of making pension payments.

During the past two decades, firms have moved away from traditional defined benefits, preferring to offer plans that reduce the employer's risk, such as cash balance or defined contribution plans. The number of employer-offered defined benefit plans has declined dramatically, falling from 148,096 in 1980 to 56,405 in 1998, the last year for which these numbers are available (*Chart 2*). Meanwhile, participation in defined contribution plans has nearly tripled (*Chart 3*). The newer plans have many features desired by both firms and workers.

A cash balance plan is technically

still a defined benefit plan because the employer completely funds the payments. However, in contrast to the life-long guaranteed monthly payments of a traditional defined benefit plan, a cash balance plan provides each employee with a lump-sum dollar amount that the employee can take at retirement or use to purchase an annuity. The dollar value of the account is derived from contributions made by the employer (usually a fixed percentage of one's salary) and a guaranteed rate of return on those contributions (either a fixed interest rate or one tied to a given index rate).

One benefit of a cash balance plan to an increasingly mobile workforce is that workers can take a lump-sum distribution if they leave the firm prior to retiring. Unlike a traditional defined benefit plan in which the value of the pension rises quickly when an employee is five to 10 years from retirement, benefits with a cash balance plan rise gradually during an employee's tenure, so the worker is not penalized for leaving the company before retirement.

Since the mid-1980s, companies have increasingly switched to defined contribution plans that give employees even more control and responsibility for their pensions. With defined contribution

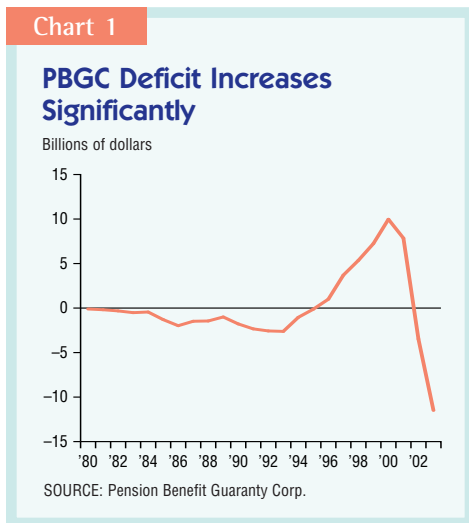


Chart 3

Participation in Defined Contribution Plans Rises

Millions of individuals



SOURCE: Pension Benefit Guaranty Corp.

plans, the most common form of which are 401(k) plans, employees accumulate money for retirement by making pretax contributions from their salary. While employers often make a limited contribution to the plan, monthly payments are not their responsibility. Individual employees choose from among the investment options offered by the employer and bear all risks associated with fluctuations in their retirement portfolio. See the box titled “Comparison of Defined Benefit and Defined Contribution Plans” for a side-by-side comparison of the two types of plans.

The key distinction between defined benefit (either the traditional or cash balance) and defined contribution plans is who bears the risk regarding the availability of funds when retirement occurs.

With a traditional defined benefit plan, the company bears all the risk of having sufficient assets to meet pension obligations. When the stock market falls and asset values plunge, it is the firm’s responsibility to add funds to fulfill pension payments. Usually this requires diverting income from current revenue into pension plans, an action that may have implications for the viability of a company that is already in dire financial straits.

With a defined contribution plan, the company is only responsible for establishing the saving plan and deciding whether to match a percentage of employee contributions. Since no ex-

plicit payment is promised at retirement, any risk regarding the performance of the plan’s assets is borne by the employee. As a consequence, when assets perform poorly, as the stock market did a few years ago, the company has no obligation to compensate the plan if the asset value falls.

Firms are free to select the type of pension plan they offer to employees. Presumably, the initial plan is structured to maximize the firm’s long-term prof-

itability, taking into account the attractiveness of the benefit plan to current and prospective workers. Once the plan design has been chosen, however, there are numerous regulatory hurdles governing a change, for example from a defined benefit plan to a defined contribution plan. (See the box titled “Switching from Defined Benefit to Defined Contribution Plans.”)

The Business Cycle’s Impact on Pensions

The business cycle can have a dramatic impact on pension plans. Economic downturns that are accompanied by a drop in interest rates or investment losses can lead to large declines in a plan’s asset value and severe underfunding. Companies with defined contribution plans are not impacted by underfunding because employees bear all the costs of any investment losses. But firms with a defined benefit pension absorb the full impact of this effect on the plans.

Employers with defined benefit pensions are legally obligated to have sufficient funds to meet future obligations of its plan.² Fund contributions can come from current company income or from investment returns on plan assets. When asset performance is strong, firms can reduce contributions from current in-

Comparison of Defined Benefit and Defined Contribution Plans

	Defined Benefit	Defined Contribution—401(k)
Determined in advance	Benefit after retirement	Contributions while working
Payment in retirement	Determined by employer	Dependent on investment returns
Vesting period	Usually 5 years	Usually 0–2 years
When accrued	Greatest wealth accrues at end of career	Evenly, throughout career
Funding	Employer	Employee and some employer matching
Portability	Difficult to transfer assets when changing employers	Easy to transfer assets when changing employers
Control of assets	Employer manages investments	Employees manage investments among choices designated by employer
Investment risk	Employer bears investment risk	Employees bear investment risk
Administrative costs	Large administrative costs when employee turnover is high	Less costly for firms to administer with an increasingly mobile workforce
Risk of default	PBGC protects funds to some degree if firm defaults	Assets belong to employees and are protected from employer default

NOTE: See Friedberg and Owyang (2002), Table 1, for a more detailed description of the differences.

Switching from Defined Benefit to Defined Contribution Plans

Over the past 20 years, the share of workers covered by defined benefit plans has fallen because an increasing number of employers are setting up defined contribution plans instead.¹ Newer firms tend to set up defined contribution plans, while older firms that previously offered only defined benefit plans have either switched to offering both types of plans or offer only defined contribution plans to new workers.

Both employers and employees seem to prefer defined contribution plans. Today's workers are far more mobile than their parents were, frequently switching between many employers during their lifetime. Defined contribution plans are more portable than defined benefit plans because the administrative costs associated with employee turnover are lower and accumulated funds can be easily transferred to a new employer. Defined benefit plans tend to penalize mobile workers because fund accumulation typically accelerates in the final years of employment.

There are other reasons why employers prefer defined contribution plans. Many firms prefer to let employees absorb the investment swings that occur with changes in the business cycle. With defined benefit plans, the firms must devote resources to managing periods of over- or underfunding of their plans. For example, General Motors recently issued \$13 billion in debt primarily to deal with an almost \$18 billion underfunding of its defined benefit plan. Thus, these resources are not available for internal investment in the firm.

Regulatory and tax burdens are also lower with defined contribution plans. Both types of plans must comply with numerous regulations, but defined benefit plans are subject to additional rules dealing with periods of over- and underfunding. Accounting costs are also higher with defined benefit plans because the accounting procedures for regulatory purposes are different from those for shareholder reporting, as required by generally accepted accounting principles.

This difference in reporting for regulatory and shareholder purposes has created incentives for firms to distort short-run investment decisions. Firms can boost short-term revenues and profits for shareholder accounting purposes (by making unrealistic assumptions regarding investment returns, employee turnover and mortality) even though the pension plan may be suffering significant losses. In addition, firms may decide to increase or decrease plan funding (stopping short of violating regulatory rules) to inflate their current bottom line and appear more favorable to shareholders.

Finally, there have been growing legal challenges for employers with defined benefit plans. Given the numerous and complex administrative rules surrounding the plans, firms say they increasingly find it difficult to comply and avoid small mistakes that can generate huge liabilities for the company from class action lawsuits. The regulatory compliance and legal burdens are sufficiently high that many firms with defined benefit plans either have changed or anticipate changing to other plans once their plans are fully funded.

Note

¹ See Papke (1999) and the references contained therein for in-depth studies of the impact of defined contribution plans on defined benefit plan offerings. The author compares company offerings of the two plans in 1985 and 1992. Her statistics indicate that "over twenty percent of the employers still reporting in the 1992 sample dropped their 1985 defined benefit plan but retained or added a defined contribution or 401(k) plan."

The federal government has created a number of rules governing and protecting pension plans.

come. But companies must increase their current income contributions when investment returns sour, as they did over the past few years.

Defined benefit plans can boost profits during periods of prosperity and add to losses during economic downturns, amplifying cyclical swings in the company's balance sheet. This can exacerbate financial problems and impede a firm's ability to stay competitive. For example, large declines in the stock market in the early 2000s resulted in many companies' being required to increase pension contributions to reduce underfunding at the same time that lower demand for their products was impacting revenues and company profitability.

Interest rate movements also affect

defined benefit plans. While the current value of assets is known, future liabilities are unknown but estimable based on assumptions about mortality, turnover and investment returns. A plan's solvency is estimated by comparing the present value of future liabilities with the current value of assets. (See the box titled "Calculating Future Liabilities.")

The choice of interest rate used to discount the value of future liabilities to today's dollar is critical to this estimation. The higher the interest rate used in this calculation, the lower the present value of future liabilities. In other words, higher interest rates would require fewer assets to be invested today to meet future liabilities.

Before a temporary legislative

change in 2002, the law required pension calculations to be made using the four-year average of the 30-year Treasury bond rate. This rate has fallen dramatically since 2000, increasing the present value of future liabilities and the estimated level of underfunding. The rate drop added to the underfunding problem caused by the 2000–02 stock market declines. To ameliorate the underfunding, firms issued equity, sold bonds or increased contributions from current income.

The impact of these actions has been twofold. First, firms with defined benefit plans are less competitive than those without because greater resources are devoted to shoring up pension plans as opposed to growing and expanding. Second, the PBGC has assumed control of more bankrupt plans, thereby stressing its limited resources.

Of course, all pension plans have been adversely impacted by the stock market declines and lower interest rates. Many 401(k) plans have lost significant value over the past few years. However, because individual employees and retirees bear all the risk with defined contribution plans, there was far less impact on firms with only defined contribution plans than on those with defined benefit plans.

Further, many companies with defined benefit plans have weathered the recent economic downturn without significant disruption to their business. It is primarily in industries already in significant decline—such as steel, or those suffering from extraordinary events, such as airlines after September 11—that the recent economic events have precipitated additional burdens on the long-term viability of numerous firms and their pension plans.

Impact on the Pension Insurance Fund

The federal government has created a number of rules governing and protecting pension plans. Many of these rules are contained in the Employee Retirement Income Security Act (ERISA), passed in 1974. Modified by virtually every major tax bill since it was first passed, ERISA provides a complex set of regulations, particularly for defined benefit plans.

Although the government does not directly insure private pensions, ERISA

Calculating Future Liabilities

Comparing assets currently set aside with potential future liabilities requires firms to make assumptions about the future. It is also necessary to convert the assets and liabilities to either today's dollar or future dollars to assess whether assets are sufficient to cover liabilities. In practice, because assets are valued in today's dollar, firms value future liabilities in today's dollar. Under assumptions regarding future interest rates, the calculation is

$$\text{Today's value of future liabilities} = \text{payment today} + \text{payment next year}/(1 + \text{interest rate}) + \text{payment in two years}/(1 + \text{interest rate})^2 + \dots$$

The interest rate used in this calculation is mandated by law to be the four-year average of the 30-year Treasury bond rate. It should be noted that the U.S. Treasury no longer sells a 30-year bond, and thus this rate is based on the yield of 30-year Treasury bonds maturing in February 2031. In addition, the above formula implies that as the interest rate increases, the value of future payments decreases.

created the self-funded PBGC to take over the payment of benefits in the event a plan ends without sufficient money to pay beneficiaries. The PBGC is financed from premiums paid by the companies it protects, from the assets of pension plans it has taken over, and from investments of any surpluses or assets. The PBGC may terminate a pension plan if it determines that doing so is needed to protect the interests of plan participants or the PBGC insurance program.

The PBGC protects most private defined benefit plans, insuring the pensions of nearly 44.3 million workers in more than 31,000 plans. There are, however, limits on the insurance provided by the PBGC. In 2004 the maximum guaranteed monthly payment is approximately \$3,700 for workers who retire at age 65. The PBGC does not insure retirement plans that do not promise specific benefit amounts, such as defined contribution plans.

The recent economic downturn has sharply increased the number of plans for which the PBGC has assumed responsibility. Bankruptcies by older, larger companies, particularly in the steel and airline industries, are placing stress on the insurance fund and creating large deficits, as previously discussed.

As of Sept. 30, 2003, America's private pension plans were underfunded by more than \$350 billion, the largest amount on record.³ Underfunding in multiemployer plans—in which more than one entity funds a defined benefit pension, such as when both a company and a union contribute to a plan—added an additional \$100 billion to that deficit.⁴

In 2003 the General Accounting Office reported that structural problems in the private-sector defined benefit system pose serious risks to the PBGC. Although the PBGC does not receive federal funding, financial markets assume that Congress will bail out the quasi-governmental agency if necessary. Current trends, if sustained, could lead to a taxpayer bailout greater than that of the \$132 billion savings and loan industry.

Prospects for the Future

While recent years have been challenging for defined benefit plans and the PBGC insurance fund, businesses and government have responded with both market and temporary legislative solutions. In general, firms with large defined benefit plans are attempting to minimize future risks from stock market and interest rate swings by changing the nature and types of plans they offer. Legislation is also being enacted to alleviate problems resulting from low interest rates.

Transitioning to Cash Balance Defined Benefit Plans. As mentioned previously, over the past 20 years companies have shifted from traditional defined benefit to either cash balance or defined contribution pension plans. The first conversion from a traditional defined benefit to a cash balance plan occurred in the mid-1980s. More recently, this shift has accelerated as the economy softened and employers faced increasingly burdensome administrative and regulatory costs. By the late 1990s, approximately 11 percent of all traditional defined benefit plans had converted to cash balance plans, and they now account for an esti-

IBM's Transition to a Cash Balance Plan

Growing pension problems have led firms to switch to cash balance plans to limit financial exposure and offer workers more flexibility. Sometimes these transitions have met substantial resistance from workers, such as when IBM Corp. attempted to change the benefit formulas and convert from a traditional to a cash balance plan.

Although converting pension plans is legal under ERISA, U.S. pension law also protects pension benefits already earned. Older employees feared that IBM's move would mean a loss in the value of their pensions and accused the company of making a change that would benefit young workers at the expense of older ones. A judge ruled in July 2003 that IBM's conversion plan amounted to age discrimination because it unfairly penalized older employees. IBM was ordered to make back payments—possibly worth billions of dollars—to 140,000 older employees.

To facilitate the transition to a cash balance plan, IBM eventually grandfathered employees age 40 and older with at least 10 years of service, allowing those workers the choice of either plan. By doing so, the company moved beyond guarantees of past pension accruals required under ERISA to more secure contracts for future pension accruals.¹

While many firms would like to make the transition from the traditional defined benefit plans to cash balance or defined contribution plans, the problems IBM faced raise the stakes for employers wishing to make changes. In particular, firms have devoted greater resources to devising plans that do not discriminate against older workers. In addition, communication of the details underlying a transition has received much greater importance.

These “win-win” arrangements will be easier to achieve when the stock market and interest rates increase and plans become fully funded. At that time, more companies will likely eliminate their traditional defined benefit plans.

Note

¹ See “Behind the Pension Tension at IBM,” an interview with Olivia Mitchell, in the Insurance and Pension section of Knowledge@Wharton, Wharton School, University of Pennsylvania, October 27, 1999, <http://knowledge.wharton.upenn.edu/index.cfm?fa=viewArticle&id=93>.

mated 40 percent of all defined benefit assets.

Converting from a traditional defined benefit to a cash balance plan has tax advantages over switching to a defined contribution plan or terminating the plan altogether. If a traditional defined benefit plan is overfunded (most plans do not convert unless they are fully funded), nontrivial taxes must be paid if the plan is converted to a defined contribution plan. In contrast, if a firm has an overfunded pension and converts to a cash balance plan, excess cash can be used toward a retiree health insurance program without triggering excise taxes.

Moving from a traditional to a cash balance plan is not without hurdles. The problems involved with IBM's conversion in the 1990s received significant press, and the conversion was successfully challenged in court. (See the box titled “IBM's Transition to a Cash Balance Plan.”) Despite IBM's experience, most firms converting to cash balance plans have done so successfully and with the

support of workers and retirees.

Legislative Reforms Provide Temporary Relief. Recent underfunding problems were partly the result of stock market declines, but the rising stock values over the past two years have significantly increased the asset values of most pension plans, although not to pre-2000 levels. The increase in liabilities resulting from low interest rates, however, remains a problem for distressed defined benefit plans.

In April 2004, Congress passed legislation to temporarily change the way these liabilities are estimated, reducing the impact of low interest rates on the level of plan underfunding. The Pension Funding Equity Act allows companies to use an interest rate based on investment-grade corporate bonds—rather than the 30-year Treasury bond rate—through 2005.⁵ The act also temporarily reduces the additional plan contributions required by firms with underfunded plans (but only in particular industries, such as steel and airlines, that have many large companies in or near bankruptcy).

Before the passage of this temporary relief bill, Congress was (and still is) considering a more comprehensive measure, the Pension Preservation and Savings Expansion Act. This legislation, introduced in July 2003, would make numerous changes to ERISA and the Internal Revenue Code. Among the proposed changes are accelerating savings limits and vesting of individuals, enhancing the portability of pension assets, temporarily allowing corporate bond rates to be used in liability calculations, expanding small business pension coverage, updating rules regarding pension distributions, clarifying the rules regarding public-sector workers and simplifying pension administration.

Although not explicit in this legislation, it is assumed that when provisions for using corporate bond rates expire at the end of 2005, a more permanent, alternate solution will be found to using the 30-year Treasury bond. There has been considerable discussion about using a yield curve approach for valuing liabilities. This approach would better match funding requirements to liability payments. For example, if half a company's employees retire in five years and the other half retire in 10 years, the five-year corporate bond rate would be applied to half the liabilities and the 10-year rate would be applied to the other half. Generally, although not always, short-term rates are lower than long-term rates. So a company with a younger workforce would significantly reduce its level of underfunding—especially compared with using the 30-year Treasury bond rate—by using rates that more closely match the retirement plans of its employees.

The PBGC's Viability. As a result of the changes occurring to defined benefit plans and the economic recovery, the PBGC's prospects for solvency are better than they might appear. The pickup in economic activity over the past two years has benefited companies on two fronts. First, the rising stock market has helped reduce the level of underfunding of defined benefit plans. Second, increases in profits have generally put firms in a better position to make additional contributions to underfunded plans. Anything that reduces the incidence of underfunding or eases firms' abilities to correct problems lessens the

likelihood that the PBGC will be required to take over a defined benefit plan.

The temporary interest rate relief granted by recent legislation also reduces companies' pension shortfalls and the payments required to address this problem. Equally important, the recent legislation directly targets relief for those industries (steel and airlines) most likely to dump their large, underfunded plans on the PBGC. The economic desirability of such targeted relief is debatable, but the practical result will be less stress on the PBGC's ability to stay solvent in the short run.⁶

As firms switch to cash balance plans and reduce their exposure to market risks, they are less likely to further burden the insurance fund. It would not be surprising to see more firms move away from defined benefit plans as the plans become fully funded.

Summary

Many firms with defined benefit plans have weathered the recent economic turmoil without being forced into bankruptcy or jettisoning their plans. Only those firms bearing the entire risk of their pension plans, combined with other, industry-specific problems, are currently in distress.

The net result is that the PBGC is likely to assume additional pension plans and its deficit will worsen in the short run. However, outside the steel and airline industries, a massive failure of defined benefit plans that would precipitate an S&L-style bailout of the PBGC is unlikely.

The current economic recovery—in addition to temporary legislative relief and a transition to defined contribution plans in which employees bear more of the risks surrounding pension incomes—will help all except the most troubled companies get back on solid footing.

—Mark G. Guzman
Fiona Sigalla

Guzman and Sigalla are economists in the Research Department of the Federal Reserve Bank of Dallas.

Notes

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¹ United Airlines' four defined benefit pension plans are currently underfunded by approximately \$8.3 billion. However, due to limits on the insurance provided by the PBGC, only \$6.4 billion of the underfunding problem would be covered. The remainder of the underfunding represents pension losses that would be absorbed by retirees and current workers invested in the pension plans.

² Under special conditions, a firm must contribute additional funds over and above normal contributions. If a plan is less than 90 percent funded for several years or less than 80 percent funded in a given year, the company must make additional contributions to reduce the underfunding.

³ Pension Benefit Guaranty Corp., *2003 Annual Report*, p. 1.

⁴ PBGC, *2003 Annual Report*, p. 5.

⁵ However, it is important to note that using corporate bonds instead of the 30-year Treasury bond will not significantly reduce the nation's underfunded pensions, although it will grant temporary relief to companies whose pensions are currently underfunded. According to the Congressional Budget Office, the corporate bond rate would likely be about 150 basis points (1.5 percent) higher than the 30-year Treasury rate, reducing liabilities in underfunded plans by approximately \$30 billion by 2006. This reliance on corporate bond rates is not without precedent. From March 2002 until the end of 2003, Congress allowed firms to use corporate bonds when calculating liabilities to provide temporary relief from recent declines in 30-year rates.

⁶ To the extent that the interest rate relief is only temporary, it will result in only a temporary respite from the recent large increases in the PBGC's deficit. Should problems with defined benefit plans persist, they are likely to add to the stresses on the PBGC's ability to remain solvent.

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Globalization: Myths and Realities

Debates over controversial economic issues—and few issues have been more controversial in recent years than globalization—can always be improved by the introduction of facts. This is particularly true when claims based on casual observation, rather than research, crystallize into “conventional wisdom.” Here, then, are a few common myths about globalization, along with their more complex realities.

Myth: Globalization Is Generally Bad for the Environment.

Several forces are at work in the relationship between globalization and environmental quality, as noted in a recent paper by Harvard economist Jeffrey Frankel.¹ One force—the one drawing concern from environmentalists—is the “race to the bottom effect.” To attract increasingly mobile international capital, nations may attempt to outbid one another in offering investment climates that are “business-friendly”—that is, low-tax and low-regulation. Environmental rules may be pared back. There is, in fact, strong evidence that changes in countries’ environmental regulations do influence the location of investment.²

Complicating this simple story, though, is the effect of income growth on environmental quality, itself subject to a complex relationship. Many measures of environmental degradation follow a hump-shaped pattern with respect to per capita income, a relationship that economists refer to as the environmental Kuznets curve.³ Loosely, this hypothesis says that as countries’ per capita incomes rise from very low levels, pollution initially rises but then begins to fall when income passes a critical threshold. The source of the initial increase in pollution is the onset of industrialization; the source of the decline is the positive effect of rising incomes on the demand for environmental quality. Like the de-

mand for better cars or bigger homes, the demand for a cleaner environment ultimately rises with income.

Globalization can also impact environmental quality in less obvious ways. Openness to trade, which encourages countries to specialize in producing the goods for which they have a comparative advantage, can alter the composition of a country’s output. The effects on pollution are ambiguous. Foreign direct

investment can also encourage countries to undertake the costly measures necessary to reduce its own emissions.

Myth: Globalization Encourages Child Labor.

As is the case with globalization and the environment, conflicting forces make the relationship between globalization and child labor complex. A developing economy that opens itself to investment and trade may be expanding its opportunities for, and the productivity of, child labor. Other things equal, this effect would increase the incidence of child labor, however regrettable that practice may be. Acting in the opposite direction, though—analogueous to the case of environmental quality—is an “income effect.” Poor households that see their real incomes rise through trade may have less need to rely on the labor of their children.

In principle, either effect might dominate. Globalization could lead to more or less child labor. In practice, for the one economy where a thorough and detailed empirical study has been done—Vietnam, which gradually liberalized its trade policy during the 1990s—the results overwhelmingly indicate that the income effect dominates. The study, by Dartmouth economists Eric Edmonds and Nina Pavcnik, shows that the real income growth among Vietnamese farming families between 1993 and 1998 can account for nearly one-half of the large decline in child labor in rural Vietnam that occurred over this period.⁴ The authors conjecture that much of the real income growth was likely due to increased openness to trade, in the form of relaxed restrictions on rice exports.

Myth: Globalization Is a Recent Phenomenon.

In reality, we are in the midst of the world’s *second* era of globalization. The first great globalization occurred from

*Wisdom don't
consist in knowing
more that is new,
but in knowing less
that is false."*

—Josh Billings,
American humorist

investment can introduce more up-to-date—and often cleaner—production techniques in place of older, less environmentally friendly ones.

Which of these many forces dominates? That is an empirical question. As Frankel notes, for certain measures of pollution, such as sulfur dioxide concentrations, there is little evidence that the unfavorable forces dominate and some evidence that the reverse is in fact the case—that globalization has led to *less* pollution. For other pollutants, like greenhouse gases, the opposite seems to be true. Even in these cases, though, the culprit is not globalization but rather a “free-rider problem.” Because the environmental harm from greenhouse gases is global, no individual country has an

Despite what is said by globalization's proponents or, in moments of resignation, by its opponents, the process is not inevitable, as the aborted first great globalization makes clear.

the middle of the 19th century to the eve of World War I, fueled partly by liberalized trade and immigration policies and partly by steep declines in transportation costs. This earlier era has been studied extensively by economic historians. What these investigations have shown is that by 1913, globalization—whether measured in flows of goods and people or in the convergence of national economies' prices and wages—had been realized to an extent never before seen. And globalization to such an extent would not be seen again for several decades. Between the first and second world wars, a combination of restrictive trade and immigration policies, together with the collapse of the international gold standard, deglobalized the world economy. Much of the post-World War II movement toward globalization has simply recovered gains lost during the interwar years.

With regard to some measures—notably, the free movement of people—globalization's extent today is still short of where it stood at the start of the 20th century. In the United States, for example, foreign-born residents constituted 14.5 percent of the total population in 1910. By 1970, this fraction had fallen to 4.7 percent. It has risen since then, particularly in the 1990s, to a bit over 11 percent, still short of the 1910 level.

Taking a more global perspective, economists Kevin O'Rourke and Jeffrey Williamson estimate that, in the 40 years from 1870 to 1910, immigration reduced the labor force in the Old World sending countries by 13 percent, while increasing the labor force in the New World receiving countries by 40 percent.⁵ Were similar flows to occur over the next 40 years, they would involve anywhere from 20 million to 80 million people.

All myths are impediments to good policy, but the perception that globalization is a relatively new phenomenon holds a particular harm: It helps to nurture a belief in the inexorability of the current globalization process. Despite what is said by globalization's proponents or, in moments of resignation, by its opponents, the process is not inevitable, as the aborted first great globalization makes clear. One becomes less confident that globalization is a train that can't be stopped—or a genie let out of a

bottle—when one realizes that 90 years ago the train was derailed, the genie recaptured.

—Jim Dolmas

Dolmas is a senior economist and policy advisor in the Research Department of the Federal Reserve Bank of Dallas.

Notes

¹ "The Environment and Globalization," by Jeffrey Frankel, National Bureau of Economic Research Working Paper no. 10090, November 2003.

² See, for example, "Trade, Growth and the Environment," by Brian R. Copeland and M. Scott Taylor, *Journal of Economic Literature*, vol. 42, March 2004, p. 7.

³ The environmental Kuznets curve derives its name from a similarly hump-shaped relationship between income inequality and per capita income, documented in the 1950s by the economist Simon Kuznets. Frankel's paper, cited above, contains references to many of the statistical studies of the environmental Kuznets curve. Interestingly, more recent and comprehensive data on inequality show the original Kuznets curve to be on a much less secure empirical footing than its environmental namesake.

⁴ "The Effect of Trade Liberalization on Child Labor," by Eric V. Edmonds and Nina Pavcnik, forthcoming in the *Journal of International Economics*. (A working paper version is available at www.dartmouth.edu/~eedmonds/.)

⁵ *Globalization and History*, by Kevin O'Rourke and Jeffrey Williamson, Cambridge, Mass.: MIT Press, 1999. The New World consists of the United States, Canada, Australia, Argentina and Brazil, while the Old World is essentially Western Europe.

Globalization Conference

What: "Myths and Realities of Globalization," a conference hosted by the Dallas Fed to discuss a variety of free trade issues

Topics: The environment, labor and outsourcing, national sovereignty, intellectual property, technology and capital flows, history of globalization

When: November 3–5, 2004

Where: Federal Reserve Bank of Dallas

More information:

www.dallasfed.org/news/research/2004/04global.html

Regional Update

Despite a summer slowdown in the nation's economic recovery, Texas' moderate recovery remains on track. Employment continues to rise modestly, and other regional indicators point to continued expansion. The Texas Coincident Index—based on employment, gross state product and the unemployment rate—has been on the upswing since September 2003, reflecting the state's rebound.

Texas added 71,000 jobs in the first seven months of the year, for a 1.3 percent annualized rate. Major sectors driving the gains include educational and health services, professional and business services, trade, transportation and utilities, and government. While the recent surge in oil prices may not translate into large job gains for the state, Texas is a major producer and exporter of oil and stands to benefit from increases in oil company profitability, well royalties and tax revenues.

Although manufacturing overall has not seen a significant turnaround, high-tech manufacturing may be showing inklings

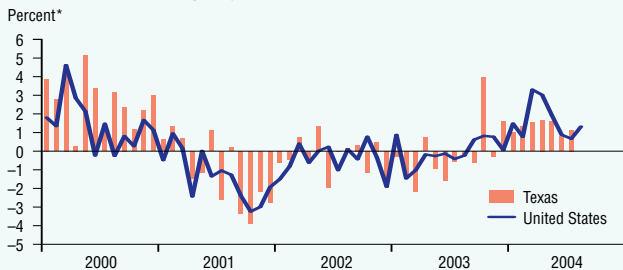
of recovery. High-tech manufacturing employment rose five of the first seven months of the year, largely due to hiring by semiconductor manufacturers. (For charts showing employment in individual high-tech industries, see "Hot Stats" at www.dallasfed.org.)

Texas' inflation-adjusted exports rose 15.1 percent in the second quarter, reflecting growing strength in the economies of the state's trading partners. The increase marked the fourth straight quarter of export growth. While real exports to Mexico edged down slightly in the second quarter, they were up 9.2 percent from a year earlier and should strengthen as Mexico's economy continues to improve.

The Texas Leading Index suggests continued recovery in the state's economy. The index currently forecasts moderate growth for Texas, much like that seen so far this year.

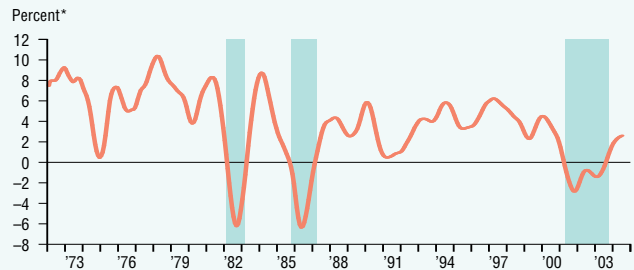
—D'Ann Petersen

Total Nonfarm Employment



*Month-over-month, seasonally adjusted, annualized rate.

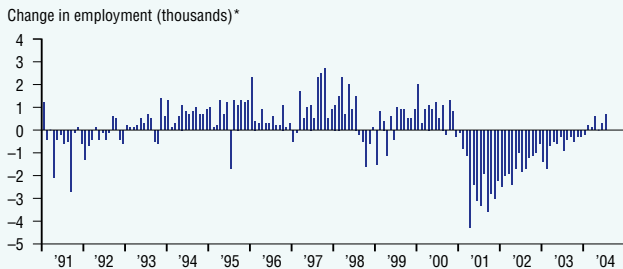
Texas Coincident Index



*Month-over-month, seasonally adjusted, annualized rate.

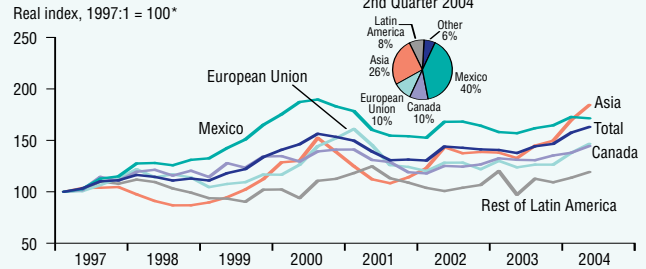
NOTE: Shaded areas indicate recession.

Texas High-Tech Manufacturing Employment



*Data are seasonally adjusted.

Texas Exports



*Seasonally adjusted.

Regional Economic Indicators

TEXAS EMPLOYMENT*

	Texas Leading Index	TIP1† total	Mining	Construction	Manufacturing	Government	Private service-producing	TOTAL NONFARM EMPLOYMENT*		
								Texas	Louisiana	New Mexico
7/04	117.1	128.2	147.2	546.4	886.4	1,653.7	6,224.4	9,462.1	1,913.9	790.4
6/04	117.4	128.2	147.2	546.8	887.5	1,653.2	6,214.8	9,453.2	1,910.8	790.6
5/04	117.9	128.6	146.6	548.7	888.1	1,653.1	6,206.3	9,446.9	1,908.5	789.0
4/04	118.2	128.4	146.4	547.4	886.6	1,652.2	6,197.9	9,434.6	1,913.5	786.6
3/04	117.4	128.1	146.6	549.3	886.3	1,650.6	6,184.4	9,421.5	1,910.5	785.4
2/04	117.3	128.3	146.2	548.9	886.7	1,647.6	6,175.9	9,409.4	1,909.7	782.2
1/04	117.3	127.6	145.1	550.3	887.4	1,647.0	6,165.0	9,399.0	1,910.5	780.4
12/03	117.8	127.2	146.0	547.2	888.8	1,645.2	6,160.2	9,391.1	1,900.7	782.4
11/03	116.9	127.2	145.5	545.9	890.3	1,644.2	6,149.3	9,378.8	1,904.7	779.8
10/03	116.0	127.8	145.3	548.8	891.1	1,644.2	6,148.3	9,380.9	1,905.9	778.1
9/03	114.7	127.8	145.4	548.2	892.4	1,640.8	6,121.6	9,350.7	1,900.0	776.3
8/03	114.5	127.4	145.3	547.4	893.7	1,648.7	6,118.1	9,355.3	1,894.7	776.7

* In thousands. † Texas Industrial Production Index.

For more information on

employment data, see "Reassessing Texas Employment Growth" (*Southwest Economy*, July/August 1993). For TIPI, see "The Texas Industrial Production Index" (*Dallas Fed Economic Review*, November 1989). For the Texas Leading Index and its components, see "The Texas Index of Leading Indicators: A Revision and Further Evaluation" (*Dallas Fed Economic Review*, July 1990). Online economic data and articles are available on the Dallas Fed's Internet web site, www.dallasfed.org.

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