

# Southwest Economy



NASA/Kennedy Space Center

## Seeding Technology with Defense Dollars

The United States responded to the September 11 attacks on New York and Washington by launching a global fight against terrorism, starting with the war in Afghanistan. The new focus on national security is altering the federal government's spending priorities. After the Carter–Reagan military build-up peaked in 1986, defense spending declined as a portion of total U.S. output through 2001, largely because of the Soviet Union's demise and the end of the Cold War (*Chart 1*). Now the terrorist threat is prompting a rise in spending for defense and homeland security. The White House proposes budget authority of \$427 billion in fiscal 2003, up 25 percent from 2001.

Economists distinguish between private and public goods. Private goods tend to benefit only the individual consumer. Capitalist societies rely on the private sector to produce cars, televisions, restaurant meals, accountants' services and millions of other goods. Through the interplay of supply and demand, markets determine what to produce, mobilize the necessary inputs and set prices. We pay individually, and we consume individually.

*(Continued on page 2)*

**INSIDE:**  
*Latin American  
Market Reforms  
Put to the Test*

## Insurance: A Risk to the Economy?

Most people don't appreciate insurance until they need it. Or can't get it. Last year was a difficult one for the insurance industry. An unprecedented surge of catastrophic claims left the industry reeling.<sup>1</sup> In response to the unexpected rise in claims and weaker investment opportunities, the insurance industry cut back coverage and sharply increased premium rates.

Insurance is a valuable financial tool that boosts economic activity. By purchasing insurance, individuals and businesses share the risk of making investments and engaging in activities that they perceive as too risky to pursue on their own. Homeowners, automobile drivers, doctors and businesses can pay regular premiums to reduce the expense of an unpredictable event.

The insurance industry is an integral part of the economy. Insurance is required for operating a business and, in most states, for purchasing a home or automobile. Increases in insurance costs are taking a bite out of corporate

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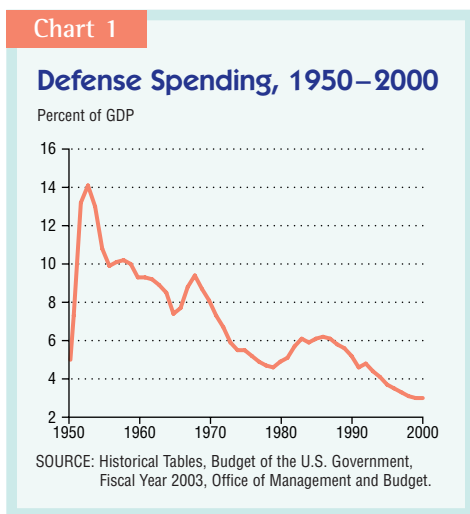
Public goods benefit the population at large, cost little more to provide to additional people and offer no effective way of excluding an individual's consumption, even if that's desired. Markets don't work well for public goods. When it's impossible to exclude anyone from the benefits, there's little incentive for individuals to pay. Not enough of the good is supplied, so citizens turn to government. Defense spending meets economists' standard for public goods, the legitimate province of government.

### Trade-Offs vs. Spillovers

In textbooks, private and public goods are distinct and citizens must choose between one and the other—guns *or* butter. Though there doubtlessly are trade-offs, in reality the math isn't that simple, especially when it comes to defense. History tells us that military spending produces important technology spillovers in the civilian economy—a bonus beyond the benefit of national defense. The private sector, driven by the profit motive, has commercially adapted many technologies developed for military use, thus making the trade-off between guns and butter less severe than it would otherwise be.

Decades ago, military funding led to the development of many of the technologies vital to civilian aviation, including radar and the jet engine. Just about every civilian use of nuclear technology—from power plants to medical procedures—traces back to the Manhattan Project, the World War II effort to harness the atom's power. The military played a key role in developing computers and the Internet, two of the driving-force technologies of America's postindustrial economy. Now the private sector is finding uses for the satellite navigation and targeting systems developed for the military.

In the war in Afghanistan, U.S. forces have displayed a technological prowess far beyond that seen in the Gulf War a decade ago. Precision-guided munitions, global communications networks and airborne surveillance systems have been important to routing enemy combatants. Now night-vision technology is making its way from the battlefield to the highway, where it will allow drivers to see in fog or other dangerous conditions. The unmanned aircraft, or drones,



that have patrolled the skies over Afghanistan may allow us to better track wind shear, microbursts and other severe-weather hazards to aviation. The Defense Advanced Research Projects Agency, the Pentagon's research arm, has dozens of projects under way for the next generation of warfare. (See the box titled "In the Pipeline.") Many of these projects may lend themselves to commercial applications. Technologies U.S. forces are using now could help drive the economy of the future.

### A Better Way to Find Our Way

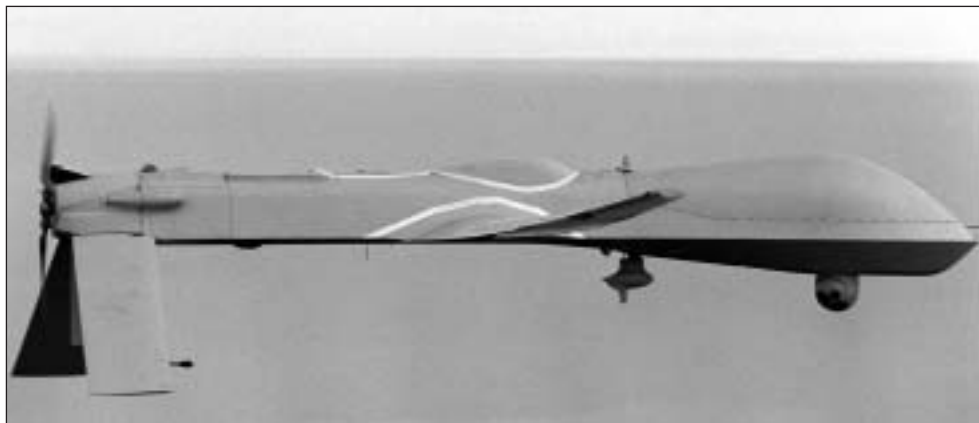
No simple pattern exists for the technology nexus between the military and the private sector. The Global Positioning System (GPS), a system of computers and satellites that allows users to pinpoint any position on earth, was developed by the armed forces. Only later was the technology transferred to the private sector. No space-based technology

would be possible, of course, without NASA, a major government program that developed the rocketry and satellite technology that made GPS possible.

GPS' roots are in the 1960s military environment, with its Cold War standoff between the United States and the Soviet Union. To get a better fix on the positions of nuclear-armed Poseidon submarines, the U.S. Navy launched seven navigational satellites into low polar orbit. The system had limited range and didn't operate quickly, so it wasn't suitable for aviation or other fast-moving military missions. In 1973, the Pentagon consolidated Navy and Air Force research projects on improving satellite-based navigation, which quickly led to a concept called Navigation by Satellite Timing and Ranging (NAVSTAR). It took 22 years and \$8.1 billion to make the system fully operational.<sup>1</sup>

In 1983, the government decided to allow civilian access to the GPS, and the next year the first commercial product hit the market. It cost \$150,000 and required two people to operate.<sup>2</sup> The expensive and bulky system found a ready market among surveyors. By 1991, almost 100 companies were selling GPS gear, and competition in the marketplace began to foster the same kind of rapid innovation and price cutting seen in consumer electronics. At the end of the GPS' first decade in the private sector, handheld units sold for less than \$150.<sup>3</sup>

The armed forces use GPS technology to reduce navigational errors, allow more precise synchronization of forces and increase the accuracy of so-called smart bombs. Civilian uses are expanding each year. Today, Americans are



Drones, used by the military today, may someday track weather hazards to aviation.

U.S. Department of Defense

## In the Pipeline

Corningware was originally developed by Dow Corning as a heat-resistant material for rocket nose cones. Tang and Teflon were spin-offs from NASA projects. DARPA—the Defense Advanced Research Projects Agency—is working on dozens of projects with potential commercial applications. Of course, not every project will be successful in completing its intended military mission or eventually resulting in a viable commercial product. So-called dual-use technologies tend to be difficult to foresee because no single mind can imagine the myriad possibilities.

DARPA program	Defense use	Potential commercial applications
Exoskeletons for Human Performance Augmentation	Increases the strength, speed and endurance of field soldiers, enabling them to tote more firepower, don ballistic protection and carry supplies greater distances.	Exoskeleton components can be used by people with various disabilities. Material movers can perform better and more safely.
Triangulation for Genetic Evaluation of Risks	Integrates data from multiple regions along an organism's genome to derive a unique identifier for the organism, so as to detect and classify bioengineered threats.	Detection and analysis of airborne pollutants, resulting in cleaner air, safer foods and improved water treatment.
Human Identification at a Distance	Detects, recognizes and identifies humans at a great distance from a face, fingerprint or walk.	Secure access to computer rooms, business files and banks. Help locate missing people.
Automatic Phrase Translators; Translingual Information Detection, Extraction and Summarization	Handheld translation devices that support such local languages as Pashto, Urdu and Dari; software that enables English speakers to locate and interpret critical information in multiple languages.	Translation for international travelers, supporting the tourism industry.
Evidence Extraction and Link Discovery	Discovers, extracts and links sparse evidence contained in large amounts of data; finding an information "needle" in a stack.	Improved Internet search engines for obtaining and managing information.
Global Positioning Experiments	Prevents radar jamming by using airborne, high-power GPS-like transmitters on aircraft to broadcast a signal that "burns through" jammers and restores GPS navigation.	Additional security for commercial flights, cruises, recreational boats and freighters.
BattleBoard: Command Post of the Future	Portable pen-tablet computer, about the size of a laptop screen, that uses speech and pen-based drawing and has a wireless connection to the battlefield local area network and its digital information.	Improved access to computers, cell phones and remote-control electronics. Replace current laptops at home and work, reduce carpal tunnel syndrome and aid the handicapped.
Friction Drag Reduction	Reduces the frictional drag on a moving ship's hull by 30 percent.	Reduce friction on recreational boats and freighters, improving fuel efficiency. Reduce drag on scuba divers.
Trapped Vortex Combustor	Uses high-energy, air-independent propulsion technology that produces more thrust with far less pollution.	More powerful, less polluting fuel source for commercial aircraft.
Microair Vehicle	Small air vehicle a soldier can carry and launch to gather information about the terrain ahead and enemy positions.	Enable hikers, mountain climbers and campers to be aware of the terrain, animals and people ahead.

SOURCE: Defense Advanced Research Projects Agency, "DARPA Fact File: A Compendium of DARPA Programs," Office of the Secretary of Defense, April 2002, [www.darpa.mil/body/newsitems/darpa\\_fact.html](http://www.darpa.mil/body/newsitems/darpa_fact.html).

driving cars with GPS that displays directions to business meetings and restaurants. Trucking companies use the technology to keep tabs on shipments. GPS readings also keep hikers from getting lost, tell golfers how far it is from fairway to flag and help anglers find their favorite fishing hole.

### Picking Up the Pace

The urgency of national defense, along with the government's ability to mobilize resources, often accelerates the

development of new technology. In the early 1930s, England's military asked whether radio waves could shoot down aircraft. They could not, but British physicist Sir Robert Watson-Watt found that the returning echoes provided a way of tracking planes. Without money, the invention languished. Little came of it until World War II, when massive U.S. funding made the "magic eye" a decisive weapon in winning the war.<sup>4</sup> The jet engine, another prewar invention, received a similar boost. After the war, of

course, jet aircraft became the centerpiece of a boom in passenger traffic.

Shortly after launching the Manhattan Project, the military began research that planted the seeds of what would become the computer industry. Calculating the trajectory of shells fired from battleships and artillery required hours of mathematical computations. Among the factors that had to be considered were the type of weapon, inclination of the barrel, wind speed and direction, temperature, atmospheric pressure and humidity. To

speed up the process, in June 1943 the military turned to the University of Pennsylvania's Moore School of Electrical Engineering, which had pioneered the design of an electronic calculating machine.

The result was the Electronic Numerical Integrator and Computer (ENIAC), the world's first all-electronic computer, capable of 5,000 calculations per second. The behemoth, delivered in 1946 at a cost of \$486,804, weighed 30 tons and took up 1,800 square feet. An energy hog, it consumed 160 kilowatts of electrical power, enough to cause brownouts in Philadelphia.<sup>5</sup>

Almost immediately after the war, entrepreneurs began exploring commercial applications for computers. After a few missteps, two scientists who had worked on ENIAC found the right design in the Universal Automatic Computer (UNIVAC). A new industry came into being, but the machines were so expensive that only big corporations could buy them. It took three decades, and the development of the microprocessor, to create the personal computer.

The military also had a role in the Internet's early development. At the height of the Cold War, the military sought a decentralized communications network that could survive a nuclear attack and allow the United States to launch retaliatory strikes. In the early 1960s, the Pentagon found a potential solution in concepts being explored by a handful of researchers who envisioned connecting computers and moving massive amounts of data over a grid of open lines. The Pentagon's \$1 million investment helped forge the Advanced Research Projects Agency Network, which linked four university computers in 1969.<sup>6</sup>

Never solely a military project, the ARPANET quickly moved to the private sector. Electronic mail started moving in 1972, and Telnet—an early commercial application for searching remote library catalogs—came two years later. The military split its network from the ARPANET in 1983. The Internet, however, didn't take off until it became easier to find information online. In 1991, Tim Berners-Lee posted the computer code for the World Wide Web, allowing users to combine words, pictures and sounds on Internet pages.<sup>7</sup> Netscape founder Marc Andreessen created the first web browser

in 1993, and the Internet exploded. Today, 190 million computers around the world have Internet access.

### Investing in Big-Ticket Projects

Investing in basic technology can be too expensive and risky for private firms. Big commercial rewards might lie at the end of the road, but market failures can occur when companies are unable to capture (internalize) all the profit from millions spent on R&D. Massive undertakings with big technology spillovers—such as harnessing nuclear power—thus sometimes fall to the federal government. Even then, Washington often wouldn't be able to muster the political will to fund the projects if not for the priority of national defense.

The Manhattan Project is the most famous name in military research. Fearful that Nazi Germany would build an atomic weapon, the U.S. military launched its own nuclear effort on December 6, 1941, the day before Japan attacked Pearl Harbor. In December 1942, a team of scientists at the University of Chicago produced the first sustained nuclear reaction in a 20-foot-tall device, using 6 tons of uranium metal, 50 tons of uranium oxide

and 400 tons of graphite.<sup>8</sup> Nearly three years passed before the basic technology could be adapted for military use. Scientists detonated the first atomic explosion in the New Mexico desert. Within weeks, bombs struck the Japanese cities of Hiroshima and Nagasaki, ending World War II.

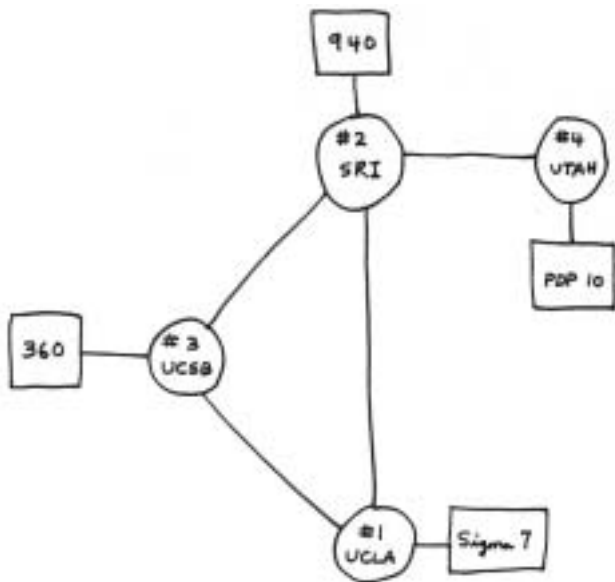
The government spent \$20 billion to develop the atomic bomb and \$6.2 trillion to build and maintain the nation's nuclear arsenal over the next 50 years.<sup>9</sup> The conversion of atomic technology to nonmilitary uses began shortly after the end of World War II, and the first commercial nuclear power plant went into operation in Shippingport, Pa., in 1957. By 2001, 103 reactors in 31 states produced 20 percent of the nation's electricity supply.<sup>10</sup>

Although nuclear power has fallen from favor in the United States, other uses of the technology continue to expand. Industrial companies use imaging technology to inspect metal parts and welds for defects. Irradiators sterilize food. Atomic gauges monitor and control the thickness of sheet metal, textiles, paper, plastics and other materials. Medicine makes use of the atom. X rays, CT scans and MRIs help diagnose problems



ENIAC—the Electronic Numerical Integrator and Computer—was the result of a military project but ultimately gave rise to today's personal computers.

John W. Mauchly Papers, Rare Book & Manuscript Library, University of Pennsylvania



This sketch shows the ARPANET as it existed in 1969. The four-node network has evolved into today's 190 million-node Internet.

year.<sup>11</sup> The computer industry, descended from ENIAC, has produced a huge economic impact, with sales of 30 million units a year. Even after the dot.com downturn of the past two years, the Internet business will grow into a mainstay of the future. Taken together, computers and the Internet are part of a vibrant, expanding information technology sector with annual output of \$800 billion (8 percent of GDP) and employment of 5.6 million workers.

Guns or butter? The classical dilemma suggests a trade-off in which increased military spending saps the commercial sector.

with internal organs and bones. Without surgery, doctors can diagnose heart disease, detect tumors and monitor transplants for rejection. Each year, Americans receive 10 million to 12 million nuclear medicine and therapeutic procedures.

### Sometimes, Guns Help Make Butter

In the mid-1950s, President Eisenhower warned of the emergence of a military-industrial complex that could warp American democracy. Government investigators periodically turn a spotlight on wasteful spending—\$7,600 coffee-makers and \$400 hammers, for example. Even when defense spending is managed well, many critics consider it wasteful, arguing that money spent on bombers and battleships drains the economy of human and natural resources the private sector uses more productively.

Viewing military spending as just threatening, wasteful or inefficient ignores important long-term potential benefits for the economy.

The Pentagon and other government agencies do play a role in directing and funding technology. But the market, with its powerful profit incentive, can take what government does and make a lot more out of it—creating new industries and jobs and adding to economic growth. For example, U.S. GPS producers employ more than 23,000 people and will ship \$4.7 billion in equipment this

year. It's not always that way. Over the years, military research has made important contributions to the civilian economy, many of them rarely acknowledged. Military spin-offs touch our everyday lives with such innovations as Corningware, air bags, photochromic glasses, the HMMWV and even a two-week tick repellent that's sprayed on clothing.

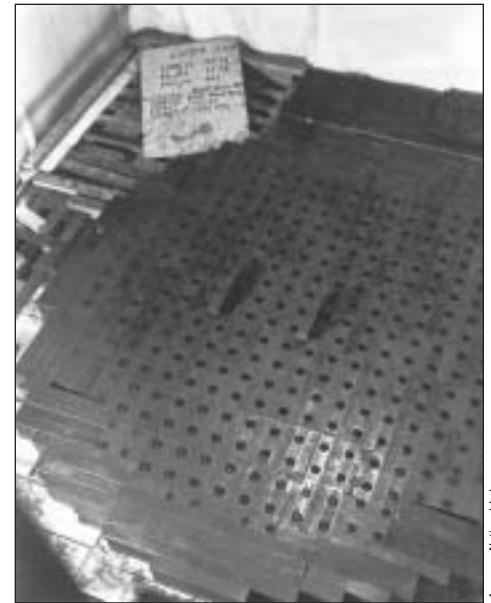
Every year the private sector creates thousands of new and improved products without government assistance. So we might have gotten the benefits of the GPS, computers, the Internet and other military spin-offs without the Pentagon's research and development. Companies or universities might have stepped forward with the funding. Private consortiums might have formed to internalize the technology spillovers and get the projects under way. But that didn't happen. What did happen isn't so bad, though, because the private sector took what government had done and found a way to bring it to market.

—W. Michael Cox

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### Notes

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Argonne National Labs

The first controlled nuclear reaction occurred at CP-1 (Chicago Pile 1), on an old squash court under the University of Chicago's Stagg Field. The 1942 feat marked the start of the Atomic Age.

- 1 Scott Pace, Gerald Frost, Irving Lachow, David Frelinger, Donna Fossum, Donald K. Wassem and Monica Pinto (1995), *The Global Positioning System: Assessing National Policies*, RAND, Washington, D.C., pp. 246, 267.
- 2 Gregory D. McLaughlin (1997), "The Commercialization of the Global Positioning System" (unpublished paper, Air Command and Staff College, March).
- 3 McLaughlin (1997).
- 4 Wolf Schafer (1993), "Global History: Historiographical Feasibility and Environmental Reality," [www.sinc.sunysb.edu/Class/wschafer/GH93/ghRealty.htm](http://www.sinc.sunysb.edu/Class/wschafer/GH93/ghRealty.htm). Jonathan Yardley (2002), "How a Well-Born Yankee WASP Taught Himself Science—and Helped America Win World War II," *Washington Post*, May 12, p. T2.
- 5 Martin H. Weik (1961), "The ENIAC Story," *Ordnance*, American Ordnance Association, January/February. Mary Bellis (1998), "Inventors of the Modern Computer: The ENIAC I, J. Presper Eckert and John W. Mauchly," *About*, June 2, <http://inventors.about.com/library/weekly/aa060298.htm>.
- 6 Tom Feran (2000), "Lo and Behold. It is Good' Cable Offers Fascinating Look at Net's Creation," *The Plain Dealer*, Jan. 31, p. E1.
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- 8 Steven Best, Richard Lindsay and Zach Brown (1998), "Nuclear History," Argonne National Laboratory, [www.anlw.anl.gov/anlw\\_history/general\\_history/gen\\_hist.html](http://www.anlw.anl.gov/anlw_history/general_history/gen_hist.html).
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- 10 Edward L. Quinn (2001), "U.S. Commercial Nuclear Power Industry Assessment for Department of Energy," MDM Services Corp., October, pp. 4–5.
- 11 Office of Space Commercialization (2001), "Trends in Space Commerce," Department of Commerce Technology Administration, June, pp. 5-3, 5-5.

# Insurance: A Risk to the Economy?

(Continued from front page)

profits and consumers' paychecks. Recent changes in the industry have made this financial tool more expensive and more difficult to obtain, which could reduce investment and slow the economic recovery.

## The Economics of Insurance: Life's a Gamble

Most economic activities involve risk. Our society has developed mechanisms for reducing the amount of risk people bear from day to day. Futures markets, hedge funds and insurance are examples. By transferring risk to others, these mechanisms make it easier for people to make decisions when there is uncertainty.

To purchase insurance, an individual or business pays a fixed price to an insurer, who promises to pay a lump sum or periodic payments if a covered event happens within a specified time period (usually 12 months). For example, property owners buy insurance that will compensate them for a future loss, such as fire or theft. The risk of loss is transferred from the property owner to the insurance company.

The cost of the insurance—the premium—is calculated so that, on average, it is sufficient to pay the present value of expected future claims plus administrative costs and profit. Actuaries estimate the risk involved and determine the appropriate premium based on the level of risk.<sup>2</sup> Some risks are more difficult to estimate than others. Historical loss data are a good predictor of claims for personal automobile insurance, but catastrophic risks, such as earthquakes and hurricanes, are very difficult to predict. Other losses, such as mold, may not be envisioned as a potential large risk when insurers originally price the coverage. Still other losses emerge from court decisions that make insurance companies liable for claims the companies did not anticipate and did not price into the premium.

Insurers are able to bear the risk of unpredictable events by pooling a diversified group of customers. To insure its own risk portfolio, the company issuing the policy typically sells a percentage of

the risk to other insurance firms, referred to as reinsurance companies. Diversifying or spreading the risk to reinsurers helps protect the insurer from catastrophic losses.

Insurance coverage is available for many types of activities. Individual coverage can be purchased for life, disability, property, auto and health, while businesses can be insured for property, workers' compensation, catastrophic events and business interruption.<sup>3</sup> In recent years, firms have found innovative ways to use insurance to hedge risk. Insurance is available to share the risk of potential lawsuits for company officers and directors. It can hedge losses a business might incur if it were unable to function.

An important source of income for insurance companies—particularly property casualty and life insurers—is the profits earned from invested premiums. Often companies use anticipated profits from investment earnings to reduce premiums to gain market share. Because investment earnings can be substantial, operating losses—that is, covered claims—often exceed premium income for several years. For property casualty insurers, covered claims have exceeded

premium income every year for the past 25 years (Chart 1).

The link between industry income and premiums contributes to an insurance cycle. This cycle is affected by many factors, including price competition, the availability and affordability of reinsurance, regulatory pressures, unplanned classes of losses and economic conditions. Insurance companies must maintain an adequate level of income or capital to cover potential claims. When insurance premium prices come down due to a limited number of claims or lucrative investment opportunities or both, the level of capital grows and the insurance market is referred to as "soft." High levels of capital and weak demand can lead to loosened underwriting standards. Competition drives down premium prices, and coverage is easily available.

When premiums are driven upward, such as when there is a large number of claims or a poor return on investment, capital may be depleted and the insurance market becomes "hard." When the market hardens, premiums rise and coverage levels decline substantially until capital is replenished, at which time the market softens and the cycle resumes.

The cycle most directly affects property casualty insurers, but it can influence other parts of the insurance market to the extent that a firm chooses to use income from one industry segment to finance expansion in others.

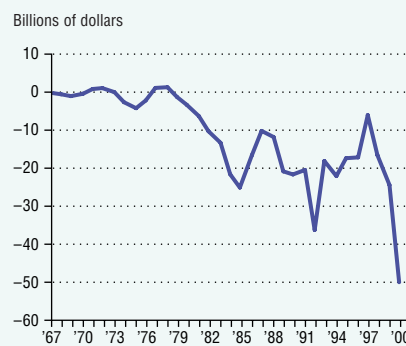
Insurance premium rates reflect financial market conditions as well as underwriting risk because of the extent to which insurers—particularly property casualty insurers—rely on investment income. When interest rates are low, some argue, insurers may not be experiencing a true "underwriting crisis" based on mispricing the risk but rather a misestimation of the investment income returns used to offset insufficient underwriting. There may be some correlation between property casualty insurance hard markets and trough periods in financial markets.

## The Insurance Industry's Own Catastrophic Event

The 1990s were good years for those wanting to purchase insurance and the companies that sold it. Insurance was readily available and relatively inexpen-

Chart 1

### Underwriting Gains and Losses for Property Casualty Insurance



NOTE: Gains and losses are the difference between premium income and covered claims plus administrative costs.

SOURCES: A.M. Best Aggregates and Averages, Property Casualty, 2000, for time series data 1967–1999; Thompson Financial Insurance Solutions for 2000 and 2001.

sive. A raging bull market led to a soft insurance market, in which insurers used healthy investment returns to hold down premium costs. Flush with cash, insurance firms sought market share with less concern for risk.

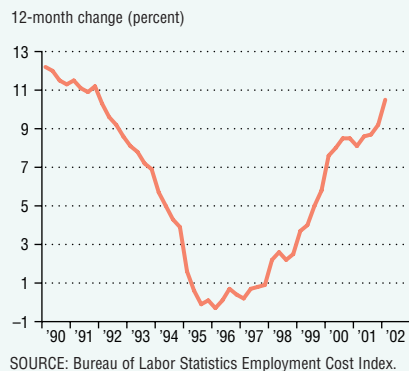
The insurance market began to harden in 2000, when growth in investment profits waned with the economy. By early 2001, faced with growing claims, the industry was having difficulty offsetting operating losses with investment income. Lower interest rates weakened earnings from bond holdings, and stock earnings plateaued. As capital was depleted, insurers were forced to evaluate risks more carefully, and premium rates began to rise to more fully reflect potential losses.

Then an unexpected thing happened to an industry that specializes in helping others deal with the unexpected. In the midst of a hardening insurance market, the industry had to absorb an unprecedented catastrophe: September 11. The terrorist attack was the largest single event in any segment of the industry, including health, workers' compensation, property, airline liability and the reinsurance market. Catastrophic losses in 2001 were the highest in the industry's history.<sup>4</sup> Underwriting losses in the property casualty industry (claims and administrative fees exceeding premiums) were roughly \$50 billion in 2001 (see *Chart 1*). For the first year ever, insurers paid more for claims than they collected from premiums plus investment earnings.

The large volume of 2001 claims and mounting investment losses drained industry capital and accelerated the firming of the insurance market. Some of the investments that had produced hefty gains a couple years earlier were now reporting substantial losses.<sup>5</sup> Administrative costs swelled, particularly for property and casualty insurers, because they need more information from policyholders to properly classify risk. While insurers must reassess the probability of terrorism and other catastrophic events, they must also take more care in classifying other risks. During the 1990s quest for market share, it was easier for insurance companies to absorb unexpected losses. Problems with rising noncatastrophic losses, such as mold and medical liability claims, were also easier to absorb.

Chart 2

### Employers' Share of Health Insurance Premiums Continues to Accelerate



Insurance and reinsurance firms today can no longer absorb as much risk as they did in the 1990s, both because the industry has fewer assets to back the risk and because the risks that previously seemed remote are more probable now than they were only a few months ago. Terrorism coverage has become particularly problematic for insurance firms and businesses. Insurers are generally unwilling to issue policies for risks they believe are undiversifiable. While limited coverage is available at high prices, most reinsurance companies no longer offer terrorism coverage, citing an inability to project the frequency and magnitude of potential losses. This leaves primary insurance companies with no way to insure their risk, while they are locked in to existing policies until renewal. Further, in some states regulators require insurers to offer coverage for certain risks, such as workers' compensation and fire, irrespective of their cause; exclusions for terrorism are not allowed.

To build capital and rein in exposure, some firms have stopped issuing policies for certain types of coverage. Others have drastically reduced coverage or are issuing policies only to customers perceived as low risk. Strains on the insurance market are heightening concerns about rising noncatastrophic claims, particularly in Texas, where costs for mold and medical malpractice claims have been skyrocketing. (See the box titled "Big Claims in Texas.")

The reduced supply of insurance

capacity has resulted in escalating premium prices. In 2001, written premiums rose by about 12 percent, according to a Standard & Poor's industry survey.<sup>6</sup> Standard and Poor's estimates that overall premiums will grow 17 percent in 2002, with commercial lines up 30 percent. Some policyholders report premium increases of more than 200 percent.

### A Damper on the Economy?

Insurance helps facilitate economic investment by encouraging people to take risky but economically beneficial actions. During the 1990s, consumers and investors benefited from the good fortunes of the insurance industry. Insurance firms garnered sizable investment earnings that were partly used to reduce premiums, making insurance a widely available and relatively affordable financial tool.

The recent sharp rise in premium prices is being felt across the economy, reducing consumer spending and business investment. For several months, the Federal Reserve's Beige Book has been reporting widespread concerns about insurance costs from businesses in all economic sectors. Recent surveys by the National Federation of Independent Business report that the cost and affordability of insurance are among the most important problems facing small businesses. According to the Employment Cost Index, employers' share of health insurance premiums resumed its acceleration in 2001, jumping 10.5 percent in the first quarter of 2002 (*Chart 2*). Hefty premium increases are pressuring the bottom line for many policyholders, particularly those located in high-risk areas or perceived as exposed to high-risk activities. However, the insurance cost increases remain a relatively small part of consumer spending.

The economy is also being affected by reduced use of this financial tool, particularly for property insurance, although the magnitude of this is unclear. Because of higher premiums and more rigorous underwriting standards, some policyholders are settling for reduced coverage; others are unable to obtain any coverage. In these instances, several outcomes may occur. Investors may continue to engage in the activity and bear more risk of loss themselves. Or, unable to reduce the investment risk, they may

choose not to invest at all. In both cases, the effects of the recent insurance market changes may take time to reverberate through the economy.

Investors who choose to bear more risk themselves will, in effect, be self-insuring. These individuals or firms may take actions to reduce the size or severity of potential losses. For example, they may purchase a new sprinkler system or burglar alarm, or they may set aside a fund to cover losses. These expenses could be considered part of the rising cost of insurance. If successful, they may not result in any additional effect on the economy. However, the rise in self-insurance is likely to lead to an increase in uninsured losses if preventive measures are not taken or are not sufficient. Expenses from uninsured losses will show up on corporate balance sheets and in homeowners' budgets as firms and families absorb unpredictable losses.

Investments that are being foregone in the new insurance climate may do even more economic damage. Lack of insurance is impairing certain business transactions, particularly those requiring aviation liability insurance and some types of property insurance. The lack of *affordable* insurance is causing even more deals to fall by the wayside. Again, it is difficult to determine the total effect of these disrupted transactions. But one thing is clear: They would likely have been successful in a softer insurance market. And without them, economic activity in the United States is less than it otherwise would have been.

## Conclusion

2001 was a difficult year for insurers and policyholders. An unprecedented surge of catastrophic claims, caused primarily by the September 11 terrorist attacks, has led insurers to reassess the probability of future devastating losses. The large volume of claims could not have come at a tougher time for the industry. Weak growth in investment earnings in 2001 left insufficient industry capital to offset tremendous underwriting losses. Insurers have responded with significant premium increases and coverage reductions as they pull back on the amount of risk they are willing to take. As a result, insurance firms are again raising  
*(Continued on back page)*

## Big Claims in Texas

They say that everything is big in Texas, and the same is true for insurance claims. And, not surprisingly, insurance premiums. Texas homeowners pay the highest insurance rates in the country. Ultimately, insurance rates are linked to the cost of expected claims, including the probability of damages and the price of repair.

While the cost of living—and therefore the price of repair—is relatively low in Texas, the frequency of insurance claims has been high compared with other states. Over the last 50 years, Texas has had more catastrophic events than any other state.<sup>1</sup> Hurricanes, hailstorms, floods, tornadoes and high winds—Texas has had them all, and all cause significant property damage.

Texas also has some of the most generous home insurance policy provisions in the country. (State laws govern the provisions of policies insurers can issue.) For example, if a Texas homeowner's roof is damaged, it is fully replaced even if the roof was old and in poor condition before being damaged. This requires the insurance company to pay for routine maintenance as well as catastrophic damage, which results in higher premiums. In

early 2002, the state authorized the issuance of less comprehensive policies—similar to those issued in the rest of the United States—which are slowly being introduced to policyholders.

Recently, a wave of noncatastrophic claims—specifically from mold and medical liability—has stirred concern from insurers and policyholders alike.

Mold has been around for hundreds of millions of years and, in some forms, provides delectables for cheese and yogurt lovers. Recently, however, mold—particularly *Stachybotrys chartarum*—has stirred widespread fears of respiratory distress and insurable damage. Mold insurance claims have accelerated exponentially over the past few years, costing insurers more than \$1 billion in 2000–01. Over three-quarters of those claims are in Texas (*see chart*).

In many states mold damage is not covered, generally because it is considered a maintenance issue. A recent court case, however, confirmed the responsibility of Texas insurers to cover mold damage. In response, some insurers have increased homeowners' premiums, and the state's three largest insurers have stopped writing homeowners policies for new customers.

Medical malpractice insurance premiums have been escalating across the country, thanks to a rising number of lawsuits with hefty damage awards, settlements and legal expenses. The problem has become particularly severe in South Texas, where health conditions are among the nation's worst and the need for doctors is intense.

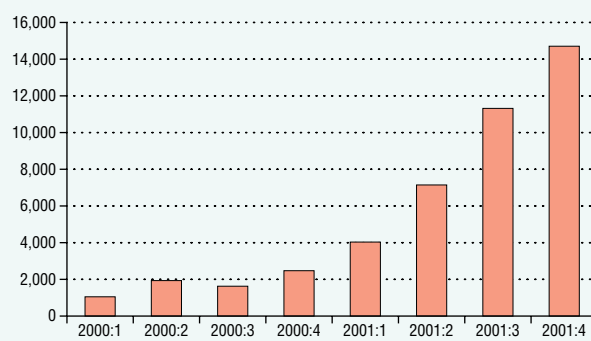
Recent increases in premiums have prompted doctors to rally for reform and insurance carriers to leave the market. Eight carriers have stopped issuing medical liability policies in Texas, and the remaining carriers have raised rates by 120 percent since 1999, according to the Texas Department of Insurance.<sup>2</sup> The department expects premiums for Texas doctors to rise by 20 percent this year, one of the largest increases in the nation.

According to the Texas State Board of Medical Examiners, as of April 16, 2002, just over half of all Texas doctors have at least one active malpractice claim filed against them, up from about 15 percent in 1992. In some specialties, such as cardiovascular, neurological, plastic, thoracic and orthopedic surgery, 75 percent or more of the doctors have at least one outstanding liability claim.

As with catastrophic events, noncatastrophic claims can be unpredictable and large. Problems such as mold and medical liability arise when the probability of such losses was not originally factored into the premium rates and when premiums fail to adjust quickly enough to changes in the probability of such claims. The insurance industry can absorb unexpected claims more easily in a soft market, when investment earnings are rich. Recent changes in the industry have accentuated problems with noncatastrophic claims because insurers can no longer afford to subsidize premiums for the sake of market share.

### Texas Mold Claims Growing Rapidly

Estimated total number of claims



SOURCE: Texas Department of Insurance.

### Notes

<sup>1</sup> Property Claim Services, a unit of Insurance Services Office, Inc., Jersey City, N.J.

<sup>2</sup> Texas Department of Insurance, <http://www.tdi.state.tx.us/commish/nr06282a.html>.



## Latin American Market Reforms Put to the Test

**B**y the beginning of the 21st century, Latin America was supposed to have living standards comparable with those of developed nations. At least, that was the implicit promise behind the ambitious economic reforms undertaken by most countries in the region during the last two decades of the 20th century. Unfortunately, not all expectations have been fulfilled.

Instead, a wave of dissatisfaction and questioning of the wisdom of market-oriented policies is spreading throughout Latin America and the world. It began with a vocal antiglobalization minority, but the ranks of the discontent seem to be growing, most recently fueled by Argentina's 2001–02 meltdown.

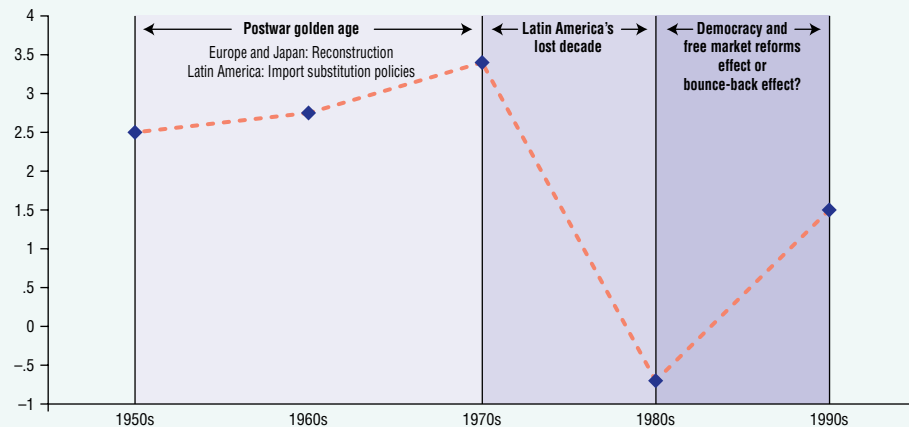
Why is Argentina, a country that was often praised for its reforms and cited as an example for other emerging economies, suffering one of the most severe economic depressions of its history? If the best student is in deep trouble after having done what the teacher advised, what awaits the rest?

Many analysts fear that this wave of antimarket criticism will swing the pendu-

Chart 2

### GDP Per Capita Growth in Latin America, 1950–2000

10-year average (percent)



lum back to the populist and authoritarian policies that market reforms were meant to replace. The fear is justified in that the reforms have not yet improved living standards to the degree promised. During the 1990s, per capita income in Latin America was far below that of both Asian and industrial economies (*Chart 1*).

Nonetheless, much of the criticism seems premature for two reasons. First, market reforms have improved the living standards in a number of Latin American countries, such as Chile, Nicaragua, Honduras and Costa Rica. Second, many criticisms typically overlook historical circumstances. The drive to market reforms originated not in purely ideological considerations but in the harsh economic realities that most Latin American countries faced in the 1980s.

### The Road to Market Reform

From the Great Depression until the 1980s, the apparent success of centrally planned economies prompted many developing countries to embrace the idea that governments, rather than markets, were best equipped to deliver endless prosperity and opportunities to their

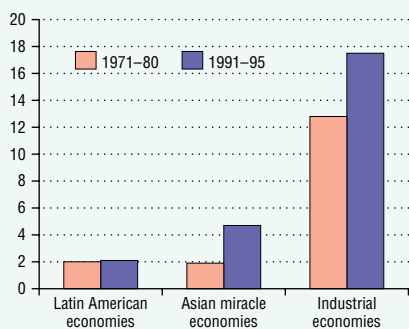
citizens. In the spirit of centrally planned economies, most Latin American countries adopted a growth strategy in the form of import substitution policies—those aimed at protecting and developing national industries through government intervention. The results were high import tariffs, government subsidies, nationalization of major industries and other forms of protectionism. Domestic prices were controlled. Currencies carried a high devaluation-risk premium, which made equipment imports needed for industrialization very expensive.

This import substitution strategy appeared to work at the beginning; GDP per capita steadily increased at an average annual rate of 3 percent between 1950 and 1980 (*Chart 2*). Less apparent, however, was the debt buildup taking place at the same time. A foreign debt crisis erupted, beginning with Mexico in 1982 and spreading throughout Latin America with such devastation that the 1980s became known as “the lost decade.” GDP per capita declined at an average annual rate of 0.7 percent during the decade. Hyperinflation was endemic. By 1986, three out of four Latin Ameri-

Chart 1

### Comparison of Per Capita Income, 1971–80 and 1991–95

Thousands of 1987 dollars\*



\* Simple average.

SOURCE: Inter-American Development Bank calculations based on World Bank statistics.

can countries had inflation rates above 30 percent.

The unparalleled crisis of the lost decade motivated a policy debate, not much different in intensity and motivation from the current one. Heavy-handed government intervention was rejected for market reforms in hopes that the region would return to its fast-track growth rate of the 1950–80 “golden age.” Emphasis on the market economy pushed import substitution policies by the wayside. Trade opened up. Institutional and political reforms replaced dictatorships with democracies. Latin America began the 1980s with 10 democracies (out of 26 countries); by 1990, all but four countries were democratic, and by 2000, only Cuba was not.

The big government era came to an end. Privatizations—turning over government institutions and activities to the private sector—became prevalent. Domestic financial systems were deregulated, and controls on capital flows and foreign currency transactions were eliminated. Latin America experienced a dramatic turnaround in the 1990s. GDP per capita growth rebounded to positive territory (*Chart 2*), and inflation declined. By the end of 1996, only one country had an annual inflation rate over 30 percent.

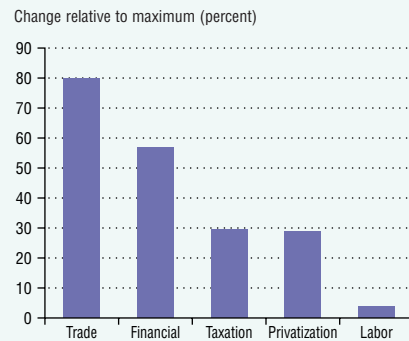
Even so, market reform critics argue that the progress was unrelated to the reforms. GDP per capita in the 1990s grew at rates that, although higher than in the 1980s, were still about half the growth rates of the import substitution era. They conclude that the relatively good performance of the 1990s is only a natural bounce-back that would have happened anyway. They also emphasize that unemployment has been climbing throughout Latin America roughly since the mid-1990s, even in countries where the reforms seem to have worked best, such as Chile.

### Bumps in the Road

These observations suggest that the question is not why market-friendly reforms have not been successful, but rather why they haven't been *as successful* as their advocates promised. Existing economic theory provides some guidance. The theorem of the second best asserts that the absence of government intervention in a particular market or set

Chart 3

### Progress of Structural Reforms, 1985–95



NOTE: Progress is measured as the change in the index between 1985 and 1995, divided by 1 minus the value of the index in 1985. Indexes are simple averages of the indexes per country.

SOURCE: Lora, Eduardo (1997). "A Decade of Structural Reforms in Latin America: What Has Been Reformed and How to Measure It," OCE Working Paper no. 348, Inter-American Development Bank, Washington, D.C.

of markets does not guarantee a favorable outcome for the society as a whole when imperfections or regulations in other markets are not removed at the same time. In other words, introducing free market reforms in some areas, but not others, is not necessarily better than a little bit of government intervention in *all* markets.

Although Latin America has made great progress in some areas, such as financial and trade liberalization, not much has been accomplished in terms of labor market legislation (*Chart 3*). The second-best theorem suggests that opening up trade while keeping labor markets heavily regulated may be bad policy because it may not guarantee enough jobs to employ the workers displaced by trade liberalization.

Domestic policies of the Latin American countries are not the only ones at fault. Developed countries also have failed to liberalize trade in agricultural products, textiles, steel and other commodities. Therefore, in another application of the second-best theorem, trade liberalization for one group of countries is not necessarily the best policy when the trading partners do not reciprocate. Thus, both the failure to remove labor market regulations and the protectionist policies of developed countries may be responsible for the underachievement of market-friendly reforms.

Another theorem, the second-welfare theorem, may also apply. Roughly stated, this theorem asserts that a free market economy can make everyone better off than an economy without free markets, provided the losers in the transition from one regime to the other are appropriately compensated. In implementing market reforms in Latin America, policymakers may have overlooked this important caveat. Stubbornly high poverty rates may very well be the lingering social consequence of that omission.

In any case, the market-friendly reforms introduced in Latin America since the 1980s have succeeded in rescuing the region from the stagnation to which it seemed condemned during the lost decade. But these reforms have fallen short of achieving the prosperity they promised. However, it is premature to attribute the failure to any intrinsic shortcomings of the reforms. The evidence seems to point instead to serious asymmetries and lack of depth in implementation.

On the issue of market reforms, as in almost anything else, the devil seems to be in the details. No question, those details may be imperative for the fate of market reforms. Policymakers and scholars will have to be more aware of the potential bumps in the road of market-friendly reforms and engineer ways of driving over them as smoothly as possible, without wrecking the economy in the process.

Provided this challenge is confronted with technical competence and patience, available economic theory supplies plenty of reasons to be optimistic about the ultimate ability of market reforms to deliver, in due time, on their prosperity-for-all promises.

—Carlos E. J. M. Zarazaga  
Sherry Kiser

*Zarazaga is a senior economist and executive director and Kiser an associate economist and coordinator in the Research Department's Center for Latin American Economics at the Federal Reserve Bank of Dallas.*

# Regional Update

There is now little question that Texas has come out of the recession. Nonetheless, May data suggest the recovery so far has been weak. Labor markets appear generally stagnant, with essentially zero job growth since January. During May, manufacturing and mining employment fell, while jobs in government and other service-producing sectors rose. Employment of temporary personnel increased in both April and May, however. This mirrored developments at the national level and should be a sign that more robust employment growth is in the short-term outlook for our region.

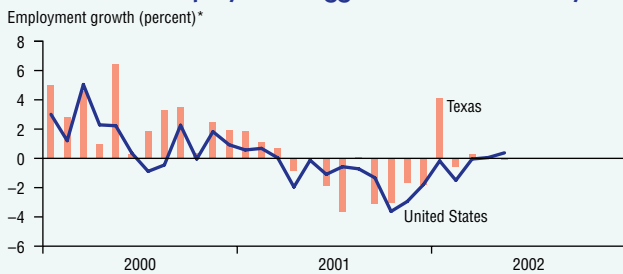
As the Texas employment level has remained flat, so has the state unemployment rate. The unemployment rate was revised upward to 6.2 percent in April and remained there in May. Employment growth must pick up soon to absorb the growing Texas labor force; otherwise the unemployment rate is likely to rise further. One interesting pattern in metropolitan unemployment rates within Texas is that San Antonio and Houston,

which typically have had the highest unemployment rates among major Texas cities, now have the lowest. They are, however, the only major Texas cities that did not see improved unemployment rates in May.

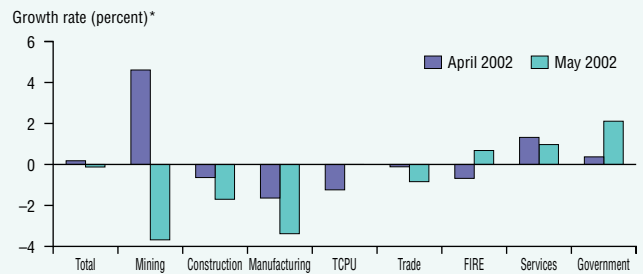
An unusual aspect of the current recovery is how well Texas' economic activity is tracking the nation's. This change in the post-World War II relationship between the Texas and U.S. economies is explained by an increasingly diversified Texas economy and its decreased reliance on the volatile energy sector. Economic indicators such as the coincident and leading indexes for both the region and the nation depict similar conditions—a continuing but slow recovery. The Texas Leading Index has increased over the last few months, suggesting recovery will pick up in the second half of the year. Strengthening of the Mexican economy and export growth will further aid the Texas recovery.

—Anna L. Berman

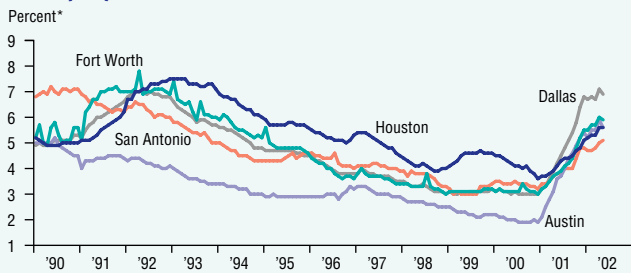
## Total Nonfarm Employment Suggests Jobless Recovery



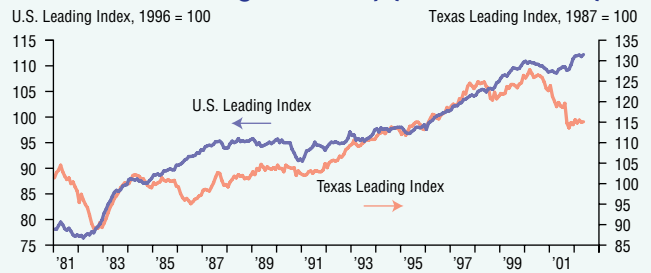
## Government and Service Sectors Drive Job Growth in Texas



## Unemployment Rates in Texas Cities



## U.S. and Texas Leading Indexes Imply a Slower Recovery



## Regional Economic Indicators

	Texas Leading Index		TEXAS EMPLOYMENT*				Private service-producing	TOTAL NONFARM EMPLOYMENT*		
	TIPI† total		Mining	Construction	Manufacturing	Government		Texas	Louisiana	New Mexico
5/02	115.1	—	159.6	558.9	1,009.7	1,613.1	6,120.5	9,461.8	1,917.4	759.9
4/02	115.0	125.7	160.1	559.7	1,012.6	1,610.3	6,119.6	9,462.3	1,921.4	761.1
3/02	115.5	125.3	159.5	560.0	1,014.0	1,609.8	6,117.6	9,460.9	1,923.5	762.5
2/02	114.8	125.7	160.8	559.4	1,018.0	1,606.7	6,113.9	9,458.8	1,922.9	762.9
1/02	115.6	126.0	161.7	561.1	1,024.8	1,603.4	6,112.3	9,463.3	1,926.1	762.2
12/01	114.4	127.0	161.9	559.7	1,024.5	1,597.2	6,088.3	9,431.6	1,925.5	758.3
11/01	114.9	126.8	162.7	559.4	1,027.9	1,594.4	6,101.5	9,445.9	1,925.7	758.1
10/01	113.6	127.1	163.0	559.0	1,033.1	1,592.7	6,111.3	9,459.1	1,926.7	758.5
9/01	114.8	129.8	163.7	561.4	1,038.9	1,592.4	6,127.3	9,483.7	1,924.0	756.3
8/01	119.6	130.6	164.5	564.0	1,047.6	1,584.3	6,148.4	9,508.8	1,928.2	756.3
7/01	118.6	131.5	164.1	561.7	1,053.0	1,584.9	6,144.7	9,508.4	1,925.4	756.4
6/01	118.9	131.5	164.2	565.6	1,063.0	1,584.2	6,161.0	9,538.0	1,927.0	757.5

\* 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](http://www.dallasfed.org).

## Insurance: A Risk to the Economy?

(Continued from page 8)

premiums enough to cover claims and rebuild capital; the insurance cycle looks like it is beginning to turn.

Uncertainty remains for policyholders. Premium rates have increased, and uninsured property is vulnerable to unexpected losses. The insurance industry has shifted some risk back to property owners and stockholders. Recent changes in the industry are likely to make risk-averse individuals and businesses unwilling to engage in activities that are not covered by insurance or not covered at a price they can afford.

—Fiona Sigalla

*Sigalla is an economist in the Research Department of the Federal Reserve Bank of Dallas.*

### Notes

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- <sup>1</sup> The insurance industry defines a catastrophe as an event that causes at least \$25 million in insured losses.
- <sup>2</sup> The economics of insurance is greatly affected by the insurer's ability to obtain information about risk. Several well-known problems can occur when the insurer cannot clearly observe the insured's expected risk at the time the policy is issued. For example, the insured may hide risky behavior from the insurer (adverse selection), or an individual may choose to engage in atypically risky behavior after becoming insured (moral hazard).
- <sup>3</sup> Insurance companies also sell annuities, a combined insurance and investment product.
- <sup>4</sup> Property Claim Services, a unit of Insurance Services Office, Inc., Jersey City, N.J.
- <sup>5</sup> Insurance companies have reported losses from investments in Enron Corp., Kmart Corp., WorldCom Inc. and several dot-com companies.
- <sup>6</sup> *Insurance: Property-Casualty*, Standard & Poor's Industry Surveys, Vol. 170, no. 4, sec. 2, Jan. 24, 2002.

## Southwest Economy



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