

# **THE TEXAS ECONOMY:** **An Age of Global Economic Opportunity**

**A Descriptive Analysis of an Emerging Global Economy  
and Its Impact on the U.S. and Texas Economies**

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# From the Author: A Note to Our Readers

The Texas economy is changing. Globalization, changing business practices, and technological advances have intersected with an economic slowdown and the tragedy of September 11<sup>th</sup> to create an economic climate radically different from what Texans have known for the past decade. A new level of economic and employment uncertainty has filled the void where job creation and job loss now occur simultaneously. Once-dominant Agricultural and Mining sectors in Texas have been surpassed by growth in knowledge industries such as Telecommunications, Semiconductor Processing, and various new Service-oriented businesses.

A decade-long economic expansion in the state has finally come to an end but opportunities to ensure future prosperity lie on the horizon. For Texas, meeting these challenges means addressing the education and training needs of our workforce—from upgrading the skills of our current labor force to educating a future generation with the knowledge and skills necessary to thrive in the 21<sup>st</sup> century.

The *Texas Economy* monograph is a descriptive overview of the Texas and U.S. labor markets. It is an effort to explain many broad and complex economic trends and phenomenon in simple, yet interesting, text. We have identified several key themes, such as globalization, that affect all labor markets. We have attempted to "tell the story" of the Texas economy by weaving together a little economic theory with pertinent labor market trends and observations from many different perspectives. The monograph is intended to provide the economic context for students, job seekers, counselors, case managers, and other individuals and intermediaries involved in making informed education and career choices.

We hope these pages are insightful enough that even experienced labor market analysts can discover new material. More importantly, however, we hope these pages are interesting, informative, and easy to understand for those who need to know about labor market trends but don't have the time or training to understand complex economic jargon. We also hope that readers will be able to pass on their understanding to clients, students, friends, and colleagues so we may all be better informed about the economic side of the world around us.

This is the fourth edition of the *Texas Economy* monograph series and one that clearly portrays the influences of a global economy. The preparation of this piece has grown increasingly difficult each year as shifting employment trends, production processes, occupational boundaries and skill sets, employer hiring patterns, the effects of global competition, the international marketplace, and rapid technological innovation all converge to create a more diverse and complex labor market picture.

And there is no single economic authority to make perfect sense of it all. Indeed, getting a group of economists to agree on anything is difficult. President Harry Truman is purported once to have said, "All my economists say, 'on the one hand... but then, on the other hand'... What I really need is a one-handed economist!" Truly, the study of economic trends and the labor market is less than an exact science. Changes in the economy are just not easy to predict.

One reason for the difficulty is the increasingly rapid pace of change. During the course of preparing this publication, the Texas economy has gone from "dot-com mania" to a "dot-com paranoia;" from rapid employment expansion to layoffs and a recession in the national Manufacturing sector. The horrific events of September 11<sup>th</sup> eroded consumer confidence, the strongest bastion of economic growth and vitality, and pulled the rest of the economy into recession. There are still mixed signals of imminent prosperity, according to many readers of the economic tea leaves, and yet those expecting a swift and robust recovery in the economy have been disappointed by continued economic doldrums.

Economic volatility in this age of interconnected global events and instant information is unparalleled. Where once increased demand for a particular product of a manufacturer generally led to employment increases, today such an increase may or may not result, given the use of new technology, equipment, and production processes to increase productivity. Even if there are job gains, a growing percentage are likely to be filled outside of the country or by temporary or leased workers whose actual work location is never reported through any government statistics. And where once an occupational title connoted a set of relatively fixed and finite responsibilities, today the duties and required skills are more likely to include the requirement to perform "whatever is necessary" to complete a job or satisfy a customer.

The economy is a constantly changing marketplace dictated by the interactions of human beings. As such, no one knows for sure what the future will hold, including us!! Some things, however, we do know for certain, while other trends seem abundantly clear. These we have described and explained.

Most of the information presented here is based on research and analysis by Career Development Resources staff. We are grateful to the staff of TWC's Labor Market Information unit for their industrial and occupational projections and wage data. I am especially grateful for the work of Elizabeth Dimmitt in organizing, editing, and formatting this document.

For individuals, teachers, counselors, case managers, placement specialists, and a host of others, we hope this monograph sheds some added light on the Texas labor market and that it helps all of us make better-informed education, career, and program planning decisions.

Richard Froeschle, Director  
Career Development Resources

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# THE TEXAS ECONOMY:

## An Age of Global Economic Opportunity

### The Global Economy

*He arrives in New York on a Singapore Airlines flight, steps into his rented Toyota, courtesy of AVIS, and drives downtown to the Marriott hotel on Park Avenue. He grabs his Doone and Burke suitcase from the trunk, careful not to scuff his new Gucci Italian loafers on the Michelin tires. He orders room service as he turns on the Sony television to watch the heavyweight boxing match live from Kuala Lumpur. A young Puerto Rican student, working part-time while attending a local college, delivers his dinner—a pizza with a bottle of Perrier.*

*Suddenly, the boxing match is interrupted with a special news bulletin, courtesy of CNN, that an earthquake has just hit Taiwan and damaged many of the semiconductor chip manufacturing plants in operation there. He sighs heavily, knowing that his company, Nokia wireless phones, will be significantly affected by a chip shortage. "Oh well," he intones as he turns out the lights to go to sleep, "so goes another day at the office."*

Think about all the products and services that are part of your everyday life that are not made in America. It is almost impossible to write about the United States, or even the Texas economy and labor market, without mentioning the interaction of other countries in the international chess match we call the "global economy."

The terms "global economy," "new capitalism," and the "new economy" are often used interchangeably. The "new economy" is largely an American term, contrasted against the old American economy that was driven by a robust Manufacturing sector and plentiful natural resources.

The **new economy** concept shares many characteristics with a global economy. Both involve the entire spectrum of world commerce, have technology embedded in every aspect, and are characterized by constant change. Perhaps where the terms differ most is that success in the U.S.' new economy will largely depend on a highly-skilled workforce dedicated to lifelong learning and the creativity of new knowledge and ideas.

The **global economy**, on the other hand, may share these requirements or take other forms—from exploiting a low-cost labor pool to maximizing the availability of financial capital. Whatever it's called, a new international economic system now exists. As Robert Atkinson of the Progressive Policy Institute writes, "It is important to realize that a New Economy has emerged in the last decade, one that is more information-based, more global, and more dynamic. Beyond the rise and fall of the stock market or the success of any dot-com, the New Economy is here to stay."

But how did we arrive at this point in history when the global economic and social fabric are transforming so quickly? Aaron Task, in a special report to ABCNEWS.com, relates the series of events that set the stage for the current global economy. "[W]ith the end of the Cold War," he writes, "most of the world recognized a need to embrace Western-style capitalism or risk being left behind. Even communist countries like China acknowledged the flaws of the Soviet model and began moving toward free markets."

This free market system is also called **new capitalism** because it differs from traditional capitalism. The new rules for corporate behavior and world expectations for the system are just now evolving slowly and in pieces. *Business Week* magazine referred to the emerging global economy as still being in the robber-baron age. In other words, it's forging new ground.

Multinational corporations, which account for the majority of investment across foreign borders and over one third of all global trade, have no clear road map to follow. They are balancing the notions of profitability with civic responsibilities to each of the nations in which they do business. For example, how much responsibility should Exxon bear to preserve the physical environment of Malaysia or other countries where relevant laws are relatively weak or easily exploited?

Similarly, national governments struggle with their role. To attract foreign investment capital, they must provide political stability, sound economic and fiscal management, an educated workforce, and other infrastructure controls. But to what lengths should a government go to induce a global corporation to invest in its country? The ground rules are only beginning to emerge in the new post-Cold War era of globalization.

Clearly, both governments and corporations must balance social responsibility with economic growth. But who defines this balance? Huffy Bicycles, for example, manufactures bicycles in China and pays workers no overtime for working 15-hour shifts, seven days a week. Are the Chinese people better off having jobs with oppressive conditions, by American standards, than having no jobs available at all? What responsibility does Huffy have as both an international corporate citizen and as a profit-maximizing company?

...the new rules for corporate behavior and world expectations for global capitalism are just now evolving slowly and in pieces...

As these questions are addressed piecemeal in the coming decade, most developing countries, whether they like it or not, will continue to operate in this Darwinian environment of unfettered global economics. As Paul Collier, director of development research of the World Bank, remarked, "[T]o close the door would be to shut out a transfer of capital from rich countries to poor countries. And nobody should want that." The winners will most likely be those that are able to strike the best balance between being profitable and being good corporate citizens.

# 1. Introduction to Globalization

**Globalization** is not just a catch phrase for the media. It is an international political and economic framework that has taken over in the post-Cold War environment. It is driven by technology, competition, and free and open markets. According to Thomas Friedman in his book, *The Lexus and the Olive Tree*, the definition of globalization is "the inexorable integration of markets, nation-states, and technologies to a degree never witnessed before—in a way that is enabling individuals, corporations and nation-states to reach around the world farther, faster, deeper and cheaper than ever before."

This process actually began a long time ago. The first wave of globalization, lasting from the 1870's to the mid-1930's, stemmed from technological and transportation advances, such as telephones, airplanes, and motor cars.

The first wave was eventually undermined by a series of events that caused nations to look inward. The Great Depression led the U.S. to impose huge tariffs and quotas, trying to protect its own national industries from commodity-dumping by other nations. Globalization continued to be stifled as World War I alienated nations and soured immigration and World War II led to the Cold War. With the end of that era, however, a second wave of globalization has begun.

While some analysts think this second wave is in full swing, well-known economist Lester Thurow believes that the real impact of a global economy is just beginning to be felt. In his book, *The Future of Capitalism*, he asserts that the raw materials and labor supply from eastern Europe, the former Soviet Union, and China will have a dramatic effect on where corporations locate facilities in the future, where workers they employ, and where they market their products.

...globalization is the integration of markets, nation-states, and technologies... enabling individuals, corporations and nation-states to reach around the world farther, faster, deeper and cheaper than ever before...

Table 1, "The New Rules of Globalization," offers some of the unique differences, many of which Friedman identifies, between the Cold War era and the new age of globalization. These "rules" are not so much prescriptions as they are descriptions.

While some of these "rules" may be new, U.S. companies have certainly had a lot more practice in mastering them than companies from other countries. Conglomerates such as Coca-Cola, McDonald's, General Electric, and Microsoft have eagerly led other nations in entering the emerging markets of Eastern Europe, Asia, and Latin America. These countries represent the untapped reservoirs of customers that U.S. corporate goliaths covet to generate bigger, faster profits.

While big U.S. companies expand overseas, big money from banks and investment houses has followed—everyone seeking profits in an expanded global marketplace. As predicted by economist Joseph Schumpeter's notion of **creative destruction**, financial capital from the developed countries—such as the U.S.—seeks the most profitable investment opportunities throughout the world.

**TABLE 1**  
**The New Rules of Globalization**

Characteristic	Cold War Period	Globalization
Born in...	1945 after the end of WWII. Lasted almost 45 years	1989 after the fall of the Berlin Wall. This second coming is only 12 years old
Friends and Neighbors...	World divided sharply between allies and enemies. World built around division and walls—both physical and economic	There are no economic friends or enemies—only competitors. Major feature is total world interdependence and integration
Most Frequently Asked Question...	Whose side are you on?	To what extent are you connected?
World Economic System...	Choice of capitalism, socialism, communism, and autocracies	Unfettered free market capitalism based on comparative advantage
Defining Measurement...	Weight—based on the ability to throw missiles around the world	Speed—the adaptation of commerce, travel, communications, and innovation to address world markets
Defining Document...	The Treaty—with whom are you aligned?	The Deal—with whom are you doing business?
Defining Structure of Power...	Nation-States with fixed national borders allied with either the U.S. or the U.S.S.R.	Nation-States balanced by independent financial supermarkets, influenced by super empowered individuals (some good, some bad—all influential)
Technology Symbol...	The "hotline" connecting the two superpower nations	The Internet, symbolizing that nobody is in charge and every country is interconnected
Cultural Impacts...	Discrete ethnic or regional cultures. Tradition, sense of belonging, and richness of the past take precedence	Cultural homogenization characterized by Americanization. Innovation, possibilities of future prosperity take precedence
Defining Anxiety...	Fear of annihilation from a known enemy	Fear of rapid change and loss through unknown and uncontrollable factors, e.g., technology, global financial markets
Sports Analogy...	Sumo wrestling—two fat guys in a ring glaring, posturing but having very little real contact	The decathlon—with all events performed on the same day
Reigning Economist...	Briton John Maynard Keynes—father of macroeconomics. His theories mapped relationship between capital investment, total demand, interest rates, and jobs. Posited interventionist role for government to stimulate demand	Austrian Joseph Schumpeter. His theory of creative destruction applies everywhere capitalism is practiced. Posited simultaneous job growth and contraction through innovation and a continuous reallocation of capital

### Creative Destruction

Joseph Schumpeter's theory of creative destruction has many facets. For some, the term "creative destruction" simply describes the now-common phenomena of technological advances creating new jobs while rendering others obsolete. But the theory has other implications.

One is that financial capital will move where it can obtain the best return on investment, not necessarily where it will be most productive. Investment create jobs. Moving financial capital to generate a better rate of return has the potential to destroy jobs at the place that loses investment, while creating jobs for the new investment beneficiary.

So far, most developing countries have eagerly welcomed the new cash. Many of these governments and their citizens are anxious to create their own version of the American dream, which they have seen first hand as a result of the global media explosion and improvements in telecommunications. But, lacking a history of open markets, many nations remain unprepared for the influx of capital. As a result, corruption and cronyism have become part of the global economic revolution. It is not surprising that in many cases global capitalism has focused resources and emerging wealth in the hands of only the elite or well-connected in these developing states.

The impact of globalization on these countries directly affects the U.S. economy and its citizens. Since U.S. investment dollars increasingly find their way to other countries, the political, economic, and financial events there take on new meaning to U.S. investors. And the U.S. has many. Where once the term "investor" was limited to a select few wealthy persons, today the average American invests as never before in corporate stocks.

When events occur, such as the Japanese stock market crash in 1989 and the subsequent collapse of the Japanese economy, there are implications not just for professional traders and a few corporations, but for almost everybody. In that case, Japan imported fewer products, including those of other Asian countries that depended on the health of the Japanese economy. Thus began a ripple effect that negatively impacted many countries along the Pacific Rim—as well as the U.S.

And this is just the beginning. As the countries of the world invest in each other's markets, they become more and more interdependent. With each world event, there are winners and losers. It's not a "zero-sum game" where everyone fights over larger pieces of a fixed size pie. Instead, the winners are those who can or do effectively take advantage of technology and the global marketplace. The losers are those that do not. Thus has begun a global age of economic competition and opportunity.

## 2. The "Side Effects" of Globalization

Few economists argue about the existence, and the on-going process, of globalization. What is in dispute is how the nations of the world will guide the process; what roles existing institutions, such as the World Bank and the International Monetary Fund (IMF), will play; and how the global community will address the multiple challenges created by the increasing interdependence among nations. Some economists, such as Herman Daly at the University of Maryland, prefer "internationalization," which reserves a larger local policy role for nation-states, to the current open market structure of globalization. Others disagree.

Some issues go beyond borders, including terrorism, pollution and infectious diseases...

Some issues go beyond borders. Terrorism has affected the global landscape and strained relations among many countries. Ecologists and health experts argue that predicted increases in air and water pollution and infectious diseases know no national borders and must be high priorities in the regulation of globalization. How these omnibus issues—which are simultaneously every country's and no individual country's concern—are addressed is critical to continued successful globalization.

Globalization may be here to stay, but what likely phenomena would accompany "unmanaged" global capitalism? Certainly, it presents both opportunities and challenges to governments and corporations. At least some of the handwriting is already on the wall:

1. **Increased wealth inequality** It is axiomatic of capitalism, after all, that rich people and rich countries get richer. Over the past thirty years, the per capita gross domestic product (GDP) gap between the richest and poorest countries widened from 40:1 in 1973 to 72:1 in 1992.

This trend has continued with globalization. According to Robin Hahnel in his 1999 book, *Panic Rules*, the world's 200 richest people have doubled their wealth since 1995 while the number of people in poverty has increased by 200 million.

2. **Worsened environmental problems** Unregulated markets encourage cheap waste dumping—encroaching on land and displacing farmers. This is especially true when a foreign corporation, with little vested political interest in improving the overall standard of living, draws on the resources of another country. This problem is exacerbated by developing countries with lax or limited environmental protection laws or a willingness to trade economic growth for possible environmental degradation.
3. **Accelerated movement of capital without productive uses** Even though financial capital moves freely around the world, very little of it is actually used for productive investment in plants or equipment. Indeed, 98 percent of currency trading in 1998 was for speculation purposes. Such rapid movement of capital in or out of a developing country can undermine its financial markets and economy (such as Thailand in 1998 or Argentina in 2001).

4. **Industrial and occupational winners and losers** In a global economy, **comparative advantage** causes upheaval in traditional industries. U.S. textiles, apparel, steel, lumber, and electronic components have all been threatened by offshore manufacturing. The Texas apparel industry, for instance, has lost thousands of jobs even as the overall economy has prospered.

### Comparative Advantage

A comparative advantage exists when one country or region can produce each of two (or more) products at less cost than some other nation or region but chooses to maximize efficiency by producing only one of those products and importing the other from elsewhere. Thus comparative advantage lies in the product or service a nation or region can produce at a greater efficiency, e.g., due to low-cost labor, available natural resources, proximity to transportation, and so on.

U.S. Senate Finance Committee Chair Max Baucus notes that global trade creates losers as well as winners. "[But] the costs of trade in lost jobs and closed factories are very focused, hitting individual industries and workers—affecting some regions much more than others," he lectured in a February 2002 speech to the Democratic Leadership Council. The Senator went on to say, "And those costs attract public attention. There are few headlines about the benefits of trade. But if a lumber mill in my home state shuts down because of unfair trade practices, it affects every single person in that town. And that will be a front-page headline in every newspaper in the area."

The Senator's point is well taken. Almost every American benefits from trade in some manner. Trade-driven (export) jobs tend to pay higher wages. Imports provide more choice and cheaper products to consumers. Still, communities that specialize in products that are now being manufactured overseas often have more to lose by supporting globalization. Vocal "losers" are more likely to challenge the political will in support of import tariffs and quotas than to promote unfettered global trade.

5. **Inequality of income based on comparative advantage** Even if one assumes that comparative advantage is an optimal strategy for global resource allocation, what happens to those countries that specialize in low-wage, low-value-added products, such as agricultural commodities? They may gain jobs but they are likely to fall behind in income equality compared to countries that specialize in high value-added manufactured goods. There are simply more profits in manufactured goods than in agricultural commodities.

6. **Limited job choices** When a country limits the breadth of its economy by concentrating on industry sectors in which it has a comparative advantage, it by definition forsakes economic diversity and limits occupational choices for its citizens. Is economic specialization really necessary for all countries? Just because a country has a strong computer software industry, should every child grow up to be a programmer?
7. **Homogenization of global culture** As American capitalism is exported around the world, so is American pop culture—the so-called "McDonald-ization" effect. Opponents of globalization believe world culture and diversity is downgraded with this ubiquitous spread of Americana—from the Hollywood media to apparel to fast food. Not all parents want their children to grow up with Mickey Mouse™, Barbie™ or Barney™!
8. **Increased market volatility** An interconnected, interdependent global economy leads to a domino effect during recessions. With the U.S. experiencing an economic slowdown, American companies and consumers are importing fewer products from overseas and outsourcing less business. When exports to the U.S. slow down, so do earnings of foreign governments and corporations. No wonder it is often said that when the U.S. sneezes, heavily export-dependent Mexico catches a cold!
9. **Continued economic growth threatens global limitations and capacities** This is akin to the environmental challenge. Clearly growth in undeveloped countries is important to raise the overall standard of living. But do likely social and earnings inequalities outweigh the benefits of growth for developed countries? In other words, what are the trade-offs between growth and the potential social and environmental upheaval which are the inevitable by-products of growth. Should there be a cap on growth to prevent environmental degradation.

As Richard Douthwaite summarizes in his book, *The Growth Illusion*, "the pathology that endangers our future is uncontrolled, undifferentiated, aggregate growth in economic output and consumption. We need growth in goods and services that serve the basic needs of the poor—as we reduce the more harmful consumption patterns of the already rich." Since the planet is dominated by poor people, Mr. Douthwaite undoubtedly has a large philosophical following.

### 3. Management Challenges: Avoiding Dysfunctional Globalization

Some of the side effects of globalization pose more serious threats than others. Depending on your perspective, some may even be acceptable trade-offs when compared to the benefits of global trade. Regardless of the side effects, however, most economists would argue that the process of globalization is already well underway. As Thomas Friedman writes in *The Lexus and the Olive Tree*, "I wish I could slow this globalization train down, but there's no one at the controls."

Given that fact, what can be done to manage global economic integration to the benefit of the greatest number of countries and citizens? What issues must be dealt with for globalization to work for everyone? Is world government a good idea, a necessary evil, or simply the inevitable loss of national sovereignty to multinational corporations? As the issues are discussed in the halls of government and in corporate boardrooms, the answers are far from unanimous. This is the exact reason that globalization is so controversial and of such concern to so broad an array of stakeholders.

The way individual countries, corporations, and citizens address these issues will set the economic and sociopolitical tone of the new millennium. Some of the issues or challenges are:

1. **Concentration of corporate power** In most globalization scenarios, power migrates from governments and organized labor to the corporate sector. While many companies are multinational, labor is primarily local and thus has less power to affect market conditions. This situation reduces the bargaining power of workers while increasing companies' choices for employing units of labor, especially full-time jobs for American workers.

Unions have also lost the power of their numbers. Union membership in the U.S. continues to decline, sliding from 17 percent in 1987 to 14.1 percent in 1997. This decline has occurred in all sectors of the economy except Government, which, with a 37.2 percent membership rate, actually accounted for roughly 42 percent of all union workers in 1997. Is it really in the best interests of workers or business for organized labor to have a diminished voice?

2. **Deregulation** How much control belongs in open markets and how much in presumably socially conscious governing bodies? Do we trust corporations to make the "right" decisions? Even the staunchest defender of the free market admits the need for government regulation to uphold the basic institutions, freedoms, and equity of access that form the cornerstones of capitalism. The Enron, Tyco, WorldCom, and Arthur Andersen frauds and other questions of corporate integrity have already begun to undermine the trust of people in private corporations. Striking a balance between free market control and the role of government will be an on-going challenge in the new global environment.

3. **Americanization of the globe** Smaller, local firms—regardless of nationality—can't compete with multinationals. We've seen the disruption and dislocation that can happen to local retail merchants when, for example, a WalMart moves into a small community. And how much homogenized American culture can the world tolerate before there is a backlash to American unilateralism that adversely affects the U.S.?
4. **Government without governance** A hallmark of globalization is that new transportation and telecommunication systems are making the world a smaller, more interconnected place. How will nations, corporations, and empowered individuals come together to deal with globally-shared problems which transcend national borders, such as environmental, terrorism, copyright infringement and intellectual property, and world health and communicable diseases? The phrase "One World Government" implies that a single governmental entity will provide all the functions necessary for governance. But which existing nation wants to abrogate its governing powers to a central world power?
5. **Participatory world democracy** The developed world clearly possesses greater wealth, resources, and power than other countries. Should that allow a powerful country, such as the U.S., to speak on behalf of all nations? In other words, at the global level, who speaks for whom? Who is invited to participate at the table? Who has what authority or veto power? Should every nation have equal votes or should there be a bicameral world governing body not unlike the U.S. Congress?
6. **Military enforcement** If there is to be world governance, shouldn't there also be an enforcement body to ensure compliance? The question then becomes what role a national military should play. Should there exist one integrated super-militia, multiple small national armies, or a global corporate security force? Fear of a global police state—rather than a unified police force—is a root concern of many globalization opponents.
7. **Influence of businesses on world politics** In a global economy, some multinational firms wield as much power as and enjoy a higher visibility than some countries. IBM's revenues in 2000, for example, roughly equaled the gross domestic products of Egypt, Singapore, and Columbia. General Motors' \$184 billion in 2000 revenues are about the size of the Turkish or Danish economies. In fact, if GM revenues were a country's GDP, the company would be the 23<sup>rd</sup> largest "economy" in the world. No wonder there is so much discussion of the relative declining importance of the "nation-state."

The controversy surrounding unfettered global capitalism falls around many of these crucial and yet unresolved challenges. The terrorist attacks of September 11<sup>th</sup> and the on-going terrorist threats to U.S. national security may be enough to slow down the rate of globalization for now. It remains to be seen whether one or more of these current globalization realities or management challenges is enough to completely derail this wave of globalization.

## 4. The Domestic Economy: Moving Globalization to the U.S. Labor Market

The United States is the center of global capitalism. In 1995, the world economy had a total value in goods and services produced of over \$19.6 trillion. Roughly 27.8 percent of that, \$5.4 trillion, was the U.S. GDP alone. By the first quarter of 2000, the U.S. GDP had risen to over \$9.1 trillion—roughly 29.6 percent of the world economy, which had exceeded \$31 trillion.

The U.S. dominates almost every aspect of international commerce, expanding its GDP by 59.1 percent during the nineties, compared with a 42.1 percent increase globally. By comparison, the second largest economy in the world is Japan with a \$4.3 trillion GDP—less than half that of the U.S.

All factors considered, the growth of the U.S. economy is a testament to the natural tendency of a free market capitalistic economy to grow and multiply. The total value of all goods and services produced in the U.S., as of the third quarter of 2001, was \$10.2 trillion. That is a lot of economic activity. But what is really going on? What does "the economy" mean and which parts of it are growing? How do the everyday phenomena taking place in this country and abroad affect the labor market and our ability to find and keep a job in Texas? This monograph sheds some light on these topics and hopefully provides the reader with enough economic background to interpret the constant change that seems to surround us.

## 5. The Influence of Global Competition on Labor Markets

To better interpret what is happening in the Texas and U.S. labor markets, it is important to understand what **capitalism**, as an economic system, really means and how global competition affects local labor markets.

**Profit maximization**—minimizing costs and maximizing revenues—is at the heart of capitalism. Breakthroughs in transportation, information technology, and telecommunications technology have enabled more companies to operate globally. They have new markets (to maximize revenues) and new sources of labor (to minimize costs). These changes have brought new demands and greater competition to the marketplace.

The "old" economy, characterized by the predictable production of long-term, well-paying jobs for many workers with relatively little education and limited skills, is giving way quickly to a new and more competitive world environment. Workers simply need more skills to compete. According to Owen Butler, former chairman of Procter and Gamble, "Globalization has meant that all companies—American, European, Asian—have world-wide choices. Global companies will take the high value-added work to wherever high value-added workers happen to be."

Sentimental attachment to any specific geographic part of the world is not part of capitalistic philosophy.

Sentimental attachment to any specific geographic part of the world is not part of capitalistic philosophy. The CEO of Coca Cola, for example, describes his corporation as an international entity that just happens to be headquartered in the United States. U.S. companies such as Tyco International, Stanley Works, Nabors Industries, and Ingersoll-Rand, meanwhile, are choosing "profits over patriotism" and incorporating their businesses in Bermuda to significantly reduce corporate income taxes.

One effect of this global marketplace is greater price competition, as consumers increasingly care more about prices and less about where a product is made. Price competition in turn makes business very cost-conscious, especially regarding their biggest expense—employee wages. Stagnant or declining real wages paid to American working class citizens in turn erodes their purchasing power to buy American products and stimulate American industry.

Since price competition means smaller profit margins, businesses able to expand their market scope are increasingly looking for more buyers to generate revenue. And they are finding them throughout the world. As former Secretary of Labor Robert Reich points out in his book *Work of Nations*, the global economy allows U.S. businesses to substitute foreign consumers for domestic purchasing power by opening up new markets in other countries.

Many American corporations are looking overseas to expand. They believe that emerging markets in Eastern Europe, Africa, South America, and Asia will fuel corporate growth well into the next century. This prediction translates into a rapid increase in offshore employment for two simple and overwhelming reasons: (1) the need to service emerging overseas customer markets, and (2) the need to take advantage of lower cost labor environments.

These business decisions will have major impacts on the U.S. labor market and Texas is not immune from their influence. According to Thurow, the new supply of worldwide educated labor available as a result of open global markets potentially will affect the wages of those without comparable education or skills in this country. He outlines the potential effects on American workers when he posits the question, "Why should anyone pay an American high school graduate \$20,000 per year when it is possible to get a better-educated Chinese for \$35 per month who will work hard twenty-nine days each month and eleven hours per day in China? American firms don't have to hire an American high school graduate if that graduate is not world-class. His or her educational defects are not their problem." Competition for jobs will obviously increase.

As price competition and access to an extended global labor supply become increasingly available to more firms, American wages will be affected, too. Thurow and others explain that many American workers historically have had higher earnings with less education than workers in other countries simply because they work with some of the best trained co-workers and have access to the best technology and equipment in the world. These factors raised workers' productivity and allowed them to earn a higher wage. As production becomes more mobile and technology more widely diffused to other countries, these wage premiums are likely to be reduced. As Thurow writes, "Put bluntly, in the economy of the future those with third world skills will earn third world wages even if they live in a first world country [such as the U.S]."

The influence of a global labor supply on wages can be observed already. The U.S. has the most unequal distribution of income of any industrialized nation and is surging toward greater inequality at the fastest pace of any industrialized nation. Education—the skills to compete—is the key. According to the U.S. Department of Education, the average difference in earnings between persons with no more than a high school education and those with at least a Bachelor's degree has increased from 19 percent in 1980 to 56 percent for males in 1998, and from 52 percent to 100 percent for females. Moreover, in 1998 persons who did not get a high school diploma made roughly 30 percent less than those that finished high school.

....those with third world skills will earn third world wages even if they live in the U.S.

With the exception of jobs that provide direct personal services to the customer, unskilled labor can be employed more cheaply outside the United States, leaving fewer opportunities for uneducated Americans. For a more in-depth description of the growing chasm between those who can master new technologies to enhance productivity and those being displaced by technology, see Marc Anderberg's works, *Technology Workers in the New Texas Economy* and *The Digital Divide: Bridging the Job Opportunities Gap*.

## 6. What Is An "American" Company?

With all the discussion about a global economy, international mergers, and emerging markets, what really constitutes an American company? The answer is neither simple nor consistent. According to financial investment researcher Gary Brinson, it is getting harder to separate countries from companies.

Certainly, not all companies are significantly affected by global economics. Those businesses with local or regional markets sell their products or services to a customer base in an area close to or within their community and feel relatively few effects.

As a business grows, however, it sometimes makes sense to look for customers nationally or internationally. Similarly, firms may search for the best prices for their supplies and parts anywhere they can, rather than buying them all from the local area. The Internet has made these business-to-business contacts much easier, cheaper, and faster and thus has significantly improved the supply chain.

Frankly, if a business or a consumer can purchase a product made in another country cheaper and of quality comparable to what they can get in the U.S., it is no wonder global commerce is blossoming. Improved transportation and telecommunications systems and a more open international political and trade-oriented business environment contribute to this increasing interaction among nations.

And it's here that identifying companies by nationality becomes difficult—especially with the multinationals—companies with consumers, suppliers, and/or personnel in more than one country. Yum! Brands Inc.—which owns Kentucky Fried Chicken, Taco Bell, Burger King, Long John Silvers and A&W—began in the U.S. but generated 34.5 percent of its 2000 revenues from overseas sales. Nestlé, on the other hand, is a Swiss company but generates 43 percent of its profits inside the U.S. Which company is more "American?"

...many U.S. companies now generate a significant amount of their sales and workforce outside this country...

Yum! Brands, Inc.'s foreign sales are not unusual. Many companies that started in the United States now generate a significant amount of their sales, revenues, and workforce outside this country.

Hewlett-Packard, begun in a good old American garage, will generate 23 percent of its total sales abroad. Other examples of "American" companies and the percentage of their total 2000 revenues that come from outside the U.S. include: General Motors (26.2 percent), General Electric (30.0 percent), Ford (30.4 percent),

Boeing (34.3 percent), Goodyear (47.2 percent), Motorola (52.5 percent), IBM (57.9 percent), Intel (58.8 percent), Coca-Cola (61.0 percent), and Texaco (65.9 percent).

The history of the RCA corporation is a perfect example of this phenomena. Founded as a joint venture between General Electric and Westinghouse in the early 1920's, RCA was an American manufacturing and innovation leader for over 60 years. In 1986, it was sold to General Electric, which in turn sold it to Thomson Consumer Electronics one year later. Thomson Consumer Electronics is a subsidiary of Thomson MultiMedia, a global conglomerate with corporate headquarters on three continents. Thomson MM derived roughly 63.7 percent of its 2000 corporate revenues from customers within the United States. And while they still market televisions under the RCA, Thomson, and GE brand names, none of those televisions are manufactured in America.

The RCA story illustrates what many firms see as a way to capture global market share: corporate mergers. There have been many high-visibility international mergers over the past several years, none more enticing than the Chrysler and Mercedes Benz companies becoming Daimler-Chrysler. Sometimes, a merger forms as a protective measure. To fend off the Wal-Mart invasion of Europe, for example, French supermarket group Carrefour acquired rival Promodes to create the world's second largest retailer. As these examples demonstrate, conducting business in the global environment presents challenges and opportunities. These, in turn, are beginning to significantly change the face of corporate America.

# The U.S. Economy

As this monograph's title suggests, the text identifies and discusses overall trends in the Texas economy, as well as phenomena in the national and global economies that help shape the labor market in Texas. But in this age of global reach, instant communication, and business volatility, a trend can come and go faster than it takes to identify and describe it!

The national economic picture exemplifies the rapidity of change. After 108 months of economic expansion and breakneck growth in sectors such as High-Tech Manufacturing, Autos, and Home Building, growth in the U.S. economy began to slow in the fourth quarter of 2000. Until this slowdown, the U.S. economy had been booming—experiencing continuing output and employment growth that, to many economists, defied conventional economic wisdom.

When the trend changed, however, it changed swiftly and dramatically. The 1.1 percent growth rate in fourth quarter 2000 GDP was half that of the third quarter 2000 and the slowest quarterly growth since 1995. By the first quarter 2001, GDP growth (revised) declined by 0.6 percent; somewhat better than expected but anemic by any standard. The second quarter was worse, showing a decline of 1.6 percent. During the third quarter of 2001 the national economy experienced continued negative growth at -0.3 percent and officially entered recession.

## 7. The National Economic Picture and Outlook

As 2002 unfolded, most economists have been freely invoking the word "recession" to describe the economic slowdown. Others have been slow to use the word because many of the conventional economic signals remain mixed and many of the "old economy" rules simply don't seem to apply in the new global environment. Strangely, with the fourth quarter 2001 GDP estimates coming in at 0.2 percent growth, some segments of the economic community are questioning whether there has really been a recession at all! Nonetheless, the National Bureau of Economic Research claims the national economy entered recession in March 2001—with the events of September 11<sup>th</sup> merely pushing an already battered economy over the edge.

When assessing the health of the economy, analysts point to many underlying fundamentals that indicate positive trends. As recently as July 16, 2002, Federal Reserve Chairman Alan Greenspan expressed the opinion of many economists that the fundamental indicators of the economy are strong and point to imminent recovery. He cites a 6.1 percent growth in GDP in the first quarter 2002 as a sign that the economy is recovering. Similarly, Bruce Steinberg, chief economist at Merrill Lynch, predicts a 3.5 percent growth rate in GDP for the second half of 2002, mirroring remarks from Treasury Secretary Paul O'Neill. These prognostications, however, occurred before the paltry 1.1 percent GDP growth for the second quarter 2002 was released by the Commerce Department.

Still, such figures, while not sterling, hardly reflect an economy in recession. But that doesn't mean U.S. workers aren't feeling the impact in the form of increased unemployment. After all, economic output and domestic job creation do not always go hand in hand. And even if the recession is over, history tells us that the unemployment rate may continue to rise even 12-24 months later.

Unemployment, which had tracked steadily downward since mid-1992, began an upward trend in 2001, rising for every gender and racial category. The trends can be viewed in a number of different ways. First, the unemployment rate rose. It crept up to 4.4 percent in May 2001, touched 5.4 percent in October 2001, reached 5.8 percent in December 2001, and hit 6.0 percent in April 2002.

In addition, the number of unemployed people increased. The civilian labor force was virtually unchanged between December 2000 and December 2001, closing the year at 142,314,000. The number of unemployed persons, however, shot up from 5.65 million to 8.26 million during that same period (seasonally adjusted). By June 2002, a rise in the labor force resulted in over 8.42 million unemployed individuals.

Although the events of September 11<sup>th</sup> shocked an already teetering economy into exaggerated job loss, the number of unemployed people rose by 2.6 million over the year and 1.2 million alone in the last four months of 2001.

Even the number of persons holding multiple jobs declined from 5.7 percent to 5.4 percent over the year. This figure is significant because two out of five people who work a second job do so to meet regular household expenses or to pay off debt. Another 7.7 percent of them hold a second job to gain experience or build up a business. These goals cannot be achieved without that extra work.

## 8. Recessions and Recoveries

With the unprecedented growth during most of the 1990's, many adults have never experienced a recession. That includes some in the media and government services who have never witnessed firsthand, or worked in, anything other than a prosperous economy. Boom times notwithstanding, recessions are a normal part of the business cycle, common during most periods of economic history.

**Recessions are a normal part of the business cycle... and are no cause for panic...**

The nation and Texas have experienced uncommon prosperity for the past decade with unsustainably-low unemployment rates. These were outside the normal expected business cycle. While recessionary periods put greater stress on public resources, they are by no means unusual nor cause for panic or extreme measures. The good news is that recessions, just like any other part of the business cycle, eventually come to an end. The question is "when?"

In any case, the national economy has entered recession. The challenge is in predicting when growth will resume. As Diane Swonk, chief economist for Bank One phrased it, "none of us know how long or how deep the tunnel actually is." Of course there is not just one answer to this question. Different industry sectors, such as High Technology and Telecommunications, are being harder hit and may take longer to recover.

Economists look at thousands of indicators to determine the economy's place in the business cycle—is it going up or down? If the economy is in recession, they then predict when it will recover and how robust the recovery will be. More than at any time in the past few decades, however, economists are split sharply about the direction in which the economy is heading. While economists often disagree, the schism between optimistic and pessimistic viewpoints is deeper and more intense than usual.

This disagreement plays out in the "alphabet soup" approach to cataloging economic recoveries that has recently come into vogue. Traditionally, for example, most recessions are shaped like the letter "U," with a steep downturn or slope, a relatively prolonged period of stagnation, and then a brisk recovery.

Some economists think the "U" doesn't apply to the most recent recession, which has been very short-lived and not particularly severe. To them, a "V" recovery seems more apt: a steep downturn followed by an almost immediate upturn. Other analysts look beyond some signs that strong economic growth is just around the corner and focus on a languishing stock market, declining Manufacturing sector, and only modestly improving unemployment. They wonder if there won't be a double-dip or "W" recovery, which is characterized by back-to-back recession and recovery cycles, both relatively short-lived.

Whatever the recovery type for the general U.S. economy, the picture for individual industry sectors may differ. And it is even more difficult to assess nowadays. The mostly Keynesian macroeconomic principles economists use to study the relationships among variables when evaluating economic conditions just don't seem to apply well in the global economy.

Is it possible, for example, to have economic growth and no net job creation? Old economic theories would say no. In the new global economy however, the answer is yes. Today, industries can produce more goods and services—thereby stimulating the economy—while using workers outside the U.S., contract labor, employees of foreign subsidiaries, or other labor arrangements. As a result, it is increasingly possible to create wealth without creating U.S. jobs. Table 2 lists industry sectors in the United States that are predicted to expand output from 2000 through 2010 well in excess of their projected domestic employment growth.

**TABLE 2**  
**More Output...Without More Workers**  
**U.S. Employment and Productivity Projections 2000-2010 (annual)**

Industry Sector	Employment	Output
Industrial Machinery	0.5%	6.1%
Electronic Components	1.6%	7.0%
Telephone Communications	1.2%	6.5%
Motor Vehicles	0.8%	4.4%
Warehousing/Storage	3.8%	7.2%
Personal Services	0.8%	3.8%
Chemical Manufacturing	0.4%	3.3%
Agriculture Production	-0.7%	1.9%
Computer Data Processing	6.4%	8.0%
State & Local Government	1.0%	1.4%

## 9. The Role of the Consumer: You Are the Economy!

What you buy has far-reaching consequences. It helps shape the direction in which our economy moves. Your purchases (and those of your neighbors) help determine the types of products and services that are in demand. By extension, they decide which **occupational skills** also will likely be in demand—because they're needed to produce the popular goods and services.

In 2001, over 69.2 percent of the U.S. GDP was driven by personal consumer expenditures. (Another 18.0 percent was due to government expenditures, with the remainder coming from business-to-business purchasing.) It's easy to see how. If, collectively, you and your neighbors eat out more often instead of cooking, take more clothes to the cleaners instead of doing laundry at home, and take kids to day care centers instead of parenting at home, you shape the kinds of goods and services that are in demand—such as food service, dry cleaning, and day care.

You also help determine what you are willing to pay for the goods and services. Since many of us could do some of these jobs ourselves if we so choose, we are not particularly willing to pay high wages to those who perform that work. For example, what consumer would pay \$10.00 for a cheeseburger or \$5.00 for a laundered shirt?

Since employers can only command so many dollars in the marketplace, they must pay wages commensurate with the sales revenues their workers generate. In the examples given, it is the combined effects of capitalism and **consumerism** (the willingness to buy and at what price) that cause wages for fast food, child care, and laundry workers to be lower than those of other professions. In just this way, personal consumption choices drive a large part of the U.S. and Texas economy.

## 10. Personal Consumption and the Labor Market

The U.S. economy was valued at \$10,229.7 billion in September 2001; consumers are responsible for spending over two-thirds of that amount. That's because Americans have the highest *per capita* income of any country in the world and have enjoyed that status for the past five decades. The national *per capita* personal income level rose to \$30,378 in 2001, representing a 30.4 percent growth rate since 1995. *Per capita disposable income*, those dollars available for spending after adjusting for taxes and other deductions, rose to \$25,859 in 2001, an increase of 27.0 percent since 1995.

This increased purchasing power has been one of the key drivers of the U.S. economic expansion, accounting for 69.7 percent of all purchases of goods and services in the U.S. in the second quarter 2002. By comparison, consumers contributed only 63.0 percent of all purchases in 1975.

What we buy is significant. Employment opportunities are derived from what people (and businesses) purchase. This **derived demand** translates into jobs. If Americans spend more money on recreation and leisure, for example, then the occupational skills needed to provide the products and services in this category also increase. Whether those jobs will be in this country or not is another matter for discussion.

By extrapolation, the goods and services we purchase strongly influence which industry sectors are likely to expand, assuming that relative prices remain constant. In 2000, American consumers spent \$6.26 trillion dollars on U.S. goods and services. Table 3 categorizes those expenditures by type, amount, and percentage of the total budget.

**TABLE 3**  
**U.S. Consumer Spending in 2000**

<b>Expenditure Category</b>	<b>Amount</b>	<b>Percentage of Total</b>
Medical Care and Drugs	\$1,043.5 billion	16.7%
Food, Beverages, and Tobacco	\$924.1 billion	14.7%
Housing	\$850.1 billion	13.6%
Cars, Parts, Gas, Other Transportation	\$735.8 billion	11.8%
Personal Business Services	\$554.8 billion	8.9%
Household Operation	\$377.6 billion	6.0%
Clothing, Shoes, and Jewelry	\$335.3 billion	5.3%
Furniture	\$294.6 billion	4.7%
Recreation and Leisure	\$227.0 billion	3.6%
Education	\$139.2 billion	2.2%
Computers and Software	\$126.6 billion	2.0%
Residual Expenses	\$649.2 billion	10.5%

## 11. The Wealth Effect Contributes to Consumer Spending

What drives consumer spending? Lifestyle choices influence *what* consumers buy. But what determines *how much* they'll spend? Income certainly accounts for part of it, but not all. In addition to the rising real incomes in the late 1990's, consumers have been buoyed by the **wealth effect**—a feeling of heightened wealth, even if only on paper. Some of this effect comes from seeing stock prices rise and their financial portfolios increase. Some comes from rising home values.

Whatever the source, the wealth effect contributes to consumer confidence—the measure of the public's enthusiasm to buy. It has resulted in both negative personal savings (i.e., spending in excess of earnings) and increased spending, further driving economic expansion. You yourself may have had a conversation that went something like, "Our Dell stock went up three points today. I guess we can afford a new washing machine after all!" This logic illustrates the wealth effect.

### Consumer Confidence

But starting in the fourth quarter 2000, both of these trends began to change. In fact, Chairman Alan Greenspan noted in his March 2001 address to Congress that not only had economic growth slowed but it had done so most abruptly. With personal savings down, paper wealth deflated, and increased media attention being paid to corporate layoffs, consumers have begun to lose confidence. That means they're spending less.

#### Technology's Effect on the Business Cycle

Interestingly, both Greenspan and former Secretary of Labor Ray Marshall note that the market "correction"—the decline of over-inflated stocks—has been magnified by the immediate spread of information simultaneously available to both consumers and businesses. The use of computerized just-in-time inventory systems, flexible manufacturing arrangements, and faster information access may have had the dual effect of slowing down the economy faster than the usual business cycle might otherwise dictate while keeping inventories from getting so far out of whack with consumer demand that a prolonged recession may be avoided.

The Conference Board's Consumer Confidence Index, a monthly estimate of the purchasing public's willingness to spend, has been on a roller coaster ride over the past year, as Table 4 reveals. The index uses 100 as a relative baseline. From 118.9 in June 2001, it fell to 84.9 after the events of September 11<sup>th</sup>—the lowest point since February 1994. By December 2001, confidence started to pick back up, causing the index to rise to 110.3 in May 2002. A labor market moving sideways, a battered stock market, and corporate scandals, however, have caused confidence to retreat to 93.5 in August 2002.

**TABLE 4**  
**Conference Board's Consumer Confidence Survey**

Date	Jun '01	Jul '01	Aug '01	Sep '01	Oct '01	Nov '01	Dec '01	Jan '02	Feb '02	Mar '02	Apr '02	May '02	Jun '02	Jul '02	Aug '02
CCB Index	118.9	116.5	114.0	97.6	85.5	84.9	93.7	97.3	94.1	110.2	108.8	110.3	106.3	97.4	93.5

The instant access to economic information and events described by Marshall and Greenspan (see box above) can be overwhelming to most Americans and has likely contributed to the abrupt changes in consumer confidence. High-profile layoffs in the Technology sector, for example—estimated at roughly 36,000 workers over the last six months of 2000—helped fuel a lack of confidence and drove down the index, which had been as high as 144.7 in January 2000.

Responses to the Consumer Confidence Survey indicate a growing pessimism about the short-term economic outlook. In an overall assessment of current conditions, consumer response seems to indicate that stagnant employment and economic growth is beginning to take its toll on people's willingness to spend. What reassurances or signs will reinvigorate the consuming public remain to be seen. Nevertheless, the fluctuations in the index may mean that the media has as much, or more, effect on consumer confidence as actual economic conditions. But, be it perception or reality, as Greenspan points out, "it is difficult for [any] economic policy to deal with the abruptness of a break in confidence."

## Housing

Despite the stock market downturn, disappearing paper wealth, a diminished job market, and the events of September 11<sup>th</sup>, one of the brighter spots in the American economy has been the Housing sector. Exceptionally low interest rates combined with investors looking for alternatives to putting their money in the stock market have continued to buoy the real estate market. Home ownership in America reached a new high in 1999, as 66.8 percent of Americans owned their own home—up from 66.3 percent in 1998.

Why is homeownership important? While an increasing number of Americans are invested in the financial markets, *Kiplinger's* magazine reports that nine out of ten households have less than 20 percent of their wealth in the stock market. Their largest asset by far is their home. Thus, home values tend to have more influence over household spending than the financial markets do. Although home prices usually fall by an average of almost three percent during a typical recession, during this slowdown prices for existing homes have actually gone up by six percent, encouraging continued consumer spending.

**Home values tend to influence household spending more than the financial markets do.**

This increase affected all ethnic groups. Home ownership rates for African Americans and Hispanics rose even faster than the national average, though they are still lower than the rates for Whites, which increased to 73.2 percent. According to a Harvard University report, there were almost one million more Black homeowners in 1999 than just five years earlier. A continuing, robust, and widespread consumer housing market is viewed as both a positive sign for economic recovery and a primary reason that the economic downturn hasn't been worse.

## 12. Factors Influencing Economic Growth: Productivity, Savings, and Consumer Debt

While the U.S. economy was extremely robust and good for many Americans during the 1990's, some of the numbers weren't quite as rosy. They could portend economic change on the horizon. The U.S.' current account deficit is at an all-time high, for example, reaching \$112.5 billion worth of transactions during the first quarter of 2002. This means that we are importing considerably more than we are exporting, thus sending more of our consumer dollars to foreign-owned or -operated companies.

Of the \$106.4 billion deficit just in the import and export of goods, almost 17 percent is spent on foreign-made automobiles, while about 10 percent is for petroleum imports. The U.S. actually had a surplus of \$11.6 billion in the balance of payments for Services.

These increased expenditures on foreign products mean fewer dollars in the pockets of U.S. companies, although the relationships between foreign-owned companies and job creation is complex. German-owned BMW, for instance, produces cars built by American workers in South Carolina. All things being equal, though, a high balance of payments deficit means more of what we consume is being made by foreign workers, leaving fewer jobs for American workers.

In addition to the U.S.'s trade balance, productivity, personal savings, and consumer debt strongly affect economic growth. For some of these factors, the outlook remains somewhat bleak.

### More About Foreign Trade

The Current Accounts ledger of international transactions captures all movements of funds into and out of the U.S. It includes dollar values for goods and services imported and exported, along with other financial capital movements. The U.S. balance of payments (BOP) is a subset of the Current Account. It is the difference between the dollars that American consumers spend on products produced outside the country and the dollars spent by foreigners to purchase U.S. products.

And just what is being traded? Major U.S. exports are machinery (including computers), cars, consumer goods, and agricultural products. Major imports include oil products, cars, computers and related products, and consumer goods.

## Productivity

Another group of numbers are equally interesting. U.S. personal income has grown rapidly, especially over the past five years. Much of this income growth is the result of improved worker productivity—the measurement of all output per hour worked—notably driven by the use of information technology (IT).

Many economists point to productivity statistics as a measure of economic health. Total productivity growth generally defines the ability of the economy to produce more with less, or at least more efficiently. Since a business's goal is to produce and sell the most "stuff" it can (e.g., maximize revenue) at the lowest production cost possible (e.g., minimize costs, especially labor costs), increased productivity generally leads to higher corporate profits. The close link between productivity growth and economic growth have led analysts to view annual productivity increases in the 3-4 percent range as bellweathers for sustainable economic growth.

Many economists point to productivity statistics as a measure of economic health.

There is no one way to achieve such a growth level. Economists use the term **multi-factor productivity** to label the combined effects of efficient use of human resources (low unemployment, high education), the application of information technology (IT is generally computers and wireless telecommunications), and changing business practices (adapting the way work is done to take advantage of worker skills and IT). Relative to other countries, the superior U.S. economic expansion can be largely attributed to much higher than average multi-factor productivity.

During some quarters, this productivity far exceeds expectations. Overall U.S. labor productivity increased by an unbelievably robust 8.3 percent in the first quarter of 2002, according to the BLS. No quarter in the past decade has enjoyed productivity growth at such a high rate. It reflects a significant increase in output, even as total hours worked and labor's share of earnings declined. In contrast, overall productivity has risen steadily from a -0.2 percent in the first quarter 2001 to 2.2 percent in the second quarter, 2.7 percent in the third quarter, and 5.4 percent in the fourth quarter.

It should be noted that quarterly productivity swings have been commonplace over the past decade, making this indicator less predictive of the state of the economy than annual figures. On average, productivity increased by an average 3.4 percent in 2000 and 2.0 percent in 2001.

It's difficult to put these figures in context because there is some evidence to suggest that recent productivity numbers can't be compared to those in past years. As businesses take advantage of global labor supply options to provide a product or service, they report fewer American worker hours, which could result in inflated productivity estimates. Economists are still assessing the degree to which this situation might be true.

Productivity numbers are skewed because the hours worked by those in Personnel Supply Services are classified in that sector while their output is realized under the business category in which they actually worked.

It might even be argued that in the new economy employers are using a number of options to increase output, not all of which are counted in the labor or hours worked part of the productivity equation. The first and best example of this is the employment that is classified in Personnel Supply Services. In Texas, this sector comprises almost 3 percent of total employment and job changes in the sector are clearly being viewed as a leading economic indicator. And yet the actual type of work, and industry in which these workers expend their labor, is unknown.

Thus, the hours worked by those in Personnel Supply Services are classified in that sector while their output is realized under the business category in which they actually worked. Other hiring practices such as use of labor through foreign subsidiaries (not counted), use of independent contractors (not counted) and outsourcing options (not counted) seem to have enormous potential to skew the interpretation of the productivity numbers. Each option uses uncounted labor to contribute to industry output without being included in the hours worked part of the equation.

## Savings

Despite considerable increases in per capita personal income, the annual personal savings rate in the U.S. went negative in the third quarter of 2000. In other words, Americans are spending more than they are actually earning—using accumulated savings, liquidated wealth, and debt to finance the difference. By comparison, the Japanese savings rate has hovered in the 15-18 percent range for most of this decade and most European countries have averaged at least 10 percent.

...U.S. personal savings rate is negative, compared to 15-18 percent in Japan and 10 percent in Europe...

This dearth of U.S. savings is more than a lack of discipline. It affects the economy significantly by leading to higher interest rates and reduced spending. Savings are an important indicator of available financial capital. At some point, the reduced savings rate means that fewer dollars will be available to our financial institutions. Following the basic laws of supply and demand, the cost for those increasingly scarce dollars, in the form of the interest rates both business and consumers pay for loans, will eventually rise.

Generally, higher interest rates have a dampening effect on new construction and investment, which translates into fewer employment opportunities for American workers. In fact, without the significant inflow of foreign dollars into American financial markets to offset it, the reduced American savings rate would have already become problematic.

The silver lining of this cloud is that as long as American labor productivity stays high and personal income growth outpaces inflation, the savings rate should, in theory, be relatively unimportant. This premise is being seriously tested during the current recession since foreign investment in the U.S. dropped 60 percent during 2001 after three consecutive record-setting

years. This decline in foreign investment from \$335.6 billion in 2000 to \$132.9 billion in 2001 is largely attributable to a reduced number of international mergers and acquisitions and economic weakness in other developed countries. To what degree this decline will impact the strength of the U.S. economic recovery remains to be seen.

Since consumers are spending—rather than saving—all their available earnings, there is not much more they can contribute to stimulate additional spending. In addition, their sense of their own wealth can depend on how the stock market is doing. If the stock market declines significantly (such as the \$5.3 trillion in market wealth that disappeared between March 2000 and January 2002, based on the Wilshire 5000 index), consumers' wealth effect can take a hit. With consumers driving such a large portion of the economy, the amount of money they have available to them—and their willingness to spend it—are important factors for economic recovery and future growth.

### Consumer Debt

Increased consumer spending might be one road to economic growth but that path is made more difficult when consumers are already in debt. Total consumer installment debt had risen to \$1.6 trillion by the close of 2001, with the average American household holding ten credit cards and carrying over \$8,367 in unpaid balances. This debt makes less money available just as we need to build and buy our way out of recession. With a rising share of earned income going to pay interest on debt, there is less money available for consumers to indulge in buying new "stuff." Economist David Littmann predicted the current level of consumer debt would dampen growth in 2002 by a full percentage point.

...High levels of personal debt may prevent Americans from buying themselves out of the recession...

Indeed, by April 2002 there were signs that at least part of Littmann's "consumption prophecy" had come true. While continued consumer spending kept the 2001 recession from worsening, many consumers had spent their way into bankruptcy. Personal bankruptcies hit an all-time record of 1.46 million, jumping by 15.2 percent between March 2001 and March 2002. With high debt levels, low savings rates, increased personal bankruptcies, and increased unemployment (or at least employment uncertainty), consumer spending may not be what leads us down the road to recovery.

## 13. The Lighter Side of Economic Analysis

Dr. Alan Greenspan and his staff at the Federal Reserve Board are said to study thousands of economic variables every quarter to determine the direction in which the national economy is headed. Yet even Greenspan is sometimes mystified. No wonder those at the state and local level, who have access to far less data, may find it difficult to assess the health of the economy!

To supplement their analysis of major economic variables, such as job growth and the unemployment rate, local economists use anecdotal indicators. Is your dentist busy, for example? Dentists claim people put off appointments when times are tough and reschedule when the economy improves. How far away do you have to park at the mall? The more shoppers, the fewer front row parking spaces. What about local commuting times? Does it take longer to drive to work? The more cars on the road, the more people employed, goes the thinking. How about the volume of trash collected in your community? When people are consuming vigorously, they throw away more containers and wrappers. Finally, what is the mood of friends or business associates at cocktail parties? The challenge for analysts is assessing how many of these indicators confirm the same conditions.

Of course, these homespun gauges are hardly sufficient to predict an economic turnaround. What's actually happening is often clear only in hindsight—when sufficient data have been collected to validate what has already happened. It may be the case that the consumer knows the recession is over before the government declares it!

## 14. There Is More Than One Economy!

The national economy, much like Texas', is not really one but several different economies. One part consists of modern, dynamic, adaptable companies using technology to enhance productivity and compete effectively in the global marketplace. The other economy is comprised of mature industries with high costs and big bureaucracies in the throes of layoffs and general restructuring to become globally competitive.

The good news is that many U.S. firms have already undergone this restructuring and emerged better prepared for international competition. The bad news is that our statistical databases report information on an aggregate basis, thereby hiding many of the positive trends occurring at the firm level. This aggregation makes understanding "the economy" more difficult. In addition, the media and other purveyors of information make broad generalizations that may anecdotally describe specific activities not common to all firms, even those within the same industry. The bottom line is this: Not every firm, nor every worker, is adjusting to changes at the same pace.

## 15. The Service Economy Is Here to Stay

One part of the economy that continues to fare well is the Services sector. As the federal government defines industries, both the U.S. and the Texas economies continue to expand in Services-producing sector—at least in terms of employment. Although we think of our economy as dominated by the Goods-producing sector (i.e., Manufacturing), the Services sector has long been the dominant force in job creation.

Since many parts of the Services sector rely more on workers than on increased technology to deliver a greater amount of services, a growing share of employment comes in the Services industries. The Bureau of Labor Statistics predicts that by 2010 the Services sector will account for 81.6 percent of total employment. It also expects that 92 percent of total employment growth in the United States from 2000 to 2010 will come from Services-producing industries. The projections for Texas are very similar. By 2008, Services industries will be responsible for 81.6 percent of total employment in the state, representing 84.1 percent of the 1998-2008 net growth.

## 16. Winners and Losers in the National Economy

During any period of structural transformation, there are industry sectors that grow and others that contract. An examination of 71 industries over the last four years illustrates this fact. Despite overall employment growth during the 1997-2001 period, 53 of the two-digit Standard Industrial Classification (SIC) industries could be labeled winners and 18 losers.

In terms of **total employment**, the four largest industry sectors in the nation were the same in both the first quarters of 1997 and 2001. Local Government was first with 13.42 million workers, followed by Health Services with 10.21 million workers, Business Services (including Personnel Supply companies) with 9.65 million, and Eating and Drinking Places with 7.90 million workers. Combined, these four industry sectors accounted for 25 percent of all national employment in 2001. These same four sectors also topped the list of largest industries in 1997 but represented only 24.1 percent of total employment then.

When it comes to **job growth**, however, the "winners" are a little different. Between the first quarter 1997 and the first quarter 2001, Business Services added the greatest number of net new jobs, expanding by 1,975,866 or 25.7 percent over the four-year period. Coming in a distant second and third in job growth were Local Government with 955,333 net new jobs and Special Trade Construction with 831,033. Collectively, these three industry sectors accounted for 38.6 percent of the roughly 9.7 million net new job growth over the period.

...10 of the 18 industries that lost net jobs between 1997 and 2001 were in Manufacturing...

Not every industry added new jobs. Eighteen experienced net job loss over the 1997-2001 period. Topping the list of nationally declining industries was Apparel Manufacturing, losing 246,934 jobs, followed by Textile Manufacturing and Transportation Equipment. Not surprisingly, ten of these declining industries were in the Manufacturing sector. Clearly, not all industries shared in the prosperity equally.

Recently, many other industries have become "losers." The onset of the recession has affected even the usually robust Services sector, which had been leading the employment boom. Growth has slowed down significantly in the Service sector, and in Wholesale Trade as well. The events of September 11<sup>th</sup> significantly affected the Travel and Tourism industries and the ripple effects have spilled over into many Service industries, adding to that sector's decline.

## 17. Role of the Contingent Worker and Personnel Supply Services

As expected, the recession has triggered declines in the Personnel Supply Services industry. This industry has served as a ready source of workers to expanding companies. It has also made it easy for companies to let workers go during economic contractions. The increased use of leased workers is clearly an evolving business practice in the new millennium—one that can benefit workers, as well.

National employment numbers in recent years have validated the role of this sector as a way to adjust workforce staffing levels. Except for a few seasonal dips, the Personnel Supply industry experienced remarkable growth throughout most of the 1990's. Nationwide there has been a four-fold increase in temporary help agency workers since 1982, according to Eddie Rasell of the Economic Policy Institute.

As the year 2000 ended, however, a significant drop in employment began in the sector as businesses, especially in the Manufacturing sector, shed their rosters of excess workers. Languishing for most of 2001, employment in Personnel Supply Services has picked up again in the first quarter of 2002 as employers began to cautiously expand in response to more positive economic news—adding temporary workers until they are certain demand warrants acquiring more full-time workers. The economic forecasting firm of DRI-WEFA believes that Personnel Supply Services experienced between 33-50 percent of the adjustment in employment for the entire recession period.

The figures for Texas follow a similar pattern. The Personnel Supply Services industry employed almost 253,000 persons in Texas in the fourth quarter 1999, an increase of 47.1 percent from the 172,000 annual average employment in 1996. By the end of the first quarter 2002, however, that figure had dropped to 217,100, reflecting the economic downturn. Validating national observations, of the 87,200 workers shed by the Texas economy between April 2001 and April 2002, the 17,400-worker decline in Personnel Supply Services represented almost 20 percent of the

total downturn. In addition to confirming that employers are increasingly using Personnel Supply Services as a buffer to deal with business cycles, employment change in the number of temporary workers may actually serve as a leading economic indicator in the new economy.

Personnel Supply Services will continue to be a growing facet of the Texas economy despite recent downturns. With a projected 2008 employment level of 308,500, this sector will represent almost 2.7 percent of the entire Texas economy. It is already twice the size of the state's entire Oil and Gas Extraction industry and is projected to generate 40 times the number of net new jobs—85,250 between 1998 and 2008. Simply said, employers have begun to realize the value of the Personnel Supply industry as a way to "staff up" or "downsize" workers in a cost effective manner without actually carrying them on their payrolls.

...Despite recent downturns, Personnel Supply Services will continue to be a growing facet of the Texas economy...

Employers are not the only ones who can benefit from Personnel Supply Services. In Texas, new labor force entrants are increasingly taking advantage of this industry. In 2000, 4.5 percent of both community and technical college and high school graduates, 7.5 percent of GED recipients, 16 percent of Windham school district exiters, and even 3.2 percent of public university exiters found their first post-exit jobs in the Personnel Supply industry.

In addition, the notion of contract or temporary work has made its way to the Internet in the form of talent or skills auctions. Monster.com™, a private sector job listing firm, has created the Talent Market auction which allows "free agents" to post their skills and job interests, including desired work hours and pay requirements. Monster.com™ claims to have over 200,000 of these free agents or non-standard workers already using their on-line service.

The potential for this market continues to grow. Rasell states that roughly 30 percent of the nation's 130 million workers are "non-standard," a classification which includes temporary workers, on-call workers, day laborers, independent contractors, leased workers, and the self-employed. The common thread of these workers is that they do not have a regular, on-going tie to a single employer.

## 18. Why All the Special Attention on Manufacturing?

History points to the Industrial Revolution as leading the transformation from an agrarian economy to one dominated by machinery and assembly line jobs. Indeed, many of the symbols of American prosperity are tied to our manufacturing prowess. Today, however, while Manufacturing continues to represent a major part of U.S. economic growth and prestige, it is contributing an increasingly smaller percentage of U.S. jobs.

The popular media seems to present lots of conflicting stories about the health of the American Manufacturing sector. On one hand, American competitiveness in manufacturing is strong and many American products are in great demand. On the other hand, it seems some of our biggest employers are having large layoffs at all levels. What is the real story?

Both are true! The U.S. Manufacturing sector is competitive in international markets in terms of production and efficiency. But it needs fewer people to succeed. Between July 2000 and April 2002, the sector lost roughly 1.8 million jobs and experienced 20 consecutive months of job loss. Between September and December of 2001, for instance, the Manufacturing sector dropped a total of 464,000 jobs. And while the rate of decline in employment losses seems to have bottomed out as the year 2001 came to a close, preliminary estimates for May and June 2002 indicate that the sector has lost roughly 197,000 jobs in the first six months of 2002.

The overall picture for manufacturing is continued productivity-led output growth, alongside marginal employment increases.

The federal Bureau of Labor Statistics (BLS) opines that through 2010 "the overall picture for manufacturing is continued productivity-led output growth, alongside marginal employment increases." In fact, all of manufacturing is expected to account for 30.2 percent of total U.S. output by 2010 but only 12.5 percent of total employment, a statistic that emphasizes the reality of output growth without concomitant domestic jobs.

This outlook reflects past experience. Consider Durable Goods manufacturing, a category that includes computers, electronic components, autos, and communications equipment. It added a negligible number of net new jobs throughout the decade of the nineties even as its output growth clipped along at 6.5 percent per year. Through 2010, it is expected to add roughly 642,000 new jobs—only 0.06 percent per year.

Tellingly, Durable Goods is expected to account for an increasing percentage of total manufacturing employment—61.8 percent by 2010—despite the relatively small amount of new jobs it will actually add. Clearly, other Manufacturing sectors are employing even fewer new people.

The Non-durable Goods sector has fared, and will fare, even worse than Durable Goods in terms of job loss. Non-durable Goods include products such as plastics, apparel and textiles, meat products, drugs, and cleaners. This sector lost 637,000 jobs between 1990 and 2000 and is projected to stay relatively stagnant through 2010—despite projected output gains of 1.9 percent per year during that period.

While the outlook for U.S. manufacturing in the global marketplace is very positive, not all industries will compete equally well and job and wage gains are not likely to keep pace with increased productivity and output expansion. A closer examination of the BLS 2010 projections underlines this split between productivity and job growth.

Most of the projections focus within manufacturing is not on job creation but on increases in output. Topping the list of industries with both the **largest projected output growth** and **average annual percent change in output** between 2000 and 2010 is Computer and Office Equipment, with an expected average output growth rate of 14.8 percent per year. Second on the list of output growth is Wholesale Trade, followed by Electronic Components Manufacturing and Computer and Data Processing Services.

The **largest job producer** in the Manufacturing sector, meanwhile, is projected to be Miscellaneous Rubber and Plastic Products, expecting to add 156,000 jobs between 2000 and 2010. Closely following is Fabricated Metal Products with 124,000 new jobs, Electronic Components (semiconductors), with 118,000 jobs, Industrial Machinery with 102,000 jobs, and Aerospace with 104,000 jobs. Of the 18 major manufacturing industries, only half are expected to have positive job gains over the projection period.

Similar to the overall economy, Manufacturing productivity continues to rise, posting a striking 9.4 percent growth rate in the first quarter 2002. Manufacturing productivity figures have been increasing steadily since they hit a decade-low negative 2.7 percent in the first quarter 2001. In addition to efficiency gains realized through technology, these increases likely indicate that employers had been trying to hold on to skilled workers—which had been hard to find during the nineties—until the economy improved. As hopes for a quick economic turnaround were dashed, firms began layoffs in earnest, thus reducing the number of hours worked. The jump in productivity figures starting in the third quarter 2001 is indicative of the high level of layoffs that have subsequently occurred in many industrial sectors.

Another area of much attention has been the Information Technology (IT) sector, as telecommunications and the much ballyhooed "dot.coms" began suffering heavy employment losses starting in the first quarter 2001. While large layoffs have occurred, total nationwide employment of IT professionals remains essentially unchanged at 4.4 million. The unemployment rate for September 2001 was higher for this group at 4.9 percent compared to 1.7 percent in the previous year, but the number of workers laid off (227,000) appears to be predominantly composed of new entrants. IT professionals remain in demand and most find new jobs quickly when layoffs occur.

Business-to-business investments in key Technology sectors have expanded manufacturing capacity and productivity gains that far exceeded a sustainable level, especially in the High Technology sector. From this perspective some type of downturn was inevitable. In fact, four out of five manufacturers predicted flat or negative growth in their industry for the first six months of 2001, according to a survey of the National Association of Manufacturers (NAM). To complicate matters, the year 2000 witnessed a 137 percent increase in the price of natural gas, a key energy resource for American manufacturing. This increase served to "tax" the economy by roughly \$115

billion in 2000. Gas prices continued to stay high in early 2001 but have since moderated significantly. By the third quarter 2001, lowered energy prices no longer contributed to the economic slowdown.

Job growth in Manufacturing depends on a number of factors. One is market share—the number or percentage of consumers buying a product from a given firm. If a company increases its market share, it means greater demand for the product, expanded output, and improved potential for job and wage growth.

**Without increased revenues or expanded market share, companies have no need to hire additional workers nor to increase wages.**

Another factor in job growth is productivity. **Productivity gains** mean more product produced per worker, resulting in increasing revenue to compensate workers, management, and stockholders. Without increased revenues or expanded market share, companies have no need to hire additional workers nor to increase wages.

Nowadays, the global economy means increased potential for U.S. market share and productivity gains which don't necessarily translate into new jobs or higher wages. In fact, as greater numbers of manufacturing jobs are shipped to overseas locations to service emerging customer markets or take advantage of lower cost labor, there is decreasing pressure for multinational companies to pay the higher wages enjoyed heretofore by American workers.

Why not consider moving production abroad when production workers in Mexico earned roughly \$2.46 an hour in 2000 or 12 percent of their U.S. counterparts' wages? Production workers in Singapore earned 37 cents and Korean workers earned 41 cents compared with every dollar earned by American manufacturing workers. It's hard for U.S. workers to compete.

The U.S. is not alone in this global economic phenomenon. Japan and Germany also have begun to establish manufacturing facilities outside of their borders to reduce labor costs. Ironically, facing higher labor costs in their own countries, companies such as Mercedes, BMW, and Nissan have opened plants in the United States, where average manufacturing wages are only 83 percent of German wages and 90 percent of Japanese wages. Globalization works both ways!

## 19. National Occupational Growth: Projections to 2010

While discussions of the stock market and whether or not the country is in recession make for interesting party conversation, they are less important to longer-term education and career choices or workforce and economic development program planning.

When it comes to these pursuits, people have one question: What are the hot jobs—the jobs with higher than average openings? There are two different ways to communicate job growth: (1) *numerical increase*, those occupations adding the greatest number of jobs, and (2) *percent increase*, those occupations expected to be the fastest growing.

The reader must be wary when viewing such figures. The notion of "fastest growing" occupations, for example, is generally based on percent change. But a fast-growing occupation with a small employment level could be responsible for very few actual job openings. Conversely, a large, but slowly growing occupation might be responsible for greater numbers of actual job openings. To get a better understanding of how employment is changing, it is always best to look at both sides of the coin.

Table 5 lists the top ten occupations expected to add the greatest number of jobs. These ten will account for slightly over 22 percent of total expected job growth. The top 30 will cover almost 46 percent of total U.S. employment growth.

**TABLE 5**  
**U.S. Occupations Projected to Add the Most Employment**  
**from 2000 to 2010**

Rank	Occupation	Net Growth	Education
1	Food Prep/Fast Food Workers	673,000	Short-term OJT *
2	Customer Service Representatives	631,000	Moderate-term OJT
3	Registered Nurses	561,000	Associate Degree
4	Retail Salespersons	510,000	Short-term OJT
5	Computer Support Specialists	490,000	Associate's Degree
6	Cashiers (except gaming)	474,000	Short-term OJT
7	General Office Clerks	430,000	Short-term OJT
8	Security Guards	391,000	Short-term OJT
9	Computer Software Engineers, Apps	380,000	Bachelor's Degree
10	Waiters/Waitresses	364,000	Short-term OJT

\* OJT means On-the-Job training

Table 6, on the other hand, lists the top ten fastest growing occupations—those with the greatest percentage increase.

**TABLE 6**  
**U.S. Occupations Projected to Grow the Fastest**  
**from 2000 to 2010**

Rank	Occupation	Growth Rate	Education
1	Computer Software Engineers, Apps	100%	Bachelor's Degree
2	Computer Support Specialist	97%	Associate's Degree
3	Computer Software Engineers, System	90%	Bachelor's Degree
4	Network Systems Administrators	82%	Bachelor's Degree
5	Data Communications Analysts	77%	Bachelor's Degree
6	Desktop Publishers	67%	Post-secondary Vocational
7	Database Administration	66%	Bachelor's Degree
8	Personal Home Care Aides	62%	Short-term OJT*
9	Computer Systems Analysts	60%	Bachelor's Degree
10	Medical Assistants	57%	Moderate-term OJT

\* OJT means On-the-Job training  
Source: Bureau of Labor Statistics

A comparison of Tables 5 and 6 reveals a striking difference. Of the ten fastest growing occupations, eight generally require some type of post-secondary degree or certificate, compared with only three of those projected to add the largest numbers of jobs.

This education differential affects earnings, although the tables don't reveal it. According to BLS, 19 of the top 30 fastest growing occupations have earnings in the top two quartiles compared to only 12 of the occupations adding the largest employment. (To learn more about the education/earnings connection, see Chapter 36 "U.S. Economic Changes Place an Emphasis on Education and Skills.")

# The Texas Economy

In years past, conversations about national economic trends or phenomena might have been viewed as of secondary concern to Texans. After all, an economy driven by Oil and Gas, related industrial sectors and other natural resources moved almost counter-cyclically to the national economy. Today, however, the Texas economy mirrors the U.S. economy much more closely and national and global trends have a greater bearing on the direction and economic health of the state.

Like the U.S. economy, the Texas economy has many facets. When the question is asked, "where has the growth been?" the answer is not always obvious. Consider just one part, such as job growth, for example. Employment growth or decline can be discussed in terms of geographic region, such as the state of Texas or particular regions within it. It can also be viewed in terms of industries or specific occupations. Moreover, job growth can be viewed as both percentage change and as absolute change.

The following sections will address the question of where growth, decline, and projected changes have occurred in Texas from a demographic, geographic, industry, occupational, and earnings perspective.

## 20. Texas is Like a Whole Other Country: Impacts of Population Change

Texas is the second largest state in the union and the second most populous. And every day its population continues to grow. Texas is projected to add roughly 525 people every day for the next five years. The sheer increase in numbers, combined with the demographics of the evolving population, are affecting the Texas economy profoundly. Overall, the Texas population is growing increasingly bigger, Hispanic, older, and urbanized.

### Increasingly More People

Texas will continue to be a fast-growing state. Anticipated population increases through 2010 place it among the top three fastest growing states in the U.S. Texas added just over 3.8 million net new residents between 1990 and 2000. The July 1, 2000 population of an estimated 20,851,820 residents represents a 22.8 percent increase from the 1990 Census count. By contrast, the United States as a whole added just over 32.6 million new residents but grew by only 13.1 percent over the same period. To put this remarkable Texas growth rate in perspective, almost 11.6 of every one hundred new Americans were Texans!

Texas' population numbers lead those of most states. Only California topped Texas in total population expansion during this period (despite a fairly average 11.2 percent growth rate), and only seven, primarily western, states had higher percentage growth rates. Texas also had four of the country's top ten metropolitan areas in terms of absolute population increase and solidified its position as second most populous state in the union.

Demographically, Texas' population expansion appears to be a given. Assuming net migration holds at the same rate as it did during the 1990-2000 period, Texas could more than double its population by 2030, growing from 20,851,820 to 40,538,290. The State Data Center at Texas A&M University arrived at this figure by extrapolating from the 2000 Census data.

Population growth is critical to the Texas labor market in many ways, not the least of which is the fact that the civilian labor force is made up of roughly 50.2 percent of the total state population. (Approximately 28.2 percent or 5.88 million of the Texas 2000 population were under the age of 18 and thus by definition are exempted from the labor force. The remaining percentages are comprised of retirees and persons institutionalized or otherwise unable to work.) The fact that Texas is expected to be among the fastest growing states over the next decade implies that we can offer employers an available labor force when other states cannot.

### Increasingly Hispanic

As Texas' population increases, its ethnic make-up is shifting, growing increasingly Hispanic. Between 1990 and 2000, Hispanics grew from 25.5 percent to 32 percent of the Texas population. This increase accounted for 60.3 percent of the state's total population growth. Some time between 2026 and 2035, the Texas population will be more than one half Hispanic. (Experts claim, in fact, that the U.S. is the fastest growing Latino country in the world!)

The impact of the growing Hispanic population on the state's demographic future cannot be underestimated. Its influence ranges from household size to earnings and beyond. Given Texas' large Hispanic population and the fact that Hispanics have a relatively high average persons-per-household rate, for example, it's no wonder that Texas' average of 2.77 persons per household significantly exceeds the U.S. average of 2.59.

The Hispanic population growth presents both challenges and opportunities to the Texas labor market. According to the Hispanic Scholarship Fund (HSF), "the astounding growth and great potential of U.S. Latinos is only part of the story. Lurking beneath the surface is a significant and

**The Hispanic population is the fastest-growing group in Texas but they have (on average) relatively low educational attainment rates and commensurate low wages.**

unacceptable gap in educational attainment." This fastest-growing ethnic/race cohort historically has a significantly lower overall educational attainment rate than other groups and below average high school graduation rates. It is also more likely to be employed in lower skill/lower wage jobs where earnings may not meet family income self-sufficiency needs.

While many of these statistical measures are improving, the HSF stresses, "the economic and social benefits of closing this [the education] gap (or the costs of not doing so) are every bit as astounding as the Latino growth rate." Here are some of the specific educational challenges Texas faces in the 21<sup>st</sup> century:

1. **Decrease the number of Hispanic 15-17 year olds who function below modal grade level.**  
(33.8 percent in 1998, compared to 28.8 percent of Whites and 38.3 percent of Blacks, Hispanic Education Fact Sheet, National Council of La Raza).
2. **Decrease the high school dropout rates of Hispanic students.**  
(28.6 percent in 1999, compared to 7.3 percent for Whites and 12.6 percent for Blacks, according to the U.S. Department of Education).
3. **Increase the college participation rate of Hispanic high school graduates.**  
(42.2 percent in 1999, compared with 62.8 percent for Whites and 59.2 percent for Blacks, according to the U.S. Bureau of the Census figures).
4. **Increase the college graduation rate of Hispanic students.**  
(10.8 percent of Hispanics 25 years old and over in 2000 had received a Bachelor's degree or higher, compared to 27.7 percent for Whites and 15.5 percent for Blacks, Hispanic Education Fact Sheet, National Council of La Raza).

Given the strong relationship between education and earnings, for instance, it is not surprising to see predominantly Hispanic regions such as El Paso, Brownsville, Laredo, and McAllen with *per capita* incomes ranging between 50 and 65 percent of the state average, which is already below the national average. Also particularly striking is the fact that Texas ranks number ten among states in the highest incidence of total persons in poverty. Educational gains will help improve these disappointing figures.

## **Increasingly Older**

Not only will the Texas' population continue to grow, but on average it also will grow older. It is well advertised that the 2000 Texas population, with a median age of 32.4 years, is much younger than the nation's, with a median of 35.3 years. Nevertheless, the average age of both Texas and the nation was considerably higher than in 1990 largely because of the aging Baby Boom generation—those people born in the U.S. between 1946 and 1964.

While Texas and the country are growing older, the average age of demographic groups may vary considerably. Because of the existing age structure of the population, differentials in average family size, number of children per household, female fecundity, and so on, each racial/ethnic group will age differently. Non-Anglos will be younger than Anglos, for instance. If current demographic trends hold true, 81 percent of the under 18 population will be non-Anglo and 39.8 percent of the persons over 65 will be Anglo by 2040—more than 15 percent points above their overall incidence in the population.

The pattern of aging will have far-reaching consequences on the state's public policies, industrial hiring, and workers themselves. It will even affect the economies of the state's geographic regions differently: rural counties generally will have older populations while counties that include college towns or more non-Anglo residents will have more youthful populations.

**At the same time that Texas has a young and fast-growing Hispanic population entering the workforce, it also has an older, largely Anglo Baby Boom generation leaving it.**

Balancing with the demands of a fast-growing, youthful population with those of the aging Baby Boomers will pose a challenge for public policymakers in the near future. These demographics create a double-edged sword for Texas policymakers. At the same time that Texas has a young and fast-growing Hispanic population entering the workforce, it also has an older, largely Anglo, Baby Boom generation about to leave it.

Policymakers must find a way to expand social and educational services to one segment of society while increasing levels of health and social services to another. Texas' future economic success will depend on how effectively we can educate the faster-growing younger minority population, grow our overall skills base, and ensure that the state has resources and a tax infrastructure appropriate to provide these services.

The aging population will also affect industry. The Baby Boom was followed by an eleven-year lull in population growth. As a result, there will be fewer potential workers in the subsequent generations born after 1965 (known respectively as Generation X and Generation Y) to draw on for any occupational employment once members of the Baby Boom begin exiting the labor force in large numbers between 2011 and 2029.

All industries will scramble for a limited number of replacement workers just to continue operating at today's employment level. High growth industries (such as Health Care, which Baby Boomers will increasingly need) will be especially hard-pressed—needing to find workers for new jobs while recruiting and retaining workers to replace the recent retirees.

The aging population also has implications for the state's workforce. As Texas Baby Boomers begin to reach traditional retirement age starting in 2011, workers across the state may face three likely scenarios:

1. **Remaining workers must improve their skills** so that they can compensate for the productivity lost as older, experienced workers leave employment. Consequently, there must be more education and training—especially for key groups such as Hispanics—to maximize their ability to contribute to overall productivity.
2. **Remaining workers must increase productivity** to support those in retirement. Unless the labor force has received sufficient education and training, coupled with adaptive business practices and technology, it will be difficult to achieve the overall productivity necessary to financially support Social Security recipients and private sector pensioners given the large number of retirees expected.

3. **Remaining workers must be willing and able to change their skills sets** to match the jobs that will be in demand. The shift in the population's age structure will alter the demand mix for goods and services. Expenditures for health and drugs will rise, for example, along with the percentage of incomes devoted to housing and leisure services. On the flip side, spending on clothing, education, and electronics will likely fall.

## Increasingly Urbanized and Mobile

Another significant change in Texas' population is its increased mobility and urbanization. People are moving around more than in the past. In particular, they're concentrating in a few regions of the state. According to Stan Reid of the Texas Association of Counties, 41 percent of the Texas population lives in just four counties and on 1.8 percent of the dry land; 50 percent of the population lives in seven counties on 3.2 percent of the dry land; and 80 percent of the population lives in just 40 of Texas' 254 counties and on only 15 percent of the dry land. This concentration of people is likely to grow. As a result, some cities and counties will increase their population while others will experience a decline.

The cities with the most people today will likely have the most over the next few decades. By 2040, analysts at the State Data Center at Texas A&M University predict that the North Texas region—which includes Dallas-Ft. Worth—will still be the most populous area of Texas, followed by Houston-Galveston. The Capital Area, however, will probably surpass the greater San Antonio region in total population.

On a county level, Harris, Dallas, and Tarrant counties will continue to have the largest populations in Texas. Collin and Denton counties, both north of the Dallas metropolitan area, could displace Bexar, Travis, El Paso, and Hidalgo as the fourth and fifth largest counties in the state should trends from the 1990's continue. Meanwhile, large percentage increases are expected in many other suburban counties through 2040.

Not all regions of the state are growing at the same pace. As one might predict from the increase in the state's Hispanic population, the fastest growing region will be South Texas, followed by the Lower Rio Grande area. The Capital Area is slated as the third fastest growing region. On the other side of the spectrum, the smallest and slowest growing regions through 2040 will be Northeast Texas, West Texas, and the Panhandle region. In fact, somewhere between 50 to 73 of Texas' 254 counties—mostly in West Texas—are expected to decline in population as people migrate toward centers of employment growth.

Not only has there been shifts of the population from rural to urban and suburban counties but also there is increased overall movement of households. In 2001, for example, roughly 6.1 percent of Texas taxpayers lived in a county different than the one reported on their 2000 tax return, some living out of state or in another country. According to the Internal Revenue Service, 420,416 Texas tax returns representing 845,956 persons already living within Texas in 2000 reported their residence in a different Texas county in 2001. There have also been movements of the population across state borders. Roughly 406,162 persons filed their tax returns in Texas in 2000 and then filed in a different state in 2001. Conversely, 449,500 persons filed in another state in 2000 but subsequently filed their 2001 returns in a Texas county.

Migration patterns do more than reflect changing concentrations of population. When higher income wage earners leave an area, they take their earnings power with them. Similarly, when lower income persons move, they tend to affect living standards in their new communities.

These migration data tell a story of people with more education and higher incomes becoming more concentrated in fewer Texas cities. Austin and Dallas-Ft. Worth gained the most high-end talent from intra-state migration during the decade of the nineties. "The state's economy is being reshaped by this molecular-level activity," says Don Hicks, a professor of political economy at the University of Texas at Dallas. "It's almost like trade flows in intellectual capital. People and income are not just being recycled. You are seeing net gains by the leading cities [in Texas] and net losses. There are power transfers that are dramatic."

For many of the regions that were net migration losers the economic consequences can be considerable. In a knowledge-based economy, the ability of a region to protect its quality and standard of life and attract or create information-related jobs increasingly lies with available intellectual capital. As Randall Kempner, Austin economic development specialist warns, "[T]he younger people who[m] you need to develop and lead a community are the people you are most likely to lose."

## 21. Texas Macroeconomic Indicators: A Changing Face for the Texas Economy

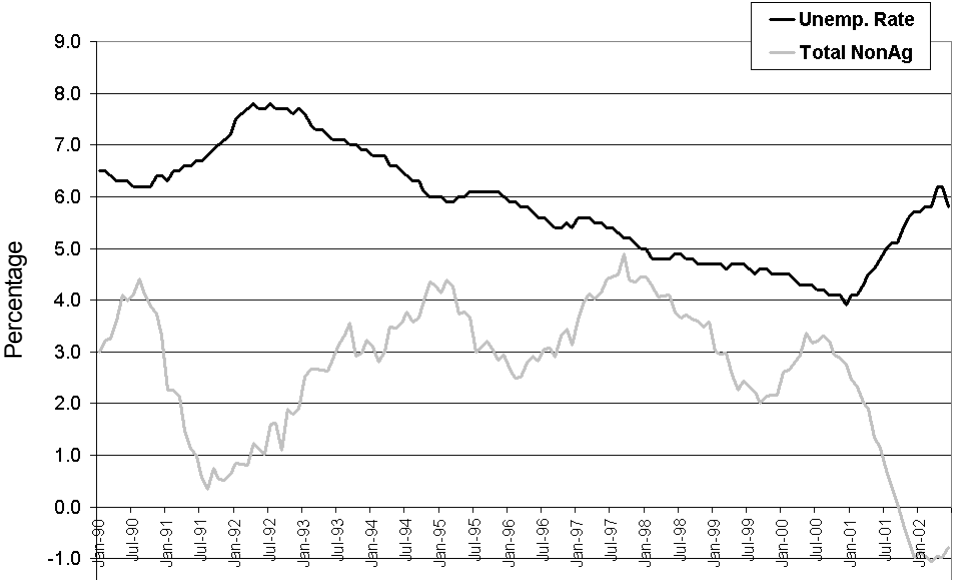
If population dictates the size of the labor force, employment conditions affect how many of those willing and able to work are actually employed. These macroeconomic indicators are generally statistics used to gauge the overall health of the economy. The conditions in Texas have definitely provided a favorable business climate: its labor force has been growing steadily. There were roughly 10,820,300 people in the civilian labor force as of June 2002, almost a million more than in June 1996. The number has risen just short of 1.7 percent per year since then. Even more impressive is Texas' employment-to-population ratio, the percentage of the total population earning a living. At over 65 percent, it already exceeds the national average and is just coming off of all-time highs.

Given the fact that so many Texans are already employed, the state has had fewer available persons in the potential labor pool from which to draw to feed continued economic expansion. With almost everyone who can and is willing to work already in the labor force, firms must turn to other alternatives to address both skill-specific and general labor shortages.

These skill shortages become apparent during an examination of one of the most closely watched indicators of economic conditions—the unemployment rate. The Texas unemployment rate stood at 6.8 percent in June 2002. (That means, inversely, that the "employment rate" stood at 93.2 percent.) While the June figure represented the highest rate since June 1994, it was still lower than the rate ten years before.

The Texas unemployment rate has experienced two distinct cycles over the past decade. Chart 1 illustrates the unemployment trends since 1990. They go from relatively high to unusually low, then back up again. In July 1992 the Texas statewide unemployment rate was 7.8 percent with 708,265 persons classified as unemployed—topping the 700,000 mark for the first time since June 1987. Starting from this peak, the unemployment rate began to move steadily downward. In February 1998 the rate dropped below 5 percent for the first time since February 1980. It continued to drift downward, going as low as 3.7 percent in December 2000 with a comparatively low 390,744 persons estimated as unemployed. After three months below 4 percent, the rate again trended upward topping 5 percent in August 2001. Similarly, the national unemployment rate moved up from 4.6 percent in July 2001 to a July 2002 rate of 6.0 percent.

**CHART 1**  
**Texas Seasonally-Adjusted Unemployment Rates**  
**January 1990 to June 2002**



So what "should" the unemployment rate be? Economists have long used what has been called the **natural rate of unemployment**—defined at roughly 4.5 percent—as an indicator of full employment. According to Keynesian macroeconomic theory, a region cannot stay below the natural rate for very long before labor shortages and wage increases begin to affect production, causing economic slowdown and job loss back to the natural rate.

Observers could witness this phenomena in Texas. In December 2001, for example, 15 of Texas' 27 metropolitan areas had unemployment rates at or below 4.5 percent. The lowest rates belonged to Bryan-College Station at 1.4 percent, Lubbock at 2.2 percent, San Angelo at 2.6 percent, and Amarillo at 3.0 percent.

Economic theory says a region cannot stay below a 4.5 percent unemployment rate for long.

By May 2002, however, only six regions had unemployment rates below 4.5 percent, led by Brazos Valley at 2.8 percent, South Plains and Concho Valley at 3.3 percent, and the Panhandle at 3.5 percent. These six remaining regions clearly show that unique local labor market conditions can challenge traditional economic norms and Texas is no exception.

For comparison purposes, the three highest unemployment rates in the state in May 2002 belonged to border regions. McAllen was at 12.5 percent, followed by Brownsville-Harlingen at 8.8 percent. El Paso and Beaumont-Port Arthur tied for third at 7.2 percent.

## 22. The Texas Labor Shortage: An Explanation

The past two years have been a roller coaster ride for the Texas workforce. In the middle of 2002, the promised economic recovery still seems weak and the labor market is soft. High tech layoff announcements are still trickling out and fewer traditional "Help Wanted" signs are being posted at businesses all over Texas. This turnaround from an economic boom that caused rampant skills shortages to the doldrums has had a dampening effect on the labor market in general. In truth, while many Texas employers are still lamenting the lack of skilled workers, for most of the last half of the nineties Texas experienced both select skill shortages and an unprecedented general labor shortage.

This general labor shortage was no secret. It was not unusual to hear comments such as these by Dave Harmon in an *Austin American Statesman* article on the increasing use of H-2B visas by employers experiencing labor shortages: "[W]ith the economy booming and unemployment low, that's [the inability to find workers] a common complaint among farmers, construction companies and service businesses nationwide." Mr. Harmon further documented the increasing number of Texas employers, "from landscapers to restaurants to motels," which have turned to temporary foreign workers to meet their labor demands. Many Texas businesses, especially construction and landscaping firms, have even used undocumented workers to supplement their labor needs.

There are five key indicators that clearly point to a labor shortage environment. Although the current economic malaise has changed short-term conditions, the longer term still portends a possible return to labor and skill shortages. These defining factors are:

1. **Declining unemployment rates**, which suggest that most of those persons available for and actively seeking work are already employed. With unemployment rates hovering around four percent in Texas, as they were two years ago, even the increasing volatility of the labor market could not provide additional workers—highly skilled or otherwise.
2. **Increases in wage and salary employment** that consistently exceeded the rate of growth in the civilian labor force from 1993 through 2001. In other words, more jobs than workers. Historically, economic boom periods are followed by an influx of available workers to balance the supply and demand picture. Inordinately strong job growth in Texas over this period simply exceeded the state's ability to replenish the available labor pool. For example, at the apex of the boom, companies such as Dell computer looked outside the central Texas region for expansion opportunities because the local labor force had been effectively absorbed.

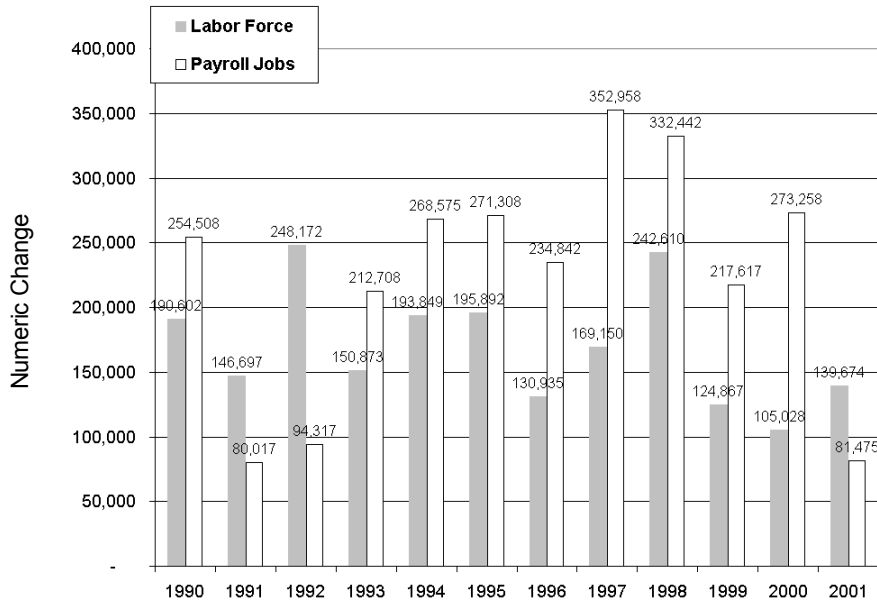
3. **Higher employment-to-population ratio**, which has trended to over 66 percent—the highest rate in Texas history and above the national average. This rate means that almost everyone in the population who is available for work is already employed. Children, retirees, and institutionalized persons make up the bulk of those persons for whom work is not an option.
4. **Low unemployment rates and high employment growth in other states** over the past decade has lowered economic incentives for workers to move to Texas. Gone are the days when the labor needs of an Oil and Gas-driven boom in Texas are fueled by persons migrating from lost manufacturing jobs in the Midwest.
5. **Worker demographics and the effects of the Baby Boom** now work against American industry. Quite simply the U.S. workforce is getting older and increasing numbers are approaching retirement. Baby boomers whose *en masse* entrance into the labor force helped drive economic expansion in the 1970's and '80's also will tend to leave the work force at the same time.

By 2008, over 40 percent of the labor force will be aged 45 or older. The American Association of Retired Persons (AARP) surveyed its membership and found that 80 percent of Baby Boomers plan to work during their retirement years, but not necessarily at the same job nor full-time. In fact, men of all race/ethnic groups are retiring earlier (at least from their primary jobs). Who will replace them?

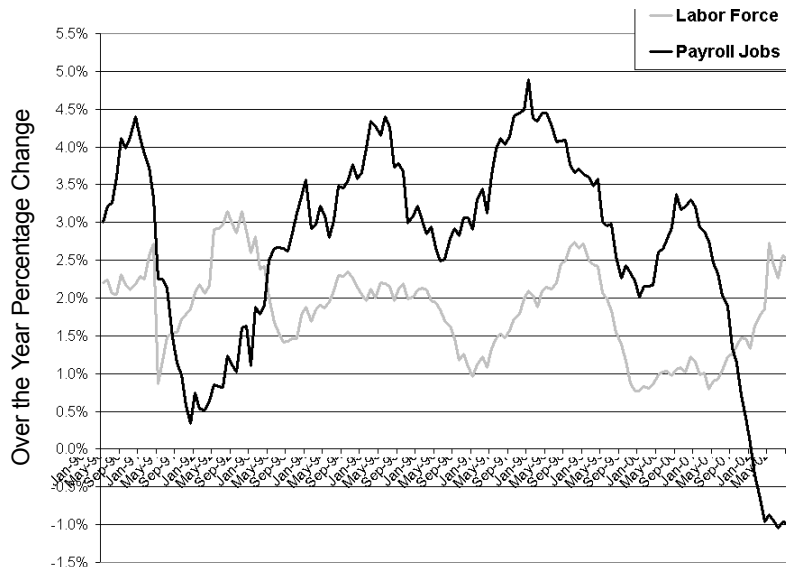
It won't be women joining the workforce. Labor force participation rates for women have begun to level off; they no longer represent an untapped labor supply pool. These factors add up to the fact that almost everybody who is available for work and wants a job is already employed. And while Texas demographics show a younger profile than the U.S., these young workers may lack the education and skills needed to fill critical occupations.

Combined, these five factors paint a telling portrait of both past—and possibly future—critical worker shortages in Texas. Charts 2 and 3 visually portray these phenomena, though for slightly different time periods. Chart 2 focuses on numeric change. Chart 3 visually depicts the percentage change. Notice how the line for the available jobs is higher than the line for available workers. The message in both graphics is clear: supply has not always met demand.

**CHART 2**  
**Texas Nonagricultural Wage & Salary vs. Civilian Labor Force**  
**Numeric Change**  
**1990 - 2001 (Seasonally Adjusted)**



**CHART 3**  
**Texas Nonagricultural Wage & Salary vs. Civilian Labor Force**  
**Over-the-Year Percentage Change**  
**January 1990 - June 2002 (Seasonally Adjusted)**



## 23. Effects of a Labor Shortage

So how does a labor shortage impact the Texas economy? The availability of skilled labor is a critical component of future employment growth. It helps drive industrial expansion, firm relocation, and overall economic growth in the state. Employers facing labor shortages have limited options for growth.

To bypass local labor shortages, many employers turn to workers in other regions of the country and the world to expand operations. An article lamenting a shortage of technology workers in Austin, for instance, noted that one locally-based company, Metrowerks, Inc., is looking to India for relief. Metrowerks, which makes software development tools for other programmers, got 30,000 résumés over a two-week period in Noida, India, when it advertised for programmers. And, according to Gregory Stoner, vice-president of marketing, "most of those résumés came from applicants with good software programming credentials." Lower pay scales combined with skilled labor make the use of non-U.S. workers a potentially attractive option.

Faced with a labor shortage, employers can get workers from other parts of the country and world or increase worker wages.

Other employers combat shortages by increasing worker wages—both in terms of providing incentives to retain existing workers and pirating workers from elsewhere. In an increasingly price-competitive global economic environment, rising labor costs tend to lead to higher product prices and reduced competitiveness—not particularly palatable to most employers. It is entirely possible that either a general labor shortage or specific skills shortages can eventually and inadvertently place a cap on economic growth in Texas.

## 24. Where Is the Job Growth by Geographic Region?

Just as Texas' population growth has concentrated in certain regions of the state, so too has its job growth. During the six-year period between 1995 and 2001, the center of the state—sometimes known as the "I-35 corridor"—and the major metropolitan areas grew at a faster pace than other areas of the state.

This concentration of growth can be best described using the 28 geographic regions around which the TWC implements the Workforce Investment Act (WIA). The nine-county Rural Capital Area (which surrounds but excludes Austin) and 14-county North Central Texas region (which surrounds but excludes Dallas and Tarrant counties) topped the list of fastest job growth regions in terms of percentage change.

The major population centers—Gulf Coast (Houston), North Central Texas, Dallas, Ft. Worth, San Antonio, and Austin—showed remarkable job expansion as well. In fact, the Gulf Coast region dominated the growth picture for the state, adding the greatest absolute number of net new jobs between 1995 and 2001, followed by the North Central Texas region.

To appreciate the concentration of growth in the state, simply review Table 7. Seven of the state's 28 regions make the lists of top ten job growth for 1995-2001 in terms of both absolute and percentage change. Those regions are Rural Capital Area, Lower Rio Grande, Capital Area, Tarrant County, North Central Texas, the Alamo region, and Cameron County. In fact, those seven make the same top ten lists for the period of 1990 to 2001, as well.

**TABLE 7**  
**REGIONAL JOB GROWTH PATTERNS**  
**Annual Average Employment Change Between 1995 and 2001**

Region of the State (and key cities it includes)	Percent Growth	Region of the State (and key cities it includes)	Absolute Growth
Rural Capital Area	30.2%	Gulf Coast (Houston)	235,079
North Central Texas (Plano)	26.9%	North Central Texas (Plano)	186,134
Lower Rio Grande (McAllen)	18.7%	Dallas County (Dallas)	117,746
Capital Area (includes Austin)	16.8%	Tarrant County (Ft. Worth)	91,815
South Texas (Laredo)	14.9%	Alamo (San Antonio)	78,109
Tarrant County (Ft. Worth)	13.5%	Capital Area (includes Austin)	68,201
Cameron County (Harlingen)	12.7%	Rural Capital Area	67,809
Dallas County (Dallas)	10.9%	Lower Rio Grande (McAllen)	29,379
Gulf Coast (Houston)	10.9%	East Texas (Tyler)	17,594
Alamo (San Antonio)	10.1%	Cameron County (Harlingen)	13,653

Source: Texas Workforce Commission

The concentration of absolute job growth is particularly striking. The top ten regions that experienced the greatest absolute growth from 1995 to 2001 comprised 95.9 percent of all employment growth in Texas. The top seven regions alone accounted for 89.5 percent of the state's total growth.

This phenomenon began years before. Over the longer 1990-2001 period, the top ten growth regions represented 86.7 percent of total Texas employment growth, despite representing only 76.7 percent of the 2001 annual average employment. In fact, the top seven regions accounted for just under 80 percent of total growth during the decade.

With so few areas experiencing most of the growth, other regions were bound to fare poorly by comparison. Seven regions of the state actually lost employment over the 1995-2001 period, led by West Central Texas (-4,567), the Panhandle (-3,397), North Texas (-2,338), South East Texas (-1,968), Permian Basin (-1,820), Concho Valley (-655), and Deep East Texas (-609).

## 25. Texas Exports: More than Just Oil and Gas

On the worldwide scene, the Texas economy was largely known for its exports of oil and gas and related products and services. Today, however, the global economy is truly integral to the state. Roughly one out of every eight dollars in gross state product comes from exports—a value of almost \$95 billion.

This figure makes Texas a significant player in U.S. exports. Texas exports to 233 different final destinations throughout the world and is the second largest exporting state in the U.S. behind California. The third largest exporting state, New York, exports less than half the dollar value of either Texas or California. In fact, Nearly 13 percent of all U.S. exports come from Texas.

Despite the breadth of activity, the majority of Texas exports are concentrated with a limited number of trading partners and in a few industries. According to the Texas Department of Economic Development, Mexico and Canada combined account for well over half of all Texas exports—with Mexico alone accounting for roughly 43.8 percent of the total. Table 8 identifies the top five largest exporting industries in Texas in 2001.

**TABLE 8**  
**Top Texas Exporting Industries 2001**

Industry	Percentage	Dollar Value
Computer and Electronic Products	27.04%	\$25,688,465,150
Chemical Manufacturing	15.37%	\$14,600,389,671
Machinery, except Electrical	13.50%	\$12,821,159,976
Transportation Equipment	11.85%	\$11,258,080,827
All Other Exports	32.24%	\$30,627,170,387
Total	100.00%	\$94,995,266,011

While Texas exports have grown by 25 percent between 1997 and 2001, the year 2001 witnessed the first drop in over a decade. Consistent with a national decline of 6.3 percent between 2000 and 2001, the roughly \$95 billion export value in 2001 represented an over-the-year decline of 8.5 percent.

Exports are a critical part of any state economy and are increasingly being seen as an important strategy to help existing businesses retain jobs and stimulate output and employment growth. Jobs driven by the export market tend to be higher paying for a number of reasons, not the least of which is the fact that global competition promotes increased productivity. In his Brookings Institution book, *Globaphobia*, Gary Burtless explains "jobs in exporting firms and industries pay wages that are about 5 to 15 percent above the national average for precisely this reason; they are more productive than the jobs in industries that are shrinking as a result of imports from developing countries."

## 26. Where Are the Jobs by Industry?

Which industries will create jobs in the future? Occupational demand and skills requirements for the Texas labor force will continue to be tied to industrial growth and the application of technology within those industries. Employers hire fewer people for clerical positions, for example, as office automation and changing office practices reduce the demand for workers whose responsibilities are exclusively clerical in nature.

Since jobs follow industry growth or decline, it's important to understand the many phenomena that affect industry growth and decline. Each of these factors affects different industry sectors in unique ways.

1. **Consumer demand for goods and services** Business thrives on providing what the customer wants (or is made to believe they need through advertising!). Consumer tastes and preferences drive the economy. If we all decided to dry our clothes outside on a clothesline, there would be no demand for clothes dryers or the people who make or repair them. No demand, no jobs.
2. **Availability of natural resources or geographic proximity to markets** If a region has timber or oil as a natural comparative advantage, it will likely exploit those commodities. Businesses that rely on certain natural resources as inputs to their final products often locate in the proximity of those resources.
3. **Available skilled labor or information resources** Industries tend to locate where there is a skilled labor pool for their needs or existing centers for related research. It is not surprising to see software development or computer systems enterprises locate near communities with strong university engineering departments.
4. **Public policy and government demand** (including defense, education and human services). If government initiates a military defense build-up, for example, defense contractors are the first to benefit. State capitols and county seats tend to have disproportionate numbers of lawyers, printers, and other professions relating to government operations.

Given these factors, particularly consumer demand driven by the fast-paced lifestyle of Texas' two-earner families, the Eating and Drinking Places industry sector has topped the list of employment growth each first quarter between 1993 and 2001. But this industry is not the only perennial favorite for job growth as Table 9 reveals. Whether looking at the first quarter statistics for the short term (2000 to 2001), medium-term (1998 to 2001), or long-term (1993 to 2001), certain industries always seem to top the high growth lists. They are Eating and Drinking Places, Public Education, Personnel Supply Services, Computer and Data Processing Services, and Local Government (excluding health and education).

**TABLE 9**  
**Texas Industrial Change in Three Time Periods**

Rank	1993-2001 (long-term)	1998-2001 (medium-term)	2000-2001 (short-term)
1	Eating & Drinking Places	Eating & Drinking Places	Computer & Data Services
2	Public Education (K-12)	Public Education (K-12)	Eating & Drinking Places
3	Personnel Supply Services	Computer & Data Services	Public Education (K-12)
4	Computer & Data Services	Personnel Supply Services	Engineering/Architect Services
5	Misc. Business Services	Telephone/Cellular Communications	Oil and Gas Field Services
6	Government (except education and health)	Local Government (except education and health)	Heavy Construction
7	Telephone/Cellular Communications	Department Stores	Department Stores
8	Home Health Care	Management/Public Relations	Local Government (except education and health)
9	Medical Doctor Offices	Engineering/Architect Services	Management/Public Relations
10	Department Stores	Contract Electrical Work	Medical Doctor Offices
11	Management/Public Relations	Medical Doctor Offices	Telephone/Cellular Communications
12	Engineering/Architect Services	Heavy Construction	Electronic Components Manufacturing
13	Contract Electrical Work	Wholesale Computer Equipment	Colleges & Universities
14	Contract HVAC/Plumbing	Contract HVAC/Plumbing	Home Health Care
15	Air Transportation (all)	Air Transportation (all)	New & Used Car Dealers

The top 15 list is just as stable. Certain sectors, such as Telephone/Cellular Communications, Department Stores, Management and Public Relations, Engineering and Architectural Services, and Offices of Medical Doctors, consistently appear on the top 15 growth industries across all three time frames. The Contract Construction and Air Transportation sectors that feature prominently in Texas' historical industrial employment growth charts didn't make the top 15 lists in the past year due to the fall-out of September 11<sup>th</sup>.

These statistics describe where job growth has historically been. To put the current structure and trends of industrial employment into future perspective, both the Texas Workforce Commission's Labor Market Information (LMI) department and the BLS generate industry employment projections for ten-year intervals. In Texas, the most current projections cover the 1998-2008 period.

**In economics, size does matter. The greatest number of job openings tend to occur in the largest industries.**

In economics, size *does* matter. It is axiomatic in most cases that, due to the phenomenon of labor turnover and replacement demand, the greatest number of job openings will tend to occur in the largest industries. The industries expected to generate the **greatest number of net new jobs** through 2008 therefore are: (1) Eating and Drinking Places, (2) Elementary and Secondary Schools, (3) Self-employed/Unpaid Family Workers, (4) Personnel Supply Services, (5) Hospitals, (6) Miscellaneous

Business Services, (7) Offices of Medical Doctors, (8) Telephone Communications, (9) Computer and Data Processing Services, (10) Colleges and Universities, (11) Management and Public Relations, and (12) Department Stores.

Collectively, these industries are projected to grow slightly faster (20.0 percent) than the average for all industries (17.4 percent). More significantly, in 1998 these sectors comprised 36.4 percent of total Texas employment. By 2008, they are projected to represent 37.2 percent of **total employment** and 41.8 percent—or slightly over 4 in 10—net new jobs created during the period.

The new job growth generated by the biggest industry sectors is only part of the picture. Smaller, fast-growing industries will provide new jobs as well. Of the Texas industries that employed at least 3,000 people in 1998, the twelve expected to grow the fastest by 2008 are: (1) Securities and Commodity Services, (2) Miscellaneous Personal Services, (3) Management and Public Relations, (4) Sanitary Services, (5) Offices of Osteopathic Doctors, (6) Office of Health Practitioners (NEC), (7) Individual and Family Social Services, (8) Used Car Dealers, (9) Museums and Art Galleries, (10) Electrical Contractors, (11) Personnel Supply Services, and (12) Miscellaneous Transportation Services.

As a group, these top twelve industries are projected to grow 40.5 percent over the 1998-2008 period, significantly more than the 17.4 percent rate for all industries. From a perspective of net new jobs created, however, they represent only 4.7 percent of total 1998 employment and are projected to comprise only 5.6 percent of the 2008 employment. They account for only 10.9 percent of the total projected change between 1998 and 2008.

To put Texas' industry's job growth into perspective, it helps to compare it to national statistics, such as the BLS' recently-completed 2000-2010 projections. We have made the point that the Texas economy today looks increasingly like the national economy and tends to respond to most of the same economic drivers. Taking a glimpse of national projections therefore provides an alternate indicator of likely sector growth in Texas.

Overall, the Services-producing sector will continue to dominate national employment growth, contributing 74.7 percent of total employment by 2010. Goods-producing industries, notably Mining, Construction and Manufacturing, will represent roughly 16.1 percent of 2010 employment, with Agriculture contributing 2.3 percent and Self-Employment 5.4 percent.

Among industries with the fastest growth rate through 2010, 19 of the top 20 in the U.S. are Services-producing. Conversely, 16 of the 20 industries expected to decline most rapidly are in the Goods-producing sector and specifically in Manufacturing.

Nationwide, total industry employment is expected to expand at a rate of 1.6 percent per year through 2010. Mining is expected to decline by 1.1 percent per year while Manufacturing will increase by only 0.3 percent per year. The fastest growing major division industry is projected to be Services, expanding at a rate of 2.9 percent per year.

Not surprisingly, given the previous statistics, the top five industries projected to add the most net new jobs nationally through 2010 are (1) Computer and Data Processing Services, (2) Eating and Drinking Places, (3) Offices of Health Practitioners, (4) State and Local Government Education, and (5) Miscellaneous Business Services. The fastest growing sectors are projected to be (1) Computer and Data Processing Services, (2) Residential Care, (3) Health Services (not elsewhere classified), (4) Cable and Pay Television Services, and (5) Personnel Supply Services.

## 27. Texas Industry Employment and Income: Does It All Pay the Same?

Despite media attention on employment and unemployment numbers, it is really **income** that drives our standard of living and reflects our general prosperity. In Texas, average income has increased in recent years. The overall average weekly wage in Texas for all employment covered by the Unemployment Insurance (UI) program in the first quarter 2001 was \$726.18 or, hypothetically based on 52 weekly pay periods, an annualized \$37,761. This figure represents an increase of just over 37.4 percent since the first quarter 1996 when the weekly average was \$528.23.

Of course, even in periods of overall prosperity and job growth, income increases are not evenly dispersed across the state. The highest average wages were found in Williamson County (home of many Dell executives); Travis County (Austin); Dallas and Collin Counties (Plano/Richardson) in the Dallas Metroplex; and Harris, Chambers, Fort Bend, and Montgomery Counties, comprising the lion's share of the Houston labor market.

Income also varied by industry sector. As Schumpeter's creative destruction theory predicts, some industries expand while others lose jobs and decrease their wage contributions to the economy. By dissecting the Texas employment change between 1998 and 2001 into job gainers and job losers, some interesting patterns appear.

**Not all job loss, just like all job gains, affects the aggregate economy equally.**

As the previous chapter attests, Texas' economic expansion between 1998 and 2001 has been as broad-based as any in the state's history, with 56 of the 76 industries analyzed adding a total of 665,940 net new jobs. During this same period, a total of 553,057 jobs were created in the top 15 growth industries. Business Services, Education, Eating and Drinking Places, and Special Trade Construction topped the list of job gainers. The

top 15's net employment gains contributed over \$4.6 billion in new quarterly wages.

On the other side of the spectrum, the bottom 15 job-losing industries accounted for a loss of 73,824 jobs during the 1998-2001 period. Despite a brief comeback during the 2000-2001 period, Oil and Gas Extraction was the biggest job loser, closely followed by Apparel Manufacturing.

From a wage perspective it is important to note that not all job loss, nor all job gains, affects the aggregate economy equally. Even though the actual numbers of jobs lost by the two industries was close (-16,005 in Oil and Gas; -14,893 in Apparel), the cost to the state of their lost quarterly wages was not. Because Oil and Gas jobs paid higher average weekly wages, their loss cost the state roughly \$368.3 million in quarterly wages, compared to the Apparel job loss cost of slightly less than \$79 million. To better illustrate the importance of wages to the Texas economy, consider the fact that—using the average quarterly wages paid to each employee in the Texas economy for the first quarter 2001—the lost Oil and Gas Extraction wages alone roughly equal 40,058 "average" jobs.

The top and bottom growth industries in Texas from the first quarter 1998 through the first quarter 2001 are presented in Table 10, along with the level of wages paid in those industries. It is interesting to note that the top 15 growth industries during this period added over \$4.6 billion to the state economy while the 15 industries losing the most jobs drained roughly \$975 million from it.

Another impact of the wage differential concerns skill differentials and re-employment. Traditional Texas industries, such as Apparel, paid relatively high wages to relatively low-skill workers. It will be more difficult to place an out-of-work sewing machine operator with twenty years' experience and limited English proficiency in a job that provides 80 percent wage replacement, for instance, than it will be to place an unemployed nurse at 80 percent wage replacement.

**TABLE 10**  
**Wage Disparity Between Job Gainers and Job Losers**  
**Texas First Quarter 1998 through First Quarter 2001**

<b>SIC</b>	<b>Industry Title</b>	<b>Employment Change 1998-2001</b>	<b>Wages Paid 1st Quarter 2001</b>	<b>Total Wages Gain or Loss</b>
73	Business Services	95,031	\$6,468,429,525	\$872,674,330
82	Education Services	65,718	\$6,540,714,471	\$466,932,018
58	Eat/Drink Places	62,332	\$1,968,046,646	\$195,733,862
17	Special Trade Construction	58,004	\$2,474,834,249	\$443,361,591
87	Engineer/Accounting Services	45,263	\$3,710,705,524	\$634,724,653
80	Health Services	31,122	\$6,218,091,337	\$248,661,652
48	Communications	28,787	\$2,194,064,069	\$417,747,663
53	General Merchandise Stores	23,863	\$1,141,356,571	\$121,555,955
93	Local Government	23,632	\$2,531,533,612	\$190,795,910
83	Social Services	23,391	\$624,782,192	\$99,275,725
50	Wholesale Trade Durables	21,511	\$4,937,912,984	\$312,427,595
59	Misc. Retail Trade	21,424	\$1,007,487,237	\$113,218,983
16	Heavy Construction	20,805	\$1,326,600,076	\$202,883,860
45	Transportation by Air	17,487	\$1,566,641,802	\$221,918,714
57	Retail Furniture	14,687	\$609,962,980	\$106,176,385
	<b>Average Quarterly Gain</b>	<b>553,057</b>	<b>\$43,321,163,275</b>	<b>\$4,648,088,895</b>
13	Oil & Gas Extraction	-16,005	\$3,198,736,737	-\$368,365,327
23	Apparel Manufacturing	-14,893	\$206,480,089	-\$78,952,167
35	Machinery ex. Electrical	-10,161	\$2,111,073,346	-\$152,548,564
91	Federal Government	-9,433	\$1,404,882,326	-\$108,622,370
37	Transportation Equipment	-6,928	\$975,800,347	-\$89,271,403
38	Scientific Instruments	-5,843	\$441,292,931	-\$73,938,996
78	Motion Pictures	-1,819	\$154,911,590	-\$9,763,493
26	Paper Product Manufacturing	-1,694	\$324,366,163	-\$19,694,490
29	Petroleum Refining	-1,644	\$548,396,867	-\$36,890,399
31	Leather and Leather Products	-1,528	\$34,226,502	-\$8,744,039
01	Agriculture-crops	-1,390	\$213,361,436	-\$6,650,202
88	Private Households	-663	\$96,636,249	-\$2,378,772
28	Chemical Manufacturing	-636	\$1,522,784,742	-\$11,541,197
24	Lumber and Wood Products	-611	\$304,068,689	-\$4,149,973
39	Misc. Manufacturing	-576	\$131,237,274	-\$3,844,412
	<b>Average Quarterly Loss</b>	<b>-73,824</b>	<b>\$11,668,255,288</b>	<b>-\$975,355,802</b>

Note: The rankings in this table differ from those in Table 9 because of differing classification levels. Table 9 uses 3-digit SIC levels while this table uses 2-digit SIC levels, which are less specific.

## 28. For Whom Do We Work? Firm Size and Job Growth

While making the point that job growth and decline have differed depending on industry sector, we also should mention that not all sizes of firms contribute equally to new job creation.

Most new jobs are created in firms with fewer than 20 employees and three-fourths of these are in firms that are four years old or younger.

Massachusetts Institute of Technology (MIT) researcher David Birch found that 52 percent of all new jobs nationwide are created in firms with fewer than 20 employees. More importantly, he found that more than three-fourths of those new jobs arose in firms four years old or younger.

His research concludes, however, that job growth depends more on a business's innovation, rather than its size. The vast majority of small firms operate for years without any job growth. Many businesses—the pizza parlors and shoe repair shops—start small and either go out of business or stay small. A handful grow, not because they're small but because they are innovative. According to Birch, "about 10 percent of the small companies create 90 percent of the new jobs and don't stay small for long." The most innovative become targets of opportunity for mergers and acquisitions.

In the end, neither small companies nor large companies have a monopoly on innovation. While employers of small companies may have more latitude to try something new, large companies are more likely to have the resources to take a good idea from the drawing board to the marketplace.

There are major differences in employment opportunities between small firms and larger firms. Larger firms, for example, tend to have a broader product mix that requires a wider array of worker skills, more defined internal career paths, and more bureaucratic behavior. They are also more likely to have an internal support structure for human resources and training, information technology, and physical plant maintenance.

Smaller firms, on the other hand, tend to be more nimble, have less well-defined job descriptions, experience greater employment volatility, and outsource more non-core business support functions. Even though the vast majority of Texas employers are small, they employ a much smaller number of workers than the far fewer, but more dominant, large employers.

According to the most recent data available (the second quarter 2001), 84.3 percent of the 443,584 businesses registered with the Texas Workforce Commission had fewer than 20 employees. These businesses employed 17.8 percent of all UI-covered Texas wage and salary workers. Conversely, only 3.2 percent of all firms had 100 workers or more but they employed 58.4 percent of the Texas workforce. Table 11 lists the employment distribution by firm size for the first quarter of 2001; the figures differed little from the second quarter's.

**TABLE 11**  
**Texas Employment Distribution by Firm Size**  
**First Quarter 2001**

Firm Size (Number of Employees)	Number of Firms this Size Statewide	Percentage of all Firms Statewide	Number of People Employed Statewide	Percentage of all People Employed Statewide
0-4	243,788	55.3%	462,175	5.0%
5-9	77,816	17.7%	520,016	5.6%
10-19	52,239	11.9%	723,532	7.7%
20-49	38,203	8.7%	1,203,531	12.9%
50-99	14,554	3.3%	1,040,977	11.1%
100-249	8,820	2.0%	1,396,492	15.0%
250-499	2,826	0.6%	992,058	10.6%
500-999	1,242	0.3%	891,835	9.6%
1,000 plus	843	0.2%	2,106,265	22.6%
<b>Total</b>	<b>440,331</b>	<b>100.0%</b>	<b>9,336,881</b>	<b>100.0%</b>

Source: Texas Workforce Commission

In Texas, the trend for employer size class distribution has changed. In 1989, for example, 34.1 percent of all employment was found in firms with 1,000 or more workers and 63.9 percent were employed in firms with 100 or more workers. Larger firms were "where the jobs were." By 1994, however, a new trend became clear. The number of workers in firms with 100 or more employees had dropped to only 51.9 percent, while the percentage for firms with 10-99 employees increased. Outsourcing non-essential business operations came into vogue, reducing total employment in the biggest firms and creating employment growth opportunities in middle-sized businesses.

The latest figures suggest that the trend may be reversing again, as Table 12 reveals. In 2001, 57.8 percent of workers were found employed in firms with 100 or more workers. If this trend persists, as may happen if the recession causes more firm consolidation and a shakeout of smaller, non-economically viable businesses, the employer contact strategies and business propositions geared for smaller firms may become less important than services to middle and larger employers.

Workforce employer services representatives seeking to establish relationships with their regional business community are well aware of the different labor force needs of large versus small employers. They are well advised to monitor these trends in their respective regional labor markets.

**TABLE 12**  
**PATTERN OF CHANGE 1989-2001**  
**Employment Percentages by Firm Size**

Firm Size (# of Employees)	Percentage of All Employees Statewide				Overall Trend for 1989 to 2001
	1989	1992	1996	2001	
0-4	4.92%	5.78%	5.16%	5.0%	SLIGHT INCREASE
5-9	5.68%	7.02%	5.97%	5.6%	SLIGHT DECLINE
10-19	6.92%	9.12%	8.01%	7.7%	INCREASE
20-49	10.26%	14.52%	13.11%	12.9%	INCREASE
50-99	8.34%	11.62%	10.91%	11.1%	LARGE INCREASE
100-249	11.52%	14.64%	14.56%	15.0%	LARGE INCREASE
250-499	9.24%	9.04%	9.77%	10.6%	INCREASE
500-999	9.02%	7.87%	9.53%	9.6%	SLIGHT INCREASE
1000 plus	34.10%	20.48%	22.98%	22.6%	MAJOR DECLINE

Source: Texas Workforce Commission

One caveat concerns the fact that different organizations use widely-varying definitions for "small business." For our purposes here, small business is generally defined as firms with 20 or fewer employees. This definition is not universal, however. The federal Small Business Administration (SBA) has a variety of definitions for designating a small business. In most manufacturing industries, for example, a small business may have up to 500 payroll workers.

## 29. Discovering the Future: Where Will the Jobs Be by Occupation?

What are "hot jobs?" Every year, new lists appear describing the latest occupations projected to have future openings. The Texas Workforce Commission's Labor Market Information department produces biennial occupational employment projections for Texas and twenty-eight sub state regions (for greater detail, see *Texas: A Decade of Change Employment Projections 1998-2008*). Table 13 lists the Top 20 occupations with the **greatest expected increase in employment** through the year 2008.

This table reveals a few pertinent points about the jobs projected to have many openings. First, they often are "unskilled." In this list, 13 of 20 require little or no post-secondary training. Those positions include, for example, Cashiers, Retail Salespersons, and General Office Clerks.

**TABLE 13**  
**Occupations Adding the Most Jobs in Texas**  
**1998-2008**

Occupational Title	Projected Employment 2008	Absolute Change '98-'08	Hourly Wages	Education Required
General Managers & Executives	339,212	51,341	\$27.35	Bachelor's Degree & Work Experience
Cashiers	276,655	47,681	\$6.91	Short-term OJT*
Retail Salespersons	320,670	47,355	\$9.03	Short-term OJT
General Office Clerks	257,365	37,000	\$9.31	Short-term OJT
Secondary School Teachers**	163,926	31,882	\$19.37	Bachelor's Degree
Systems Analysts	73,596	29,504	\$24.86	Bachelor's Degree
Heavy Truck Drivers	149,677	28,472	\$12.49	Short-term OJT
Registered Nurses	155,719	28,305	\$19.88	Associate's Degree
Waiters & Waitresses	158,414	25,951	\$5.88	Short-term OJT
Telemarketers & Sales Vendors	70,492	23,742	\$8.68	Moderate-term OJT
Teacher Aides	90,217	23,383	\$6.72	Short-term OJT
Computer Support Specialists	57,483	23,236	\$19.63	Associate's Degree
Food Prep/Fast Food Workers	172,393	22,565	\$5.97	Short-term OJT
Child Care Workers	120,902	22,147	\$6.44	Short-term OJT
Nursing Aides & Orderlies	112,526	21,259	\$6.70	Short-term OJT
Light Truck Drivers	103,108	21,013	\$9.37	Short-term OJT
Office Support Supervisors	123,982	20,607	\$15.67	Work Experience
Marketing & Sales Supervisors	173,633	20,561	\$16.86	Work Experience
Private Security Guards	90,293	19,397	\$8.47	Short-term OJT
Correctional Officers	63,092	18,255	\$11.54	Long-term OJT

\* OJT means On-the-Job training

\*\*Usually operate on nine month contracts. Hourly rate presumes full-year, full-time employment.

Source: Texas Workforce Commission

Second, they often are low-paying. The weighted average hourly wage for this top 20 subset was only \$12.83 in 2000. Breaking down the wages by education level, however, reveals a stark contrast. The average hourly wage for the 13 unskilled positions was \$8.27, while for the remaining seven positions it was \$20.52.

Overall, the 20 occupations adding the most jobs are projected to represent 26.6 percent of 2008 employment and 32.9 percent of the net growth between 1998 and 2008. By comparison, the **fastest growing occupations** in Texas from 1998 to 2008 (listed in Table 14) are expected to account for 3.8 percent of 2008 total employment but a disproportionate 8.9 percent of total new jobs. Moreover, 18 of the top 20 will require some post-secondary education and 9 out of 20 will require an Associate's degree or higher. Topping the list of fastest growing occupations is Desktop Publishing Specialists, followed by Computer Support Specialists, Systems Analysts, Surgical Technologists, and Cardiology Technologists.

The wages for these occupations reflect the education levels they require. The weighted average hourly wage of the top 20 fastest growing occupations is \$15.98, almost 25 percent higher than that of the top 20 occupations adding the largest number of jobs.

A comparison of Tables 13 and 14 reveals a few noteworthy facts. The occupations that appear on both the fastest growing occupations list and the largest job producers are Computer Systems Analysts, Computer Support Specialists, and Telemarketers and Sales Vendors. Noticeably absent from both tables are occupations in Assembly, Production and Bench Work, and other Agricultural, Mining, and Manufacturing-related industries.

Although there are no occupations typically associated with Manufacturing on the lists, there is considerable transformation occurring in this sector. In fact, the new jobs being created in Manufacturing require significantly higher academics, technology, and interpretive skills than ever before. The BLS estimates that 60 percent of Manufacturing jobs in 1950 were unskilled. Their prediction for 2005 is that only 15 percent of Manufacturing jobs can be considered unskilled.

In the National Association of Manufacturers (NAM) report, *The Skills Gap 2001*, 80 percent of manufacturers report a moderate to severe shortage of qualified job candidates, despite the slow economy. Interestingly, manufacturers are citing fewer worker shortages in IT-related occupations and greater concern for production workers—including various machine operators, machinists, and craftworkers.

In addition, the top skills deficiency cited in the NAM 2001 annual survey of 6,000 employers is basic employability skills, including attendance, punctuality, work ethic, dress, demeanor, and so on. The survey also found that two-thirds of respondents believe the Manufacturing sector continues to suffer from a poor, outdated image which affects its ability to attract competent workers. As a result, a quarter of manufacturers confirmed that the shortages made hiring immigrants, high school students, and individuals moving from welfare to work with requisite skills much more attractive.

**TABLE 14**  
**Fastest Growing Occupations in Texas 1998-2008**

Occupational Title	Projected Employment 2008	Percent Change '98-'08	Hourly Wages	Education Required
Desktop Publishing Specialist	4,012	98.0	\$12.64	Long-term OJT*
Computer Support Specialist	57,483	67.8	\$19.63	Associates Degree
Systems Analysts	73,596	66.9	\$24.86	Bachelor's Degree
Surgical Technologists	5,935	56.5	\$11.28	Post-secondary Vocational
Cardiology Technologists	1,871	54.0	\$17.36	Associate's Degree
Respiratory Therapists	9,283	53.6	\$15.41	Associate's Degree
Paralegals & Legal Assistants	16,340	51.3	\$16.87	Associate's Degree
Parking Lot Attendants	7,696	51.2	\$6.74	Short-term OJT
Telemarketers & Sales Vendors	70,492	50.8	\$8.68	Moderate-term OJT
Medical Assistants	28,172	49.2	\$9.43	Moderate-term OJT
Computer Science Teachers**	2,209	49.2	\$21.43	Masters/Doctoral Degree
Sheriffs and Deputy Sheriffs	7,513	48.7	\$12.60	Long-term OJT
Database Administrators	10,800	48.3	\$23.70	Bachelor's Degree
Computer Engineers	36,534	48.1	\$27.99	Bachelor's Degree
Central Office/PBX Installers	3,428	48.1	\$18.64	Post-secondary Vocational
Telephone/Cable TV Installers	22,772	46.7	\$15.29	Long-term OJT
Cleaners/Servants, Private	23,163	45.6	\$6.22	Short-term OJT
Sheet Metal Duct Installers	4,355	45.5	\$11.84	Moderate-term OJT
Physical Therapy Assistants	7,569	43.9	\$11.04	Associate's Degree
Police Patrol Officers	42,952	43.6	\$15.87	Long-term OJT

\* OJT means On-the-Job training

\*\* Usually operate on nine month contracts. Hourly rate presumes full-year, full-time employment.

Source: Texas Workforce Commission

## 30. High Technology Occupations and Labor Market Disparity

Turn on the nightly news or pick up a newspaper—everywhere you look there is talk about "high-tech" occupations and the lack of qualified workers to fill these positions. In response, federal, state, and local governments are passing legislation and instituting special programs to ensure that there are enough workers with the appropriate skills to fill high-tech job openings. Training institutions are racing to offer courses to prepare workers and career counseling services are more than ready to help anyone enter the high-tech field. But what exactly is a "high-tech" occupation? How do researchers define the term? And how do they gather data on these occupations?

Not everyone that works in a semiconductor manufacturing facility has to be well versed in digital technology.

The federal government has devised methodology to classify *industries* as high-tech, so most researchers base employment studies on these designations. To date, however, there is no common methodology to classify *occupations* as high-tech. The distinction is important because not everyone that works in a semiconductor manufacturing facility has to be well versed in digital technology. Conversely, even chain grocery stores and retail outlets employ some technologically savvy workers.

CDR staff tackled the task of defining occupations as "high tech" or not. After developing a process for assigning the degree to which each occupation is driven by advanced technology, they applied the research to a master database of occupation-specific variables. The goal was to determine whether occupations classified in one of five technology-driven categories had any unique group labor market characteristics.

The results may be surprising. Although digital technology has become quite pervasive in consumer goods and services, from an occupational standpoint, over 40 percent of all occupations and 43.3 percent of all 1998 occupational employment "do not rely on technology." In fact, of the 638 total occupations with useable data for assessing technology-intensity, only 18 were classified in the highest category of "driven by advanced technology" and only another 49 "required significant use of advanced technology"—the second highest category.

These technology-driven occupations do exhibit all the unique characteristics one might imagine, however. First, their employment outlook is excellent. Those that rely on technology are projected to expand by 33.7 percent between 1998 and 2008; a rate almost double that for all occupations combined. Most tellingly, however, 65.9 percent of those projected job openings will be due to growth, as opposed to replacing existing jobs. (See Marc Anderberg's *Technology Workers and the New Texas Economy*, appendix II, for a complete occupational list).

This reliance on growth as opposed to replacement distinguishes technology-driven occupations from others. In contrast, occupations that do not rely on technology will have only 38 percent of total openings due to growth, compared to 42.2 percent for the Texas job market as a whole.

Another characteristic of occupations which are either driven by technology or require significant use of technology is that they will represent an increasingly greater percentage of total employment in the Texas economy. Those that do not rely on technology, conversely, will decrease as a percentage of total employment by 2008.

Still, despite these percentage changes, occupations in the top two technology categories will represent less than seven percent of total employment by 2008. The flip side is that 43.2 percent of total Texas employment is projected to be in occupations that do not rely on advanced technology in 2008. This statement assumes, of course, that duties, tasks, and skills for this subset of occupations are not substantively changed by technology itself between 2001 and 2008—an assumption that may be heroic.

Occupations in the top two technology categories will represent less than seven percent of total employment in 2008.

This CDR research also substantiated several noteworthy hypotheses about technology and occupations. The amount of education required to practice effectively in occupations driven by technology is slightly above a Bachelor's degree. In contrast, occupations that do not rely on advanced technology averaged an educational preparation period of about one month of on-the-job-training (OJT).

Those employed in technology-driven occupations also received higher monetary compensation. The weighted average hourly wage for all occupations in Texas was \$13.40 in 1998. The weighted average hourly wage for occupations that do not rely on technology was only \$9.03. Occupations that rely on technology, conversely, averaged \$23.37 per hour. Even those that just required significant use of technology averaged \$21.58. Clearly, there are financial rewards for those investing both in education as a whole and particularly in educational programs associated with technology-driven occupations.

## 31. Changing Income Distribution and Wage Inequality

Karl Marx once argued that market capitalism creates income inequality by default, as those who own the means of production (land and money) profit from their investment and naturally outpace workers who have nothing to sell but their labor. Most countries new to capitalism have found some truth to this theory. Often, a small minority become obscenely rich while the vast majority eke out a meager existence.

The U.S. economy, in contrast, has long been characterized by the existence of a prominent middle class, meaning that many people shared in the nation's wealth to a certain extent. During the past 20 years however, real wage growth has slowed and, depending on the time period studied, even become negative. Slower wage growth reduces the purchasing power of an effective middle class and increasingly tends to polarize families as either "rich" or "poor."

Many thoughts have been offered on why this has occurred. The arguments range from (1) Marx's natural tendency model of worker exploitation to (2) corporate greed, such as executive pay packages far in excess of front line workers' wages and reduced profit distribution to workers; (3) the erosion of Manufacturing sector employment with above-average pay for below-average educated workers; (4) overseas competition and wage leakages to other countries; (5) declining labor union representation, once a critical factor driving wage equalization; and (6) a growing inequality of educational attainment by race and gender.

While there is merit in each argument, Gary Burtless of the Brookings Institution offers a different perspective regarding the widening wage gap between those with college educations and those without. He writes, "A generation ago, most of the women who worked were concentrated in lower-income families and they tended to earn relatively low rates of pay, not unlike their husbands. But in recent years, the women who have joined the workforce have come disproportionately from the middle and upper classes. And because higher-income, college-educated men tend to marry women who are also college-educated and can command above average pay, the entry of these women into the workforce has had the statistical effect of allowing those upper income households to pull even farther ahead."

## Male and Female Earnings Differentials

Another traditional realm of wage disparity is the difference between male and female earnings. A cursory look at 2001 Current Population Survey (CPS) data shows that, in the aggregate for all workers 16 years and older, women earned roughly 76 cents for every dollar earned by men. But while this fact is correct, it doesn't tell the whole story.

"Comparing the earnings of women and men is complicated by the dynamics of marriage and family responsibilities," says Ed Potter, president of the Employment Policy Foundation (EPF). There are, in practice, at least four major areas that tend to differentiate male and female earnings, each of which has shown improvement for women.

1. **Seniority in the workplace** tends to result in higher earnings. In 2001, full-time working women averaged 3.2 years less work experience than men by the age of 45, accounting for part of the wage disparity. That gap has closed, however, from a 5.1 years experience deficit in 1993.
2. The **"housework effect"** CPS survey data show that women devote an average of 14.2 hours per week to household chores and child rearing, compared to 7 hours for men. Although the commitment to child rearing has historically been viewed as primarily a female responsibility, from an earnings perspective it is interesting to note that women age 25-39 without children earned 96 percent of male earnings in 2001—up from 88 percent in 1981. Moreover, the EPF found that single women who live alone, have never married, and have full-time jobs earn 28 cents per hour **more** than their male counterparts.

3. **Occupational choice** has historically had a downward effect on female earnings as women tended to cluster into lower paying teaching, clerical, and health service jobs. That landscape has significantly improved in recent years as women have made advances into higher paying managerial, professional, and technical occupations. Women accounted for 51 percent of employment in these fields in 2001, up from 38 percent in 1981.
4. **Education levels** Women's rising education levels have further contributed to the convergence in male and female earnings. Women have a higher overall high school graduation rate and a roughly equal likelihood of being college educated as men. A combination of factors—the economy's transformation to a service orientation and the loss of many higher paying, male-dominated manufacturing jobs—have also contributed to increasing equality.

Regardless of the cause of wage inequality among many segments of the population, many ask what government can do to reverse the trend. In truth, an economy based on market capitalism operates like a global tidal wave of activity that notices government policy but is rarely driven by it. In matters of job creation, economists agree that the Chairman of the Federal Reserve Board, who sets interest rates, has more power than any government official—including the President—to affect economic activity.

According to former chairman of the Council of Economic Advisors, Charles Schultze, "when it comes to things like long-term growth of the economy, the distribution of income or the quality of education in our schools, the truth is, government has got to work like hell to make a difference of even a couple of tenths of a percentage point. Don't get me wrong, there are a lot of things worth doing. In most cases though, the results are long-term and they are small."

## 32. Occupational Wages: Why Doesn't Everyone Make The Same?

There are many reasons everyone doesn't make the same wages in a capitalist economy. Wages often differ depending on the industry. Some industries require a higher mix of highly skilled professionals to deliver the intended product or service while others require more less skilled workers. In this situation, those with more education or skill earn more than their less educated counterparts.

Other times, an occupation itself may have a high or low wage rate. Part of this differential may stem from the difficulty of conducting research about wages. Collecting current, detailed occupational wage data is very complex and possible data inaccuracies may occur. This monograph relies on wage data from the TWC/LMI department, which are collected under the scrutiny of the BLS using rigorous methods. Since occupational wage data by definition include only wage and salary income, they can understate earnings of occupations with large numbers of self-employed workers such as doctors, lawyers, dentists, and commission sales workers.

Regardless of the data collection method, other factors can explain the differences among wage rates even within the same occupation. They include the following:

1. **Experience level** There is a difference between the entry-level wage and the average, or prevailing, wage. Newly employed persons generally make less than those with more experience in the position.
2. **Union activity** The amount of union activity associated with a particular job can vary widely. In general, union wages tend to be higher than non-union wages.
3. **Part-time workers** Part-time employment tends to lower the average wage. Part-time workers also tend to receive fewer benefits.
4. **Geographic region** Texas has regions that pay occupational wages at higher and lower rates than the national average, for example.
5. **Industry sectors** An occupation that is employed by several different industries may be higher paying in one than in another.
6. **Availability of trained workers** Skill shortages lead employers to increase wages to attract qualified people.
7. **Actual job duties and skills required** Different jobs that carry the same occupational title may vary widely in their duties. Generally, the more responsibilities or higher skill requirements associated with any given job, the higher the salary.
8. **Quality of education** A person who received training from a particular education program may earn more than someone from another program.
9. **Productivity** Some people are simply more productive than others and therefore deserve higher wages. Individual factors—including work ethic, effort, initiative, education, and innate intelligence—all may affect individual productivity.

# Education and the Economy

More than ever before in U.S. history, education enhances earnings. In 1998, for example, persons who finished high school made roughly 30 percent more than those who did not get a diploma. Furthermore, in general, the greater the education, the greater the earnings. Not surprisingly then, the future of the Texas economy depends in large part on the future of Texas education.

In his recent analysis, *Educational Attainment and Border Income Performance*, Thomas Fullerton determined that "[F]ailure to complete high school leads to statistically significant negative impacts on *per capita* incomes in Texas. Thus, more than any other investment, a reduction in the high school dropout rate, especially in border communities, is the single most important factor in raising county *per capita* incomes." The HSF/Rand study confirms this finding in the following recommendation, "We must significantly increase the number/percentage of students who finish high school, who finish high school prepared for college, and who enroll in four-year institutions after high school or transfer from community college. None of these strategies alone or in tandem would do the job."

In fact, a high school diploma is just the beginning. "This is a labor market that will be unforgiving to those persons without the necessary skills." This June 2000 quotation by former U.S. Department of Labor Secretary Alexis Herman summarizes the importance of education and skills acquisition in the new global economy. Since people have to learn—and in some cases re-learn—these skills, education and training are integral to workforce preparedness and critically important to the individual's ability to be employed productively in an era of global competitiveness.

## 33. Occupational Wages and Education

Depending on which data source you view, there will be variance in the hourly wage in Texas for all wage earners. The average weekly wage (AWW) in the first quarter of 2001 for all Texas workers in jobs covered by Unemployment Insurance (UI) was \$726.18. Roughly translated, this wage is \$37,761 per year or \$18.15 per hour, assuming a forty-hour work week. By comparison, the first quarter AWW in 1996 was \$528.23, or roughly \$13.21 per hour.

These numbers may be a little misleading, though. The UI data come from including all wages reported divided by the number of employees. As a result, highly paid individuals tend to skew the average upward. Compare the Texas figures with those of the Occupational Employment Statistics (OES) survey. The weighted average hourly rate for 2000 for all occupations included in the OES analysis is \$13.40 per hour. Differences unique to the OES data collection methodology account for the lower average hourly wages in this analysis.

Whatever the average wage for all jobs, certain occupations definitely pay more than others. Table 15 shows the top 25 highest paying occupations in the Texas labor market, based on OES survey data. The highest paid occupation, anesthesiologists, makes well over three times the average for all wage earners. Most interesting about this list, however, is the fact that only one occupation is generally accessible with less than a four year college degree.

**TABLE 15**  
**Top 25 Highest Paying Occupations in the Texas Labor Market**  
**With 1,000 or More Year 2000 Employment**

Occupational Title	Annual Earnings	Education Required
Anesthesiologists	\$123,913	First Professional Degree
Dentists	\$112,243	First Professional Degree
Airline Pilot, Flight Engineers	\$111,265	Bachelor's plus Work Experience
Physicians/Surgeons, Misc. Specialists	\$109,276	First Professional Degree
Family Doctors/General Practitioners	\$108,922	First Professional Degree
Psychiatrists	\$108,867	First Professional Degree
Internist, General Medicine	\$106,351	First Professional Degree
Pediatricians	\$106,026	First Professional Degree
Chief Executives	\$95,803	Bachelor's plus Work Experience
Lawyers	\$89,577	First Professional Degree
Engineering Managers	\$86,425	Bachelor's plus Work Experience
Geologists, Geophysicists, Oceanographers	\$80,620	Bachelor's Degree
Petroleum Engineers	\$80,375	Bachelor's Degree
Veterinarians	\$79,112	First Professional Degree
Computer/MIS Managers	\$77,928	Bachelor's plus Work Experience
Air Traffic Controllers	\$77,833	Long-term OJT*
Computer/MIS Research Scientists	\$75,860	Bachelor's Degree
Mechanical Engineers	\$72,350	Bachelor's Degree
Mining and Safety Engineers	\$71,883	Bachelor's Degree
Electrical Engineers	\$71,813	Bachelor's Degree
Sales Managers	\$71,587	Bachelor's plus Work Experience
Marketing Managers	\$70,632	Bachelor's plus Work Experience
Electronics Engineers	\$70,321	Bachelor's Degree
Aerospace Engineers	\$70,149	Bachelor's Degree
Pharmacists	\$69,783	First Professional Degree

\* OJT means On-the-Job training

Wage data and training requirements by occupation elicit interesting and diverse reactions among analysts. Casual observers must watch out for the "Cousin Ernie Phenomenon;" so named because of the natural tendency to view data simply from a personal experience. It is not unusual for someone to read the wage for a chemical engineer, for example, and respond with, "that can't be right, my Aunt Susan is a chemical engineer and she makes twice that amount!"

Many of us have anecdotal information from family and friends that may be contrary to the statistical aggregates presented in reports such as this one. Keep in mind that all wage data represent median or mean amounts for all persons in an occupation. In both wages and training requirements, there are many unique situations that can shape anecdotal information. Before disregarding the data, ask if there are any situations that may bias your personal knowledge.

### 34. The Difference for a Lifetime of Work

It is commonly understood that there is a strong correlation between higher education and higher earnings. The list of highest paying professions above certainly bears this out. What is startling is the remarkable difference it can make over a lifetime.

Consider that a full-time worker will average 83,200 hours in a lifetime of work (40 hours a week X 52 weeks = 2,080 hours per year X 40 years—the average work life). Based on the data from Table 16, the wage difference between an Associate's Degree (\$17.72 per hour) and an occupation requiring no more than 12 months of combined work experience and informal training (\$11.32 per hour) is roughly \$6.40 per hour.

On the surface it may not seem like a lot. Over the course of an entire career, however, the difference can be as much as \$532,480—or 47,038 additional hours of work at the lower pay scale! The differences get even larger if you compare jobs that require little or no training with those which require a Bachelor's Degree. Managed and invested wisely over a lifetime, the difference in earnings is astounding. An investment in education does pay!!

**TABLE 16**  
**Lifetime Earnings by Education Level in Texas**

Education Level	Estimated Lifetime Hours	2000 Weighted Hourly Earnings	Estimated Work Life Earnings
Short-term training	83,200	\$8.26	\$687,232
Moderate-term training	83,200	\$11.32	\$941,824
Long-term OJT*	83,200	\$12.12	\$1,008,384
Work Experience	83,200	\$15.85	\$1,318,720
Post-secondary Vocational Award	83,200	\$13.30	\$1,106,560
Associate's Degree	83,200	\$17.72	\$1,474,304
Bachelor's Degree	83,200	\$19.74	\$1,642,368
Bachelor's plus Work Experience	83,200	\$24.82	\$2,065,024
Master's Degree	83,200	\$18.51	\$1,540,032
Doctoral Degree	83,200	\$19.53	\$1,624,896
First Professional Degree	83,200	\$35.61	\$2,962,752

\* OJT means On-the-Job training

## 35. Education and the Labor Force

The challenges of education to meet 21<sup>st</sup> century employer skill demands are not as simple as getting more students to pursue more rigorous graduation plans in high school and providing greater remediation training for dropouts, although these are certainly good foundations. According to Arnold Packer in his study *Workforce 2000*, "The complex interconnections between employment, education, literacy, cultural values, income, and living environments argue that employment problems cannot be solved without also addressing issues of individual and family responsibility."

**There is no single answer to all our labor force problems nor can our problems be cured by any one group acting independently.**

It will take greater commitment and higher standards of performance on the part of students, parents, schools, and employers to create the internationally competitive, quality workforce we must develop. In translation, there is no single answer to all our labor force problems nor can our problems be cured by any one group acting independently.

Increasingly, education and work are becoming closely integrated in the sense that employers demand workers to continuously improve their skills, knowledge, and abilities. According to Jack Pellichi of the Oracle software company, "forget K through 12 education, it is now K through 95 (years old!)." The new economy is teaching us that work and learning are becoming one and the same and that learning never ends.

Another private sector visionary, Bill Gates, emphasizes the importance of a solid education foundation from which to grow. As he writes in his book *The Road Ahead*, "In a changing world, education is the best preparation for being able to adapt. As the economy shifts, people and societies who are appropriately educated will tend to do the best. The premium that society pays for skills is going to climb, so my advice is to get a good formal education and then keep on learning."

There is no doubt that there is a strong correlation between higher earnings and advanced education. The economic returns to a college education are still high: college graduates, in general, have much higher median earnings than those with less education. Table 17 illustrates this point by capturing national earnings by education level for all persons for the years 2000 and 2010. These data are especially pertinent because the Texas data through 2008 look remarkably similar to the nation as a whole.

Table 17 clearly indicates that, on average, those with a Bachelor's degree and beyond earn more than those with less education. Even the effects of seniority and experience don't change that fact. Many of the managerial occupations are included in the education categories of "Work experience" and "Bachelor's plus work experience," which increases the wage levels for those segments. While work experience may eventually bring individuals without a degree close to the average earnings comparable to those who have Associate degrees, neither comes close to the average for a Bachelor's.

Why the relatively low earnings for those with Master's degrees? Since these earnings data were weighted by employment level, rather than simply calculating a numerical average, wages for each strata are influenced by the employment size of occupations that fall within a given category. Consequently, the industry sector in which each occupation is traditionally employed exerts some influence over earnings. Many individuals with Master's degrees work in the Education and Social Work fields, which generally pay less than private industry. Similarly, many with Doctorates work in Education as college faculty members, earning less than their private sector counterparts.

**TABLE 17**  
**Distribution of U.S. Employment by Education Category**  
**2000-2010**

Education Category	Employment Percent Distribution		Distribution of Jobs Added Between 2000-2010	Weighted Mean Annual Earnings 2000
	2000	2010		
Bachelor's Degree or higher	20.7%	21.8%	29.3%	\$56,553
First Professional Degree	1.4%	1.4%	1.7%	\$91,424
Doctoral Degree	1.0%	1.1%	1.6%	\$52,146
Master's Degree	1.0%	1.0%	1.5%	\$43,842
Bachelor's plus work experience	5.0%	5.2%	6.4%	\$69,967
Bachelor's Degree	12.2%	13.0%	18.1%	\$48,440
Associate's Degree	3.5%	4.0%	7.3%	\$41,488
Post-secondary vocational award	4.6%	4.7%	5.5%	\$31,296
Work experience	7.2%	6.9%	5.0%	\$40,881
Long-term OJT*	8.5%	8.0%	4.2%	\$33,125
Moderate-term OJT	19.0%	18.4%	14.1%	\$29,069
Short-term OJT	36.6%	36.3%	34.6%	\$19,799

\* On-the-job training

Table 17 also shows the expected education requirements for all jobs projected to be added between 2000 and 2010. These figures indicate employment increases for all higher education categories with concomitant decreases in employment for jobs requiring relatively little formal education.

Not surprisingly, the distribution of jobs expected to be added to the national economy during the decade will have sharply higher education requirements. As the fourth column of the table reveals, almost 30 percent of the job growth projected for the 2000-2010 period will require a Bachelor's degree of higher. Conversely, the percentage of jobs requiring a short demonstration training only will remain static, in the 34-36 percent range.

## 36. U.S. Economic Changes Place an Emphasis on Education and Skills

A report recently completed by the Employment Policy Foundation (EPF), *The American Workplace Report 2001*, vividly highlights the issues of structural transformation and the impact of "creative destruction." While concerns about a recession and terrorism dominate the news and focus the nation's attention on changes in total employment, a deeper look at the workforce reveals a long-term shift in the economy to occupations and sectors that require more education and advanced skills.

This need for greater education marks a profound turn for an economy that used to be Manufacturing-based. The trend is reflected in the BLS' October 2001 unemployment report. National unemployment rose to 5.4 percent after a net 165,000 jobs were lost economy-wide over the year ending September 2001. Most of the job loss was concentrated in Production, Craft, and Agriculture occupations. Those sectors lost almost 1 million jobs during that period. Meanwhile, employment in managerial, technical and professional occupations—jobs at the core of the changing economy—grew by 636,000.

The rise in jobs that require relatively high levels of education was no fluke. "What is noteworthy about the managerial and professional occupations is their strength during a year of slowing economic growth, widespread layoffs and Sept. 11," said EPF President Ed Potter. "The growth of these sectors in 2000 was actually greater than the increase in such jobs from September 1999 to September 2000, when 504,000 jobs were created."

"The loss of jobs for those with no post-secondary training continues a long-term trend that was only briefly interrupted by a buoyant job market of 1997-1999."

This trend points to a continuing critical need for greater skills and education across a broader spectrum of occupations. Between September 2000 and September 2001, more than 944,000 new jobs went to applicants with post-secondary training. Specifically, workers age 25 and over with a four-year college degree gained 366,000 new jobs. Workers with vocational training or certificates gained 511,000 new jobs. Meanwhile, job losses of 1.1 million were concentrated among workers with no post-secondary education. "The loss of jobs for those with no post-secondary

training continues a long-term trend that was only briefly interrupted by a buoyant job market of 1997-1999," Potter said. "Among workers age 25 and older, the number of job-holders with only a high school diploma or less has been stagnant for the past decade."

The Tables 18, 19, and 20 present earnings by education level for U.S. workers of prime working age (30-59) for 1973 and 2000. Table 18 focuses on all jobs. Tables 19 and 20 target, respectively, lower end service jobs and office jobs, as defined by Anthony Carnevale and Donna Derocers in their white paper, *The Missing Middle: Aligning Education and the Knowledge Economy*.

**TABLE 18**  
**Prime Working Age (30-59) Educational Distribution—All Jobs**

Education Level	1973		2000	
	Percent of All Jobs	Avg. Annual Earnings	Percent of All Jobs	Avg. Annual Earnings*
High school dropout	32%	\$25,200	9%	\$20,100
High school graduate	40%	\$31,100	32%	\$28,600
Some college, no degree	12%	\$39,000	18%	\$35,600
Associate's Degree	n/a	n/a	10%	\$36,500
Bachelor's Degree	9%	\$49,600	20%	\$51,200
Graduate Degree	7%	\$56,300	11%	\$68,300

**TABLE 19**  
**Prime Working Age (30-59) Educational Distribution—Low-End Service Jobs**

Education Level	1973		2000	
	Percent of these Jobs	Avg. Annual Earnings	Percent of these Jobs	Avg. Annual Earnings*
High school dropout	41%	\$16,000	17%	\$14,900
High school graduate	45%	\$20,800	40%	\$21,300
Some college, no degree	9%	\$30,400	18%	\$25,600
Associate Degree	n/a	n/a	8%	\$24,800
Bachelor's Degree	4%	\$35,000	14%	\$37,700
Graduate Degree	1%	\$37,000	3%	\$42,800

**TABLE 20**  
**Prime Working Age (30-59) Educational Distribution—Office Jobs**

Education Level	1973		2000	
	Percent of these Jobs	Avg. Annual Earnings	Percent of these Jobs	Avg. Annual Earnings*
High school dropout	15%	\$29,600	4%	\$23,700
High school graduate	47%	\$33,000	27%	\$31,000
Some college, no degree	18%	\$43,000	21%	\$38,300
Associate Degree	n/a	n/a	10%	\$38,900
Bachelor's Degree	12%	\$60,200	26%	\$58,700
Graduate Degree	8%	\$63,500	12%	\$77,100

\*Adjusted for inflation

These tables offer several findings. First, they validate the idea that earnings correlate highly with education level. A comparison of the earnings in Tables 19 and 20 make that point abundantly clear.

They also show that, while this correlation existed in 1973, it had grown higher by 2000, when the earnings differential between high school dropout and graduate degree was wider than ever before. In Table 18, for example, someone with a graduate degree in 1973 earned 123 percent more on average than someone who dropped out of high school. In 2000, the difference was 240 percent, a differential increase of 94 percent in 27 years.

**It simply takes  
more education to  
do most jobs.**

The percentage of the prime age workforce with higher educational attainment levels has expanded significantly between 1973 and 2000. Table 18 shows, for example, only 16 percent of prime age workers in 1973 had a Bachelor's degree or higher. By 2000, that number was 31 percent, representing a 93.7 percent increase. It simply takes more education to do most jobs. Even in lower end Service jobs (Table 19), once almost exclusively the domain of high school graduates and dropouts, the number of prime age workers with a Bachelor's degree or higher increased from 5 percent in 1973 to 17 percent in 2000.

Finally, the tables demonstrate that real earnings, adjusted for inflation, actually declined for almost all education categories except those with a Bachelor's or graduate degree during the period. The loss of real purchasing power was most noticeable for high school dropouts in all jobs and in office jobs in particular. In both cases, those lacking a high school diploma earned a whopping 20 percent less in 2000 than in 1973.

Not surprisingly, the wage decline for low-end jobs, which required less education in both time periods, was less acute. Earnings for high school dropouts, for example, only declined by 7 percent in this category. Interestingly, those with some college credits saw a 16 percent decrease while those with high school diplomas only actually had a two percent increase in their earnings from low-end jobs over the period.

The positive correlation between education and earnings is undeniable. So, too, is education's relationship with employment: the greater the education, the lower the unemployment rate. During the year 2001, for instance, the unemployment rate for workers with college degrees was a low 2 percent, which is effectively full employment, according to Potter. Vocational program degree holders were similarly in high demand, with an unemployment rate of only 2.7 percent. In contrast, the rate for workers with some college education but no degree was 4.2 percent, while the rate for those with less than a high school diploma spiked from 5.6 percent to 7.1 percent. These figures clearly reinforce the importance of demonstrated and certifiable accomplishments and skills achieved through education.

Indeed, if there is any single determinant of labor market success in this new "human capital economy," it is the unflinching relationship between educational attainment and prosperity, whether in terms of wages or employment. In their December 2001 article, *Individual Economic Welfare in the Human Capital Economy 1973-2000*, staff at the Mortenson Research Seminar demonstrate that those with the highest educational attainment tend to have a higher likelihood

of entering the workplace, enjoy much larger increases in median annual income, experience significantly lower rates and shorter spells of unemployment, and have significantly lower rates of poverty. They finally conclude, however, that, despite increases in high school graduation rates and in college participation in the general population, these improvements are not occurring fast enough to keep up with workplace demands.

## 37. Higher Education: Costs, Enrollments, Majors, and More

This monograph addresses education and workforce training because of the emerging global economy's transformative effects on industries and occupations. To succeed in the rapidly-changing economic environment, today's workers must strive for **employment resiliency** rather than employment security or career stability. As the pace of technology accelerates and alters requisite skill sets, it is increasingly unlikely that an individual will remain in the same job with the same firm for his or her entire work life. Indeed, entire occupations—even some high-demand, high paying, high-tech jobs of today—may be wiped out by the creative destruction so predominant in the global economy.

Resiliency—the ability to bounce back from a career setback and forge new career paths—is the best possible characteristic of employment in the future. It refers to the likelihood that: (1) an individual will move between jobs with fewer and shorter episodes of unemployment and (2) full wage replacement or earnings gains will be realized in each successive career move.

**Resiliency—the ability to bounce back from a career setback, to forge new career paths—is the best possible characteristic of employment in the future.**

Given the importance of education in the nation's and individuals' continued economic success, it seems appropriate to discuss how much it costs to obtain that education, who is getting it, what they're learning and how they're learning it, i.e., what technology they are using.

### Costs

Education is costly at every level and every taxpayer bears the burden, whether by contributing to government coffers or directly paying a tuition office. Given education's great importance, how much does it cost exactly? How much are we investing in this critical economic development factor? There are several ways to look at this investment.

First, educational spending can be viewed in gross terms. Roughly \$732 billion in public dollars was spent nationwide on education at all levels for school year (SY) 2001-02, about 90 percent of which comes from state, local, and private sources. This translates into roughly 7.2 percent of the nation's 2001 gross domestic product.

Second, public spending for K-12 comes into play. The federal government's education budget is slated at \$55.8 billion for 2002 and \$56.5 billion for 2003. Although this percentage represents the highest spending level since the mid-1970's, the level remained essentially unchanged throughout the 1990's. In Texas for SY 2000-2001, roughly 53 percent of education revenues came from local sources, 43.6 percent from state coffers, and 3.4 percent came from the federal government.

Another way to look at educational spending is to consider the cost to educate each student through high school. Nationwide, it cost an average of \$6,585 per student in SY 1999-2000, an increase of 34.3 percent since 1991. In Texas, the figure was \$6,354 per student, an increase of 42.7 percent since 1991.

Texas' educational spending has generally grown in recent years. In SY 2000-2001, the state spent an average of \$6,638 per student, a 13.4 percent increase in just three years. In SY 1998-1999, Texas ranked 34<sup>th</sup> of the 50 states in educational spending, averaging roughly \$5,853 per pupil. This amount marked an increase over the \$5,057 per pupil average in SY 1994-1995, when Texas ranked 39<sup>th</sup>.

Educational spending can also be viewed on the post-secondary level. The cost of higher education continues to be a hotly-debated political issue, partly because of the great expense involved. Spending on U.S. colleges and universities in the early 1990's was at the highest level in history, averaging almost 4 percent of the U.S. gross domestic product. The price of admission has continued to rise steadily over the past ten years.

To explain the numbers in a way parents can appreciate, the total annual tuition, fees, room, and board rates in the U.S. averaged \$8,418 in SY 2001-2002, according to The College Board Annual Survey of Colleges. In Texas, the average was \$7,677 for public universities, \$15,308 for private colleges, and \$4,989 for community and technical colleges. By the 2000-2001 school year, a full-time student attending a Texas public university could expect to spend \$8,378 per year. Given that students on average currently take over six years to achieve a Bachelor's degree, the average cost of a college education at a four-year public university in Texas amounts to over \$50,268, not adjusted for inflation.

## Enrollment

The cost of higher education directly affects enrollment. So do a number of other factors, including the state of the economy. Enrollments in U.S. colleges and universities rose by 11.7 percent between 1987 and 1997. Long-term projections through 2011 show enrollments in degree-granting institutions growing by 20 percent, with an 18 percent increase in the number of Bachelor's degrees obtained. Only a closer examination of the numbers, however, can reveal exactly who is enrolling.

Some research suggests that students of higher socio-economic backgrounds are more likely to enroll in higher education. In a study by the Mortenson Research Seminar using Current Population Survey (CPS) data, family income strongly influences college enrollment and completion, regardless of race/ethnicity or gender. In the U.S. in 2000, the average college enrollment rate was 58.8 percent for all families. This figure masks the lower participation of

persons from lower income families. The average college enrollment rate was 34.7 percent for persons aged 18-24 from families with incomes of less than \$25,000 a year. Conversely, the rate was 79.9 percent for their counterparts from families earning greater than \$75,000 per year.

Besides family income, gender may help affect the likelihood that an individual will enroll in an institution of higher learning. Between 1989 and 1999, male enrollment increased by 5 percent, representing 43.9 percent of all enrollments in degree-granting institutions. The enrollment of females, meanwhile, increased by 13 percent, representing 56.1 percent of all such enrollments.

As women are increasingly enrolling in college, so too are "minorities." Minority representation has increased substantially, growing from 15.7 percent in 1976 to almost 27 percent in 1997. Most of this expansion stems from Asian and Hispanic student enrollments—a fact of particular relevance to Texas, given its increasingly Hispanic population.

## Majors

There remains a debate about the role of traditional colleges and universities in higher education. Many academicians argue that the university is a place to learn critical thinking skills and other essential knowledge, notwithstanding labor market demands. They decry the "vocalization" of college in favor of a well-rounded educational experience.

On the other hand, students and employers increasingly see college as a means to acquire specific skills to secure more lucrative employment opportunities. This viewpoint has given rise to an growing number of private, non-traditional post-secondary options geared toward teaching specific workplace skills, as well as public community colleges striving to fill that same role.

In any event, despite growth in overall enrollments, there continues to be mismatches between the subject majors that students pursue and the types of jobs being generated for college graduates. In 1998, roughly 23.4 percent of all Texas jobs required a four-year college degree or more. It is anticipated that this percentage will grow only slightly to 23.9 percent by 2008. From a labor market perspective, it would make sense if students sought to obtain degrees in the fields where these jobs can be found. Unfortunately, many students don't consider future employment when selecting their major.

There continues to be mismatches between the subject majors that students pursue and the types of jobs being generated for college graduates

If they did, they might consider obtaining an Associate's degree rather than a Bachelor's. Jobs requiring Associate's degrees are expected to show the greatest percentage growth, which is consistent with the fast growth of occupations in the health and computer sciences fields.

Setting employment opportunity aside, the popularity of certain majors has remained steady for a long time. According to the *2000 Digest of Educational Statistics* published by the National Center for Education Statistics, four-year Business and Management degrees surpassed Education in the 1980's as the number one degree of choice. That major has remained in the top position through

1998, the most recent year for which data are available. Since 1986, Social Sciences and History degrees have been in the second position and Education in third. Together, these three have been the top degrees awarded since 1970.

In Texas, the rankings of majors have been slightly different, as Table 21 illustrates. The Texas Higher Education Coordinating Board (THECB) oversees the number of degrees awarded by Texas public universities, health science centers, and community and technical colleges. Between 1995 and 2000, it determined that the top five programs were Business Management and Administration; Liberal Arts and Sciences; Computer and Information Sciences; Communications; and Engineering-Related Technologies. Collectively, these five degree programs accounted for 34.5 percent of the 122,522 degrees awarded in 2000.

**TABLE 21**  
**Top 10 Texas Public Degree Programs in 2000**  
**with the Greatest Net Growth 1995-2000**

Instructional Program (Major)	Degrees Awarded		Change from 1995-2000	
	1995	2000	Actual	Percentage
Business Management & Administration	20,398	23,074	2,676	13.1%
Liberal Arts and Sciences	6,193	8,187	1,994	32.2%
Computer and Information Sciences	3,092	4,997	1,905	61.6%
Communications	2,367	3,119	752	31.8%
Engineering Related Technologies	2,406	2,932	526	21.9%
Biological and Life Sciences	3,181	3,670	489	15.4%
Parks, Recreation and Leisure Studies	1,904	2,370	466	24.5%
Visual and Performing Arts	2,594	3,032	438	16.9%
Science Technologies	104	485	381	366.3%
Multi/Interdisciplinary Studies	7,038	7,357	319	4.5%

When it comes to majors/degrees that are growing fastest in popularity, the picture changes. Nationally, the fastest growing degrees have been in Park, Recreation and Leisure Studies, rising 288.9 percent between 1991 and 1998. The list continues with Agriculture and Natural Resources (77.4 percent); Biological Sciences/Life Sciences (66.6 percent); Protective Services (49.2 percent); Multi-Interdisciplinary Studies (45.0 percent); and Liberal Arts (43.3 percent).

While these majors have grown in popularity, others have declined. The biggest overall declines in degrees awarded nationally have come in Communications Technologies (-35.1 percent); Architecture and Related Programs (-21.8 percent); Mathematics (-19.5 percent); and Library Science (-18.9 percent).

The year 2000 numbers for Texas look a bit different from the national picture, as Table 22 reveals. The fastest growing degrees have been in Computer Information Sciences (61.6 percent); Liberal Arts and Sciences (32.2 percent); and Communications (31.8 percent).

The degrees in greatest decline generally reflect a new direction in Texas community and technical college programs. Health Professions and Related Sciences (1,134 and -6.1%), Protective Services (-676 and -17.0 percent), and Mechanics and Repairers (-497 and 19.4%) top that list.

**TABLE 22**  
**Top 10 Fastest Growing Texas Public Degree Programs in 2000**  
**with at Least 1,000 Graduates**

Instructional Program (Major)	Degrees Awarded		Change from 1995-2000	
	1995	2000	Actual	Percentage
Computer and Information Sciences	3,092	4,997	1,905	61.6%
Liberal Arts and Sciences	6,193	8,187	1,994	32.2%
Communications	2,367	3,119	752	31.8%
Parks, Recreation, and Leisure Studies	1,904	2,370	466	24.5%
Foreign Languages and Literature	836	1,029	193	23.1%
Engineering Related Technologies	2,406	2,932	526	21.9%
Precision Production Trades	1,350	1,616	266	19.7%
Visual and Performing Arts	2,594	3,032	438	16.9%
Biological and Life Sciences	3,181	3,670	489	15.4%
Mathematics	1,213	1,387	174	14.3%

So far, the discussion of majors has focused on actual degrees obtained. But there is usually a significant difference between the programs in which degrees are awarded and the majors selected by new college enrollees. It is sometimes said that enrollments represent student ideals while degrees awarded represent the realities of the labor market and subject matter difficulty.

Table 23 lists the top 11 programs based on 1999 enrollments in Texas public degree-granting institutions. It is noteworthy that the top three programs represent 45.3 percent of all enrollments and the top 11 represent 77.9 percent of total enrollments. More tellingly, several of the top 11—including Psychology, Social Sciences and History, and Visual and Performing Arts—are not associated with abundant job opportunities. It's not surprising, then, that students later change their minds about them.

**TABLE 23**  
**Top 11 Public Texas Degree Programs in 1999 Enrollments**

Instructional Program (Major)	Total Enrollments	Percentage of Total
Liberal Arts and Sciences	124,194	17.2%
Business Management	121,813	16.9%
Health Professions and Related Sciences	80,627	11.2%
Education	37,604	5.2%
Computer and Information Sciences	34,962	4.8%
Multi/Interdisciplinary Studies	33,579	4.7%
Engineering	31,750	4.4%
Biological and Life Sciences	26,121	3.6%
Social Sciences and History	25,672	3.6%
Visual and Performing Arts	23,897	3.3%
Psychology	21,815	3.0%

Meanwhile, majors that relate to some high-demand jobs have been stagnant or in decline nationally. Degrees in Engineering, for example, declined from 5.62 percent of all undergraduate degrees awarded in 1991 to 5.06 percent in 1998. Degrees in Computer and Information Sciences, which increased dramatically during the 1980's, have changed little since, dropping from 2.29 percent in 1991 to 2.27 percent in 1998. The 1998 figure actually represents a reversal of a downward trend, which had CIS degrees reaching a low of 2.07 percent in 1996.

Again, the picture is slightly different in Texas. Engineering degrees did decline by 9 percent between 1995-2000, falling from 4.77 percent of all degrees awarded in 1995 to 4.06 percent in 2000. The number of degrees earned in Computer and Information Sciences, however, rose sharply during this period, increasing from 2.70 percent in 1995 to 4.08 in 2000. The decline in Engineering degrees is a major concern to the Texas business community and, despite the positive upturn, the number of CIS degrees conferred appears to be well below labor market demand, as well.

## Technology

Finally, no discussion of education is complete without mentioning the use of technology as a source for universal access to learning and knowledge. It may come as a surprise to many that the largest university in the country, the University of Phoenix, is not a bricks and mortar institution at all. It exists only in cyberspace. There has been a presumption that training via electronic learning technologies (distance learning, for example) will both revolutionize our entire educational system and make traditional education methods obsolete.

While the Internet in particular is indeed changing the way people access education, the 2001 American Society for Training and Development (ASTD) Benchmarking Service showed that 78.4 percent of training still was delivered in the classroom and only 8.5 percent via electronic learning technologies. These percentages have not changed much since 1997.

Employers have been one group that has seized on training via electronic equipment. They spent \$2.95 billion in 1982 in off-the-shelf materials, hardware, custom-designed materials, and outside services. By 2001, that amount had grown by 555 percent to \$19.3 billion. When it comes to training, employers tend to be venue-neutral and modality-neutral. They want to know what job seekers know and can do—not when and how they learned it.

Among the courses delivered by interactive computer without an instructor, the teaching of computer skills remains the most popular topic. Roughly 37 percent of all 2000 employer-sponsored training in the U.S. sought to enhance employee computer skills. Broken down by industry, this percentage is closer to 50 percent each for Educational Services, Government, and Business Services. It accounted for less than a third of employer-sponsored training for the Health Services, Communications, and the Wholesale and Retail Trade sectors.

The ASTD believes that the leveling off of technology as a training tool since 1997 is due to firms "finding the obstacles to implementing technology-based training difficult to overcome." Medium and small-sized firms especially have difficulties. It is one thing to create the hardware and software to provide distance learning, but it is another to teach the teachers and the reluctant student to adopt a completely different educational modality. As Marc Anderberg writes in *Technology Workers in the New Texas Economy*, "access to technology does not assure learning."

Nonetheless, companies continue to train their employees, often relying on outside help to do so. The *Chronicle of Higher Education* notes that 92 percent of corporate America outsource their employee training and 62 percent of corporations that do offer their own training outsource its curriculum development. These figures indicate a continued close relationship between traditional higher education and newer approaches to post-secondary delivery. It will be interesting to see how the public higher education system adapts to employer demands driven by a global labor market and how well private and public providers of educational knowledge and skills converge toward a common goal of a highly skilled workforce.

## 38. Re-thinking the Concept of an "Occupation"

Former Secretary of Labor Robert Reich has noted that, "what do you do?" is typically the second question asked on meeting someone for the first time. Occupation establishes one's identity. It demarcates a particular place in society, and implies a set of values and ideals." While increasingly what you know and what project you're working on are as important as your occupational title, much of the business world still relies on occupations as a short-hand way to communicate unique skill sets.

That short-hand may be changing. As researchers Marc Anderberg and Dan Bristow (1996) report in their study, *Converging Paradigms*, the world of work is quickly abandoning the notion of rigid occupations while the world of education is following with more creative alternatives to standard semester-length classes. This convergence may lead to a common language and understanding of the types of skills required by employers and more meaningful ways for workers to acquire those skills.

This new understanding wasn't always necessary. Within a manufacturing-based economy, the tasks and duties of specialized jobs could be lumped together to define an occupation. Since workers needed to have specific skills and abilities to do a specific job, the concept of an "occupation" became an easily understood method of categorizing necessary tasks within a specific work environment. It was therefore relatively easy to prepare workers for the tasks.

This model served the industrial world reasonably well from the early nineteenth century until recently. As the 21<sup>st</sup> century unfolds, however, the business community is moving rapidly and focusing on the development and distribution of information of all types, in all environments. This global transformation into an information-driven economy has major implications on employment needs of specific industries, employer hiring requirements, and worker skills. Specifically, it is becoming more difficult to use the concept of occupation when job tasks and duties change quickly in response to technological advances applied in the workplace.

Nowhere is this problem more noticeable than when we try to predict the skill needs in a local economy. No longer can we simply look at our local employers, understand the products and services they provide, and project their historical employment patterns forward. We are in a unique period in history where overriding structural changes throughout the world are complicating every theory we have put into place over the past half century. These changes include the way that we define, collect, and measure employment, and how we analyze and predict future workplace needs for Texas and its regions.

So what kind of skills do workers need today? It has never been easy to identify which exact labor market skills will be in demand, but some trends seem clear. When it comes to technical skills, employers look for those who keep abreast of developments in their field, whatever they are. If you are not adding to your abilities you are falling behind—especially in the applied use of computer hardware and software technologies.

Given the increased turnover associated with an increasingly project-oriented labor market environment, the most appropriate goal for workers today may be employment resilience, not necessarily employment security. Since job security no longer exists, workers must put their trust in their own ability to find new employment. Their efforts to develop and continually enrich their skills—including job hunting skills—will make a difference should the inevitable dislocation occur.

Beyond technical skills, workers today—regardless of occupation—need a host of "soft skills" as well. According to the ASTD in their monograph *Workplace Basics*, employers look for workplace skills that go beyond basic academic skills of reading, writing, and computation. They want individuals who can listen and have good oral communication skills. They believe teamwork is an essential skill, along with other interpersonal and negotiation skills. Those who have problem-solving skills, positive attitudes, pride in themselves and their work, and the ability to learn will be most in demand. This general prescription describes a well-rounded worker who can not only accomplish the tasks of today but can grow to meet the challenge of new or expanded responsibilities.

## 39. Knowledge, Skills, and Abilities: New Thoughts for Worker Training

What education and training should employees obtain to stay resilient in the new economy? What knowledge, skills, and abilities (KSAs) do employers need from their workers? Knowing the KSAs for different occupations will help answer these questions.

The U.S. Department of Labor has recently revamped the way it catalogs and describes occupational employment by introducing an automated taxonomy and database called O\*NET. Replacing the *Dictionary of Occupational Titles*, O\*NET offers far fewer detailed occupational categories but includes a much greater richness of occupational characteristics. In fact, O\*NET is designed as the first major taxonomy that places occupational characteristics—such as requisite KSAs—on equal footing with job descriptions.

The O\*NET database includes 33 unique knowledge areas, 46 skills, and 52 abilities statements. The importance of the different KSAs makes every occupation or grouping of occupations fairly unique. Thus, by combining KSAs from O\*NET with detailed Texas occupational projections through 2008, it is possible to project workplace skill requirements.

To get a sense of how KSAs can differ depending on the occupation, Tables 24-29 compare the top ten KSAs that might be projected for all occupations that currently require a Bachelor's Degree with those that require a short demonstration training only. In other words, these three pairs of tables allow you to compare first knowledge areas, then skills, then abilities based on an occupations' educational requirements.

The column labeled *Units of Demand* expresses the importance of a particular KSA relative to the other KSAs for that occupational grouping. The Units of Demand metric, which has no intrinsic meaning, is calculated by multiplying the number of projected job openings by the level of importance for each KSA in the group. It uses an O\*NET five-point scale, where five is most important and one is least important.

In Table 24, for example, mastery of the English Language is the most important knowledge area for all occupations requiring a Bachelor's degree. The second most important area is Mathematics, followed by Administration & Management and Education & Training. Given the large number of Teacher and Manager occupations included in this group, these rankings are not surprising.

The right-hand column, labeled *Proficiency Level*, indicates the degree of mastery needed for that KSA. While Mathematics is very important to both Bookkeepers and Nuclear Physicists, for instance, the level of required Math mastery is very different for each. Proficiency is measured on a seven-point scale, with seven being the highest level of mastery. An example of proficiency level statements for the skills Reading Comprehension and Speaking would be:

**Reading Comprehension:**

- Level 2.0 is Reading step-by-step instructions for completing a form;
- Level 4.0 is Reading a memo describing new personnel policies; and
- Level 6.0 is Reading a scientific journal article describing surgical procedures.

**Speaking:**

- Level 2.0 is Greeting tourists and explaining tourist attractions;
- Level 4.0 is Interviewing applicants to obtain a personal work history; and
- Level 6.0 is Arguing a legal case.

Thus, while English language shows up in the top two most important knowledge areas both for occupations requiring a Bachelor's degree and for occupations requiring a short demonstration only, there is a significantly higher level of proficiency associated with occupations requiring Bachelor's degrees.

**Occupations that require Bachelor's degrees demand significantly higher levels of proficiency in their relevant knowledge, skills, and abilities.**

O\*NET Requirements/Proficiencies—KNOWLEDGE

TABLE 24  
for Occupations Requiring a Bachelor's Degree 1998-2008

Rank	Units of Demand (No. of Openings X Importance Level)	O*NET Knowledge Area	Proficiency Level (1 = lowest; 7 = highest)
1	259,598	English Language	3.32
2	254,838	Mathematics	3.72
3	244,823	Administration & Management	3.31
4	234,384	Education & Training	2.74
5	181,115	Economics & Accounting	2.50
6	176,605	Computers & Electronics	2.64
7	169,330	Customer & Personal Service	1.91
8	168,603	Psychology	1.95
9	163,032	Clerical	2.32
10	161,508	Personnel & Human Resources	1.95

TABLE 25  
for Occupations Requiring a Short-term Demonstration 1998-2008

Rank	Units of Demand (No. of Openings X Importance Level)	O*NET Knowledge Area	Proficiency Level (1 = lowest; 7 = highest)
1	482,729	Customer & Personal Service	1.73
2	370,717	English Language	1.79
3	369,095	Mathematics	1.84
4	357,235	Clerical	2.05
5	274,576	Sales & Marketing	0.71
6	269,071	Computers & Electronics	1.34
7	261,113	Economics & Accounting	0.88
8	243,750	Mechanical	1.57
9	232,330	Psychology	0.88
10	223,268	Production & Processing	0.93

## O\*NET Requirements/Proficiencies—SKILLS

**TABLE 26**  
for Occupations Requiring a Bachelor's Degree 1998-2008

Rank	Units of Demand (No. of Openings X Importance Level)	O*NET Skill	Proficiency Level (1 = lowest; 7 = highest)
1	289,569	Speaking	4.16
2	286,899	Reading Comprehension	4.64
3	269,799	Writing	4.33
4	266,472	Information Gathering	4.38
5	262,408	Active Listening	4.03
6	258,720	Problem Identification	4.19
7	257,856	Implementation Planning	3.67
8	257,743	Judgment & Decision-making	4.08
9	256,629	Critical Thinking	4.17
10	249,662	Coordination With Others	3.81

**TABLE 27**  
for Occupations Requiring a Short-term Demonstration 1998-2008

Rank	Units of Demand (No. of Openings X Importance Level)	O*NET Skill	Proficiency Level (1 = lowest; 7 = highest)
1	446,035	Speaking	2.19
2	434,516	Active Listening	2.45
3	416,759	Service Orientation	1.73
4	369,778	Mathematics	2.11
5	364,245	Social Perspectives	1.64
6	347,509	Writing	2.07
7	341,843	Reading Comprehension	2.44
8	335,918	Problem Identification	2.31
9	297,246	Information Organization	2.08
10	295,178	Product Inspection	2.00

O\*NET Requirements/Proficiencies—ABILITIES

TABLE 28  
for Occupations Requiring a Bachelor's Degree 1998-2008

Rank	Units of Demand (No. of Openings X Importance Level)	O*NET Ability	Proficiency Level (1 = lowest; 7 = highest)
1	297,535	Oral Expression	4.59
2	292,700	Written Comprehension	4.46
3	290,496	Oral Comprehension	4.36
4	280,894	Written Expression	4.36
5	276,772	Speech Clarity	3.41
6	241,942	Deductive Reasoning	3.90
7	241,722	Number Facility	3.70
8	240,114	Near Vision	3.55
9	236,884	Problem Sensitivity	3.47
10	227,253	Mathematical Reasoning	3.55

TABLE 29  
for Occupations Requiring a Short-term Demonstration 1998-2008

Rank	Units of Demand (No. of Openings X Importance Level)	O*NET Ability	Proficiency Level (1 = lowest; 7 = highest)
1	489,303	Oral Comprehension	2.72
2	479,231	Oral Expression	2.67
3	442,714	Near Vision	2.85
4	435,732	Speech Clarity	2.00
5	434,701	Information Ordering	2.45
6	413,168	Written Comprehension	2.52
7	410,111	Manual Dexterity	2.25
8	405,067	Number Facility	2.12
9	387,961	Wrist-Finger Speed	2.39
10	369,199	Written Expression	2.01

# Scanning the Horizon: Some Trends To Watch

There is an art to economic forecasting. Unraveling future social, economic, and technological trends and events is the role of the Futurist, a new and unique occupational title. Contrary to popular notion, futurists do not actually attempt to predict the future. In the words of the World Future Society, futurists "suggest things that *might* happen in the future, so that people can decide what they *want* to make happen."

**Futurists suggest what  
MIGHT happen in the  
future, so that people can  
decide what they WANT  
to make happen**

One thing all futurists agree upon is the fact that "predictions—statements indicating that something definitely will happen in the future—are generally impossible, due to human decisions that alter the future and to the many uncertainties inherent in human life." These wise words are particularly true in the study of economics and the potential impacts on national and state labor markets.

A 2000 report by the Organisation for Economic Cooperation and Development (OECD), *Is There A New Economy?*, made the point that "predicting the future when the recent past is not fully understood is hard." What an understatement! Future trends, as the OECD writes, "will depend on many inter-related factors including... whether the network effects of information and communications technology (ICT) will manifest themselves in a big way; whether the pace of innovation in ICT consumer use can be maintained or even raised; and whether, and how rapidly, the necessary reorganization of production and distribution will be forthcoming." Given the sophistication of these phenomena and the complexity of the global environment in which they will take place, predicting trends in the New Economy will require more than just a crystal ball!

Trend prediction, or even speculation, begins with knowing where to look. Global economic competition, workforce development, and worker skills are three of the most talked about phenomena in the workplace today. They are good places to start. As a former Texas Governor's Office official once reminded a group of educators, "[A]n effective workforce development system is critical to our economic health in the short run, and our economic survival in the long run."

Because workforce development is inextricable from local, state, national, and global economic dynamics, there are several economic trends on the horizon that may indeed affect which sectors of the economy will grow and what worker skills will be in demand. Many of these emerging phenomena are technology-driven, and, not surprisingly, will be influenced by changes in the way individuals and consumers use the Internet. This monograph cannot describe all of these trends, but it will note a few that may directly impact the Texas labor market.

## 40. The Internet and E-commerce

There is no doubt that the Internet has already made an enormous impact on the everyday lives of people and the business community in Texas and the U.S. This effect will likely only grow. The eMarketer company estimates that in 1999 the average consumer spent around \$500 per year on Internet purchases. That figure is expected to double to \$1,023 per person by 2003—a total of \$100 billion per year in Internet purchases.

Predicting the employment effects of the Internet is no easy task, however, because the Internet itself is relatively new. In 1999, for example, exclusively Internet-based "e-tailers" were said to represent the future of retail trade. Storefronts and shopping malls were soon to be extinct. By the Spring of 2000, however, conventional wisdom supported traditional retailers who had, perhaps belatedly, begun to master the Internet as a marketing medium. The reasons are simple. As Patrick Connolly of Williams-Sonoma put it, "It is much easier to take a great brand to a new sales channel than it is to take a new sales channel and try to create brand loyalty."

There is more to building a retail business than opening a website, concurred major retailers at a Spring 2000 conference. Offering low-cost, low-margin products over the Internet may work for a select few, but to really make any money retailers must sell at least part of their product line at higher profit margins. Thus far, though, most consumers have been hesitant to purchase higher dollar items without touching them or otherwise first having a "personal experience" with them. Not surprisingly, by the close of 2000, very few "Internet-only" retailers had managed to survive, much less break-even financially.

Meanwhile, traditional retailers gained confidence in their ability to gain customers with the Internet. Home Depot representatives may have said it most succinctly in their 2000 annual report to shareholders. "During this period of dot-com mania, we firmly believe that, in the long run, the most successful on-line retailers will be those who know how to extend to the Internet the power of their brands, the leverage of their bricks and mortar assets, and the value of their customer service." Garden.com, pets.com, peapod.com, and scores of other e-tailers which have now come and gone are proof that brand loyalty and established retail reputations are tough to beat.

This notion of the Internet as a tool to be wielded by traditional retailers seems to have caught on. In fact, there is even a name associated with the trend of having large bricks and mortar companies extend their retail presence through the Internet. This so-called "Bricks and Clicks" strategy describes the partnership of solid, brand name companies with the fast-paced, technology-driven innovation of smaller web-focused companies. This outsource relationship linking the greater financial resources afforded by existing brand name companies and the technology of smaller Internet-driven firms may prove to be the most profitable business model of all.

As the folks at Home Depot recognized and many analysts believe, the desire for excellent customer service and a "personal shopping experience" has come into play more significantly than originally expected. There is no doubt that the level of Internet-based buying continues to grow impressively, especially in the business-to-business market that is still virtually untapped. A key question, however, is whether consumers will really stop going to the mall and instead make an increasing number of their purchases over the Internet. It is interesting to note that Internet sales amounted to more than one percent of total retail transactions for the first time in the fourth quarter of 2000.

Despite the fervor over Internet-driven business or "e-commerce," some economists predict that not all the employment impacts originally envisioned will come to fruition in this area either. No one seems to want to own these companies. According to a [Boston.internet.com](#) article on the sale of bankrupt "dot.com" company assets, "[I]f there were any doubters about the size and scope of the oft-repeated dot-com shakeout, the data in 2002 underscored a different kind of pain in a year that saw fewer buyers stepping up for firesale prices." Data from Webmergers, a company that specializes in structuring technology mergers, concluded that "total spending for all four major Internet sectors (Infrastructure, Destinations, Consulting Firms and Access Providers) amounted to less than half the nearly \$90 billion spent by acquirers in 2000 in just one sector alone."

Traditional companies are understandably leery about putting too much emphasis on their Internet retail operations. At a 2000 year-end shareholders meeting, Ford Motor Company officials discussed eliminating their dealership network and selling cars directly to the public over the Internet. Such a suggestion aligns with many predictions that the Internet will eliminate the need for car salespersons. As one chief executive concluded, however, they would still need physical locations to service vehicles, display new models, and give customers an opportunity to test drive the cars. "In other words," he mused, "if we didn't already have a dealership network we would have to create one."

Even as some of the diminishing numbers of car dealerships do survive, they are experiencing a different mix of business practices and worker skills and knowledge. Computer literacy, for example, is increasingly an important skill for car salesmen dealing with market-savvy customers armed with a wealth of cost information from the Internet.

Not all Internet-based companies have failed, of course. Amazon.com—famous for selling books and music exclusively over the Internet—has added over a billion square feet of warehouse space to accommodate its inventory. This means traditional jobs for warehouse managers, order fillers, route/delivery drivers, etc., have grown despite the fact that Amazon.com, as a retailer, exists only in cyberspace. Similarly, E-bay, the online auction house, has created a model for an electronic marketplace that has increased the demand for accounting and financial professionals.

## 41. Technology Developments That Might "Rock Your World"

There is no crystal ball to forecast the best investments or the employment implications of new technology. But there are some phenomena worth watching nonetheless because they may create or change occupations. They are multi-fuel cars, "smart materials," voice recognition and translation, Internet business-to-business transactions, Smart cards, and "geneticceuticals."

Multi-fuel cars are already moving into the commercialization phase, as are "smart materials" that sense stress and movement in buildings and bridges. These technological advancements may not create new occupations but they will significantly affect the knowledge, skills, and abilities (KSAs) required of existing engineers and designers.

The evolution of the Internet and its impact on the labor market has already been discussed in the previous chapter. But the introduction of high speed, fiber-optic combination data, and voice and video lines has really just begun and may change the employment landscape in new ways. Voice recognition technology combined with Internet access will result in instant information access and—particularly valuable to the global economy—the ability to translate commands into multiple languages.

Such messaging means that an American can send a voice-recorded e-mail in English to a colleague in Paris who will hear that message in French! Now imagine sending that message using wireless technology, through a cell phone, laptop computer, or personal messaging device from anywhere in the world. Look Ma—no wires, no cables, no language barrier!

The Internet may have garnered attention with e-tailers offering products directly to consumers, but the real impact is just now being felt in the business-to-business (B2B) applications. E-business will allow firms to cut costs, reduce the role of the middleman or broker, shorten supply lines, and link back-office operations directly to the customer. For industries in which product sales or brokering provide significant employment prospects, such as Medical Equipment, this new B2B Internet use will change business practices and staffing patterns. The job responsibilities of Product Demonstrators and Internal- and External-Sales Engineers are likely to change as well.

Another technology that may affect the labor market is Smart Cards. These credit-card-sized cards with embedded microchips not only store information, but can manipulate, receive, and transmit data, as well as run external software programs at unlimited transaction points. Such cards will allow people to buy tickets as they board a subway or bus, store personal medical files and transmit them anywhere in the world, even provide key-less entry to their homes or autos. Imagine the concept of an "electronic wallet" to replace everything from credit cards to car keys. Such cards might not put Ticket-takers or Locksmiths out of business, but they may change the form of those occupations.

Finally, the field of medicine offers significant technological advances. Innovations in biotechnology and the recently completed mapping of the human genome will greatly affect medical products and services. Experts have already coined the term "geneticceuticals" to describe medical treatments that combine advancements in genetic research with traditional pharmaceuticals. Already on the drawing board are personal health monitors to track your vital signs, as well as optical security devices—such as retina scanning and biosurveillance

techniques—to track germ movements to prevent disease epidemics across the more closely-knit global community. All of these advances will impact employer skill needs and drive the education and training community to find ways to best teach the emerging KSAs.

## 42. A Final Reminder: Workplace Rules Are Changing!

The new economy of Texas and the U.S. affects what and how people buy and how they interact in the workplace. Indeed, it's changing how people view the workplace. The concepts of managing one's own career and engaging in lifelong learning are becoming fundamentals of the new world of work.

In a speech to high school students, Bill Gates, Chairman and Founder of Microsoft Corporation, recently offered a set of rules for the new economy. His rules addressed concepts that he did not learn in school but which dominate the workplace today. They apply not only to students but to people in all walks of life.

Rule 1: Life is not fair; get used to it.

Rule 2: The world will not care about your self-esteem. The world will expect you to accomplish something BEFORE you feel good about yourself.

Rule 3: The vast majority of students will not make \$40,000 a year right out of high school. You won't be a vice president with a car phone until you earn both.

Rule 4: If you think your teachers are tough, wait until you get a boss. He doesn't have tenure.

Rule 5: Flipping burgers is not beneath your dignity. Your grandparents had a different word for burger flipping; they called it opportunity.

Rule 6: If you mess up, it's not your parents' fault, so don't whine about your mistakes; learn from them.

Rule 7: Your school may have done away with winners and losers but life has not. In some schools they have abolished failing grades and they'll give you as many times as you want to get the right answer. This doesn't bear the slightest resemblance to ANYTHING in real life!

Rule 8: Life is not divided into semesters. You don't get summers off and very few employers are interested in helping you "find yourself." Do that on your own time.

Rule 9: Television is not real life. In real life people actually have to leave the coffee shop and go to jobs.

Rule 10: Be nice to nerds. Chances are you'll end up working for one!

We hope this monograph has provided an overview of some of the most interesting and important trends in the global, U.S., and Texas labor markets; the strong influence that capitalism and the world economy have in shaping occupational opportunities; and where job and income growth both have occurred and are projected to occur. As importantly, we hope you have gained a better understanding of what you can do to shape your own successful labor market future. As we begin a new millennium and endeavor to design both our own careers and help others do the same, there is one fact of which we can be absolutely sure... we are truly entering an age of global economic opportunity!

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