Research to Support Strategic Planning

Texas Workforce Investment Council

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March 14, 2014, Quarterly Meeting of the Texas Workforce Investment Council

June 6, 2014, Quarterly Meeting of the Texas Workforce Investment Council

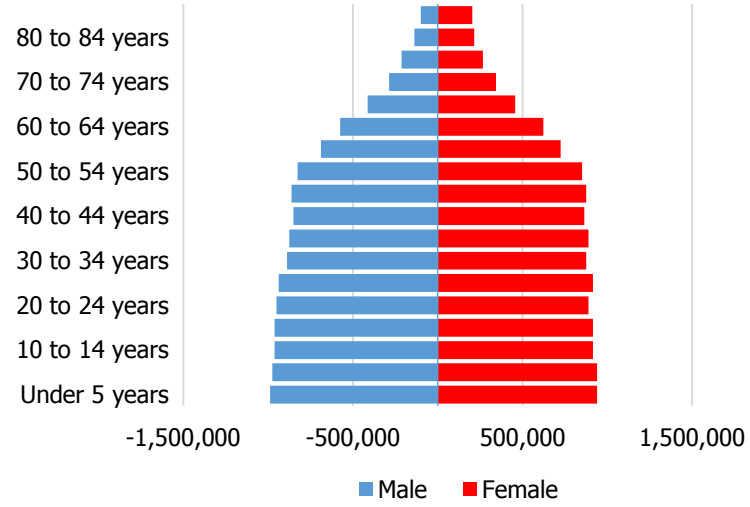
An Overview of Texas Workforce Demographics: 2014

Understanding the composition of the Texas workforce is an important component of planning and policy development. The Texas workforce is, relative to much of the United States, young, growing, and diverse. The following selected data from the U.S. Census Bureau and the Texas State Data Center illustrate current and projected demographic characteristics of the state. Unless otherwise noted, all data is collected from the U.S. Census Bureau and is accurate as of 2012.

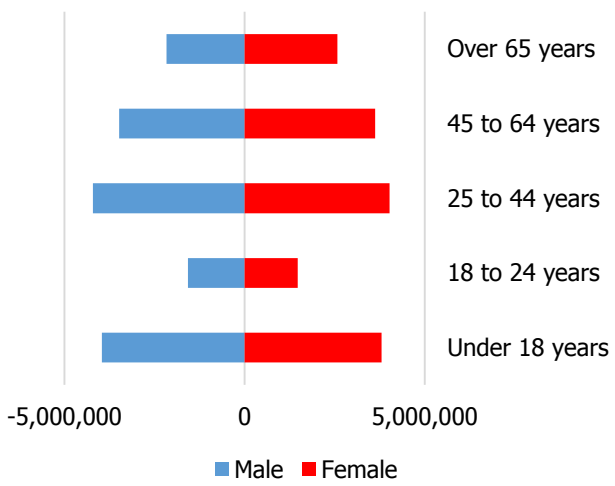
Key Texas Population Characteristics

- In 2013, the Census Bureau estimated the population of Texas to be 26,448,193.
- According to the Bureau of Labor Statistics year-end measurement for 2013, Texas has a civilian labor force of 12,852,645, second only to that of California among U.S. states.
- As of December 2013, Texas' unemployment rate of 6.0 percent was the lowest among the 10 most populous states, and third lowest among the 20 most populous states.
- The median age in Texas is 33.4, compared to 37.4 nationally.
- 50.3 percent of Texans are women, relative to 50.8 percent of Americans nationally.

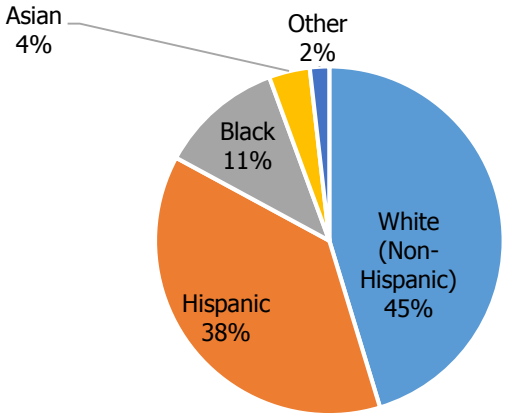
Texas Population Pyramid as of 2013



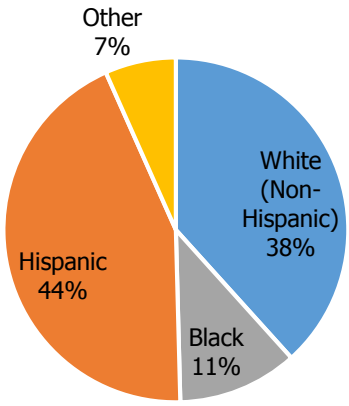
Population Pyramid, Texas in 2025 (Texas State Data Center Projection)



Racial/Ethnic Composition of Texas as of 2013

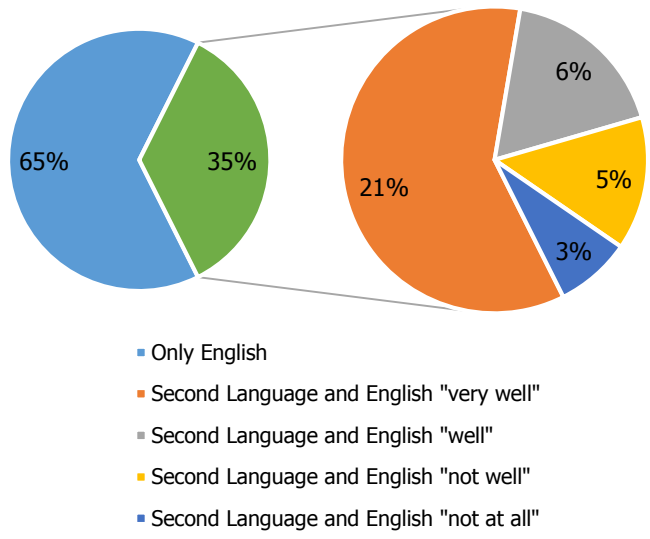


Racial/Ethnic Composition of Texas in 2025 (Texas State Data Center Projection)



Education in Texas

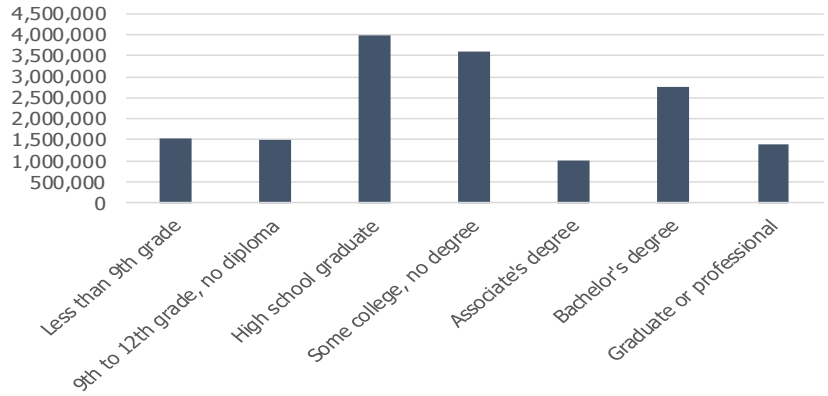
Linguistic Capabilities in Texas (Age 5+)



Texas and Literacy

- The most recent survey, conducted in 2003 by the National Center for Education Statistics, estimated that 29 percent of Texas adults lacked basic prose literary skills, compared to a national average of 14.5 percent.
- Higher average levels of educational attainment in Texas since 2003 make it likely the gap has closed somewhat.

Educational Attainment in Texas, Age 25+

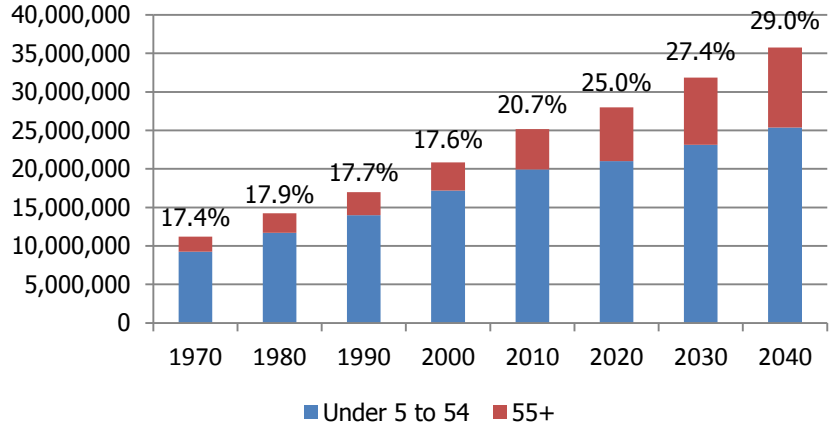


Texas' Education Compared to the Nation

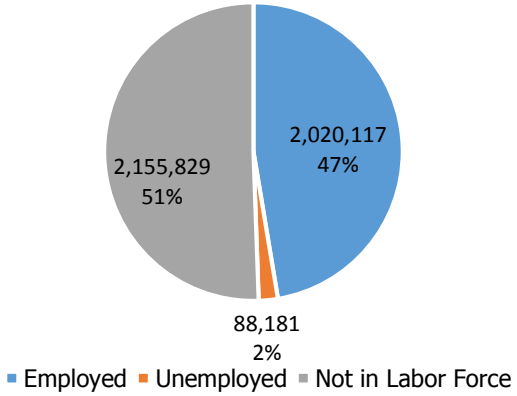
- Texans tend to have lower levels of educational attainment than the country as a whole.
- However, the gap between Texas and the national average decreases in younger age groups.

Mature Workers in Texas

History and Projection of Percentages of Mature Workers in Texas

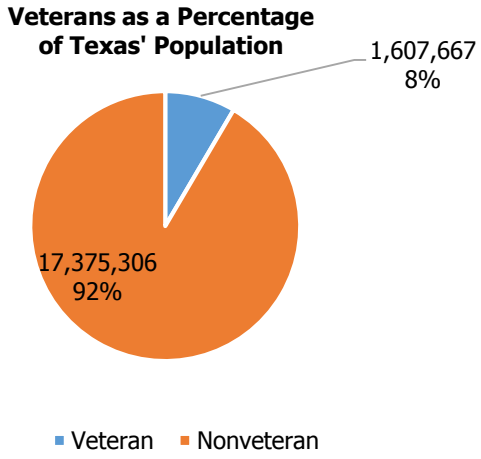


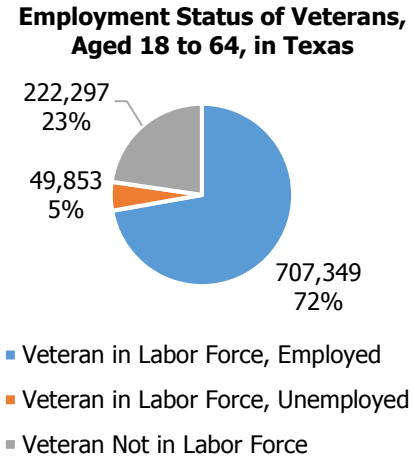
Employment Status for Mature Workers (Aged 55+) in Texas



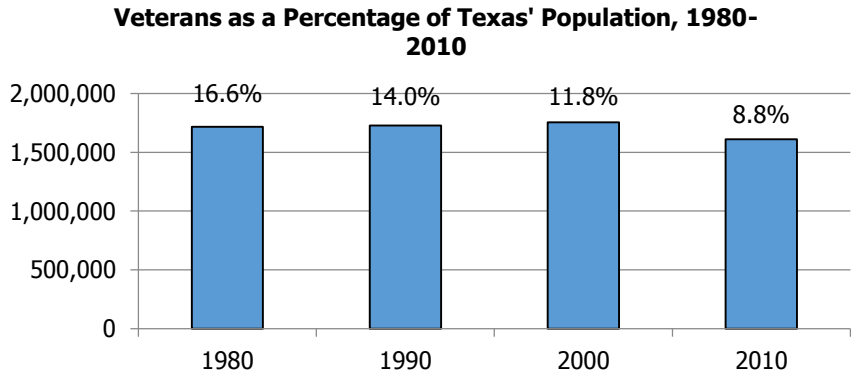
Relative to the rest of the country, Texas has lower unemployment levels for workers over the age of 55.

Veterans in Texas



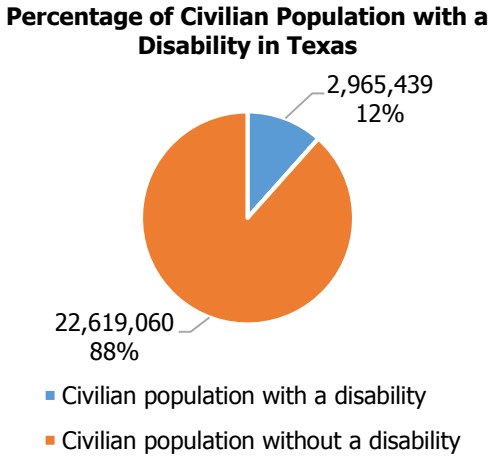


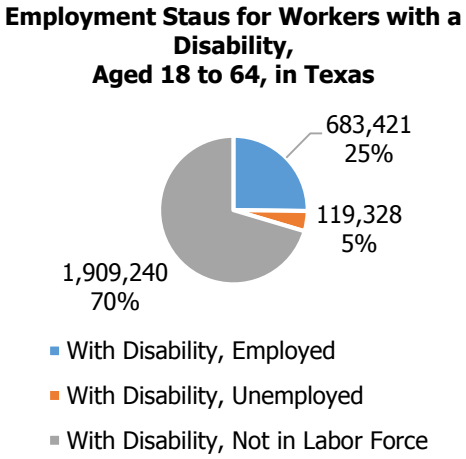
The percentage of veterans in Texas' population is roughly average relative to the rest of the United States, but Texas veterans are slightly more likely to be employed than the national average.



The percentage of veterans in Texas' population has decreased over time at approximately the same rate as the percentage of veterans in the national population.

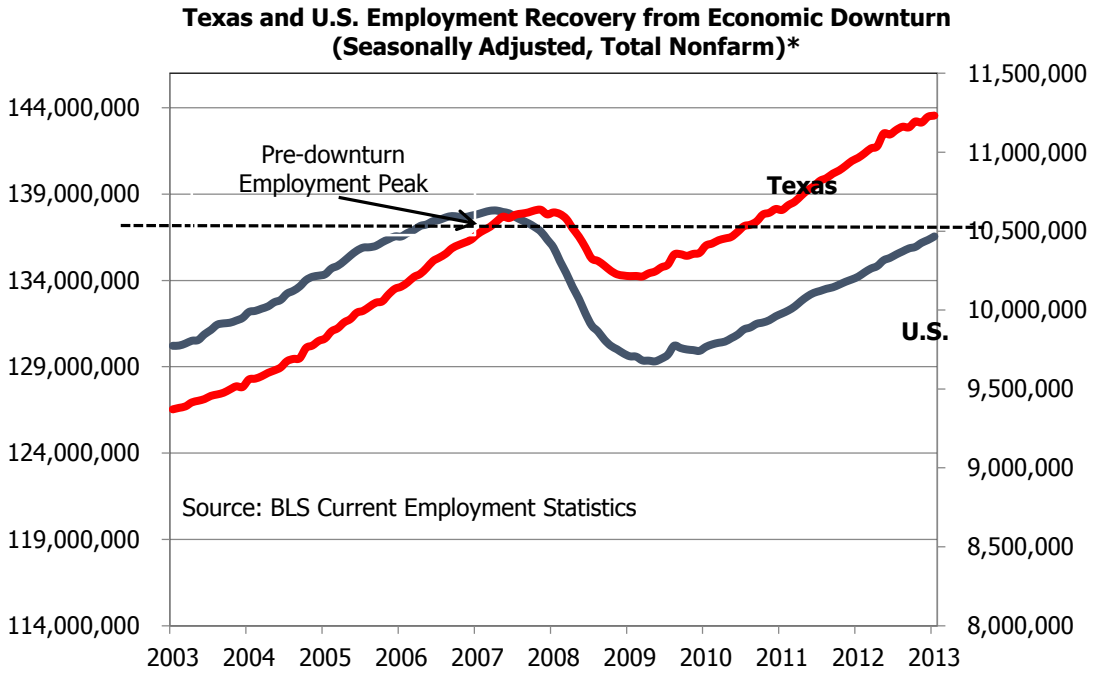
Workers with Disabilities in Texas





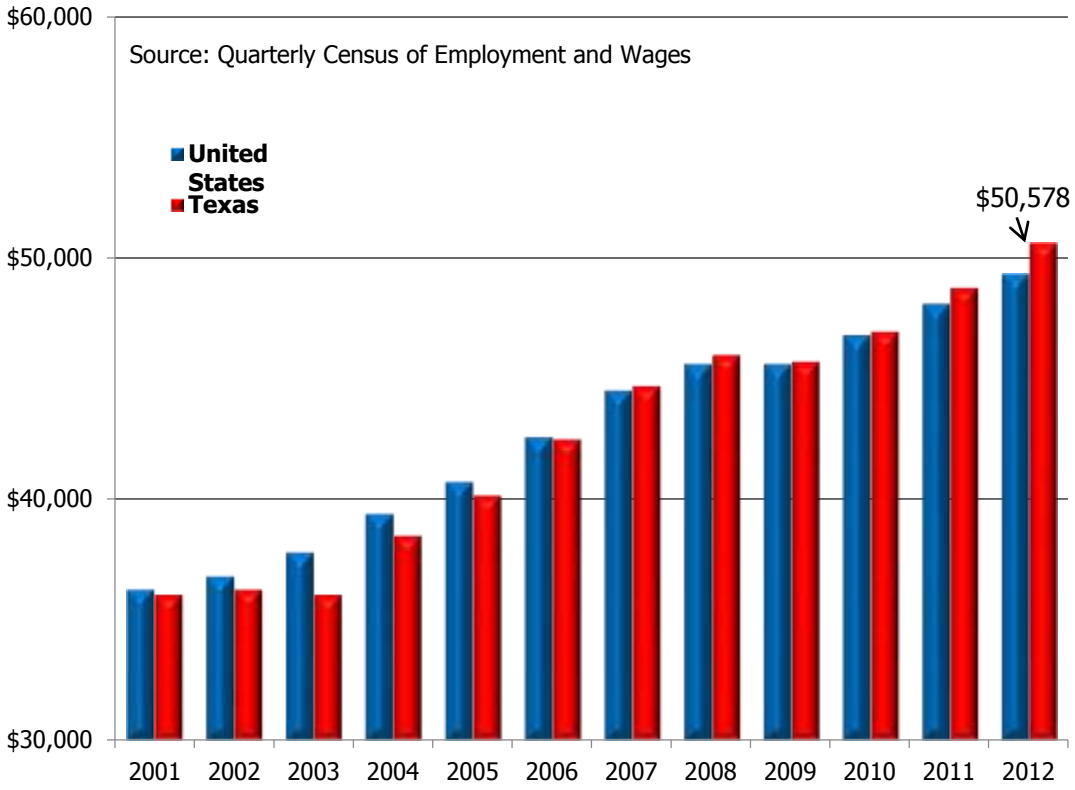
Relative to the rest of the United States, Texas has slightly fewer workers with disabilities. However, on average, workers with a disability in Texas are more likely to be in the labor force and employed than they are in the United State more broadly. Over time, workers with disabilities have accounted for roughly the same percentage of Texas' population.

The Texas Economy



Relative to the rest of the United States, employment levels in Texas were less impacted by the recent recession, and recovered more quickly. By 2011, Texas reached a new high in employment.

Average Annual Wages in Texas and the United States: 2001-2012*



In recent years, Texas' average annual wages have risen from below the national average to solidly above the national average.

*Charts originally developed by the Texas Workforce Commission

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Local Workforce Boards Refresher

Texas' workforce system comprises the workforce programs, services, and initiatives administered by eight state agencies and 28 local workforce development boards (boards), as well as independent school districts, community and technical colleges, and local adult education providers. To assist with preparation for the Texas Workforce Investment Council's (Council) strategic planning process, this brief provides information and data about the boards.

Information and Scope

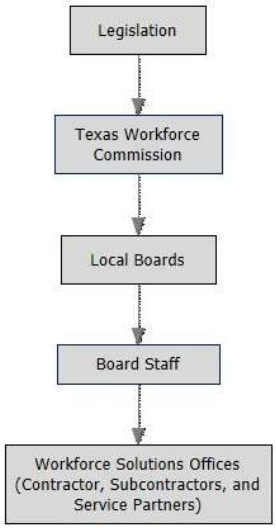
Beginning in 1993, Texas created a workforce system based on foundational principles that included limited and efficient state government, local control, personal responsibility, support for strong families, and a firm belief in the value of work. Key state legislation includes:

- Senate Bill 642 (73rd Legislature) required creation of the Council and the boards, and paved the way for the development of an integrated state and local program delivery system.
- House Bill 1863 (74th Legislature) consolidated employment and training programs from multiple agencies, identified the boards as key to local service delivery, required integrated one-stop centers, and created the Texas Workforce Commission (TWC).

TEXAS WORKFORCE SOLUTIONS

Guiding principles:

- economic development
- market-driven focus
- one-stop model
- flexible responsiveness
- universal access
- customer choice
- accountability
- customized training and human resource solutions



The Workforce Investment Act of 1998 (WIA, Public Law 105-220) implemented a national one-stop system under the U.S. Department of Labor, designated local boards as the focal point for community workforce development needs, and grandfathered major features of the Texas system. The WIA grandfather provisions, including those listed below, and application of prior consistent state law allowed Texas to maintain the best features of the state's existing workforce development system and to build upon past success.

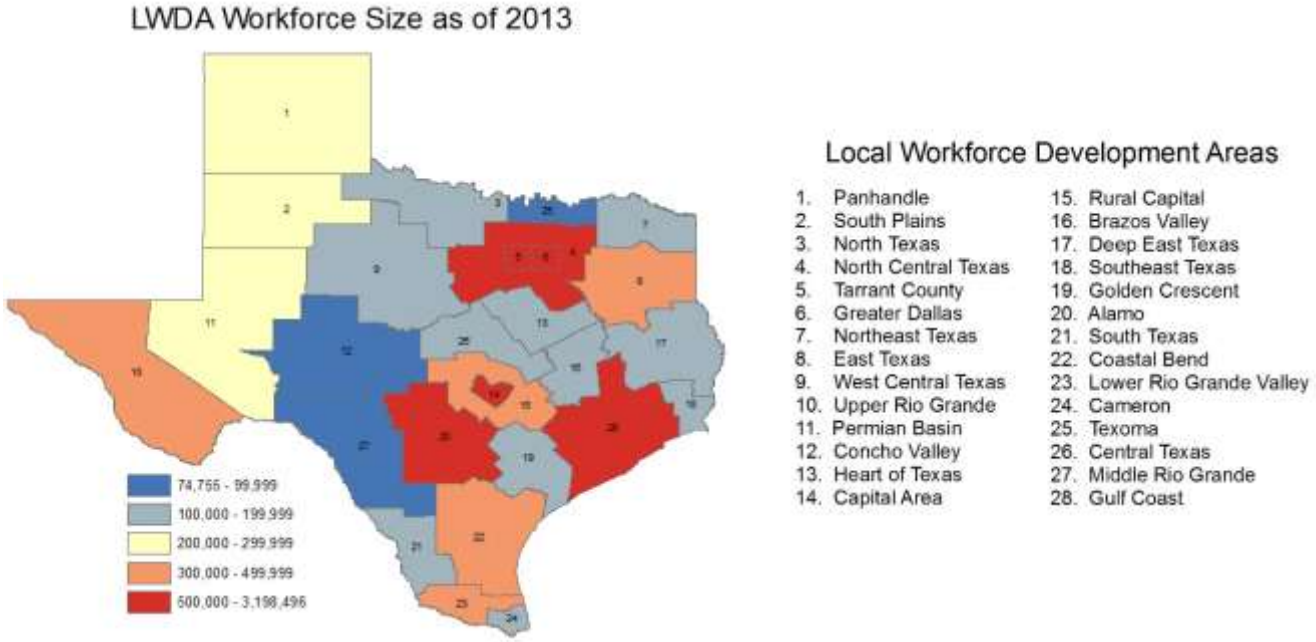
- state boards (Sec. 111),
- local boards (Sec. 117),
- administrative provisions (Sec. 189), and
- continuation of state activities and policies (Sec. 194).

WIA Title 1, Section 118, requires that each board develop and submit to the Governor a comprehensive five-year local plan. Texas Government Code §2308.304(b) also requires each board to develop a local plan with goals and objectives that are consistent with statewide goals, objectives, and performance standards. State and federal law require the Council to review local plans and modifications and make recommendations to the Governor for approval.

Designed as a market-driven system, Texas Workforce Solutions includes TWC; local boards and board staff; and contractors, service providers, and subcontractors including educators, Workforce Solutions

office operators and their staff. As frontline partners in the workforce system, the 28 boards provide programs and services through a network of workforce centers and offices. The boards work together and also collaborate with business, economic development, educational, and other entities to provide services funded by WIA and other state and federal sources.

The map below illustrates workforce size, based on TWC's 2013 Local Area Unemployment Statistics data.



Key elements of the local delivery structure include:

- *Local board members and board staff* – Private sector employers constitute each board's majority, with other members representing local education agencies, labor organizations, community-based organizations, economic development agencies, and each of the one-stop partners such as adult education and literacy, and vocational rehabilitation. Each board develops a strategic and operational plan, with local plans subject to approval by the Council and the Governor. They designate one-stop operators, identify providers of training services, and monitor system performance against established performance measures.

  Board staff is the administrative arm that conducts the board's day-to-day business operations. The boards operate with a high degree of local flexibility for service delivery design, and partner with local training and educational institutions to ensure employment and training opportunities meet area employment needs.

- *Workforce Solutions offices* – These offices provide a variety of online, in-house, and on-site services including employer services, job search resources, labor market information, and customized training referrals. In addition to these traditional brick-and-mortar offices, mobile workforce units provide on-site services to area employers and communities.

- *Business Services Units* – The units address the ever-increasing need for skilled workers in high-demand fields by offering job search assistance, skills training, and other workforce development services. Supported by state and federal funds, most basic services are provided free of charge to employers registered with the state and federal government. Some boards also provide certain services, including workshops and seminars, at nominal fees.

- *Texas Association of Workforce Boards (TAWB)* – TAWB is a not-for-profit association representing Texas' local boards and more than 750 of the business, education, and community leaders who serve on the boards. TAWB facilitates communication among the business community, educational providers, and state and federal officials, and provides a forum for members to share best practices.

The boards utilize funding from a variety of federal, state, and local sources to provide programs and services designed to meet the needs of employers, incumbent workers, and job seekers. Currently, TWC provides the Council with performance data for 12 board-administered workforce programs. Financial and performance data are provided in the tables below:

Table 1: Workforce Programs – Budget ($)[1]

Program	FY 2013	FY 2014
Adult Education and Literacy		71,089,835
Apprenticeship	3,032,277	2,893,444
Employment and Community Services	58,220,130	50,398,847
Senior Employment Services	4,815,355	4,694,316
Self-Sufficiency	6,639,235	2,679,465
Skills Development	23,472,644	23,942,954
SNAP E&T	22,880,413	19,123,454
Trade Affected Worker Training and Assistance	10,923,602	19,905,748
TANF Choices	96,038,223	90,792,113
WIA (Adult and Dislocated)	121,784,553	117,250,408
WIA Youth	49,899,342	49,899,342

Table 1 includes fiscal year (FY) 2013 and 2014 budget figures for the 12 workforce strategies or programs administered by TWC. The funds administered at the state level include those that support pilot, demonstration, and research projects. These initiatives support capacity-building, potentially benefiting all boards and the state's workforce delivery system as a whole.

Table 2: Workforce Programs – Board Allocations ($)[2]

Program	FY 2013/ PY 2012	FY 2014/ PY 2013
WIA Formula Funds:		
Adult	49,766,918	47,637,548
Dislocated	60,166,875	53,319,200
Youth	52,881,414	49,899,342
Employment Services	24,094,849	23,191,839
SNAP E&T	13,579,095	12,328,021
TANF Choices	80,023,672	78,357,335

Table 2 presents board allocation data for FY 2013 and FY 2014. Of the 12 workforce programs, funds for six, as well as child care funds, are allocated to the local boards based on specific eligibility criteria and/or funding formulas. For example, while certain minimums apply, WIA Adult allocations are based on one-third each for the relative share of three factors: total unemployed in areas of substantial unemployment, excess unemployed, and economically disadvantaged adults.

Table 3: FY 2013 Performance[3]

Employers Served	91,884
Job Seekers Served	1,471,741
Achieved Educational Outcome	77.83%
Entered Employment	70.03%
Retained Employment	83.12%

Table 3 includes summative performance data for FY 2013. The figures represent aggregate data for all programs reported, adjusted to exclude duplicate TWC customers.

[1] TWC, *Monthly Legislative Report – Financial Status by Strategy*, FY 2013 (12 month) and FY 2014 (for the three months ending November 30, 2013).
[2] TWC, *Summary of Allocations* for applicable years.
[3] TWC, *Formal Measures Report* (October 11, 2013).

Current Activity

In 2013, the boards developed new local plans for FY 2013–2018. The plans document alignment of local goals and objectives with the relevant statewide goals and objectives in the current system strategic plan, *Advancing Texas,* and also provide information on an innovative strategy that includes collaboration with two or more system partners.

To address diminishing financial resources and to meet the needs of Texas' employers, the boards:

- leverage additional funding sources;
- develop, analyze, and share labor market information and regional economic studies;
- engage in planning and service delivery across workforce areas and/or with other workforce and community partners;
- incorporate new, and adapt current, delivery strategies such as the use of mobile units and new technologies that make service more accessible; and
- strive for integrated, effective service delivery by sharing, modifying, and replicating effective training models and processes.

Events and projects provide the opportunity for the boards and system stakeholders to collaborate, innovate, and streamline services to improve workforce service delivery. Continuous improvement efforts by the boards are facilitated and encouraged through activities such as:

- sharing best practices and other information at TWC's annual conference, workforce forums, and other regional and local meetings; and
- maintaining user-friendly, online resources for topics such as integrated workforce processes, performance measures, and program-specific monitoring toolkits, through the ongoing work of the Quality Assurance Network, a multi-board committee that works with TWC's Training and Development Department.

Concluding Comments

The dynamic nature of Texas' economy is reflected in the evolving industrial and demographic compositions of the local board areas. The potential for further funding reductions, particularly for programs with specific eligibility and use criteria, may further challenge the system.

The boards work individually, together, and with other stakeholders to achieve greater cost efficiencies and make service delivery more seamless. Models exist that, if replicated or expanded, could significantly enhance participant access to a range of workforce and associated support services. Collaborative efforts aid in providing an adequate supply of workers that meet the skills requirements of available jobs, thus assisting the state's employers with retaining and enhancing a competitive economic advantage.

Youth Unemployment and Underemployment in Texas

Young workers are often the hardest hit by economic downturn. In difficult times, the youngest and oldest workers are, by far, the most likely to lose existing jobs, to be unable to find work, and to be underemployed. They are also the last groups to see significant recovery in employment. For young workers, though, negative consequences to their careers last far beyond the recent recession. Unemployment and underemployment early in a career can have significant economic impacts for the duration of a worker's lifetime. This paper examines the impact of the recession on young workers in the United States and Texas, as well as the consequences that can be expected for these workers, and the Texas economy, going forward.

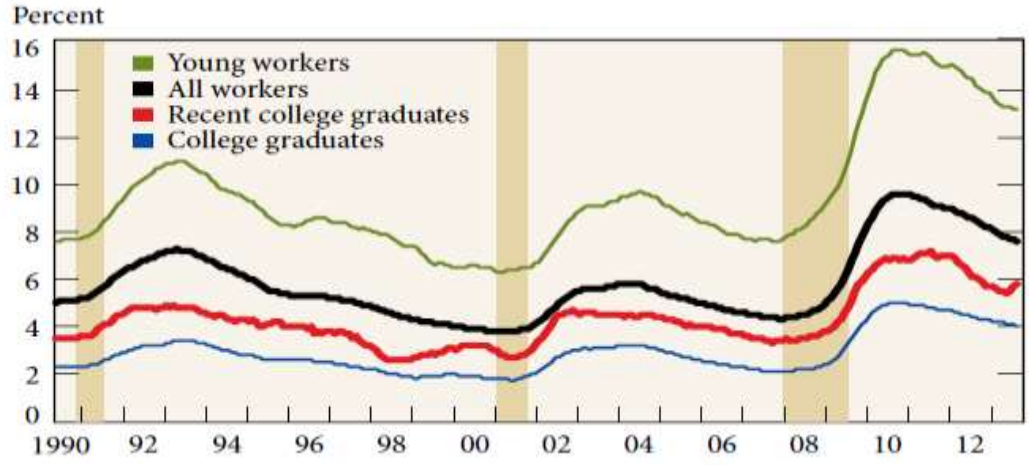
Information/Scope

Young workers are defined differently across different studies referenced in this paper. This paper will generally use the term to refer to those in the labor force under the age of 30. *Underemployment* occurs when a worker is either working fewer hours than desired, or when a worker accepts a job that does not require the skills that he or she has acquired.

The immediate costs of unemployment, both individually and systemically, are obvious. However, youth unemployment and underemployment have particularly pernicious long-term impacts on the career prospects of workers. These conditions can devastate the long-term health of an economy long after workers who experienced them have rejoined the workforce. As the state with the second-lowest median age, Texas has special cause to be concerned about these impacts.

In a recent report[1], the Federal Reserve Bank of New York finds that the percentage of young people who are unemployed or underemployed has risen since the 2001 recession. While the report focuses on the plight of workers with a college degree, troubles extend beyond that demographic. As demonstrated by figure 1, young workers without a bachelor's degree are far worse off than other workers. When workers with bachelor's degrees are underemployed (and thus, by definition, accepting jobs that do not require their degrees) fewer of those low-skill jobs are available for those without degrees.

Figure 1 – Unemployment Rates over Time, Nationally, For Various Groups[2]

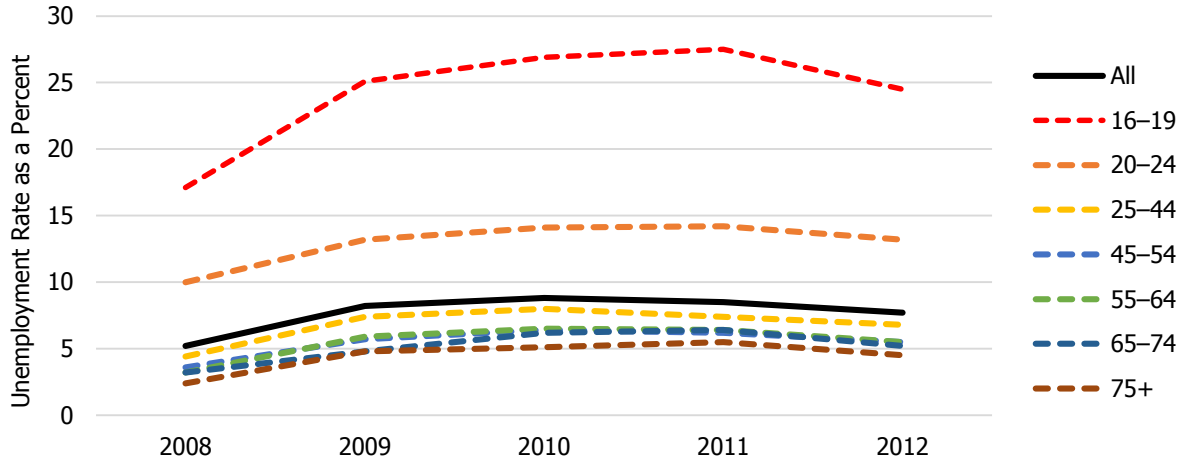


[1] Abel, J, Deitz, R, and Su, Y. (2014) Are recent college graduates finding good jobs? *Current Issues in Economics and Finance*. *20, 1*.

[2] Chart from Abel, Deitz, and Su. Original sources: U.S. Census Bureau and U.S. Bureau of Labor Statistics, Current Population Survey. **Notes:** *All workers* are ages 16–65, *college graduates* are 22–65 with a bachelor's degree or higher, *recent college graduates* are 22–27 with a bachelor's degree or higher, and *young workers* are 22–27 with no bachelor's degree.

While unemployment in Texas, on the whole, is lower than the national average, the pattern of its impact on different age groups is similar. Young people have borne a significant portion of the burden of joblessness in recent years, as shown in figure 2.

Figure 2 – Unemployment Rate by Age Group in Texas in Recent Years[3]



Quantifying underemployment among Texas youth is more difficult. In figure 3, the Federal Reserve Bank of Dallas charted changes in underemployment in Texas, among all workers, in recent years. After the most recent recession, underemployment increases significantly, even relative to unemployment.

Figure 3 – Texas' Underutilized Labor Force[4]

Though figure 3 does not address workers' ages, results of other studies conducted at the national level show that underemployment is more likely to impact young workers, such as in figure 4 and figure 5. Figure 4 demonstrates that, while underemployment is a chronic concern for younger workers, it has been worse in recent years relative both to workers of the same age in the past, and relative to the next higher age group of workers concurrently in the market.

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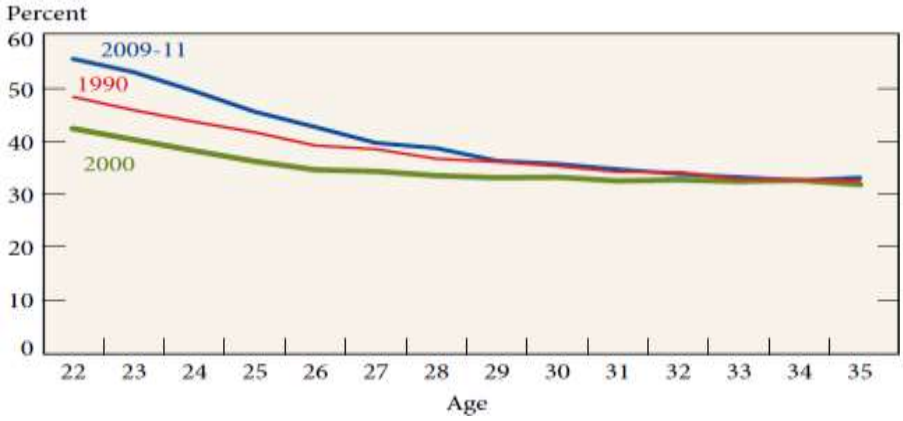
[3] Data from respective year's American Communities Survey by the U.S. Census Bureau. **Notes:** While data are available from 2005–2007, changes in the questions used to generate employment data make comparisons unwise. The general pattern of unemployment weighted toward youth continues, but at a lower rate, in these years.

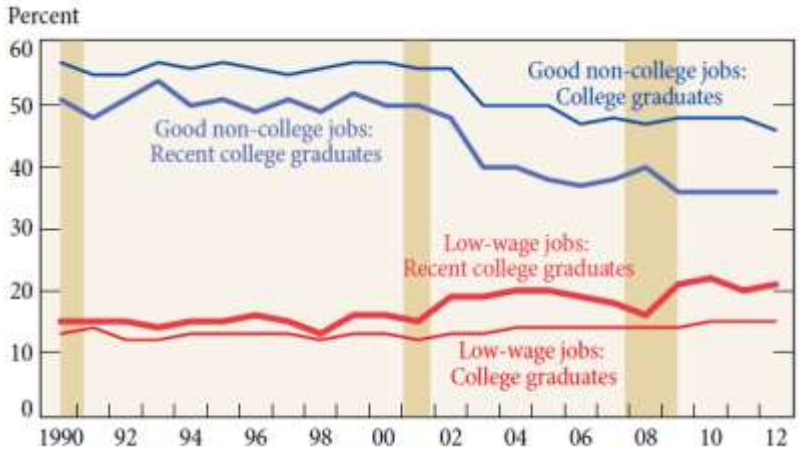
[4] Chart from Kumar, A., and Weiss, M. (2011). Underemployment poses long-term financial risk to more workers. *Southwest Economy, Third Quarter.* 16–19. Data originally from Current Population Survey, Bureau of Labor Statistics.

Figure 4 – College Graduates' Underemployment Rates, by Age[5]



To get a clear picture of how this trend toward underemployment significantly impacts the job market for less-skilled workers, we turn to a final measure. Figure 5 divides jobs into "good" non-college jobs (wages over $45,000 annually) and "low-wage jobs". It is easy to see that, in recent years, college graduates have increasingly moved into underemployment in the "low-wage" jobs.

Figure 5 – Share of Underemployed Graduates in Good Non-College and Low-Wage Jobs[6]



The trickle-down effect of underemployment among college graduates can translate to unemployment for the non-degree-holding population. Clearly, unemployment and underemployment are serious problems for young workers at all levels on the path to employment in today's economy. However, concerns about these conditions go beyond the immediate impact. Historically, young workers who enter the market under these conditions face serious long-term impacts, including future employability, wage scars, cohort wage scars, and wage scarring across the economy.

- The best predictor of future employment is current employment. A person who spends three months unemployed before the age of 23 will, on average, experience an additional month and a half of unemployment between the ages of 28 and 33. There are significant multiplier effects for longer, or multiple, periods of unemployment.[7]

[5] Chart from Abel, Deitz, and Su. Original sources: U.S. Census Bureau, Decennial Census and American Community Surveys, and U.S. Department of Labor, O*NET.
[6] Chart from Abel, Deitz, and Su. Original sources: U.S. Census Bureau, Decennial Census and American Community Surveys, and U.S. Department of Labor, O*NET.
[7] (September 10, 2011). The Jobless Young: Left Behind. *The Economist*.

- Youth unemployment leaves a "wage scar" that can persist into middle age. If a worker spends a year unemployed before the age of 23, all else equal, 10 years later he can expect to earn 23 percent less. For women the gap is 16 percent. This penalty persists throughout a career, though it eventually shrinks.[8]
- Impacts on wages are not restricted to the young people who are actually unemployed. One study, isolating the deep American recession of the early 1980s, shows that young people graduating from college and entering the labor market during this time suffered long-term wage scarring—regardless of periods of unemployment. Graduates in these periods suffer a wage decline of six to seven percent for each point increase in the overall unemployment rate. The effect diminishes over time, but is still statistically significant at least 15 years later.[9]
- Finally, underemployment causes an erosion of expected wages, across the economy, years into the future. According to a report from the Federal Reserve Bank of Dallas, beyond the obvious long-term costs to workers who start at lower wages, any worker entering into a workforce with high underemployment is likely to be earning 2.5 percent less than would otherwise be expected, 15 years into the future.[10]

Current Activity

Currently, much of the preparation for workforce efforts for younger workers is handled by postsecondary education and training. These systems are generally geared toward younger workers, as more than two-thirds of post-high school students in Texas are under the age of 25. Additionally, initiatives that support high school dropouts tend to focus on younger workers as well. Workforce Investment Act programs and services also address this population through youth activities including mentoring services, peer-centered activities, and leadership development. Additionally, Wagner Peyser employment services are available to assist in finding and keeping a job.

Concluding Comments

One of the strengths of the Texas labor force is that it is young and not yet at the peak years of productivity. However, Texas runs the risk of getting less than the optimal benefit from these peak years due to the long-term impacts of the recession, which have led to high youth unemployment and underemployment. These impacts will continue to be felt at all levels of the workforce system, and throughout the Texas economy. So long as a significant number of workers who are relatively more skilled are underemployed, it will be difficult to place those young workers whose skill levels are more appropriate to the jobs those skilled workers are occupying. In addition, leaving underemployment untreated in the short-term carries with it long-term consequences for workers, since their employment outcomes will lag behind at each stage of their careers.

Existing workforce programs focus mostly on placement and retention. This approach means that problems of underemployment may not be well understood or addressed. There is not a clear picture of the extent and impacts of underemployment. A concerted effort to develop measures and collect data on these issues would assist Texas to maximize the strength of its economy going forward by combating the damage done to the young workforce in the recent recession. It would also assist in better understanding the fit between young workers' skills and knowledge, current job skill requirements, and projected labor demand.

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[8] Gregg, P., and Tominey, E. (2005). The wage scar from male youth unemployment. *Labour Economics*, *12*, *4,* 487–509.
[9] Kahn, Lisa. (2010). Long-term labor market consequences of graduating in a bad economy. *Labour Economics, 17, 2,* 303–316.
[10] Kumar, A., and Weiss, M. (2011). Underemployment poses long-term financial risk to more workers. *Southwest Economy, Third Quarter.* 16–19

High School Dropout Rate – Improvement and Impact

National and international reports express concern that dropping out of high school has a significant impact on lifetime earnings, unemployment rates, and economic productivity. Texas is recognized as a national leader in implementing strategies that deliver promising outcomes for at-risk students and high school dropouts. However, the fiscal well-being of state and local governments continues to suffer the consequences of the high school dropout rate. This brief looks at the current high school dropout rate in Texas, its economic impact, and the status of programs and initiatives developed to support this population.

Information and Scope

According to the U.S. Census Bureau, the median age of the Texas population is 33.4 years, versus 37.4 years for the nation as a whole. Texas has the second-youngest median age population among the states. This puts the state at a competitive advantage since aging of the workforce has become a primary concern in many industries and a younger workforce is considered to be more agile in an employment environment that requires training for increasingly complex jobs.[1] However, lack of basic education credentials for employment can delay an individual's entry into the workforce and limit lifetime career growth. Students who drop out of secondary education without earning a high school diploma or an equivalency credential such as a General Educational Development (GED) certificate can have a dramatic impact on the state's economy, on their individual quality of life, and often on their families and communities.

Definition and Rate

The annual dropout rate measures the percentage of students who drop out of school during one school year. The rate can be calculated in several ways, and each method reveals a different aspect of the situation. This brief presents high-level findings for further consideration.

In 2003, the Texas Legislature required that dropout rates be computed according to the National Center for Education Statistics (NCES) dropout definition, beginning with the 2005–06 school year. Under this definition, a dropout is a student who is enrolled in public school between Grades 7–12, does not return to public school the following fall, is not expelled, and does not: graduate, receive a GED certificate, continue school outside the public school system, begin college, or die.[2] The NCES reported rate is shown in Table 1.

Table 1: Annual Dropout Rates, by Grade Span, Texas Public Schools, 2011–12[2]

Grade span	Dropouts	Students	Rate (%)
Grades 7–8	1,991	742,667	0.3
Grades 9–12	34,285	1,407,697	2.4
Grades 7–12	36,276	2,150,364	1.7

The longitudinal rates reflect the percentages of students from a class of beginning ninth graders who graduate, remain enrolled, receive GED certificates, or drop out by the fall following their anticipated graduation date. While the longitudinal rate for the class of 2012 appears higher than the annual rate for grades 9–12 reported to NCES, the dropout rates for the classes of 2009–2012, shown in Table 2, demonstrate that fewer students are dropping out of school in Texas and more are graduating.

[1] Eschbach, Karl. *Demographic Advantage: Young State, Solid Growth*, Texas Ahead, Issue 7, 2010.
[2] TEA, *Secondary School Completion and Dropouts in Texas Public Schools 2011–12*, August 2013.

Table 2: Grade 9 Longitudinal Graduation and Dropout Rates, Texas Public Schools, Classes of 2009 Through 2012[3]

		Graduated		Continued		Received GED		Dropped out		Graduated or received GED		Graduated, continued, or received GED	
Class year	Class	Number	Rate (%)	Number	Rate (%)	Number	Rate (%)	Number	Rate (%)	Number	Rate (%)	Number	Rate (%)
2009	308,427	248,500	80.6	26,667	8.6	4,404	1.4	28,856	9.4	252,904	82	279,571	90.6
2010	314,079	264,632	84.3	22,532	7.2	3,927	1.3	22,988	7.3	268,559	85.5	291,091	92.7
2011	319,588	274,562	85.9	19,757	6.2	3,456	1.1	21,813	6.8	278,018	87	297,775	93.2
2012	316,758	277,778	87.7	15,750	5	3,198	1	20,032	6.3	280,976	88.7	296,726	93.7

Economic Impact to the Individual

Regardless of the method of calculation, the future for these students presents a number of challenges for the individual and the workforce system. The Georgetown University Center on Education and the Workforce estimates the economic penalty for not finishing high school to be almost $9,000 a year. Over a 40-year career, students who did not earn a high school diploma or GED are expected to earn less than $1 million, that is, slightly more than $24,000 a year. By comparison, the average annual earnings of people with a high school diploma is $32,600 representing 33 percent higher lifetime earnings.[3]

In Table 3, a wage comparison of employed Texans 25 to 30 years of age similarly demonstrates disparity in earnings by the level of educational attainment. The educational attainment categories represent the highest level of education attained. The number employed represents the count of individuals reported with wages, who were between the ages of 25 and 30 during the earnings year (and had been enrolled in the Texas public school system). College enrollment and graduation data include Texas public colleges and universities only.[4]

Table 3: Wage Comparison by Educational Attainment for Texans Age 25 to 30[4]

	Median 4th Quarter Wages			Number Employed		
Earnings Year	2010	2011	2012	2010	2011	2012
Educational Attainment						
Advanced Degree	$12,795	$13,102	$13,397	34,250	30,830	32,970
Bachelor Degree	$11,031	$10,965	$11,250	176,944	177,303	183,310
Associate Degree	$8,549	$8,475	$8,632	47,216	47,168	50,228
Some College	$7,070	$6,889	$7,039	428,731	442,213	460,199
High School Graduate	$6,674	$6,504	$6,696	159,504	167,050	172,137
Less Than High School Diploma	$4,755	$4,696	$4,706	38,336	39,109	42,284

Economic Impact to the State

In the 2009 report, *The ABCDs of Texas Education: Assessing the Benefits and Costs of Reducing the Dropout Rate*, the research team estimated the state's annual economic loss of wages, sales tax revenue, and welfare payments to be over $4,000 per dropout. Even after accounting for the cost of education had

[3] Carnevale, Anthony P., Rose, Stephen J. and Cheah, Ban, (2011) *The College Payoff: Education, Occupations, Lifetime Earnings*, the Georgetown University Center on Education and the Workforce. Data source: 2007–2009 American Community Survey.

[4] TEA, Student Longitudinal Reports Portal, Texas PK-16 Public Education Information Resource (TPEIR).

the students remained in school, the negative economic impact from longitudinal dropout numbers in 2007 was estimated to be a future loss to the state's economy of between $5.4 billion and $9.6 billion.[5]

Adults who earn a bachelor's degree or higher are more likely to contribute to federal, state, and local taxes. They also pay four-to-seven times more in federal and state income taxes than adults who lack a high school diploma or GED certificate. The Alliance for Excellent Education reports that Texas' economy would have realized the financial gains presented in Table 4 if it had increased the class of 2012 high school graduation rate of 87.7 percent to 90 percent.

Table 4: Estimated Economic Impact of a 2.3 Percent Increase in Texas' 2012 Graduation Rate[5]

Economic Gains	Category of Increase
$919 million	Annual Earnings
$729 million	Annual Spending
$1.3 billion	Home Sales
$78 million	Auto Sales
7,600	New Jobs
$1.2 billion	Annual Gross State Product
$143 million	Federal Tax Revenue

While Texas can dramatically improve economic outcomes by increasing high school graduation rates, the state can also reduce substantial losses associated with having many high school dropouts. Compared with high school graduates, adults without a high school diploma face limited employment opportunities and lower wages when employed; accordingly, findings show that individuals who drop out of high school:

- are less likely to be employed,
- earn less when employed,
- pay less in taxes,
- receive more in direct welfare payments, and
- are more likely to be incarcerated.

Current Activity

Innovative educators and workforce system partners in Texas have implemented proven research-based strategies and have demonstrated success in decreasing the dropout rate in recent years. These strategies include:

- data systems that identify struggling students who need early intervention;
- personalized learning environments, academic support, and mentors to advocate for students; and
- dropout prevention and recovery programs that alleviate and reduce the long-term economic impact when students drop out of high school.

Changing the Expectations of Dropout Recovery Programs

In 2007, the Pharr San Juan Alamo Independent School District launched the College, Career, and Technology Academy to identify students who had almost earned a high school diploma but dropped out and had begun to question the wisdom of that choice. In 2011, the Texas Legislature passed a bill

[5] *The ABCDs of Texas Education: Assessing the Benefits and Costs of Reducing the Dropout Rate,* Bush School of Government and Public Service, Texas A&M University, May, 2009.

allowing community colleges to create similar programs on their campuses and to partner with school districts that have dropout rates higher than 15 percent.[6]

Early College High School[7]
According to the *Early College Initiative Impact Study*[8], early college students were significantly more likely to graduate from high school, enroll in college, and earn a degree than comparison students. Early College High Schools, high schools located on or in close proximity to a college campus, allow students who are least likely to attend college an opportunity to earn a high school diploma and either an associate degree or at least up to 60 college credit hours toward a baccalaureate degree. These schools provide dual credit at no cost to students; offer rigorous instruction and accelerated courses; provide academic and social support services to help students succeed; increase college readiness; and reduce barriers to college access. The first graduates earned their degrees in 2010. In February 2014, an additional 44 Early College High School designations for the 2014–2015 school year were approved by the Texas Education Agency (TEA). With these designations, Texas will become home to 109 such school campuses across the state. A school district or charter must obtain an Early College High School designation from TEA to allow high school students to enroll in more than two dual credit courses per semester and enroll in dual credit coursework with freshman or sophomore standing.

Texas Dropout Recovery Pilot Program[9]
In less than two years, this pilot program served twice the number of students originally projected. Of those 4,141 students, almost 1,300 completed the program by earning a high school diploma or demonstrating college readiness. The average graduate is expected to earn $246,348 more in his or her lifetime than a high school dropout. Over $21 million in general revenue funding was awarded to 42 grantees between 2008 and 2012, and this grant program is expected to save the state $95.3 million in current dollars after accounting for initial program expenditures.

Concluding Comments

When some national and global competitors are concerned about the availability of their future workforce, Texas has a competitive advantage in its abundant youth population. The state's success in job creation suggests that Texas' youth have opportunities for greater employment outcomes and higher lifetime earnings. However, occupations in demand increasingly require some postsecondary education, and many high school dropouts are not prepared to enter education and training programs, and are even less prepared for employment.

A thriving workforce system requires workers that have, or are able to train for, the requisite skills in demand. While Texas is a recognized leader in reducing the high school dropout rate, the economic impact of each dropout remains significant.

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[6] *Striving for Academic Excellence, A Profile of Seven Economically Disadvantaged School Districts*, Legislative Budget Board, December 2008.
[7] Early College High School. February, 2014. In TEA's website. Retrieved from http://www.tea.state.tx.us/index3.aspx?id=4464.
[8] *Early College, Early Success, Early College High School Initiative Impact Study*, American Institutes for Research, September 2013.
[9] Dropout Recovery Pilot Program. April, 2013. In TEA's website. Retrieved from http://www.tea.state.tx.us/index3.aspx?id=3686&menu_id3=814

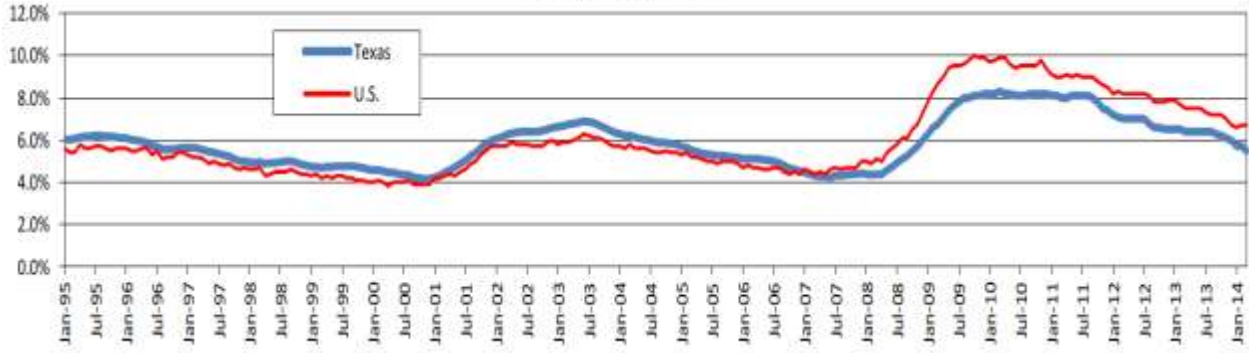
Overview of the Texas Economy

The purpose of this profile is to provide Council members with information regarding the state of the Texas economy through early 2014. This profile examines key indicators as Texas continues growing after the Great Recession that began in 2007. The information presented is meant to provide a clearer understanding of the Texas economy and labor force, as well as an outlook for the next five years. Unless otherwise noted, all data in this report come from the Bureau of Labor Statistics as of May 2014.

Texas Employment

Through 2013, the number of employed Texas workers grew at a higher rate than nationally.

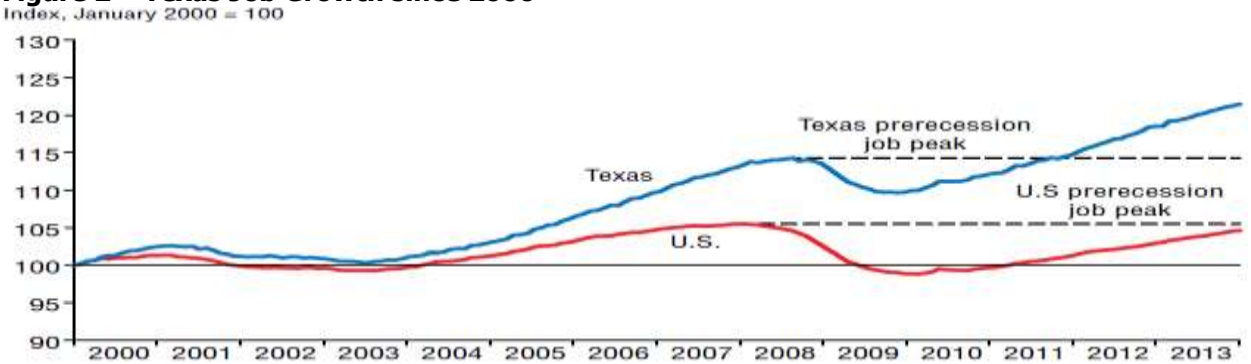
Figure 1 – Changing Unemployment Rates, Texas and the United States[1]



Texas' nonfarm employment expanded by about three percent over the course of 2013. In the United States, this figure grew by about 1.7 percent. The national unemployment rate dropped more than the Texas unemployment rate, 1.3 and 0.8 percent, respectively. However, the Texas unemployment rate was nearly two points lower at the start of 2013. Texas added approximately 300,000 additional jobs from the beginning of the year through March of 2014, lowering the unemployment rate another 0.2 percent to 5.5.

As illustrated in figure 1, Texas has not yet matched its pre-recession low unemployment rate of 4.3 percent from 2007. However, this is because the denominator, Texas' working population, has grown. In fact, Texas has added almost 800,000 jobs more than its pre-recession high. In comparison, as can be seen in figure 2, the country as a whole will likely reach its pre-recession high in jobs with the next update to these figures. (Preliminary data indicate that it did, indeed, pass this milestone in April 2014.)

Figure 2 – Texas Job Growth since 2000[2]

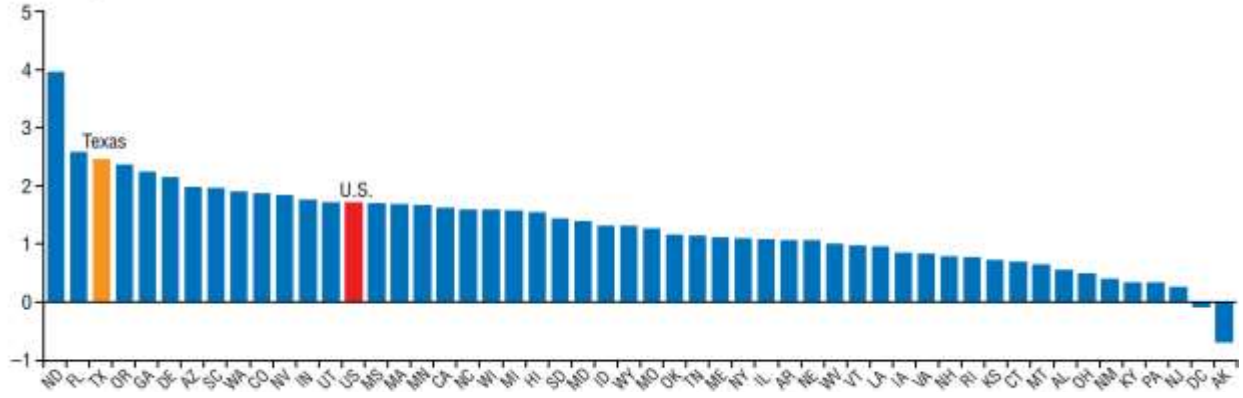


[1] Figure from Texas Workforce Commission's 2014 LMCI Economic Profile of Texas, from March 2014.

[2] Figure from Phillips, Keith R. and Slijk, Christopher. "Texas to Remain a Top State for Job Growth in 2014." *Southwest Economy*. Federal Reserve Bank of Dallas. 1/2014.

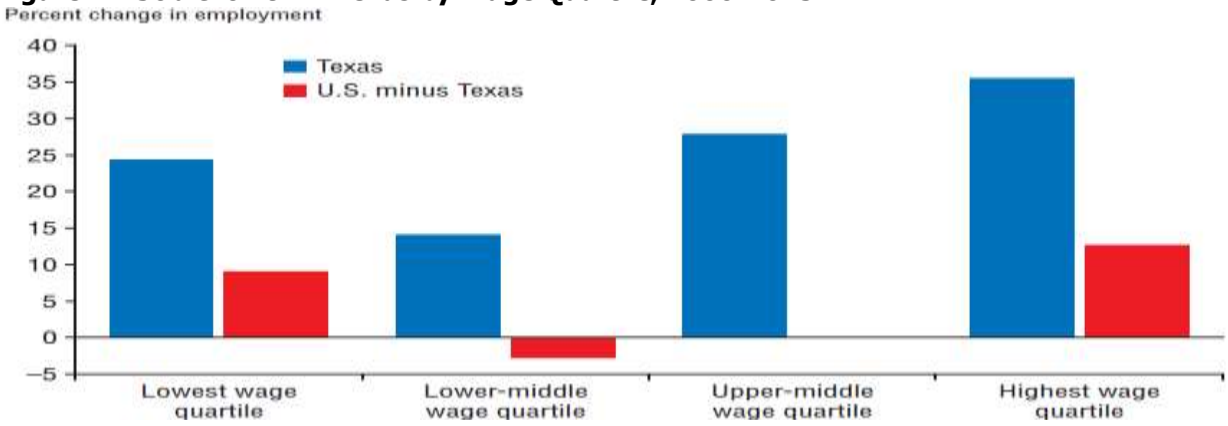
Total nonagricultural private employment in Texas has maintained an annual growth rate at or above 2.6 percent since January of 2012. While sectoral employment is covered more exhaustively in the report *Texas' Gross State Product and Employment 2014*, it is worth noting that all 11 major industries in Texas experienced annual job growth in 2013. As can be seen in figure 3, Texas was among the leading states in job growth in 2013. In 2014, Texas has continued this trend, with only North Dakota outpacing the state.

Figure 3 – Job Growth Rate among States in 2013, Percent Change, December to December[3]



Texas' growth, meanwhile, has occurred across a broad spectrum of pay levels. Figure 4 shows that Texas created more jobs than did the United States as a whole in every wage quartile. And, without Texas' growth, the country as a whole would have experienced a net loss or no gain in jobs in the middle two wage quartiles.

Figure 4 – Job Growth in Texas by Wage Quartile, 2000-2013[4]



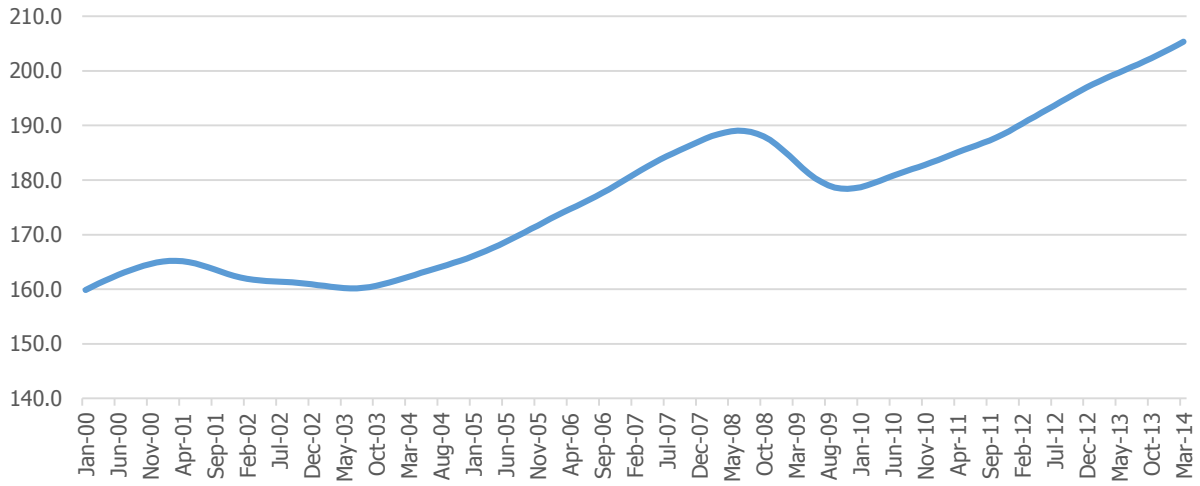
In fact, Texas has created more high-paying jobs than low-paying jobs. Jobs in the top half of the wage distribution were responsible for 55 percent of net new jobs in Texas since 2000. As a whole, job creation in Texas has run counter to the "hollowing" of the middle class that has occurred in much of the rest of the United States. This phenomenon has seen the prospects of workers at the very top of the economic distribution improve, while those at the bottom have mostly remained steady, and those in the middle have seen minimal, or even negative, changes in jobs and wages.

[3] Figure from Phillips, Keith R. and Slijk, Christopher. "Texas to Remain a Top State for Job Growth in 2014." *Southwest Economy*. Federal Reserve Bank of Dallas. 1/2014.
[4] LoPalo, Melissa and Orrenius, Pia M. (2014). "Texas Leads Nation in Creation of Jobs at All Pay Levels." *Southwest Economy*. Federal Reserve Bank of Dallas. 1/2014.

Economy Going Forward

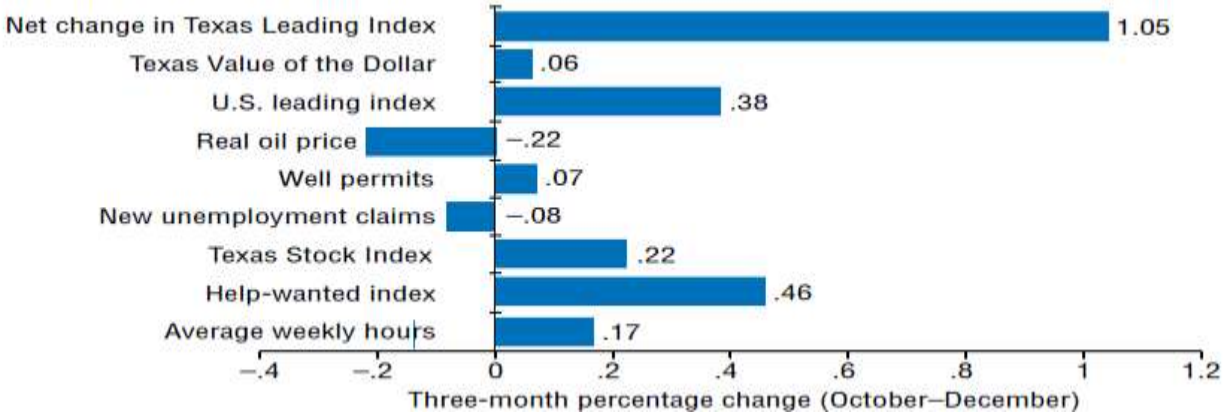
Two important measures that the Federal Reserve Bank of Dallas (Dallas Fed) uses to predict future economic performance in Texas are the Texas Business-Cycle Index (BCI) and the Texas Leading Index. The BCI combines measures of employment, the unemployment rate, and state real gross domestic product to provide a broad view of the state's economic health. In short, the BCI provides a visual representation of expansion versus contraction. Periods of negative movement represent recessions. As can be seen in figure 5, the BCI has been on a strong upward trend in Texas over the last four years.

Figure 5 – Monthly Texas Business-Cycle Index Scores[5]



The Texas Leading Index combines key state economic indicators to forecast Texas job growth. Movements in the indicators for the three-month period concluding 2013 were largely positive, with two exceptions. The first is a slight decrease in oil prices. The second is a slight increase in initial unemployment claims, which is represented as a negative indicator on the graph below. The positive economic outlook suggested by the Texas Leading Index indicators in figure 6 is supported by the Dallas Fed's industry outlook surveys, as well as by increasing stock prices for companies with a large presence in Texas.

Figure 6 – Texas Leading Index Component Changes, 4th Quarter 2013[6]



[5] The data used to make up this chart are provided by the Federal Reserve Bank of Dallas, and can be found at: http://www.dallasfed.org/microsites/research/econdata/coini.cfm

[6] Figure from Phillips, Keith R. and Slijk, Christopher. "Texas to Remain a Top State for Job Growth in 2014." *Southwest Economy*. Federal Reserve Bank of Dallas. 1/2014.

The latest Texas economic forecast from the Perryman Group also predicts continuing strong performance, relative to the rest of the United States, for the Texas economy. All major industrial sectors are predicted to experience gains over the next five years. In addition, a 4.59 percent annual growth rate for Texas' state gross product is expected. That rate of growth would add well over 300 billion dollars to the state's total economic output through 2018. Additionally, the forecasted employment growth rate of about 2.33 percent would push Texas over 13 million jobs by the end of 2018.

Concluding Comments

Texas' economy has been one of the strongest in the United States over the past 15 years, and has thrived since the Great Recession of 2007. That recession did less damage to the Texas economy than to the national economy, and Texas was also able to recover more quickly from it than was most of the country. Most indicators predict that Texas' economic health will remain strong through the near future. While Texas' economic growth may regress closer to the national average, this narrowing gap is to be expected given its outlier-level performance in recent years. And, as the rest of the American economy improves, Texas exports are well-positioned to increase in future years. In all, the economic and employment situations in Texas are, and are likely to remain, strong.

Texas' Gross State Product and Employment, 2014

Understanding the relative contributions of different types of Texas employers, in terms of contributions both to gross state product (GSP) and to employment, is an important step in efficiently targeting workforce development. Because of significant economic and population growth over the last decade, most sectors have seen increases in both gross product and employment. However, looking at the relative changes between various sectors can suggest where Texas is headed, and in what areas the workforce is likely to be concentrated in the coming years. Unless otherwise noted, all statistics are 2012 Bureau of Labor Statistics data.

Key Texas Employer Characteristics

- Texas has seen significant increases in the importance to employment of the retail trade and healthcare sectors in recent years.
- In contrast to much of the rest of the country, Texas has also seen a significant increase in the value of manufacturing to the state economy and, to a lesser extent, to employment.
- Since 2003, retail trade and healthcare have added relatively more employment compared to its GSP growth, while mining, manufacturing, and real estate have grown far more quickly in GSP than employment.
- The majority of privately employed workers in Texas work in establishments with fewer than one hundred employees, and only about one quarter of them work in establishments with more than 250 workers.

Figure 1: Texas Gross State Product Growth by Major Industry Sector, 2003 and 2012

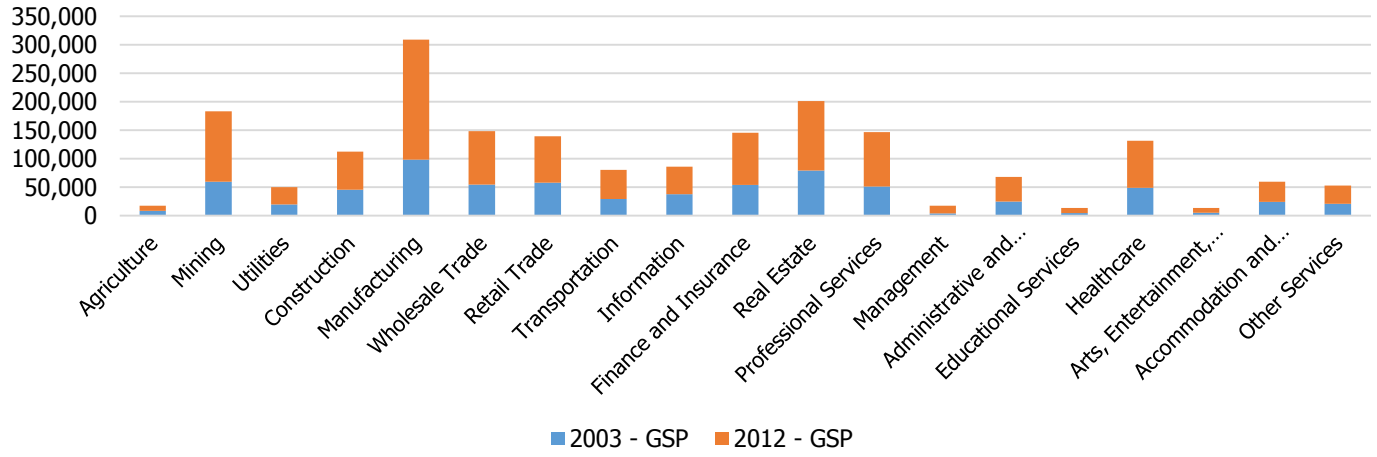


Figure 2: Texas Private Sector Employment Growth by Industry Sector, 2003 and 2012

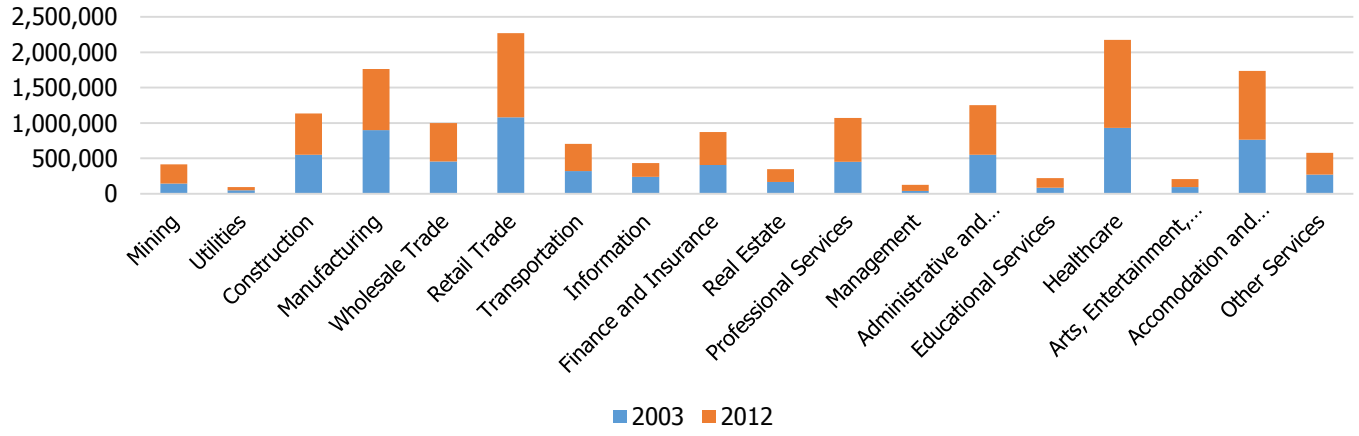


Figure 3: Texas Employment Growth Compared to Texas GSP Growth, 2003 and 2012

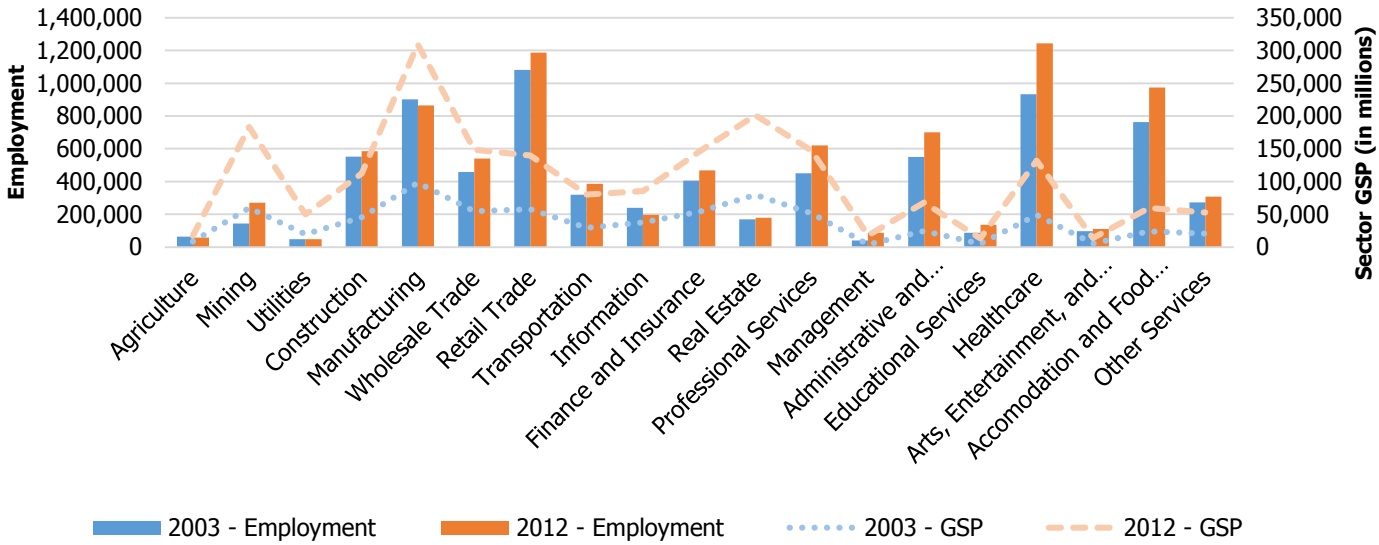


Figure 3 compares growth in employment in various industries from 2003 (blue bar) to 2012 (orange bar), and changes in GSP contribution from 2003 (blue dotted line) to 2012 (orange dotted line). For an industry in which the height of the bar far outstrips the height of the dotted line, as in healthcare, an industry has relatively high employment for its contribution to GSP. Meanwhile, for an industry in which the dotted line is higher than the bar, as in mining, there are low levels of employment relative to contribution to GSP. Additionally, in the industries in which the orange bar or dotted line is higher than the blue bar or dotted line, growth has occurred.

Figure 4: Share of Private Employment by Number of Employees in Business, 2012

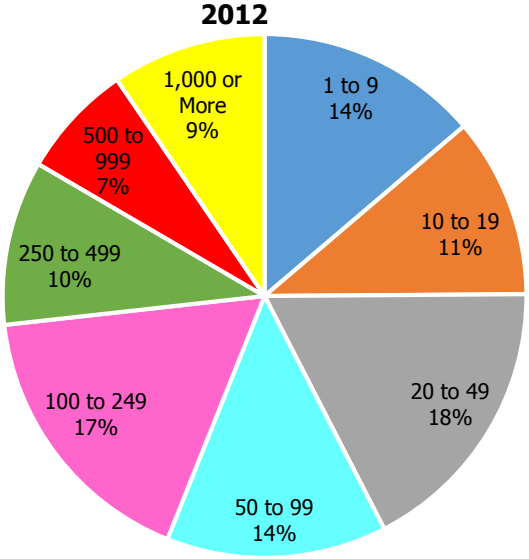


Figure 4 illustrates the percentage of the total number of private sector employees in Texas by size of employing establishment. A few facts of note:

- Roughly the same number of people are employed in establishments with fewer than 20 employees (25 percent) as in establishments with 250 employees or more (26 percent).
- More than half of all private sector employees in Texas are employed in establishments with fewer than 100 total employees (57 percent).

Figure 5: Private Employment in Texas By Sector, 2012

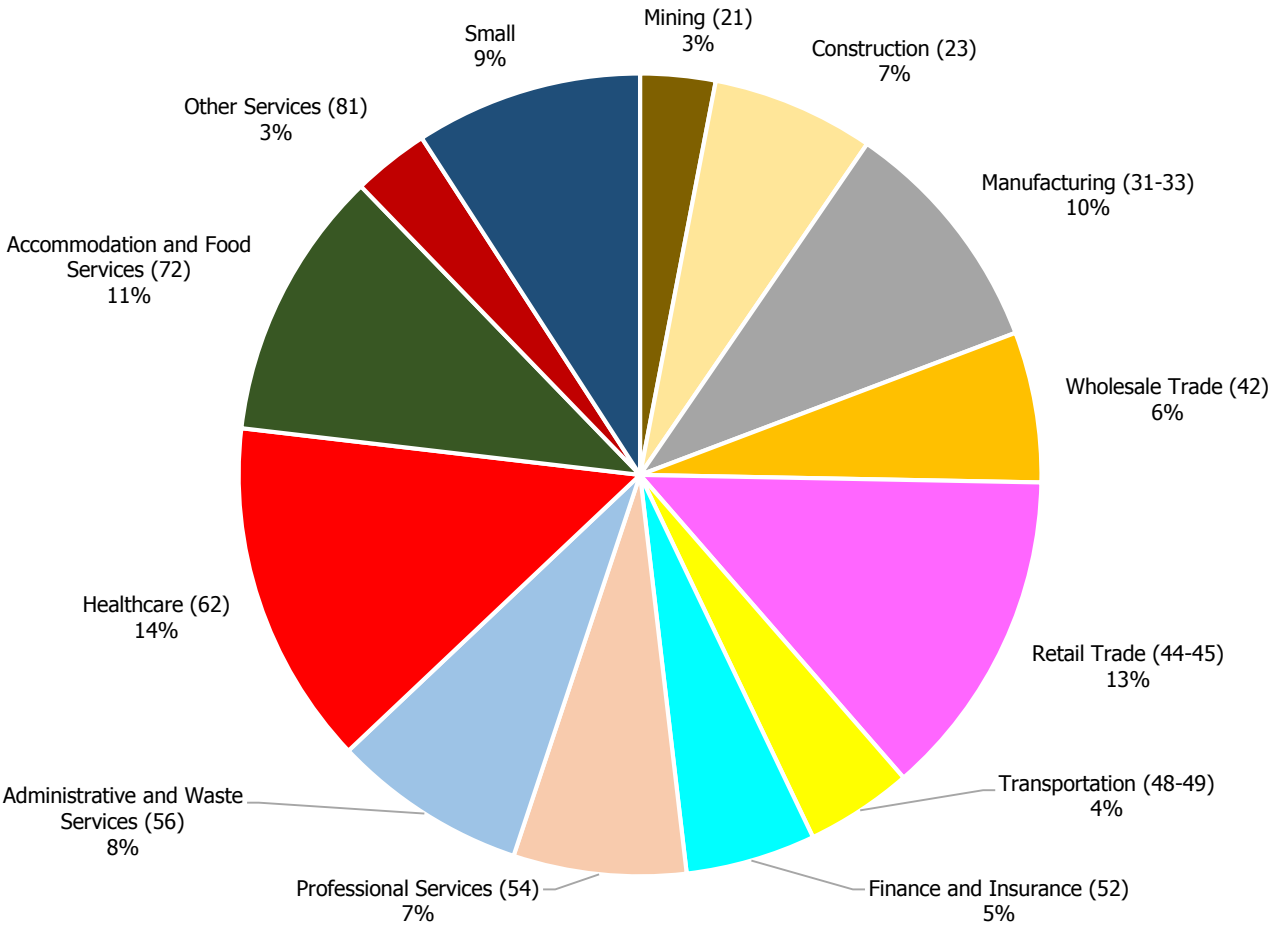


Figure 5 shows the relative share of employment in Texas by sector as a percentage of total private sector employment. Sectors are defined using the two-digit North American Industry Classification System (NAICS) code, which is presented in parentheses after the sector's title.

The chart on the following page further breaks out these two-digit categories, and displays more specific types of business activity under each header by three-digit NAICS codes. It is a non-exhaustive list, as each category continues to break down into more specific job titles. The NAICS codes in figure 5 double as order of placement on the NAICS list. Note that the "small" category includes all sectors with fewer than 250,000 workers statewide, and the sectors that make up that category can be seen on the following page, in the same blue color as used on the pie chart. Those sectors are also designated with an asterisk (*).

2012 NAICS Code	2012 NAICS US Title
11*	**Agriculture, Forestry, Fishing, and Hunting***
111	Crop Production
112	Animal Production and Aquaculture
113	Forestry and Logging
114	Fishing, Hunting, and Trapping
115	Support Activities for Agriculture and Forestry
21	**Mining, Quarrying, and Oil and Gas Extraction**
211	Oil and Gas Extraction
212	Mining (except Oil and Gas)
213	Support Activities for Mining
22*	**Utilities***
221	Utilities
23	**Construction**
236	Construction of Buildings
237	Heavy and Civil Engineering Construction
238	Specialty Trade Contractors
31–33	**Manufacturing**
311	Food Manufacturing
312	Beverage and Tobacco Product Manufacturing
313	Textile Mills
314	Textile Product Mills
315	Apparel Manufacturing
316	Leather and Allied Product Manufacturing
321	Wood Product Manufacturing
322	Paper Manufacturing
323	Printing and Related Support Activities
324	Petroleum and Coal Products Manufacturing
325	Chemical Manufacturing
326	Plastics and Rubber Products Manufacturing
327	Nonmetallic Mineral Product Manufacturing
331	Primary Metal Manufacturing
332	Fabricated Metal Product Manufacturing
333	Machinery Manufacturing
334	Computer and Electronic Product Manufacturing
335	Electrical Equipment, Appliance, and Component Manufacturing
336	Transportation Equipment Manufacturing
337	Furniture and Related Product Manufacturing
339	Miscellaneous Manufacturing
42	**Wholesale Trade**
423	Merchant Wholesalers, Durable Goods
424	Merchant Wholesalers, Nondurable Goods
425	Wholesale Electronic Markets and Agents and Brokers
44–45	**Retail Trade**
441	Motor Vehicle and Parts Dealers
442	Furniture and Home Furnishings Stores
443	Electronics and Appliance Stores
444	Building Material and Garden Equipment and Supplies Dealers
445	Food and Beverage Stores
446	Health and Personal Care Stores
447	Gasoline Stations
448	Clothing and Clothing Accessories Stores
451	Sporting Goods, Hobby, Musical Instrument, and Book Stores
452	General Merchandise Stores
453	Miscellaneous Store Retailers
454	Nonstore Retailers
48–49	**Transportation and Warehousing**
481	Air Transportation
482	Rail Transportation
483	Water Transportation
484	Truck Transportation
485	Transit and Ground Passenger Transportation
486	Pipeline Transportation
487	Scenic and Sightseeing Transportation
488	Support Activities for Transportation
491	Postal Service
492	Couriers and Messengers
493	Warehousing and Storage

51*	**Information***
512	Motion Picture and Sound Recording Industries
515	Broadcasting (except Internet)
517	Telecommunications
518	Data Processing, Hosting, and Related Services
519	Other Information Services
52	**Finance and Insurance**
521	Monetary Authorities-Central Bank
523	Securities, Commodity Contracts, and Other Financial Investments and Related Activities
524	Insurance Carriers and Related Activities
525	Funds, Trusts, and Other Financial Vehicles
53*	**Real Estate and Rental and Leasing***
531	Real Estate
532	Rental and Leasing Services
533	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)
54	**Professional, Scientific, and Technical Services**
541	Professional, Scientific, and Technical Services
55	**Management of Companies and Enterprises**
551	Management of Companies and Enterprises
56	**Administrative and Support and Waste Management and Remediation Services**
561	Administrative and Support Services
562	Waste Management and Remediation Services
61*	**Educational Services***
611	Educational Services
62	**Healthcare and Social Assistance**
621	Ambulatory Healthcare Services
622	Hospitals
623	Nursing and Residential Care Facilities
624	Social Assistance
71*	**Arts, Entertainment, and Recreation***
711	Performing Arts, Spectator Sports, and Related Industries
712	Museums, Historical Sites, and Similar Institutions
713	Amusement, Gambling, and Recreation Industries
72	**Accommodation and Food Services**
721	Accommodation
722	Food Services and Drinking Places
81	**Other Services (except Public Administration)**
811	Repair and Maintenance
812	Personal and Laundry Services
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations
814	Private Households
92	**Public Administration (Public Employment, not included in above data)**
921	Executive, Legislative, and Other General Government Support
922	Justice, Public Order, and Safety Activities
923	Administration of Human Resource Programs
924	Administration of Environmental Quality Programs
925	Administration of Housing Programs, Urban Planning, and Community Development
926	Administration of Economic Programs
927	Space Research and Technology
928	National Security and International Affairs

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STEM as a Workforce Advantage

Texas' diversity spans its regional economies, geography, natural resources, cultural influences, advanced industries, and the array of talent and skills needed to attract and develop those industries. By harnessing and building on these assets, Texas consistently leads the nation in job creation. In fact, from 2000 to 2013, Texas experienced more job growth at all pay levels than any state in the nation. The highest rate of this job growth occurred in the upper half of the pay scale.[1]

Economic indicators such as job growth, employment rates, patenting, wages, and exports are all higher in economies that are more science, technology, engineering, and mathematics (STEM) oriented.[2] While these indicators may point to some of the reasons behind Texas' economic success, studies that look at STEM graduation, employment, and wage rates to determine the occupational demand and identify any gaps in the workforce supply present varying conclusions. Some recent studies highlight a broader STEM economy that presents an opportunity for sustained growth in Texas.

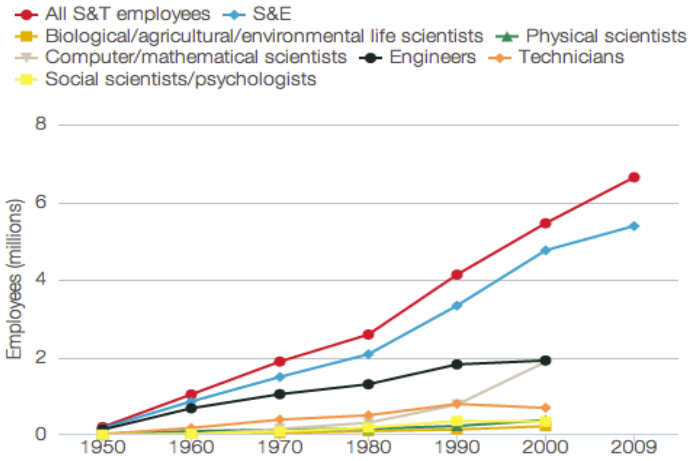
This brief will consider several factors that support state and national emphasis on the development of STEM competencies and highlight state resources that may support developing STEM economies.

Information and Scope

For over half a century, the science and engineering workforce has shown consistent growth reflective of a period of technological innovation and economic productivity that required expertise and knowledge in STEM fields.[3] The overall science and technology workforce in the U.S. has grown from about 182,000 in 1950 to in excess of 7.4 million workers in 2012 and is expected to be over 8.6 million by 2018.

The projected number of scientists and engineers needed to meet growth and net replacement demand between 2012 and 2022 is 2.3 million, including 1.2 million in the computer occupations and 544,300 engineers.

Figure 1: Science and technology employment by occupation, 1950–2009[3]



Notes: Science and engineering (S&E) S&E plus technicians (S&T). Physical scientists include: chemists, physicists, astronomers, and earth/ocean/atmospheric scientists. Data include bachelor's degrees or higher in science occupations, some college and above in engineering occupations, and any education level for technicians and computer programmers. No estimates were calculated below the level of S&E and S&T from 2009 American Community Survey.[3]

Definitions

While the need for STEM education has been emphasized for many years, primary studies limited the focus to professional STEM occupations, or those linked to graduate school education, research universities, and the corporate sector. There remains no authoritative definition of which occupations compose the workforce, and the size of the workforce varies depending upon which occupations are included in the definition. However, when the Georgetown University Center report, *STEM*, considered the many blue-collar, technical, and nonprofessional jobs that require high-level STEM knowledge, two STEM economies emerged: traditional STEM occupations and those which require some postsecondary

[1] *Southwest Economy: Texas Leads Nation in Creation of Jobs at All Pay Levels*, Federal Reserve Bank of Dallas, First Quarter 2014.
[2] *The Hidden STEM Economy*, Brookings Institute, June 2013.
[3] National Science Foundation, adapted from Lowell, B.L. and Regets, M.C. *A Half-Century Snapshot of the STEM Workforce, 1950 to 2000*, Commission on Professionals in Science and Technology (2006); with additional estimates from the Census Bureau, American Community Survey (2009).

education but not necessarily a four-year or higher degree, i.e., sub-bachelor or middle-skill STEM jobs.[4] Workers in this broader STEM economy provide critical support services, such as: feasibility reports, design advice, cost estimates, medical technology, and other technical support occupations.

This broader classification of STEM occupations helps explain skill shortages in some regions. Several studies shed light on the demand for STEM occupations that require some postsecondary education or training but do not require a four-year degree, as demonstrated in table 1 below.

Table 1: STEM Jobs by Educational Requirements and Professional Classification, by Various Sources and Definitions, 2011[5]

	Brookings' STEM, Any One Field	Brookings' STEM, Combined Fields	Georgetown	NSF	Commerce	U.S. Total
Share (%) of total by most significant educational requirement						
Less than a high school diploma	2	0	0	0	0	11
High school diploma or equivalent	13	11	5	4	4	50
Postsecondary certificate	17	18	1	1	1	9
Associate's degree	19	10	15	13	14	6
Bachelor's degree	37	43	71	65	74	20
Master's degree	6	4	6	8	4	3
Doctoral or professional degree	7	14	3	8	3	2
Other Characteristics						
Nonprofessional occupations	31	29	0	0	0	42
Share of all U.S. jobs	20	9	4	5	5	100

Concentrations of STEM jobs vary significantly from one region to another. Rankings associated with STEM concentration are based primarily upon the number of highest skilled, STEM-intensive jobs, such as those in engineering, computing, and science. High concentrations of these jobs are found only in certain regions, whereas, middle-skill STEM jobs pay relatively high wages ($53,000 on average), account for as many as 30 percent of STEM occupations, and are prevalent in most regions.

Ranking within the top 20 regions with the highest STEM-intensive shares of total employment can be attributed to strong specializations in high-skilled manufacturing. Texas' regional economies do not currently rank among the most high-science, high-tech, STEM-intensive economies; however, Houston's energy sector puts it among the list of STEM-based economies and Texas scores highly among the states.[5]

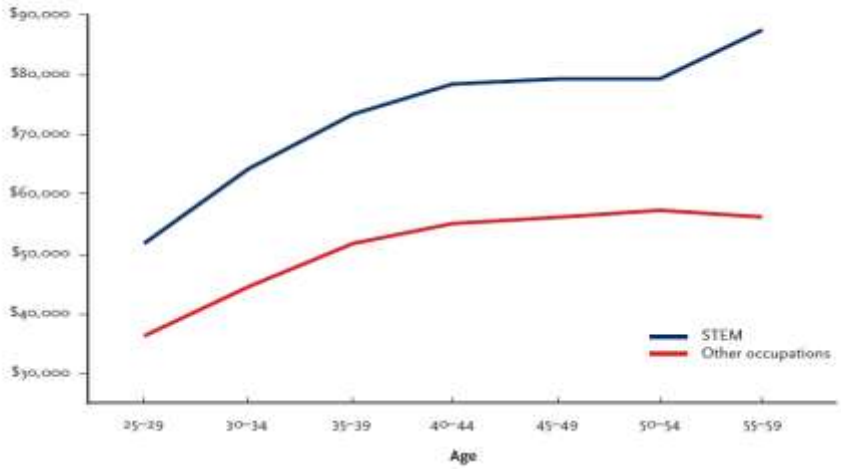
Earnings

Educational attainment and occupational choice are key factors in determining earnings. Earnings advantages apply to STEM jobs across multiple educational and professional levels—in fact, middle-skill workers in STEM occupations earn an average of 22 percent higher wages than middle-skill workers in occupations with similar educational requirements.[6] For STEM workers with some college, no degree, or an associate's degree, the average wage premium is nearly 26 percent to 34 percent respectively.[7] For jobs at the middle-skill level, the average advertised entry-level salary is nearly $48,000 for STEM jobs and $38,000 for non-STEM jobs—a 28 percent premium.[8]

[4] *STEM*, Georgetown University Center on Education and the Workforce, October, 2011.
[5] *The Hidden STEM Economy*, Brookings Institute, June, 2013.
[6] *The Hidden STEM Economy*, Brookings Institute, June, 2013.
[7] *STEM*, Georgetown University Center on Education and the Workforce, October, 2011.
[8] *Real-Time Insight into the Market for Entry-Level STEM Jobs*, Burning Glass Technologies, February 2014.

In STEM fields, wage premiums are also found to increase with age and experience. These findings indicate that high value is placed on experience in STEM occupations. Traditional experiential learning strategies in STEM education, such as project-based learning and competitive events, similarly point to the value of experience in these occupations.

Figure 2: The STEM wage premium increases with age (2009)



Readiness, Interest, and the STEM Talent Supply

Multiple reports emphasize the advantages for workers in STEM fields, including: higher wages and lifetime earnings, greater employment opportunities, and lower unemployment rates. However, many students who demonstrate capability in mathematics choose to pursue non-STEM disciplines.

Studies show that high school students taking advanced math and science courses are more college ready:

- The more credits a student took in high school, the more likely he/she was to enroll in a two-year or four-year college.
- Students were less likely to take remedial math courses once enrolled in college.
- Students with no advanced math or science credits were more likely to enroll in a two-year college than a four-year college.
- Nearly 40 percent of students who took no advanced math or science credits needed remedial math.[9]

The public, private, and non-profit sectors have funded efforts to engage and inspire student interest in STEM fields for many years. However, the recently released *STEM Index* shows student interest and attainment of STEM postsecondary degrees, as a proportion of degrees granted, close to the same levels as measured in 2000.[10]

Fast Facts: STEM Supply in Texas

Not all STEM jobs or degrees are equal; some two-year STEM degrees perform better.

More than **60 percent of jobs** in Texas will be middle skill and will require some postsecondary educational attainment.

Fewer than **three out of 10 students** who start full-time at community colleges finish in three years.

In Texas, **51 percent** of freshmen enrolled in two-year colleges require **remediation**.

In Texas, **two out of 100 students graduate** with an associate's degree in two years.

Undergraduate STEM attrition by major is substantial.

Only about half of STEM college graduates choose to work in STEM careers.

Significant numbers of students, graduates, and workers with demonstrated capability in STEM disciplines leave STEM at various points on the educational and career pathway. Transitions from STEM employment vary depending on the occupation and level of educational attainment. Regardless, STEM graduates and workers typically experience positive employment outcomes and higher earnings.

[9] *STEM Education Data and Trends*, National Science Foundation, National Science Board. Retrieved from https://www.nsf.gov/nsb/sei/edTool.
[10] *STEM Index*, U.S. News and World Report, 2014.

Current Activity

The emphasis of public and private funding for STEM skill attainment has expanded from secondary education and the highest skill STEM occupations into postsecondary education and multiple levels of educational attainment for broader STEM occupations. Activities and funding show promising coordination across systems and organizations.

Texas spends roughly $39 million annually, in partnership with charitable dollars, to increase STEM skills attainment.[11] The state's most targeted and collaborative effort, Educate Texas, is a public-private initiative of the Communities Foundation of Texas and the Texas Education Agency. Since 2005, the state has established 70 Texas STEM (T-STEM) academies and seven blended early college high school/T-STEM academies serving some 40,000 students in grades 6 and up.

Educate Texas is currently developing a statewide STEM strategy and a STEM independent school district. Elements of the STEM strategic plan include:

- Aligning economic and talent development in an ongoing strategic approach tied to specific growth targets, mobilizing STEM champions to support and sustain the effort, and identifying innovations in policy and practice that will benefit the state;
- Expanding current quality STEM teaching and learning, and the assets that support it; and
- Identifying and launching STEM-ready communities within Texas to inspire and drive student demand, support STEM integration in classrooms across regions, and advocate for high expectations at the local level.[12]

Administered by the Texas Higher Education Coordinating Board, the T-STEM Challenge Scholarship Program grants allow community and technical colleges, in partnership with local employers, to provide merit-based scholarships with complementary part-time employment opportunities to qualified, high-achieving full-time students pursuing careers in STEM and related fields.

Concluding Comments

Middle-skill STEM occupations pay high wages, tend to be prevalent in all regions, and are growing in Texas. However, due to the emphasis placed on the highest skill STEM occupations, studies on STEM offer little insight into the types of middle-skill STEM occupations that are in demand, the educational programs that supply workers, the levels of student interest, and the attainment of the appropriate credentials required to effectively compete for employment.

STEM workers at all levels of educational attainment experience stronger employment outcomes and higher lifetime earnings. While workers tend to command higher pay if they have knowledge in more than one STEM field, education and training programs tend to focus on one specific domain of knowledge.

Texas has developed an infrastructure from which to engage public and private sector stakeholders to enhance, reinforce, and build a strong supply of STEM-capable workers across the state. The state has also honed its ability to source, compete, and grow targeted industry clusters. Research to better understand the broadly defined STEM occupations and economies in Texas would inform regional strategies that align education, workforce, and economic development to develop STEM economies.

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[11] *The Hidden STEM Economy*, Brookings Institute, June, 2013.
[12] T-STEM, Educate Texas, retrieved from www.EdTX.org.

Education and Training Structural Alignment – Implementing Programs of Study

Today's rigorous and relevant career and technical education (CTE) prepares youth and adults for a wide range of high-wage, high-skill, high-demand careers by preparing them to be college- and career-ready. Career readiness involves three major skill areas: core academic skills, employability skills, and technical, job-specific skills.[1]

The Texas Education Agency (TEA) and the Texas Higher Education Coordinating Board (THECB), are working on multiple initiatives related to CTE and programs of study (POS). These efforts are critical to ensure linkages between secondary and postsecondary career pathways and dual credit, and to develop technical core curricula that prepare graduates for middle-skill careers and, where possible, lead to industry-based credentials that meet the needs of Texas employers.

The national trend is to implement POS as an effective method of CTE delivery, providing students with real-world applications and practical experience. When aligned across secondary and postsecondary education, POS provide understandable, viable education and career training pathways for students. POS also facilitate transfer options and may result in higher completion/graduation rates, and an increasing number of individuals with licenses or credentials needed in today's job market.

CTE Fast Facts

Experts project **47 million job openings** in the decade ending 2018 … nearly all will require **real-world skills** that can be mastered through CTE.

70 percent of students concentrating in CTE areas **stayed in postsecondary education or transferred** to a four-year degree program, compared to an average state target of 58 percent.

Average high school **graduation rate** for students concentrating in **CTE programs is 90.18 percent** … average freshman graduation rate of 74.9 percent.

– *National Association of State Directors of Career Technical Education Consortium (www.careertech.org)*

★ ★ ★

Eight of the 10 fastest growing occupations through 2040 will require some form of **postsecondary** training, but not necessarily a bachelor's degree.

CTE programs **lead to postsecondary training** including bachelor's and associate's degrees, and on-the-job training.

– *Career and Technology Association of Texas (www.ctat.org)*

★ ★ ★

Students who take **two or more CTE courses** have lower dropout rates, higher graduation rates, better attendance rates, and higher scores on standardized TAKS exams than students who take one or no CTE courses.

Over 36,000 industry-recognized certificates and licensures were earned by high school students in 2011–2012, providing a measure of technical skill attainment and credential leading to advanced levels of employment.

– *Texas Education Agency*

Information and Scope

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Perkins, Public Law 109-270) increased focus on CTE students' academic achievement and strengthened secondary and postsecondary education connections. Perkins is the primary source of federal funding to states for secondary and postsecondary CTE programs. CTE is:

- organized educational activities that offer a sequence of courses to provide the academic and technical knowledge and skills needed to prepare for further education and for careers in current or emerging employment sectors;
- competency-based applied learning that contributes to students' academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, employability skills, technical skills, and occupation-specific skills; and
- offered in middle schools, high schools, community and technical colleges (CTC), and other postsecondary institutions.

Career Clusters and POS. There are 16 Career Clusters[2], or occupational categories, with industry-validated knowledge and skills statements. Within the 16 clusters, POS have been developed that outline

[1] Association for Career and Technical Education.
[2] www.careertech.org/career-clusters/glance/clusters-occupations.html.

sequences of academic, career, and technical courses and training. Essentially, a POS is a comprehensive, structured approach for delivering academics and CTE designed to prepare students for postsecondary education and career success.[3] This approach helps education systems reduce access barriers and improves student success, and also helps students navigate the range of career options.

Under Perkins, local education agencies (LEA) and postsecondary institutions must offer at least one POS that:

- incorporates secondary education and postsecondary education elements;
- includes coherent and rigorous content aligned with challenging academic standards, in a non-duplicative progression of courses that align secondary to postsecondary education;
- may include the opportunity for dual credit or concurrent enrollment programs; and
- leads to an industry-recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree.[4]

The POS design framework (figure 1) identifies 10 components that support the development and implementation of effective POS. All 10 components are important, but not independent or of equal priority for a given POS. State and local program developers must identify the most pressing components for state or local adoption.

Beginning as early as the ninth grade, POS lead to progressively higher levels of education and higher-skilled positions in specific industries or occupations.[6] Table 1 provides examples of Career Clusters and POS linked to the targeted industry clusters developed under Texas' previous workforce system strategic plan.

Figure 1: Program of Study Design Framework[5]

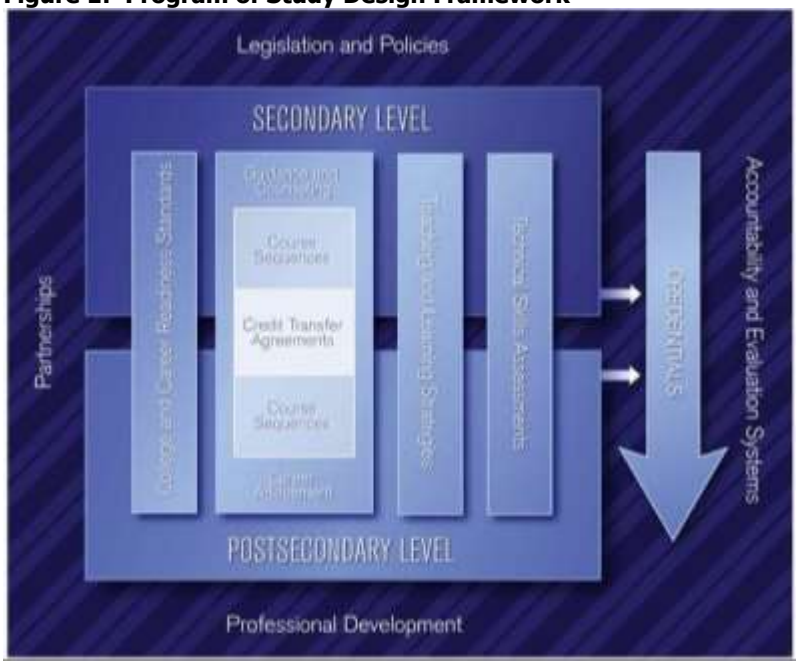


Table 1: Examples of Industry Clusters, Career Clusters, and Programs of Study[7]

Program of Study	Career Cluster	Texas Targeted Industry Cluster
Engineering and Technology	Science, Technology, Engineering, and Mathematics	Advanced Technologies and Manufacturing
Security and Protective Services	Law, Public Safety, Corrections, and Security	Aerospace and Defense
Biotechnology Research and Development	Health Science	Biotechnology and Life Sciences
Network Systems	Information Technology	Information and Computer Technology
Facility and Mobile Equipment Maintenance	Transportation, Distribution, and Logistics	Petroleum Refining and Chemical Products
Power, Structural, and Technical Systems	Agriculture, Food, and Natural Resources	Energy

[3] http://www.careertech.org/career-clusters/glance/programs-study.html.
[4] http://cte.ed.gov/nationalinitiatives/localstudyimplementation.cfm.
[5] US ED, OCATE (formerly Office of Vocational and Adult Education), http://cte.ed.gov/nationalinitiatives/rposdesignframework.cfm.
[6] US ED, OCATE.
[7] *AchieveTexas Implementation Guide* (2007 Update).

Funding. In Texas, the State Board of Education (SBOE) and TEA are the eligible recipients of Perkins funds. TEA provides leadership for secondary CTE programs, while the THECB provides leadership for postsecondary programs. For fiscal year (FY) 2014–2015, Texas received $92,014,058 in federal Perkins Basic State Grants (Title I) funds.

- Each state determines the split of federal funds to be distributed to recipients at the secondary and postsecondary levels. In Texas, the funding split is 70 percent for secondary programs, with 30 percent allocated to THECB for postsecondary CTE.
- Perkins funds support state leadership activities, administration of the state CTE plan, and subgrants to eligible recipients to improve CTE programs.
- All LEAs that participate in the Perkins grant must offer at least one POS as part of the federal grant requirements; however, LEAs that do not participate in Perkins may still offer POS.
- THECB allocates Perkins Basic Grants to 50 community colleges, three Lamar State Colleges, and four Texas State Technical Colleges.

Performance. Under federal reporting requirements, states annually submit data for 13 core indicators (seven secondary, six postsecondary) measuring performance in academic and technical skill attainment, as well as completion, graduation, and placement rates. At the state level, data elements related to Secondary CTE and CTC Technical (postsecondary) programs are reported by TEA and THECB, respectively, each year. Table 2 includes performance data reported to the Council for FY 2013.

- With no legislated mandate for data collection, TEA does not collect POS data for the number of schools participating, number of students participating, or participant outcomes.
- Dual credit enrollment at all Texas higher education institutions has risen significantly since record keeping began in 1999, reaching a high of 107,598 in 2013 (fall enrollment). Students enrolled in technical semester credit-hour courses at Texas CTCs constituted 13.9 percent (spring 2013) and 12.3 percent (fall 2013) of total dual credit students.[8]

Table 2: FY 2013 Performance

Measure	Secondary CTE	CTC Technical
Educational Achievement	96.42%	23.43%
Entered Employment	70.73%	84.12%
Employment Retention		91.59%
Customers Served	1,111,610	189,533
CTE Concentrator Graduates	79.89%	
CTE Indicator Code 3 (formerly Tech Prep)	105,717	

Current Activity

In Texas, CTE and POS implementation is guided by federal and state law. The AchieveTexas College and Career Initiative (AchieveTexas, sponsored and funded by TEA) and *Closing the Gaps* (state plan for higher education) place emphasis on strengthening connections between secondary and postsecondary education. Under *Advancing Texas*, the current workforce system strategic plan, TEA and THECB have focused on more effective integration at the secondary and postsecondary levels, and coordinated planning to facilitate transitions to further education or into the workforce. Key actions taken in recent years are noted below.

Secondary. In 2005, Texas began the process of reorganizing its CTE system from traditional CTE program areas to the national model of 16 Career Clusters. All 16 clusters are fully implemented, with:

- 79 associated career pathways,
- 122 POS that reflect current occupations, and
- over 190 new secondary CTE courses developed and adopted by the SBOE.

[8] THECB (4/22/14). THECB defines dual credit as a process by which a high school junior or senior enrolls in a course and receives simultaneous credit from both the college and the high school.

Additionally, TEA works with public high schools to meet the Texas Education Code §28.009 mandate to offer all students at least 12 hours of college credit in academic and/or technical courses.

Postsecondary. POS have not been fully implemented at the postsecondary level; however, THECB has funded several Perkins State Leadership Grant projects that address the alignment of CTE programs and development of POS, with examples provided below.

- The Dallas County Community College District worked with TEA and Texas Tech University to align AchieveTexas' POS with the College and Career Readiness Standards and to develop vertical alignment crosswalks.
- The Tarrant County College District developed an energy career pathway model.
- For 2012–2013, San Jacinto College was awarded a grant to build on the foundational work of previous projects, and to develop a plan for Texas POS.
- San Jacinto College, and previously Midland College, received grants to support the Workforce Education Course Manual (WECM)[9] project. San Jacinto's current deliverables include the provision of course review workshops organized according to Texas career clusters and POS.
- Another San Jacinto project focuses on POS strategic alignment by: developing new POS curriculum pathways; maintaining and sustaining alignment with AchieveTexas; and integrating POS into CTE programs and academics as well. A statewide POS development process has been designed and will be beta-tested in 2014 within the business management and administration career cluster, initially for real estate POS. A statewide committee will then refine the process, with the intent of aligning POS with the WECM course review process and implementing them in Texas CTCs.

Concluding Comments

Texas must continue to develop and integrate CTE and POS opportunities within and across educational levels. CTE, and secondary education programs in general, are being modified to address requirements of several bills enacted by the Texas Legislature in 2013, while POS development at the postsecondary level is at an earlier stage.

As the education landscape changes, opportunities exist to enhance career awareness and options at both the secondary and postsecondary levels. Timely program review cycles—incorporating input from business and industry, as well as applicable licensing and/or certification entities—are essential to ensuring POS meet current market demands and provide a skilled workforce to meet the evolving needs of Texas employers. Although program content may change, the basic structure of career clusters and POS and the associated benefits to students and employers, will still apply.

While strides have been made to improve alignment across secondary and postsecondary education, much of the work to date has been within, rather than across, the two systems. Currently, data are not available to differentiate academic and technical college credit awarded to secondary school students; however, anecdotal information indicates it is primarily academic. Data are needed to both understand dual credit offerings and outcomes, and to assess the effectiveness of POS as a bridge from secondary to postsecondary education.

[9] WECM serves as the guide for postsecondary technical curriculum development. It is composed of courses that include academic and technical competencies and is an active database of all workforce education courses approved for use by Texas CTCs.

The Maturing of Texas' Workforce

Texas has one of the youngest populations of any state; however, it is not immune to the current trend toward an aging population that is being felt across the rest of the United States. The effects of this trend will be delayed in Texas, but they are not likely to be permanently avoided. In a state with a growing economy and low unemployment, capitalizing on this older workforce as it expands will become crucial. Avoiding "brain drain", maximizing training and productivity, and adapting to the unique needs of older workers could give Texas a significant edge in workforce development. This paper examines the influence of an aging population on the United States and Texas, as well as the consequences that can be expected for these workers, and the Texas economy, going forward. Unless otherwise noted, all data are from the 2010 American Community Survey by the U.S. Census Bureau.

Information and Scope: Aging Texas

Texas is a relatively young state; however, the direction of its demographics demonstrates that the growing population of mature workers will increasingly make up a greater percentage of the workforce in coming years.

Figure 1 – Projected Shifts in Texas' Population Pyramid, 2010–2040

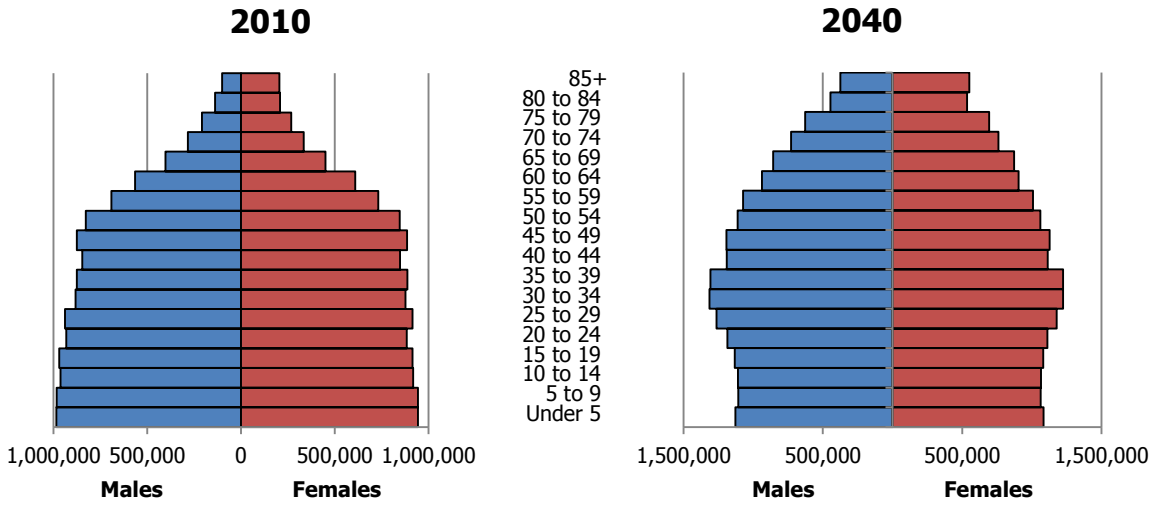
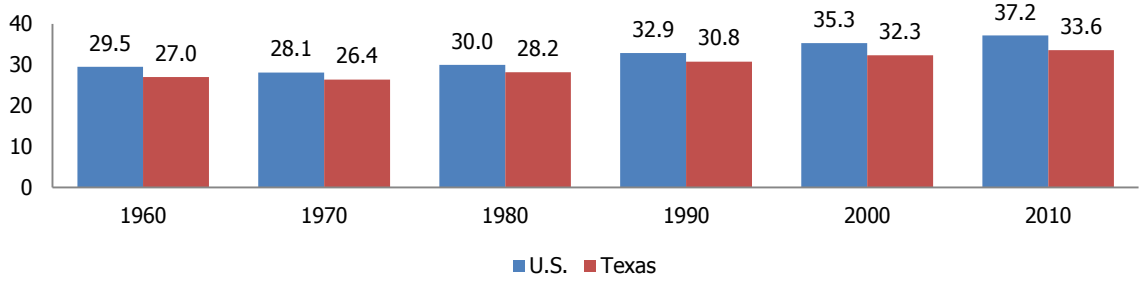


Figure 1 presents a visualization of the projected changes in Texas' population in the coming years. The wide base of the 2010 pyramid represents a large youth population relative to the population as a whole. However, by 2040 that existing youth population will be moving into middle age. Additionally, an increasing portion of the population will be aged 55 years and older. A significant factor in this increase in the population at the highest end of the age ranges comes as a result of a more than doubling of the population in every age range above 70, across both genders. Meanwhile, the smaller base of the pyramid, relative to the middle, indicates a continuing shift in the population from working to retirement age.

Figure 2, below, clarifies how Texas' population is both youthful and aging. Not only is Texas more youthful than the rest of the United States, the discrepancy between Texas and the United States as a whole has been growing over time. However, as is also clear in figure 2, this increase is due to the rapidly climbing average age in the United States, while in Texas—with the exception of a slight decrease from 1960 to 1970—the average age has merely been climbing less rapidly. So, while Texas' youth is currently a distinguishing feature of its population, it is still on the same aging path as the rest of America.

Figure 2 – Trends in Mean Ages, United States and Texas, 1960-2010



Information and Scope: Characteristics of an Older Population

An aging population is generally associated with certain characteristics. By examining some of the characteristics of the population over the age of 55 in Texas now, it is possible to get an idea of what the expectations should be for an aging population in the future.

Figure 3 – Educational Attainment of Texas' Over-55 Population Relative to General Population

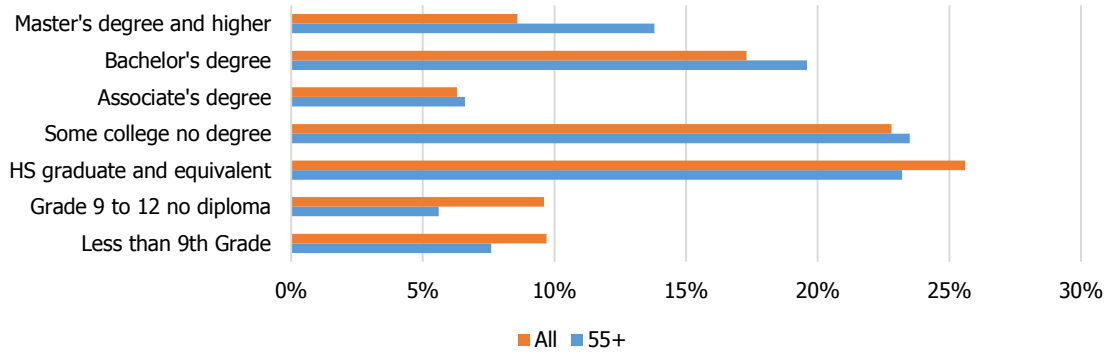


Figure 3 illustrates that an older population tends to have higher levels of educational achievement.

Figure 4 – Workers, 55+, with Disabilities in Texas, by Type of Disability[1]

Reported Disability	Mature Workers		Mature Population not in Labor Force	
	Number	Percent	Number	Percent
Ambulatory difficulty	138,853	6.5%	990906	32.0%
Hearing difficulty	116,290	5.4%	493011	15.9%
Vision difficulty	51,253	2.4%	296080	9.5%
Cognitive difficulty	43,196	2.0%	435242	14.0%
Independent living difficulty	35,009	1.6%	677129	21.8%
Self-care difficulty	26,340	1.2%	423773	13.7%

Another characteristic of an aging population is an increased prevalence of citizens with disabilities. Figure 4 shows some of the most common types of disabilities, and the frequency with which they occur among mature workers. Overall, about 11 percent of Texas workers have some sort of disability, while for mature workers, the number is well above 30 percent. These numbers not only result in lower participation in the workforce for mature workers, but also a higher participation of workforce participants with some sort of disability.

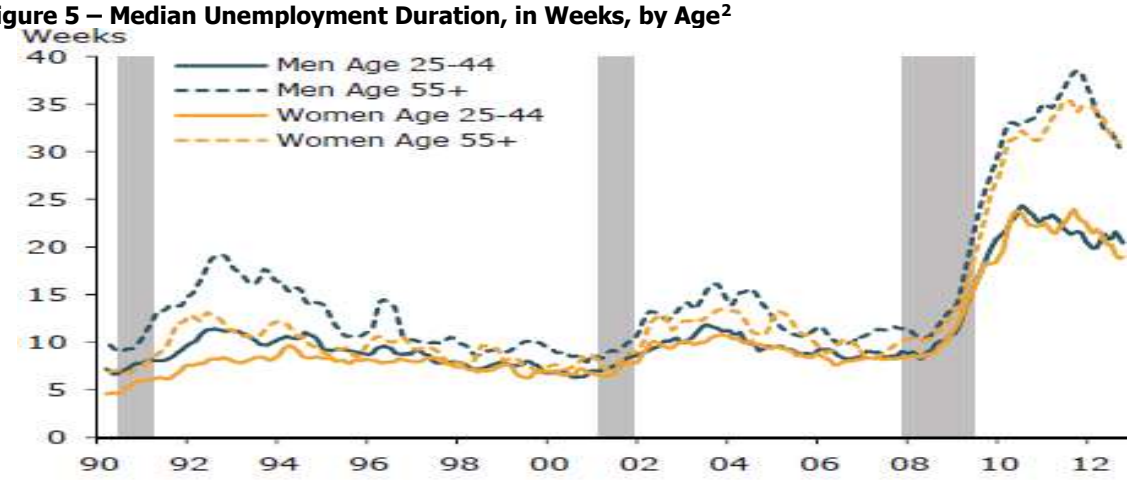
[1] Neumark, D. and Button, P. (2014). Age Discrimination and the Great Recession. *FRBSF Economic Letter*. 2014-10.

Impact of an Older Population

An increasing reliance on older workers can create new challenges for an economy transitioning to an older workforce.

- **Unemployment Duration:** Nationally, older employees were more likely than average, but less likely than younger employees, to experience unemployment during the most recent recession. There is not a scholarly consensus as to whether the recession was especially influential on employment rates for older worker. There is no question, though, that older workers who lost their jobs have had a far more difficult time finding new employment than have younger workers. This impact has only become more severe in recent years, as demonstrated by figure 5 below, where the average duration of unemployment increases significantly for mature workers after the most recent recession.

Figure 5 – Median Unemployment Duration, in Weeks, by Age[2]



- **Retention and "Brain Drain":** Older workers are, naturally, more likely to leave the workforce at any given time. The exit of older workers, if not carefully managed, can result in a "brain drain" of important organizational knowledge that can be damaging to a workplace or an economy.[3] Additionally, the costs of eventually replacing these workers can be significant short-term investments for companies.
- **Training:** Private employers are less likely to be willing to invest in training older workers, sometimes even going so far as to exclude older workers from existing training programs.[4] As older workers become an increasingly important component of the workforce, and as workers stay in the labor force longer, this lack of access to training threatens to create a serious gap in workforce preparedness.
- **Disability:** As indicated in figure 4 and through a number of studies, the incidence of disability rises as the workforce ages.[5] Additionally, in cases in which employers believe that a disability is the result of "natural aging," they are less likely to introduce accommodations for that employee.[6] This phenomenon has costs for society beyond the workplace implications, as research has found

[2] Neumark, D. and Button, P. (2014). Age Discrimination and the Great Recession. *FRBSF Economic Letter*. 2014-10.
[3] Pitt-Castouphes, M., Matz-Kosta, C., and Besen, E. (2009). Workplace Flexibility: Findings from the Age and Generations Study. Boston: Sloan Center on Aging and Work, Boston College.
[4] Armstrong-Stassen, M. and Templer, A. (2005). Adapting Training for Older Employees: The Canadian Response to an Aging Workforce. *The Journal of Management Development.* 24(1/2), 57.
[5] Bruyere, S. (2006). Disability Management: Key Concepts and Techniques for an Aging Workforce. *International Journal of Disability Management Research*, 1, 149-158.
[6] McMullin, J. and Degges-White, S. (2007). Aging, Disability, and Workplace Accommodations. *Aging and Society*. 26. 831-847.

that well-accommodated workers are significantly less likely to apply for government benefits within the three years following the onset of their disability.[7]

Current Activity

Programs designed to address workforce concerns associated with older workers include:

- The Trade Adjustment Assistance program is a federally funded program that provides training and job placement assistance to workers who lose their jobs due to foreign imports or outsourcing. Within that program, alternative/reemployment trade adjustment assistance focuses specifically on older workers.
- The United States Department of Labor Older Worker Initiative promotes efforts in hiring and retaining older workers. The Texas Workforce Commission (TWC) helps to publicize these programs to workers and employers.
- The Senior Community Service Employment Program, administered by the TWC, provides training and employment counseling to help low-income Texans over the age of 55 find employment and become financially self-sufficient.
- Secondary education options throughout Texas provide specialized assistance to mature and continuing learners. These programs are designed both to help older students transition into secondary education programs, and to help them succeed once enrolled. Meanwhile, Texas community colleges are working to increase the availability of recreational and avocational continuing education programs targeted to this group, and to ensure that workforce training is accessible and valuable to older workers.[8]
- Programs such as the "Plus 50 Encore Completion Program" are being designed and implemented by community colleges to help older adults train for new careers in high-demand fields such as healthcare, education, and social services.
- The Department of Aging and Disability Services delivers a variety of services and support to aging and disabled citizens throughout Texas. Additionally, the Department of Assistive and Rehabilitative Services provides services and accommodations for disabled citizens in Texas. Both agencies work to foster independence in their clientele, and can provide assistance to employers in better accommodating workers with special needs.

Concluding Comments

The aging workforce is certainly a less pressing concern for Texas than for most states. However, it is not one that the state can afford to discount completely. As the United States ages, states that are able to maximize the productivity of their mature workers stand to reap a tremendous benefit. States that fail to address some of the existing inefficiencies in training, retaining, and accommodating an older workforce, meanwhile, are more likely to suffer economic consequences. A future Texas workforce is certain to be an older Texas workforce. The consequences that fact has for workers individually, and for the economy more broadly, should be considered in planning for the economic future of Texas.

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