PREPARED FOR

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Future of Texas Workforce

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POINTS CONSULTING

CONTENTS

1. Summary

With a GDP of $2.0 trillion in 2021, Texas's economy is larger than that of most nations. Coupled with higher-than-average employment and population growth, the Texas economy is poised to become even larger through the next decade but will also be subject to the influence of the worldwide social, demographic, and economic trends. The Future of Texas Workforce study includes an evaluation of the current economic conditions and forecasts to inform the Texas Workforce Commission (TWC) of prominent trends which will influence the Texas economy through the year 2035.[1] The study consists of a thorough literature review, analysis of key data sets, a focus group report, and discussion throughout of what the results mean for Texas through 2035.

Literature Review

The literature review aims to identify and analyze the current and future impacts of emerging trends in the Texas economy. These include the rise of the "gig economy," the continuing impacts of the COVID-19 pandemic, the increase in remote work, and other factors listed below:

- Automation
- Multilingualism
- Immigration trends
- Industry regulation (particularly related to oil and gas extraction)
- Inflation
- International trade
- Workforce participation rates
- Workforce retirement rates

The gig economy is characterized by short-term flexible jobs which do not include a lasting contractual commitment be-tween the employee and employer. In the United States, **an estimated 30% of those 18- to 29-years old have worked through a gig platform**, although these rates are much lower in older populations. Gig work can provide benefits to both workers and businesses as it allows companies to reduce their payrolls and provides workers more independence and flexibility to accommodate different lifestyles. However, critics note gig work can deprive workers of important benefits such as healthcare and may not pay well enough to be an individual's primary income source. **The gig economy is expected to grow 17% per year globally through 2023**, although legal challenges may slow this growth.

COVID-19 has had a powerful global economic impact, and many economic changes from this pandemic will likely affect the Texas economy for years to

[1] Chmura Economics & Analytics and Points Consulting were retained to produce this report.

come. Texas employment has generally recovered from pandemic-induced unemployment, but some industries such as accommodation and food services; mining, quarrying, and oil and gas extraction; and construction have not yet fully recovered as of the first quarter of 2022. The pandemic accelerated several economic trends such as remote work, early retirement, and automation which will continue to impact Texas's economic landscape.

Remote work became prevalent during COVID-19 lockdowns, and many believe it will continue to grow as technical capabilities evolve. In April 2022, the BLS household survey found that only 7.7% of employed persons tele-worked from home in the past four weeks due to the pandemic—down from 26.4% in July 2020. However, a study by McKinsey suggests that **20% to 25% of U.S. employees could work remotely 3 to 5 days a week** even after the pandemic wanes significantly. Companies that do not provide remote work options may face labor shortages as more workers desire a more flexible work-life balance.

Automation continued during COVID-19 and is expected to remain a predominant economic trend. **Scenarios for employment at risk for replacement by automation over the long term (roughly for the period of 2030-2035) range from 9% to 47% of total employment in the nation.** This could hurt workers with skills that are less transferable to other similar, but more in-demand, occupations in other industries. On the other hand, these exciting innovations could help companies that are quick to successfully adapt to new technology.

Inflation has developed into a primary economic concern recently as the U.S. economy has been experiencing the highest inflation growth in decades. Inflation, as measured by the Consumer Price Index, reached a high of 9.0% in June 2022 on a year-over-year basis—the highest rate since November 1981 and above the Federal Reserve Bank's target rate of 2%. While inflation is putting stress on the economy, the Federal Reserve is pursuing policies, including raising the federal funds rate, to bring inflation bad down to around 2%.

As a border state, immigrants and international trade play a large role in the Texas economy. In 2019, immigrants contributed a total of $40.6 billion in taxes to the state and national economy and held $120.3 billion in spending power. **The Texas immigrant population is expected to reach 7 million, or 18.6% of the total population, in 2035**. Immigrants can help fill gaps in the labor market as baby boomers retire. Additionally, higher immigration has been shown to lead to in-creased birth rates, which will also help contribute to labor force growth. Immigration also boosts multilingualism, which is a skill more businesses have started to demand. In 2020, more than a third of the Texas population spoke a second language, and this is expected to increase.

Regarding international trade, Texas exports, led by the energy sector, rose to more than $375 billion in 2021, cementing Texas as the leading state in exports for the 17th consecutive year. Energy exports may continue to increase in the short run due to heightened European demand for natural gas due to the suspension of Russian supplies and elevated energy prices. Exports are expected to increase in the long run as experts remain optimistic about the continued growth of international trade, although regulation (discussed below) may change these dynamics.

Labor force participation and workforce retirement trends have also undergone recent changes. The labor force participation (LFP) rate in Texas was 63.4% in March 2022 (higher than the U.S. average of 62.3%). However, according to the Texas Demographic Center, the LFP rate in Texas is forecasted to decline between now and 2035. This trend, along with early retirement, could hurt economic strength. Regarding retirement, The Federal Reserve Bank of Saint Louis estimates that 2.4 million individuals retired early because of the pandemic. However, 1.5 million have re-entered the workforce as of May 2022. Nonetheless, **by 2030 all those in the "baby boomer" generation will be 66 or older, meaning that a significant proportion of the U.S. population will be past or very near retirement age.** This development could lead to further labor shortages.

Industry regulation, though somewhat dependent on uncertain future politics, will play a strong role in some of Texas's most important industries. Long-term goals to reduce fossil fuel emissions are expected to lead to declining employment in the oil and gas sector while boosting renewable energy industries as these industries will be provided subsidies and other competitive advantages. Some international regulations, such as carbon pricing policies in the EU and other regions, may decrease the demand for Texas energy exports in the future. Additionally, the Biden administration has signaled their support for regulations which help boost unionization, a policy that may have a smaller impact in Texas as the state's union membership percentage is well below the national average.

Data Analysis

An analysis of relevant labor market information (LMI) is provided to give a more complete picture of the economic conditions facing Texas. Generally, the Texas economy is expected grow at a strong pace through 2035 as population and employment growth is expected to outpace the nation. This growth may look different for different demographics, industries, occupations, and regions.

The demographic analysis describes population projections, labor force participation, age, gender, and race & ethnicity. Between 2010 and 2019, Texas was the second fastest growing state in the nation, with the population increasing an annual average 1.6% compared with 0.7% in the nation. This higher-than-average population growth is partly due to Texas's high level of immigration. The average nation-wide pace of population growth is expected to slow to 0.4% annually from 2021 to 2050 while the **population in Texas is expected to continue growing at 1.6% annually from 2018 through 2050**. Additionally, out-of-state migration has bolstered Texas's population levels. More than 500,000 out-of-state residents have moved to Texas every year between 2012 and 2019, with many drawn to Texas because of the lower cost of living compared to other states and the lack of personal income tax.

Texas's age demographics are also expected to shift through 2035. Overall, the proportion of those aged 65 or older is expected to increase while most other age cohorts will decrease in proportion. Specifically, the share of adults 75 years of age or older is projected to increase from what was 4.5% in 2010 to 8.0% in 2035. **The population of adults 65-74 years of age will also increase during this period, from 5.9% to 8.5%.** This demographic shift will drive investment in healthcare and social services and contribute to fewer individuals being within the "prime age" for working. A high level of retirement would cause stress on Texas businesses and may contribute to increased out-of-state hiring levels.

Women have historically numbered slightly higher than men throughout Texas's history. There were 12.7 million women in 2010, compared to 12.5 million men, living in Texas. By 2035, the number of women is expected to increase to 19.0 million, and the male population is forecasted to grow to 18.6 million. This growth is only expected to cause a slight change in the gender ratio, with women projected to make up 50.3% of the population in 2035 compared to 50.4% in 2010. Men have higher labor force participation rates (LFP). **Although declines in LFP are forecasted for both genders, by 2035 men are projected to have higher LFP rates at 68.5% compared to 54.4% for women**. This differs from the national average in which the BLS projects that female LFP will increase by 2035. To better align with national trends, Texas may institute programs to increase LFP for women such as subsidizing childcare or providing greater work-life flexibility for mothers.

The fastest growing racial/ethnic group in Texas is expected to be Hispanic, and the Hispanic population is expected to become the largest racial or ethnic group in Texas by 2023. **By 2035 Hispanic workers are projected to make up the majority of Texas's labor force at 40.8% of all workers** compared to non-Hispanic White at 34.9%. All other racial and ethnic groups are also expected to increase in absolute number but at slower rates. The share of Asian Americans in the labor force will more than double, from 4.0% in 2010 to 8.6% in 2035 while the Black population will also see a modest increase from 11.5% to 13%. Some business owners may be concerned that this demographic shift could lead to increased language barriers; however, a 2015 report by the Pew Research Center found that the share of Hispanics in the United

States who spoke English proficiently increased from 59.0% to 68.0% from 2000 to 2013. As addressed in section 2.10, this increase in multilingualism is expected to continue.

The industry mix and employment growth in Texas reflect a robust economy that is expected to continue growing at a strong pace. Charles Schwab, Oracle, Hewlett Packard Enterprise, and Tesla are just a few companies that have moved their headquarters to Texas in recent years. In fact, 49 Fortune 500 companies are headquartered in Texas. This strong business environment has exhibited itself in very favorable employment growth. **For most of the past two decades, Texas has outpaced the nation in employment growth at an average of 1.4% between 2002 and 2021 compared to 0.5%, respectively. This growth is projected to continue through 2035 at an average of 1.4% per year** reaching 16.6 million total jobs (13.6 million as of 2021Q4). This growth will be disproportionately concentrated between 2021 to 2024 as Texas continues to recover from disruptions caused by the COVID-19 pandemic. During this time period, employment in Texas is projected to grow by 958,359 jobs—an average increase of 2.3% per year. As of 2021, the health care and social assistance sector in Texas employed the largest percentage of workers at 12.9% followed by retail trade (10.4%); educational services (9.0%); and accommodation and food services (8.7%). Based on Gross Domestic Product (GDP), manufacturing (12.8%) and real estate and rental and leasing (10.1%) are the two largest components of the Texas economy.

Texas Economic Development Corporation targets eight industry clusters for attraction into the state. These clusters are mostly included in the following industry classifications: health care and social assistance; professional, scientific, and technical services; manufacturing; information; and mining quarrying and oil and gas extraction. **In Texas, all five of these industry groups are expected to outperform their respective nationwide employment growth rates.** A summary of these industry groups is provided in the table below.

Table 1.1 Key Metrics of Target Industry Groups

Metrics	Health Care & Social Assistance	Professional, Scientific, and Technical Services	Manufacturing	Information	Mining, Quarrying, and Oil and Gas Extraction
2021 Employment	1,766,097	992,961	901,374	224,265	184,366
2021 Average Annual Wages	$56,572	$101,535	$81,333	$105,885	$129,693
2020 GDP Proportion	7.6%	7.6%	12.8%	3.7%	6.9%
Employment Projection 2035	2,341,519	1,321,385	996,984	284,062	235,462
Forecasted Employment Growth Rate (through 2035)	2.0%	2.1%	0.7%	1.7%	1.8%

Source: JobsEQ® by Chmura

At a broad level, all occupation groups are expected to grow through 2035 in Texas. The fastest growing group is healthcare support, which is expected to add jobs at an average annual rate of 2.6% from 2021 through 2035. Computer and mathematical occupations are the second fastest, with average annual growth of 2.4%, followed by personal care and service (2.1%). All occupation groups are expected to grow faster in the short term as recovery from the pandemic impact continues. This is particularly true for industries that suffered the heaviest losses during the pandemic. For example, leisure and hospitality is expected to add the most jobs in the short term. Office and administrative support occupations have the slowest long-term growth forecast, followed by production and sales, as repetitive tasks in these jobs are expected to be increasingly automatable by 2035.

Drilling down into more specific occupation classifications (6-digit SOC codes) reveals more drastic changes in a few occupations. The top two fastest growing occupations through 2035 are expected to be wind turbine service technicians and solar photovoltaic installers, which reflects the continued expansion of renewable energy production. Several healthcare occupations, including nurse practitioners and physical therapist assistants, follow closely behind in predicted growth. Computer and mathematical occupations also appear several times in the list of top growing Texas occupations, likely driven by continued growth in the digital economy. Alternatively, some occupations are expected to see declines in employment through 2035. However, only 60 occupations (less than 8%) are expected to decline over the forecast period. Technology advances that are expected to render certain types of products and services obsolete will drive these declines.

In order to properly prepare future workers for the changing economic landscape in Texas, it is important to consider what skills will be most in-demand. **Between 2018 and 2021, the top ten skills requested in online ads in Texas have been very stable.** Demand for Microsoft Office products, especially Excel and Word, regularly top the list of skills needed to fill open positions. Sales skills and the ability to lift 40+ pounds are also commonly requested in job advertisements. These skills, however, may not be see the same high demand in the future as either the skills themselves, or the jobs in which the skills are used, become more obsolete due to automation. The top ten fastest growing skills between 2018 and 2021 were mostly in specialized software platforms which may grow to replace certain tasks. Demand for Terraform in ads rose 803% from around 7,000 in 2018 to more than 65,000 in 2021.[2] DevOps platforms like GitHub, data storage and integration software like Azure Data Factory and Databricks, and the Kotlin and GraphQL languages are a few of the other skills for which demand has increased rapidly.

A strong urban-rural divide exists when it comes to Texas's economic activity. **Although rural areas account for 174 of the 254 counties in Texas, urban and suburban areas account for 90% of employment in the state.** The population in urban areas of Texas is expected to increase to 91.0% of the total state population by 2035 or 34.4 million individuals. Only 3.0 million individuals (12.0%) lived in rural Texas in 2010. By 2035, there are estimated to be 3.3 million individuals living in rural Texas, or 9.0% of the total population. Labor force participation rates are expected to decline in both rural and urban geographies and in most other demographic (race and gender) subgroups.

Urban and rural Texas also differ by industry mix and employment growth outlook. **Overall, urban areas are projected to add jobs at an annual rate of 1.6% while slower growth is projected in rural areas (0.3% annual growth).** One similarity between the two regions is healthcare and social assistance and retail trade command the largest proportions of employment. Rural areas having more agriculture and oil & gas extraction jobs, and urban areas housing more business support jobs. In both urban and rural areas, the occupation groups projected to grow the fastest are healthcare support (2.7% in urban areas and 1.7% in rural areas). The next fastest growing occupation group is computer and mathematical occupations (+2.3% average annual growth) in urban areas and community and social service occupations (+1.1% average annual growth) in rural areas.

Focus Groups

The team carried out a series of 12 virtual focus groups with the aim of gaining insights into the current and future concerns of the Texas workforce. In total, 123 participants were surveyed on a variety of topics including automation, remote work, changes in technology, and the effects of COVID, among others. Most of the participants were average employed Texans, though one focus group was focused on leaders within the economic development, workforce development and higher education sectors (i.e., public sector leaders). The team also interviewed the three Commissioners with the Texas Workforce Commission in order to discuss the team's findings and obtain their input. The interview facilitators sought organic conversations that touched on each of the key topic areas, but typically allowed the participants to lead those discussions. In

[2] Terraform is an open-source software tool which aids in data center infrastructure with human-readable configuration files.

general, respondents were not too concerned about advancements in automation taking their jobs, had a largely positive outlook on remote work, and felt better about their prospects post-COVID.

When confronted with the possibility that their jobs could eventually be replaced by A.I. and automation, most respondents did not agree, while a few were fully in accord with this possibility. Even those who considered it a strong possibility were split on whether an A.I.-dominated future represents a net social positive or a net negative. Many acknowledged that there were aspects of their work that could be automated, but they **tended to believe that the most critical parts of their work (usually either highly analytical, creative, personal, or a combination of the three) are irreplaceable**. On the other hand, some participants had a more positive outlook on the use of A.I. and automation in the workplace — such as those who worked in the technology sector and pointed out how the automation of repetitive and time-consuming tasks had aided them in their work.

On the topic of the pandemic, many participants noted how the ensuing isolation resulted in a time of personal reflection. In numerous cases, people considered the costs and benefits of their employment situation. At the same time, with labor market shifts and shortages, new opportunities became available, many of which had lower demands and expectations on their time, energy, and location of work. **Workers with the most physically and emotionally demanding positions seemed to be the most likely to shift employment.** That definition spans a wide array of industries from high-skilled professional jobs (technology, sales, etc.) to service jobs (food/beverage and retail). However, participants had a mixed response when asked if they were better off in their work situation post-COVID. Respondents who ran businesses from their home such as daycares, dog-sitting or hair salons were greatly negatively impacted during COVID, and several mentioned that they still are not faring as well as they did previously. At least half of the general public workforce, however, said that they were able to reinvent their careers and learn new skills which have helped them switch fields, and move into careers that more closely align with their interest and work-life balance desires.

The demands on workers have shifted and decreased in many cases, but some still in the typical 9-5 work cycle report that pressures and expectations at the workplace are stronger than ever. When asked why, respondents noted the lack of eligible employees to relieve them of their positions and/or take up additional shifts. It was common for respondents to mention how they had seen many “help wanted” signs posted around businesses in their area. This is despite the fact that Texas has received 174,000 in-migrants on net in the five quarters after the pandemic began, which is higher compared to the 109,000 in-migrants in the previous five quarters.[3] When asked about labor shortages in their place of work, several respondents mentioned that they were short-staffed and presented ideas as to why that is the case. Some suggested that younger generations had no interest in working and lacked a strong work ethic. Others said many workers felt entitled and demanded more flexibility, benefits, and pay than employers were willing or able to provide. On the other hand, a few respondents emphasized that workers were now less inclined to work in the typical in-office fashion after having experienced the increased flexibility of remote work, gig work, and other hybrid forms of employment.

This generational divide in perspectives showed up with respect to labor shortages as well as issues of technological advancement. The issue of work-life balance also arose in this discussion. Younger people tended to emphasize the importance of maintaining a balance between work and their personal lives. This was reflected in their responses to questions regarding working from home and gig work. In both cases, **having increased flexibility when compared to the traditional in-office jobs was one of the key factors that seemed to influence younger participants’ positive views**. Several older respondents remarked how some of their younger employees (or even their own children) seemed less inclined to work full-time hours when asked why the younger cohort often complained of the lack of free time and flexibility. For young people in these positions, they see little advantage in committing themselves wholly to a single employer, particularly given

[3] Wenli Li, and Yichen Su, “Largest Texas Metros Lure Big-City, Coastal Migrants During Pandemic,” Federal Reserve Bank of Dallas (2021), Accessed July 2022, https://www.dallasfed.org/research/swe/2021/swe2104/swe2104b.aspx

the perceived low pay, lack of benefits, and encumbrances on their freedom. Older workers, on the other hand, are likely to see these attitudes as entitled and lazy.

Every focus group contained several respondents who participated in the gig economy, either full-time or as a "side hustle". These participants spoke favorably of the ability to control how much they worked and when. One particularly revealing component of this conversation was how universally common gig work was among participants. It is often supposed that gig work is most common among low-skill, lower-income, and urban-dwelling audiences. **Focus groups revealed that high earners were actually *more* likely to engage in the gig economy**. Area of residency was not highly predictive as well, as gig work was just as common among rural and suburban dwellers as urban residents. Age was the one demographic that followed the expected lines, with older workers being less likely to engage in the gig economy.

Participants both young and old tended to hold favorable views on remote and flexible work. In most groups, around half of the participants were either working fully from home or in a hybrid arrangement, such as only working some days in the office. In fact, when polled on what would be the most influential factor on the future of work, they consistently ranked working remotely as the most important. Participants enjoyed not having to commute, and many claimed they were more productive in their home than in an office environment. **Several respondents in rural and suburban areas noted how remote work provided an expanded market of job opportunities that was hugely beneficial to their households and their community, in general.** On the other hand, respondents also shared their thoughts on the negative aspects of working remotely. The most commonly cited unfavorable point was a lack of social interaction. Others also highlighted how it took some discipline not to become lazy or complacent when working from home. A handful of participants also complained about having to use their own equipment for work, rather than having access to the company's resources at the office. Additionally, those who were not as familiar with technology struggled to resolve and troubleshoot issues on their own.

When respondents were asked about how their skills should change and adapt over the next 15 years**, the majority acknowledged that they should develop their technology skills**. Most participants seemed to be aware of the need to adapt to and learn new technology-based skills in order to remain relevant in the workforce. No industry was exempt from these sentiments including those traditionally considered very blue-collar, such as oil and gas extraction, and transportation. Pressing into what respondents actually meant by "tech skills" revealed a wide variety of responses. For some, technological skills simply meant basic aptitude with computers and smart devices. Others provided detailed explanations related to specific programming languages, data analytics skills, and information technology systems.

Technology was also a consistent point of emphasis when discussing the future of education. Some participants proposed that there be a higher degree of interaction between industries and learning institutions. Others believed that more students should forego college and instead opt for trade or tech schools, citing labor shortages in those fields and the prospect of earning high wages. Teachers across multiple focus groups were also wary of the increase in the use of technology due to the effect observed on their students. They mentioned how their students behaved differently in the classroom post-COVID. Students were commonly described as less social and less driven in the classroom environment after taking remote classes for several semesters.

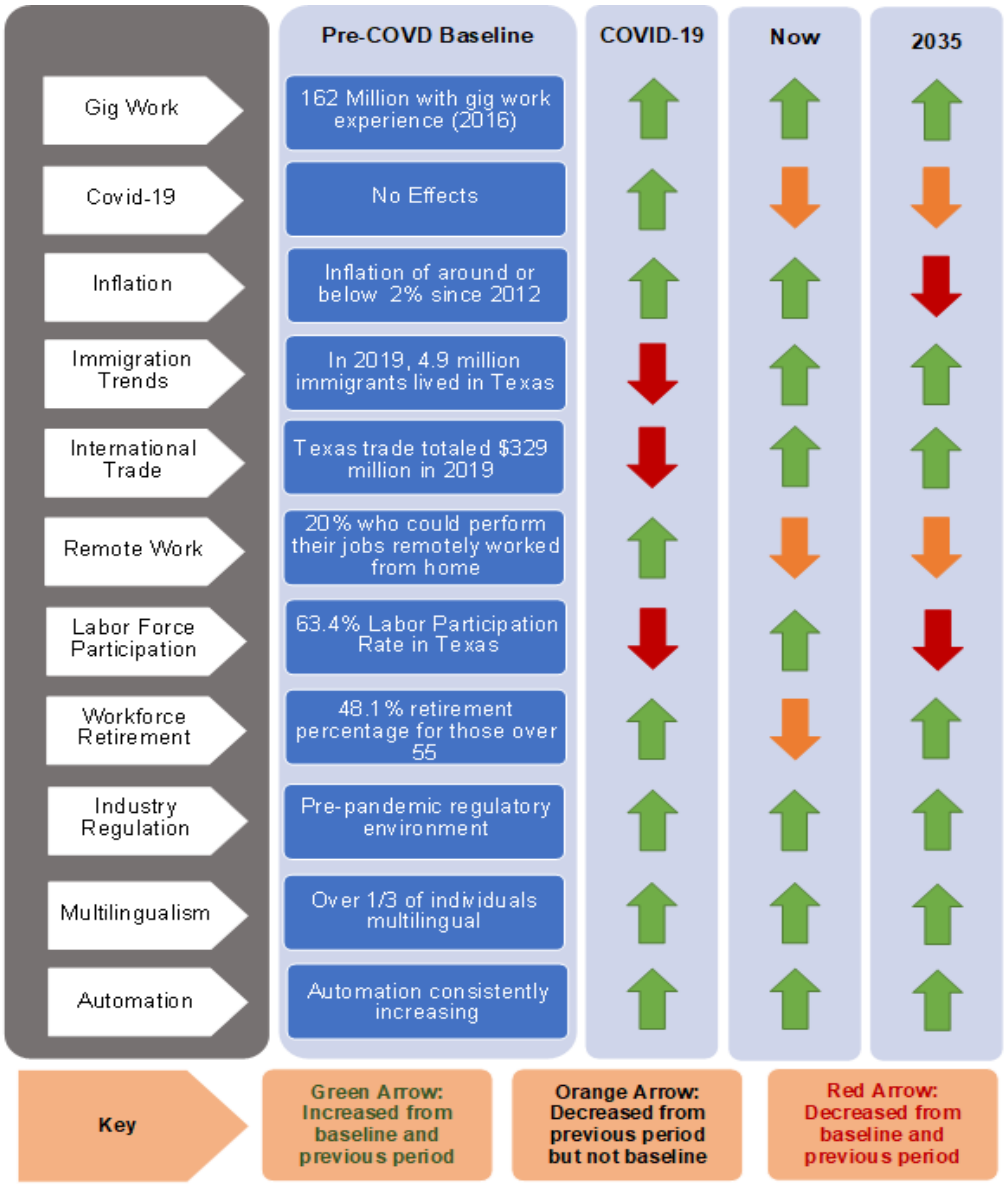
Education was not discussed exclusively in terms of formal education, since participants also emphasized the importance of continuing education and self-teaching new skills in order to keep up with the rapidly evolving world of work. Some respondents were able to learn new skills using online courses and essentially reinvent themselves and move on to different career tracks post-COVID. In many cases, participants used their extra time at home to increase their skills to facilitate these transitions using platforms such as Kahn Academy, Coursera, Udacity, and others. In fact, several participants mentioned that the availability and accessibility of online courses also allows young people to bypass the formal college education route and instead obtain the required skills needed to land jobs on their own.

2. Literature Review

With a GDP of $2.0 trillion in 2021, Texas's economy is larger than most nations.[4] An economy of such size is subject to the influence of the largest social, demographic, and economic trends in the world. In this section the authors discuss some of these trends, their current impacts on Texas, and the likely future consequences of their impacts.

This literature review identifies how existing and emerging trends may impact the Texas workforce between now and 2035. Some trends such as remote work, retirement rates, and automation have accelerated because of the COVID-19 pandemic. Predictions vary about how much these trends will revert to pre-pandemic levels or continue as the new normal.

Summary of Trends



[4] "News Release," Bureau of Economic Analysis, February 3, 2022. https://www.bea.gov/sites/default/files/2021-12/qgdpstate1221_1.pdf

2.1 Gig Work

Key Trends

- **As Is** – Gig work has grown to the point where up to 162 million people in Europe and the United States have joined the gig economy.
- **Future** – The gig economy is expected to grow 17% per year globally through 2023, although legal challenges concerning the employment status of gig workers may slow this growth.

Why Does It Matter?

Gig work allows society to offer services it might not otherwise offer. Workers can supplement income from other jobs with gig work or choose a lifestyle with fewer restrictions on their time. Labor leaders worry that gig work lowers wages and protections for workers.

- **Workers** – Gig work is likely to remain an option, particularly for lower income individuals who need to supplement their incomes. The legal work status of gig workers will determine whether they are eligible for health care, unemployment benefits, and other benefits associated with traditional full-time employment.
- **Employers** – Gig work reduces company payroll, which can increase profitability and decrease prices for consumers. Should the legal status of gig workers change, these advantages would be reduced.
- **Publics** – Gig work provides the public with new services and a way to supplement income with generally low barriers to entry.

The gig economy is characterized by short-term, flexible jobs with no lasting commitment between worker and company. Much, but not all, work associated with the gig economy requires the use of mobile technology platforms like Uber, Lyft, and DoorDash to link companies to workers and workers to companies.[5] McKinsey notes that gig jobs typically have "three defining features: a high degree of autonomy; payment by task, assignment, or sales; and a short-term relationship between worker and client."[6]

Up to 162 million people, or 20-30% of the working age population, in Europe and the United States have joined the gig economy with great variation along demographic lines.[7]

- In the United States, an estimated 30% of 18- to 29-year olds have worked through a gig platform, with rates much lower among older adults.
- Figure 2.1 shows that Hispanic people participate in the gig economy at higher rates, and white people at lower rates than Black or Asian people.
- Figure 2.2 shows that lower income[8] workers are much more likely to work gig jobs.
- Three percent of U.S. adults say gig work is their primary job.
- Among gig workers, 68% say their gig job has been a "side job," and 41% say they work at a gig job less than ten hours per week.
- Fifty-eight percent of gig workers say their gig job is "essential" or "important" for meeting their basic income needs.

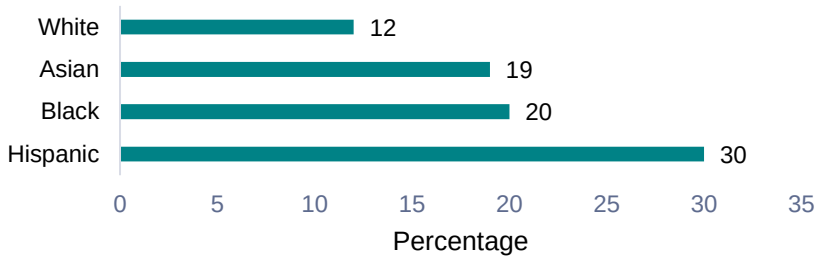
[5] By one estimate, by August 2021 16 percent of United States adults used these platforms. Monica Anderson et al, "The State of Gig Work in 2021," Pew Research, December 8, 2021, Accessed April 2022, https://www.pewresearch.org/internet/2021/12/08/the-state-of-gig-work-in-2021/

[6] James Manyika et al, "Independent work: Choice, necessity, and the gig economy," October 10, 2016, Accessed April 2022, https://www.mckinsey.com/featured-insights/employment-and-growth/independent-work-choice-necessity-and-the-gig-economy

[7] JManyika et al, "Independent work: Choice, necessity, and the gig economy."

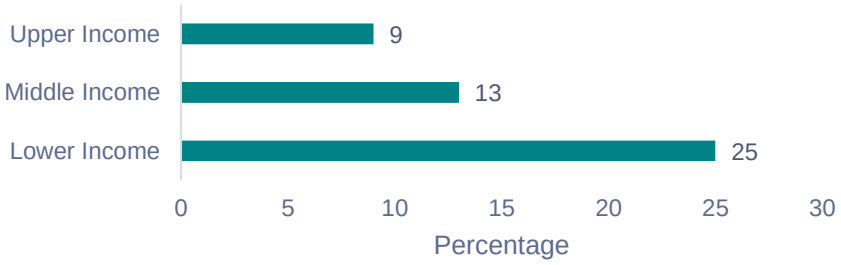
[8] Monica Anderson et al, "The State of Gig Work in 2021." "Family incomes are based on 2020 earnings and adjusted for differences in purchasing power by geographic region and for household sizes. Middle income is defined here as two-thirds to double the median annual family income for all panelists on the American Trends Panel. Lower income falls below that range; upper income falls above it."

Figure 2.1: Hispanic Workers Participate in the Gig Economy at Higher Rates



Source: Pew Research Center

Figure 2.2: Lower Income Workers Participate in the Gig Economy at Higher Rates



Source: Pew Research Center. "Family incomes are based on 2020 earnings and adjusted for differences in purchasing power by geographic region and for household sizes. Middle income is defined here as two-thirds to double the median annual family income for all panelists on the American Trends Panel. Lower income falls below that range; upper income falls above it."

People engage in gig work for a host of different reasons. McKinsey estimates that approximately 70% of gig workers choose independent work, either as a primary or supplemental source of income. Thirty percent of gig workers might prefer traditional jobs but feel forced into gig work as their primary source of income or as a supplement to low wages they earn in other jobs.[9]

The advantages of gig work are substantial for both workers and the companies that employ them. Seventy-eight percent of United States residents who have performed gig work describe their experiences as "somewhat or very positive," and 64% describe the pay they receive as "at least somewhat fair." Gig work can help workers set their own schedules, increase their savings, and mitigate financial harm happening elsewhere in their lives.[10] Those that choose independent work (as opposed to those who felt pushed into it) reported a higher sense of confidence and increased satisfaction with their lives.[11] Gig work may also improve labor force participation and raise productivity.[12] For employers, a chief benefit is the relatively lower labor costs associated with gig work relative to traditional employees, although some analysts expect pay for gig work to increase throughout 2022.[13]

[9] JManyika et al, "Independent work: Choice, necessity, and the gig economy."
[10] Monica Anderson et al, "The State of Gig Work in 2021."
[11] Gianpiero Petriglieri, Susan J. Ashford, and Amy Wrzesniewski, "Thriving in the Gig Economy," March-April 2018, Accessed April 2022, https://hbr.org/2018/03/thriving-in-the-gig-economy
[12] JManyika et al, "Independent work: Choice, necessity, and the gig economy."
[13] Ariella Kupetz, "What Will 2022 Bring for the Gig Economy," Fischer Phillips, January 24, 2022, Accessed April 2022, https://www.jdsupra.com/legalnews/what-will-2022-bring-for-the-gig-economy-2607682/

Gig work also comes with a set of drawbacks that fall mainly on gig workers. The most often cited are the lack of "benefits, income-security measures, and training and credentials."[14] Almost half of United States gig workers say that companies have been unfair with regards to benefits. A 2021 survey found 68% of Americans believe that gig work is not a way to build a promising career.[15]

This "lack of benefits and income-security measures" drives many of the legal challenges faced by gig companies in Texas and elsewhere, with advocates for workers claiming that gig workers should be classified as employees, rather than independent contractors. The Trump Administration enacted a rule that classified them as independent contractors who are ineligible for overtime, minimum wage, and other protections granted to employees. The Biden Administration overturned this rule, but a March 14, 2022 ruling in the Eastern District of Texas ruled that the Administration had not followed proper protocols in that decision. The Biden Administration may move forward with a different regulatory strategy, so the future legal classification of gig workers at the fedeal level remains unclear.[16]

Several states have tried to clarify the legal status of gig workers.

- In California, voters passed Proposition 22 in November 2020, which allowed companies to classify gig workers as independent contractors. On August 20, 2021, a state judge ruled that Proposition 22 was unconstitutional.
- Massachusetts is set to consider a ballot initative that mirrors Proposition 22 in Fall 2022.

Currently, gig workers in Texas are treated as independent contractors, by ruling of the Texas Workforce Commission (TWC). A 2019 report ranked Texas as the fifth best state for gig jobs, citing a large population, high tourism that drives the use of ridesharing services, low income taxes, and out-of-pocket health insurance costs.[17]

Of great interest is the impact of gig work on wages. A Boston Federal Reserve Bank survey found that most gig workers would return to formal work given the opportunity, and this phenomenon created labor market slack that contributes to slower wage growth.[18] Research from the Dallas Federal Reserve Bank also supports this hypothesis.[19] Surveys show 27% of gig workers believed their gig activities increased the volatility of their income.[20] A Center for New York City Affairs/University of Chicago report found that the city's gig driver pay standard, passed in February 2019, did have the effect of raising gig worker pay about nine percent in its first year.[21]

The gig economy is expected to grow in the future. A Mastercard study forecasts the gig economy to grow 17% per year to approximately $445 billion by 2023.[22] Its continued growth will spur new technology, tools, processes, and practices and will reach into new industries.[23]

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[16] Rebecca Rainey, "Gig Economy May See Tougher Contractor Rule After Court Victory," Bloomberg Law, March 17, 2022, Accessed April 2022, https://news.bloomberglaw.com/daily-labor-report/gig-economy-may-see-tougher-contractor-rule-after-court-victory
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[22] "Fueling the global gig economy," Mastercard, August 2020, Accessed April 2022. https://www.mastercard.us/content/dam/public/mastercard-com/na/us/en/documents/mastercard-fueling-the-global-gig-economy-2020.pdf
[23] Zahara Sayed, "The future of the gig economy," February 14, 2022, Accessed April 2022. https://hrforecast.com/the-future-of-the-gig-economy/

2.2 COVID-19 Pandemic Impact

Key Trends

- **As Is** – The COVID-19 pandemic resulted in over 1.1 million jobs and $28.5 billion in economic output lost in Texas in the second quarter of 2020. Overall employment has recovered to pre-pandemic levels as of the first quarter of 2022, but several industries have not yet fully recovered, including accommodation and food services; mining, quarrying, and oil and gas extraction; and construction.
- **Future** –The pandemic and associated recession accelerated several workforce trends such as remote work, baby boomer retirements, and automation, which are detailed in later sections of this report. Computer-related industries and occupations are expected to see higher demand.

Why Does It Matter?

The COVID-19 pandemic disrupted every industry in every part of the nation. Shifts in workforce trends may be temporary before returning to long-term trends or may result in permanent structural changes in the workforce and fundamental changes in projections to 2035.

- **Workers** – The pandemic's impacts on jobs, particularly in hard-hit industries such as accommodation and food services, has resulted in fewer potential workers participating in the labor force as well as workers switching careers to other industries. Long-term implications of labor force participation and trends such as remote work and retirements are explored in later sections of this report.
- **Employers** –Many businesses unable to adapt to the changes during the pandemic have had to reduce employment or close operations. Trends such as automation were accelerated and there is an increased focus on supply chain resilience. Small businesses and downtowns experienced greater pandemic impacts and are expected to face a slower recovery.
- **Publics** – The COVID-19 pandemic and public responses to it affected general populations ranging from school to work: disruptions to supply chains and quick deployment of public health measures changed how the general public conducted their lives. Ripples of these impacts will continue to be seen as the public adapts to a new normal.

The COVID-19 pandemic has impacted the national economy in a manner not experienced in modern times. This pandemic has affected every community and every industry in the country, including those in Texas. Information about the pandemic's spread, government responses, and effective treatments and prevention evolved quickly and impacted the initial economic shock and consequential recovery.

Texas was one of the first states to experience the COVID-19 virus, as Lackland Air Force Base in San Antonio housed people in March, 2020 who were exposed to the virus while overseas. With 50 confirmed cases in the state, Texas Governor Greg Abbot declared a statewide public health emergency on March 13, 2020 and ordered state employees to work from home where possible. Dallas Mayor Eric Johnson ordered food establishments, gyms, and theaters, and other entertainment establishments to close business on March 16, 2020 to contain the spread of the virus. Three days later, the Governor issued an executive order to limit social gatherings to 10 people or fewer, restricted operations of restaurants and bars, gyms, and visits to nursing homes, and temporarily closed schools. On April 17, the Governor announced initial steps to reopen businesses in Texas, while schools would remain closed for the rest of the school year. Restaurants, retail stores, and movie theaters were allowed to reopen at 25% occupancy on May 1, followed by hair salons, pools, and gyms by May 18. A second reopening phase allowed child care facilities and bars to open May 22, and the third reopening phase allowed virtually all businesses to reopen and operate at 50% capacity.

As of the first quarter of 2020, total employment in Texas was greater than 13.7 million.[24] Based on the two-digit industry level of the North American Industry Classification System (NAICS), the largest sector in the state was healthcare and social assistance, employing nearly 1.8 million workers. The next-largest sectors in the region were retail (1.4 million workers); educational services (1.3 million workers), and accommodation and food services (1.3 million workers).

Table 2.1 summarizes the employment and GDP impacts of the COVID-19 pandemic in Texas at the two-digit NAICS level. The table covers the initial decline and recovery of the regional economy. In the second quarter of 2020, an estimated 1.1 million jobs in Texas were lost, equivalent to 8.2% of the total state workforce in the first quarter of 2020. This represents a loss of $28.6 billion in state GDP.

[24] This employment number is based on the place of work, not the place of residence. Source: JobsEQ by Chmura.

Table 2.1 Employment and GDP Impact from COVID-19 in Texas Was Widespread

	Q2 Job Change	Q2 GDP Impact ($Million)	Q3 Job Change	Q3 GDP Impact ($Million)	Q4 Job Change	Q4 GDP Impact ($Million)
Accommodation and Food Services	-317,941	-$3,388.4	108,054	$1,035.4	54,093	$537.7
Retail Trade	-114,379	-$1,905.3	81,597	$1,254.6	62,198	$1,028.3
Health Care and Social Assistance	-105,685	-$1,891.2	35,206	$757.1	27,398	$641.1
Educational Services	-96,845	-$1,786.1	-27,597	-$621.7	70,340	$1,414.7
Administrative and Support and Waste Management and Remediation Services	-90,190	-$1,492.9	53,220	$792.3	41,572	$670.9
Other Services (except Public Administration)	-66,949	-$1,076.0	30,734	$465.2	6,934	$111.4
Construction	-55,924	-$1,491.6	5,835	$93.4	-1,238	-$31.8
Arts, Entertainment, and Recreation	-55,177	-$936.4	26,228	$367.8	-3,939	-$20.2
Manufacturing	-53,894	-$2,543.6	-647	$123.3	4,316	-$150.4
Mining, Quarrying, and Oil and Gas Extraction	-44,132	-$3,729.2	-18,366	-$1,567.8	1,219	-$444.5
Professional, Scientific, and Technical Services	-42,329	-$1,343.7	13,597	$493.4	16,022	$549.9
Wholesale Trade	-28,828	-$1,616.2	-1,516	-$114.2	4,245	$219.4
Transportation and Warehousing	-21,019	-$625.1	16,222	-$55.4	42,988	$640.6
Real Estate and Rental and Leasing	-20,257	-$2,791.6	3,934	$954.3	2,069	$424.7
Information	-18,875	-$590.7	1,616	$5.8	2,837	$91.8
Management of Companies and Enterprises	-8,674	-$394.7	-398	-$18.1	1,077	$49.0
Finance and Insurance	-4,104	-$109.6	6,678	$360.7	7,857	$394.1
Public Administration	-1,180	-$24.1	17,164	$486.0	-12,762	-$363.4
Utilities	-476	-$54.2	706	$89.6	442	$51.3
Agriculture, Forestry, Fishing and Hunting	14,938	$183.4	4,178	$50.4	9,026	$125.8
Total	**-1,132,947**	**-$28,574.1**	**360,021**	**$8,317.3**	**341,754**	**$10,705.3**

Source: Chmura and JobsEQ by Chmura

The industry most impacted by COVID was accommodation and food services, with a job loss of 317,941 in the second quarter, or 25% of the regional workforce. As physical stores closed and voluntary medical procedures were canceled, the retail trade industry lost 114,379 jobs, and the healthcare and social assistance industry lost 105,685 jobs. Other industries such as educational services; administrative and support and waste management and remediation services; and other services (excluding public administration) also lost a significant number of jobs. On the other hand, some industries experienced limited impact in the second quarter. For example, industries such as utilities; public administration; and finance and insurance experienced a small number of job losses, while the industry of agriculture, forestry, fishing and hunting gained jobs in the second quarter.

Critically for the Texas economy, the pandemic significantly impacted oil prices. In January 2020, oil demand in China dropped as the country shut down. Increased oil production in Saudi Arabia and other OPEC members coincided with reduced global demand due to the pandemic and prices plunged in March and April 2020 to such an extent that crude petroleum traded at negative prices on April 20.

Overall, producer prices for crude petroleum dropped 71% from January to April 2020. This shock rippled through the Texas oil industry, causing higher unemployment.[25]

As the state entered different phases of reopening in 2020, Texas experienced a robust economic recovery in the third quarter of 2020. Overall, the state added $8.3 billion in regional GDP during that quarter. The state regained 360,021 jobs, led by job gains in accommodation and food services and retail. The mining, quarrying, and oil and gas extraction industry continued to lose jobs due to the Russia-Saudi Arabia oil price war. The educational services; wholesale trade; management of companies and enterprises; and manufacturing industries also lost jobs in this quarter.

Upon entering the fourth quarter of 2020, there was a surge in COVID-19 infections across the country and in Texas. Economic recovery slowed, but Texas registered sizable employment growth. The state added 341,754 jobs in the fourth quarter of 2020, led by growth in educational services; retail trade; accommodation and food services; transportation and warehousing; and administrative and support and waste management and remediation services. Total employment changes represent an increase of $10.7 billion in state gross domestic product (GDP) in the fourth quarter of 2020. The arts, entertainment and recreation industry and public administration industry continued to lose jobs over this period.

At various points in the pandemic, federal policies provided some economic relief. On March 27, 2020, the federal government passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act. The CARES Act temporarily expanded unemployment insurance benefits and provided a $1,200 payment to eligible Americans. In addition, this law included the Paycheck Protection Program (PPP) that allocated $349 billion in loans to small businesses to help them continue to pay their employees.[26] In late April, Congress passed additional legislation that added $310 billion to the PPP program.[27] As of May 31, 2021, nearly 560,000 of these loans were confirmed in Texas, amounting to nearly $22.3 billion.[28] Those policies allowed many businesses to keep their employees, thus moderating the effects of the COVID-19 pandemic on the economy throughout 2020. In December 2020, Congress passed a new relief package providing several measures similar to those in the CARES Act. This new package expanded unemployment insurance benefits of $600 weekly to eligible Americans. In addition, this package added $285 billion to the PPP program to provide loans to small businesses.[29] In March 2021, President Biden signed a new COVID-

Table 2.2: Federal Policies Provided Economic Relief

Federal Policy	Amount	Impact
March 2020 CARES Act	$1,200 per adult $500 per child	Support households disrupted in initial pandemic shutdowns and layoffs
April 2020 PPP program	$349 Billion in small business loans	Assist impacted businesses to continue to pay employees, payments tied to maintaining employment levels
December 2020 Second Round Consolidated Appropriations Act	$600 per adult $600 per child	Continue to boost household incomes and spending
March 2021 American Rescue Plan	$1,400 per adult $1,400 per child	Continue to boost household incomes and spending

Source: Chmura

[25] Kevin Camp et al., "From the barrel to the pump: the impact of the COVID-19 pandemic on prices for petroleum products," *Monthly Labor Review*, U.S. Bureau of Labor Statistics (Oct 2020), Accessed April 2022, https://www.bls.gov/opub/mlr/2020/article/from-the-barrel-to-the-pump.htm

[26] Erica Werner, Mike DeBonis, and Paul Kane, "Senate approves $2.2 trillion coronavirus bill aimed at slowing economic free fall," *The Washington Post* (Mar 25, 2020), Accessed April 2022, https://www.washingtonpost.com/business/2020/03/25/trump-senate-coronavirus-economic-stimulus-2-trillion

[27] Victor Reklaitis, "Trump signs into law $484 billion bill that replenishes coronavrius aid program for small businesses," *MarketWatch* (Apr 24, 2020), Accessed April 2022, https://www.marketwatch.com/story/house-set-to-pass-bill-that-replenishes-coronavirus-aid-program-for-small-businesses-2020-04-23

[28] "Paycheck Protection Program Weekly Reports 2021," U.S. Small Business Administration (May 31, 2021), Accessed April 2022, https://www.sba.gov/document/report-paycheck-protection-program-weekly-reports-2021

[29] Zach Montague, "The Second Stimulus Package: Here's What's Included," *The New York Times* (Dec 22, 2020), Accessed April 2022, https://www.nytimes.com/2020/12/22/us/politics/second-stimulus-whats-included.html

19 relief package to provide more help to households and businesses, including expanded unemployment benefits and additional cash payment to eligible households.[30]

The pandemic affected every segment of the economy, with several trends continuing into 2022 and expected to continue in the near future. At the business level, small businesses[31] and downtowns[32] generally experienced greater pandemic impacts and face a more challenging recovery. At the household level, migration patterns shifted to increasingly suburban and rural locations and areas with lower costs of living[33] while housing demand and prices and surged.[34] Female workers and Black and Latinx workers faced greater job losses and continue to participate in the labor force at reduced levels compared to before the pandemic.[35]

The long-term implications of the COVID-19 pandemic are uncertain, but it is clear several trends have accelerated. The nature of work has changed with increased remote work and reduced labor force participation. The rate of automation has accelerated, a trend that may be expected to continue especially in types of work with close physical proximity.[36] These trends are explored in greater detail in other sections of this report. E-commerce has grown three times faster than before the pandemic, and other types of virtual exchange such as telehealth are expected to continue to grow now that they have been more generally adopted.[37] Long-term projections from the Bureau of Labor Statistics incorporate an expected decline in brick-and-mortar retail and higher demand for computer-related industries an occupations.[38]

[30] Tony Romm, "Biden signs $1.9 trillion stimulus into law ; some could see stimulus payments this weekend," (Mar 11, 2021), Accessed April 2022, https://www.washingtonpost.com/us-policy/2021/03/11/biden-sign-stimulus-covid-relief-congress-checks/

[31] Daniel Wilmouth, "The Effect of the COVID-19 Pandemic on Small Businesses," U.S. Small Business Administration (Mar 2021), Accessed April 2022, https://cdn.advocacy.sba.gov/wp-content/uploads/2021/03/02112318/COVID-19-Impact-On-Small-Business.pdf

[32] Tracy Loh and Joanne Kim, "To recover from COVID-19, downtowns must adapt," Brookings (Apr 15, 2021), Accessed April 2022, https://www.brookings.edu/research/to-recover-from-covid-19-downtowns-must-adapt/

[33] Stephan Whitaker, "Did the COVID-19 Pandemic Cause an Urban Exodus?" *District Data Brief*, Federal Reserve Bank of Cleveland (Feb 5, 2021), Accessed April 2022, https://www.clevelandfed.org/newsroom-and-events/publications/cfed-district-data-briefs/cfddb-20210205-did-the-covid-19-pandemic-cause-an-urban-exodus

[34] Jon Duca and Anthony Murphy, "Why House Prices Surged as the COVID-19 Pandemic Took Hold," Federal Reserve Bank of Dallas (Dec 28, 2021), Accessed April 2022, https://www.dallasfed.org/research/economics/2021/1228.aspx

[35] Katherine Lim and Mike Zabek, "Women's Labor Force Exits During COVID-19: Differences by Motherhood, Race and Ethnicity," Finance and Economics Discussion Series 2021-067, Board of Governors of the Federal Reserve System, Accessed April 2022, https://doi.org/10.17016/FEDS.2021.067

[36] Susan Lund et al., "The Future of Work After COVID-19," McKinsey & Company (February 18, 2021), Accessed May 2022, https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19

[37] Lund, "The Future of Work After COVID-19"

[38] Kevin S. Dubina, Lindsey Ice, Janie-Lynn Kim, and Michael J. Rieley, "Projections overview and highlights, 2020–30," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, October 2021, https://doi.org/10.21916/mlr.2021.20

2.3 Inflation

Key Trends

- **As Is** - Inflation, as measured by the consumer price index, rose to 9.0% in June 2022 on a year-over-year basis—the highest rate since November 1981 and well above its 2.3% average over the past 20 years.
- **Future** – "The Federal Reserve Act mandates the Federal Reserve to conduct monetary policy 'so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.'"[39] Over the long run, the Fed will use monetary policy to reduce inflation toward its 2% target, which is the Fed's definition of "stable prices."

Why Does It Matter?

Over the short run, when inflation is rising and volatile, decisions become more complicated by the uncertainty that rising prices cause. As inflation stabilizes around a pace of about 2%, it no longer becomes a factor in decision making.

- **Workers** – Inflation-adjusted wages are likely to be lower than inflation in the short term which erodes purchasing power. If employers do not raise wages in line with inflation, some workers may seek alternative employment which will cause the quits rate to remain high during the currently tight labor market. Over the longer term, workers' pay increases will be lower but would be expected to outpace inflation.
- **Employers** – Over the short run, profit for some businesses will contract. Some may even go out of business if they are not able to pass along higher wages and input costs to consumers. Over the longer run, lower inflation will enable employers to make better investment decisions based on market conditions of demand for their products and services.
- **Publics** – Accelerating inflation is particularly difficult for fixed income and low-wage workers because a higher percentage of their income is spent on essential goods such as food, transportation, and rent when compared with those who earn a higher income. Stable prices, at a lower annual rate of about 2%, enables the public to better manage their discretionary income.

Over the past 20 years, inflation, as measured by the consumer price index (CPI), grew an average 2.3% per year. This is consistent with the Federal Reserve Board's dual mandate to promote maximum employment and stable prices. Supply chain shortages, a tight labor market, and stimulative federal monetary policies that resulted from government policies to alleviate economic stress caused inflation to accelerate.

Inflation was running 8.6% on a year-over-year basis in June 2022, based on the personal consumption expenditure (PCE) price index, which is the Fed's preferred inflation measure. Core PCE, which excludes volatile food and energy prices, rose 4.8% over the same period. The Fed focuses on core inflation when considering monetary policy changes because Fed policy has little impact on food prices, which are more dependent on weather, or oil prices, which are more dependent on the output of the few producing countries.

Based on the CPI, inflation is even higher than the PCE. The CPI jumped 9.0% to in June 2022 compared with 12 months earlier, the steepest year-over-year increase since November 1981, according to the Labor Department. Core inflation, which excludes volatile food and energy, rose 5.9% in June 2022.

Figure 2.3 shows the CPI index in Texas from January 2008 through July 2022.[40] It is consistent with national trends—over this period, the CPI index rose at an average rate of 2.2%. The increase in CPI began to accelerate in 2020 along with the supply chain disruptions and changes in consumer demand due to the pandemic. CPI inflation in Texas rose 8.0% year-over-year in February 2022, continued to increase to 9.9% in June 2022, and slowed to 9.5% in July 2022.

[39] Board of Governors of the Federal Reserve System (2016), The Federal Reserve System: Purposes and Functions (PDF), 10th ed. (Washington: Board of Governors).

[40] "Economy: Key Economic Indicators," Texas Comptroller's Office, accessed September 2022, https://comptroller.texas.gov/economy/key-indicators/.

Figure 2.3: Texas Year over Year CPI Rate Surged in 2021

Source: Texas Comptroller's Office

An increase in inflation is bad for the economy. It erodes consumer spending power and causes consumers and businesses to change their behaviors. Low-income consumers are hit particularly hard because a larger percentage of their income is spent on essential items. According to the 2020 Consumer Expenditure Survey, consumer units[41] in the lowest income decile in the nation spend an average 14.6% of their income before taxes on food, compared with 10% for consumer units in the highest decile of income.[42] Similarly, consumer units in the lowest decile of all income categories in the nation spend an average 9.4% of their income before taxes on utilities, fuels, and public services, compared with 4.6% for consumer units in the highest decile.

In an environment where inflation is rising rapidly, workers may change jobs if their employers do not provide wage increases that match the annual pace of inflation. Coupled with the tight labor market that exists in 2022, quit rates are likely to remain high in the nation. This increased turnover may inhibit businesses from meeting the requests for their goods and services.

Inflation also causes consumers and businesses to increase their inventory of goods in advance of further price increases. For example, builders may stockpile wood or steel. If the economy goes into a downturn, stockpiling of goods would prolong a recession. Once the economy started growing again, builders would not need to purchase more inventory from manufacturers until they worked off their current supply.

Almost all industries and assets are adversely affected by an acceleration in inflation. One of the few beneficiaries of inflation is borrowers with fixed interest rates including holders of real estate. Whether the real estate is a house, office building, or warehouse, loans on those assets are generally set at a fixed monthly rate over a period of time, which enables the owner to benefit from the higher value of the asset while monthly loan payments remain constant.

Many observers are concerned that the Fed waited too long before raising interest rates to bring inflation under control. It typically takes six to nine months or longer for interest rate increases to work their way through the economy. They started raising the federal funds rate target at their meeting in March 2022.

[41] The Bureau of Labor Statistics defines consumer units as "families, single persons living alone or sharing a household with others but who are financially independet, or two or more persons living topgher who share major expenses."

[42] Cosumer Expenditure Surveys, Bureau of Labor Statistics, 2020, Table 1110. https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error/cu-income-deciles-before-taxes-2020.pdf

The federal funds rate target, which is the overnight rate banks use to lend to each other, is the only rate the Fed can directly change. As that rate goes up, however, so do rates with short maturities such as the 3-month Treasury bill or the 2-year Treasuries. Raising the federal funds rate will eventually affect rates such as 5- or 10-year notes on which many consumer-related interest rates are based, such as car loans and mortgages. According to the *Blue Chip Financial Forecasts*,[43] the consensus of their 44 forecasters in September 2022 is to expect the federal funds rate to rise to 3.6% by the third quarter of 2023. The consensus of the same forecasters expects the 3-month Treasury bill yield to be at 3.6% by the third quarter of 2023, the 2-year yield at 3.5%, the 10-year yield at 3.3%, and 30-year home mortgage rates at 3.6% over the same period. These increases in interest rates will slow economic growth because it will decrease the affordability of automobiles and housing in the consumer sector as well as plant and equipment in the business sector.

Economists are concerned that the Fed will have to raise the funds rate target more than expected over the next 1-2 years, which could push the economy into recession. Former Federal Reserve Vice Chairman Roger Ferguson was recently interviewed on CNBC and said the probability of a recession is 'very high' in 2023.[44] If such a recession materializes, some employers will lay off workers, thereby increasing unemployment. During a recession, the tightness in the labor market would eventually ease and dampen the acceleration in wages.

Eventually, the Federal Reserve will be successful in bringing inflation down to its long-run target of 2%, which is consistent with its mandate "to conduct monetary policy 'so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.'"[45]

[43] Chmura Economics & Analytics is one of the 44 firms that provide forecasts to the *Blue Chip Financial Forecasts*. Source: Haver Analytics, Blue Chip Financial Forecasts, Vol. 41, No. 9, September 1, 2022.

[44] **https://www.cnbc.com/video/2022/05/02/probability-of-a-recession-is-very-high-says-former-fed-vice-chair.html**

[45] Board of Governors of the Federal Reserve System (2016), The Federal Reserve System: Purposes and Functions (PDF), 10th ed. (Washington: Board of Governors).

2.4 Immigration Trends

Key Trends

- **As Is** – Immigrants are essential to the Texas labor force and economy. In 2019, immigrants contributed a total of $40.6 billion in taxes to the state and national economy and held $120.3 billion in spending power.[46]
- **Future** – Looking forward, immigrants are expected to play a larger role in the state's labor force and economy. As baby boomers retire, immigrants will help fill gaps in the labor market. The Texas immigrant population is expected to reach 7.0 million or 18.6% of the total population in 2035.

Why Does It Matter?

Immigrants bolster the national birth rate, which has recently dropped to historically low levels among the native-born population.[47] A low birth rate leads to slow growth in the labor force, reduces demand in certain industries such as housing.

- **Workers** – Some American workers worry that more immigration leads to greater competition for jobs. A study by the Brookings Institute found that "immigrants often fill the jobs Americans don't want."[48]
- **Employers** – Immigrants increase the supply of labor in the economy, which makes it easier for employers to fill open positions.
- **Publics** – As an increasing number of Americans retire in the coming years, immigrants' increasing tax contributions might fill gaps in funding for public services such as schools, emergency services, and welfare programs.

Immigrants play an important role in the Texas labor force and contribute to the local and national economy. Texas has a long history of immigration, with most coming from Mexico. Immigrants account for one-sixth of the state's population while another one-in-six is a native-born U.S. citizen with at least one immigrant parent. In 2019, 4.9 million immigrants lived in Texas, or 17.1% of the population compared with 14.0% in the United States. The top five countries from which immigrants in Texas migrate are Mexico (51%), India (6%), El Salvador (5%), Vietnam (4%), and Honduras (3%).[49]

The education level of immigrants resembles a barbell with many highly educated and many having little education, which allows them to fill both high- and low-skill occupations. In Texas, 11.6% of immigrants hold an advanced degree, compared to 10.6% of U.S. natives. However, a greater share of immigrants (35.8%) received less than a high school education, compared to 9.2% of U.S. natives.[50] One-in-five workers in Texas are immigrants, making up a vital part of the state's labor force in a range of industries. An important benefit of Texas immigrants is their relative youth. A greater share of immigrants (82%) is prime working-age (16-64) compared to 60.8% of U.S. natives. Especially as baby boomers retire, immigrants fill crucial gaps in the labor market in high-tech fields, agriculture, hospitality, and service industries.[51]

[46] "How Immigrants Drive the Economy in Texas," New American Economy, accessed March 2022. https://www.newamericaneconomy.org/locations/texas/

[47] Brady E. Hamilton, Joyce A. Martin, Michelle J.K. Osterman, and Lauren M. Rossen, "Births: Provisional Data for 2018," Centers of Disease Control and Prevention, May 2019, https://www.cdc.gov/nchs/data/vsrr/vsrr-007-508.pdf

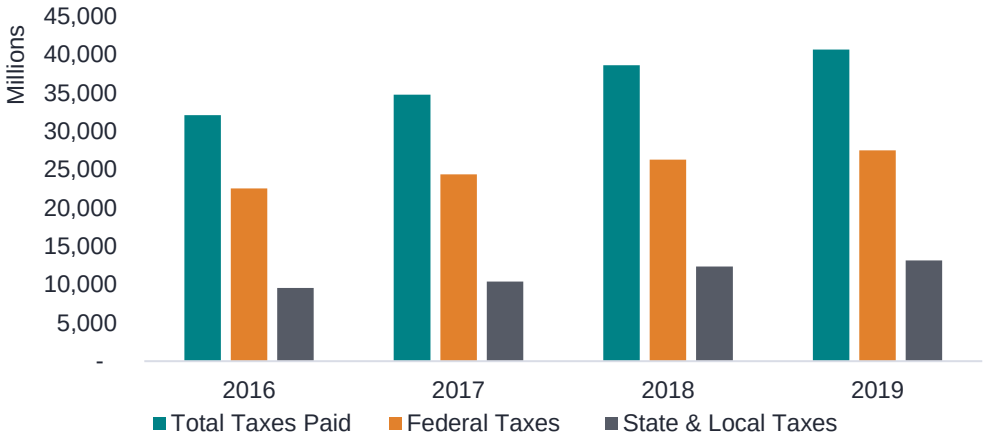
[48] Brennan Hoban, "Do immigrants "steal" jobs from American workers?," Brookings Institute, August 2017, https://www.brookings.edu/blog/brookings-now/2017/08/24/do-immigrants-steal-jobs-from-american-workers/

[49] "Immigrants in Texas," American Immigration Council, August 6, 2020, https://www.americanimmigrationcouncil.org/research/immigrants-in-texas

[50] "How Immigrants Drive the Economy in Texas," New American Economy, accessed March 2022, https://www.newamericaneconomy.org/locations/texas/

[51] See section 2.9 for information on retirement.

Figure 2.4: Immigrants' Contributions to the Texas and National Economy are Rising



Source: New American Economy

Immigrant households' contribution to the national and Texas economy has risen since 2016 as shown in figure 2.2. As consumers, immigrants spent $120.3 billion (after-tax income) in 2019. According to the nonprofit organization New American Economy, in 2019, Texas immigrant households paid $27.5 billion in federal taxes and $13.1 in state and local taxes—a total of $40.6 billion.

Looking forward, immigrants are expected to play an important role in increasing the Texas labor force growth rate by offsetting the declining native-born birth rate. Specifically, the national birthrate has slowed to historically low levels among the native-born population. A low birth rate can result in slow labor force growth, which reduces demand for goods and services. Projections by the Texas Demographic Center suggest that by 2027 immigrant population growth will outpace that of native-born Americans.[52]

The immigrant population in Texas grew at an average annual rate of 1.7% from 2016 to 2019. Assuming Texas continues to follow this trend, the immigrant population is expected to reach 7.0 million, or 18.6% of the total population by 2035.

[52] Steve White, Lloyd B. Potter, Helen You, Lila Valencia, and Jeffrey A. Jordan, "Introduction to Migration in Texas," Texas Demographic Center, March 2015, https://demographics.texas.gov/Resources/Publications/2015/2015-03-04_Intro_to_Mig.pdf

2.5 International Trade

Key Trends

- **As Is** – In 2021, Texas exports, led by the energy sector, rose to more than $375 billion, cementing Texas as the leading state in exports for the 17th consecutive year.
- **Future** – Experts are generally optimistic about the continued growth of international trade, although recent events such as supply chain disruptions have caused medium-term forecasts to be revised downward.

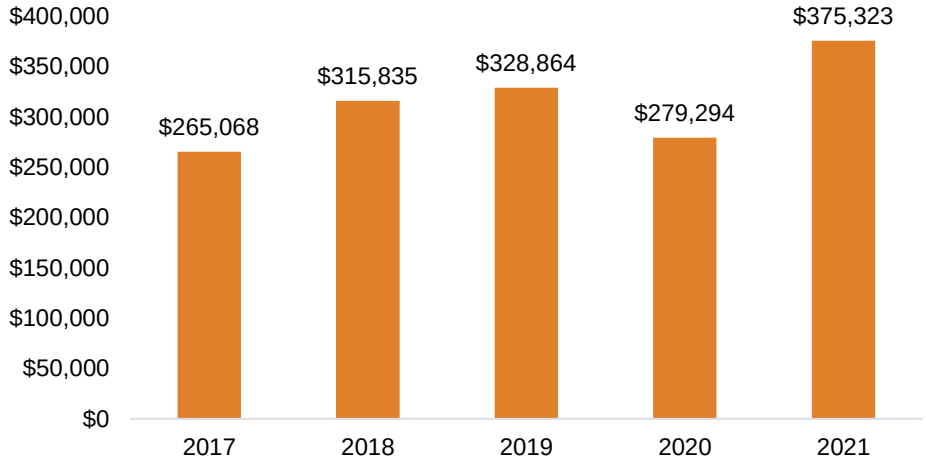
Why Does It Matter?

International trade is an important part of the Texas economy that creates many jobs. Energy makes up a large portion of Texas's trade, so fluctuations in energy prices have a disproportionate impact on trade.

- **Workers** – So long as international trade remains strong, it will be a continued source of job creation.
- **Employers** – Texas employers rely on international markets.
- **Publics** – International trade allows countries to specialize in areas of comparative advantage and grow the overall size of their economies, benefiting the public at large; however, local areas may be disproportionately affected by such shifts due to trade.

International trade is an important part of the Texas economy. As of July 2020, Texas led the nation in exports for 17 straight years.[53] Exports in 2019 were almost $329 billion according to US Census data and rose to more than $375 billion in 2021.[54] Energy is a critical segment of Texas exports, with 2019 exports of oil and gas reaching $75 billion in 2019, or 17.4% of the gross state product and 22.9% of all exports. Texas is also the second largest importing state in the nation, with total imports for 2019 totaling $295 billion.[55] Mexico is Texas's largest trading partner with Texas supplying intermediate parts to maquiladora factories along the Texas/Mexico border—these factories manufacture auto-related products, refrigerators, washing machines, and medical surgical devices.[56]

Figure 2.5: Pre-Pandemic, International Trade in Texas Continued to Grow (in millions of dollars)



Source: United States Census Bureau

[53] David Green and Shannon Halbrook, "Texas' International Trade," Fiscal Notes, July 2020, https://comptroller.texas.gov/economy/fiscal-notes/2020/july/trade.php

[54] "State Exports from Texas," United States Census Bureau. "Trade and Export," https://www.census.gov/foreign-trade/statistics/state/data/tx.html; "Exhibit 2: Origin of Movement of U.S. Exports of Goods by State by NAICS-Based Product Code Groupings, Not Seasonally Adjusted: 2021," United States Census Bureau, https://www.census.gov/foreign-trade/statistics/state/origin_movement/exh2s_2112.pdf

[55] David Green and Shannon Halbrook, "Texas' International Trade."

[56] The Federal Reserve Bank of Dallas, "Cross-Border Manufacturing Rises from Pandemic Lows," Southwest Economy, First Quarter 2022, https://www.dallasfed.org/research/swe/2022/swe2201/swe2201d?utm_source=cvent&utm_medium=email&utm_campaign=SWE

Recently, the COVID-19 pandemic, its resulting supply chain disruptions, and protectionist trade policies have presented challenges to Texas's international trade. The Trump Administration's tariff programs and the resulting trade war with China had a negative effect on exports, with exports to China down 34% from 2018 to 2019. Supply chain disruptions and other effects of the pandemic contributed to a 39% drop in Texas exports from March to May 2020.[57] Manufacturers reported a shortage of raw materials and transportation workers that compromised revenues. The impact of these disruptions does not detract from the overall strength of international trade as part of the Texas economy, as evidenced by record exports in 2021 referenced above. Exports from Texas in February 2022 were 32% above February 2019 levels prior to the pandemic.[58]

The United Nations estimates that global trade growth will slow in 2022, in part due to persistent U.S. inflation fears, continued supply chain disruptions, rising energy prices, and international debt.[59] In light of the war in Ukraine, the International Monetary Fund revised its global growth projections down to 3.6% in 2022 and 2023.[60] Longer term, the National Intelligence Council warns that as bilateral and regional trade agreements introduce new restrictions, global trade may become increasingly fragmented but estimates that global trade will continue to grow through 2030. Services, including financial, telecommunications, information, and tourism, are among the industries expected to grow the most.[61] In its Fall 2021 economic forecast, the Texas Comptroller suggested that Texas exports would reach $581 billion by FY 2035.[62]

[57] U.S. Census Bureau, Exports of Goods for Texas [EXPTOTTX], retrieved from FRED, Federal Reserve Bank of St. Louis, Accessed April 2022, **https://fred.stlouisfed.org/series/EXPTOTTX**

[58] U.S. Census Bureau, Exports of Goods for Texas.

[59] "Global Trade Updated," United Nations Conference on Trade and Development, February 17, 2022, Accessed April 2022, **https://unctad.org/web-flyer/global-trade-update-february-2022**

[60] "War Sets Back the Global Recovery," The International Monetary Fund, April 2022, Accessed April 2022, **https://www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022**

[61] "Global Trends 2040: A More Contested World," The National Intelligence Council, March 2021, Accessed April 2022, **https://www.dni.gov/files/images/globalTrends/GT2040/GlobalTrends_2040_for_web1.pdf**

[62] Glen Hegar, "Texas Economic Detail: Fiscal Years 1991-2047," Texas Comptroller, Accessed May 2022, https://comptroller.texas.gov/transparency/reports/forecasts/2021-11/detail-fiscal.xlsx

2.6 Remote Work

Key Trends

- **As Is** – As the spread of COVID-19 has decreased, an increasing number of people have gone back to working at physical locations. In April 2022, the BLS household survey found that 7.7% of employed persons teleworked from home in the past four weeks—down from 26.4% in July 2020.
- **Future** – The number of full-time remote workers is expected to decline long-term, although some companies, like Twitter, will allow employees to work remotely indefinitely.[63] Some states and members of the government have pushed for remote and hybrid work to continue post-pandemic, while others seek a full return to the physical workplace. At this point in time, the degree and extent to which remote work will continue is unclear.

Why Does It Matter?

Remote work has provided thousands of American workers with flexibility and time savings over traditional "in-person" work.[64] Based on a McKinsey report, 22% of U.S. employees could permanently work remotely three to five days a week after the pandemic wains.[65]

- **Workers** – Some workers have shown a preference for telework and a reluctance to return to the office full-time. In the short term, some workers may choose to avoid working at companies that do not provide flexible telework options, which may contribute to a relatively high quits rate. At some point, an increasing number of employees may be required to appear in person, when the unemployment rate rises during an economic slowdown.
- **Employers** – In the short term, employers may leverage remote or hybrid work as a benefit to attract employees. Companies that do not provide remote work options may face labor shortages, as 39% of adults and 49% of millennials have indicated they would leave their job for one that provides remote work opportunities.[66] In the long term, as unemployment increases, companies may require employees to return to the physical workspace. Some companies will permanently allow workers to continue to telecommute.
- **Publics** – Individuals that are able to permanently work remotely may choose to move to locations that are a distance from their place of work. This may lead to an influx of new residents migrating to urban and suburban neighborhoods and away from city centers. There will still be demand for living in cities, but rural areas that lack access to amenities, such as broadband connectivity, will have a harder time attracting telecommuters.[67]

Remote work, also known as telecommuting or work from home (WFH), is a type of flexible work arrangement that allows an employee to work from a remote location outside of a corporate office. In the early months of 2020, the number of remote workers skyrocketed, in part because of government mandates for nonessential workers to work from home.[68] A study by the Pew Research Center found that only 20% of the 5,858 surveyed workers worked from home prior to the virus (of those who could perform their job roles remotely). By December 2020, 71% of people surveyed were working remotely.[69] According to a June 2020 study conducted by the Standford Institute for Economic Policy Research, despite only 42% of employees being fully remote at this time, WFH accounted for 60% of economic activity in the United States. These individuals were typically managers or other people who could work effectively by computer and email.

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[63] Emily Courtney, "25 Companies Switching to Permanent Remote Work," Flexjobs, 2022, Accessed April 2022, https://www.flexjobs.com/blog/post/companies-switching-remote-work-long-term/

[64] Susan Lund et al., "What's next for remote work: An analysis of 2,000 tasks, 800 jobs, and nine countries," McKinsey Global Institute, November 23, 2020, Accessed April 2022, https://www.mckinsey.com/featured-insights/future-of-work/whats-next-for-remote-work-an-analysis-of-2000-tasks-800-jobs-and-nine-countries

[65] Susan Lund et al., *The Future of Work after COVID-19* (McKinsey Global Institue, February 2021) https://www.weldgov.com/files/sharedassets/public/departments/human-services/documents/the-future-of-work-after-covid-19-executive-summary.pdf

[66] Anders Melin and Misyrlena Egkolfopoulou, "Employees Are Quitting Instead of Giving Up Working From Home," Bloomberg, June 1, 2021, Accessed April 2022, https://www.bloomberg.com/news/articles/2021-06-01/return-to-office-employees-are-quitting-instead-of-giving-up-work-from-home

[67] David McCue, "The Possible Impacts of Remote Work on Cities, Neighborhoods, and Households," Joint Center for Housing Studies of Harvard University, November 8, 2021, Accessed April 2022, https://www.jchs.harvard.edu/blog/possible-impacts-remote-work-cities-neighborhoods-and-households.

[68] Rita Zeidner, "Coronavirus Makes Work from Home the New Normal," SHRM, March 21, 2020, Accessed April 2022, https://www.shrm.org/hr-today/news/all-things-work/pages/remote-work-has-become-the-new-normal.aspx

[69] Kim Parker et al., "How the Coronavirus Outbreak Has – and Hasn't – Changed the Way Americans Work," Pew Research Center, December 9, 2020, Accessed April 2022, https://www.pewresearch.org/social-trends/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/

Typically, these individuals were more educated and higher paid. Individuals who had a harder time transitioning to WFH include retail and transportation employees.[70]

As of early 2022, the number of people working remotely because of the pandemic continued to decline. The BLS reported that 7.7% of individuals teleworked because of the pandemic in April 2022, compared to 10% in the previous month and 26.4% in July 2020 when the survey was first performed.[71]

Despite many individuals returning to the office, the popularity of remote work has caused some businesses to reevaluate how they will conduct work going forward. Between 2019 and 2021, job postings from Chmura's JobsEQ® showed that the following jobs, which represent, some of the top ten jobs that allowed remote work, saw two-year growth rates exceed 400% for remote job postings.

- Securities, Commodities, and Financial Services Sales Agents (486%)
- Marketing Managers (465%)
- Accountants and Auditors (456%)
- Software Developers (447%)
- Management Analysts (419%)

Even though there has been a large increase in the number of jobs that allow work from home, the percentage of all jobs that allow work from home was relatively low in 2021. For example, only 21% of all software developer job ads allowed work from home, and 11% of accountants and auditors allowed work from home.

From May 2021 through May 2022, there were 3.4 million job postings in Texas.[72] Of that 3.4 million, 165,923 job postings (or 4.9% of total job postings) explicitly offered remote work. As of May 5, 2022, 20,184 of those remote job postings are currently active. The largest number of active remote work postings are in Austin (1,163), followed closely by Dallas (1,093). At the 2-digit standard occupational classification (SOC) code level, computer and mathematical occupations had the most active remote job ads in Texas (6,621), followed by management occupations (3,723) and businesses and financial operations occupations (2,803).

The rise in remote work has impacted where people live. One survey found that 36% of people were more willing to live or commute further away from their office if they were not required to be in an office full-time.[73] Some cities and towns have offered incentives, such as sign-on bonuses of up to $20,000 to attract remote workers to move to their areas.[74]

Continued migration into Texas may be driven, in part, by remote work opportunities[75] with five counties in Texas among the top ten for remote work in the United States between 2020 and 2021.[76] In 2022, Dwellics, a personalized recommendation engine designed to help individuals decide where to move, conducted a study on the top one hundred American cities for remote work. The study looked at over 50,000 cities and compared factors such as internet speed, climate, infrastructure, housing costs, and more to determine which cities were most ideal for remote work. Seven of the top twenty cities were located in Texas, while 17 Texas cities were in the top 50. Among the top ten cities for telecommuting, Sugar Land (ranked fourth), Lakeway (sixth), and Frisco (seventh) are all in Texas.[77]

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[70] Nicholas Bloom, "How working from home works out," Standford Institute for Economic Policy Research, June 2020, Accessed April 2022, https://siepr.stanford.edu/publications/policy-brief/how-working-home-works-out

[71] "The Employment Situation-March 2022," Bureau of Labor Statistics, April 1, 2022, https://www.bls.gov/news.release/pdf/empsit.pdf

[72] JobsEQ.This data was pulled from Chmura's proprietary software, JobsEQ. Job posting data is collected from over 40,000 sources.

[73] "Home Buying 2020: Consumer Preferences Post-COVID," Realtor.com, July 22, 2020, Accessed April 2022, https://www.realtor.com/research/home-buying-2020-consumer-preferences-post-covid/

[74] Jack Kelly, "Small Towns And Cities Are Offering Up To $20,000 For Remote Workers To Relocate," Forbes, November 3, 2021, Accessed April 2022, https://www.forbes.com/sites/jackkelly/2021/11/03/small-towns-and-cities-are-offering-up-to-20000-for-remote-workers-to-relocate/?sh=1889b03f308c

[75] Wenli Li and Yichen Su, "Largest Texas Metros Lure Big-City, Coastal Migrants During Pandemic," Federal Reserve Bank of Dallas, 2021, Accessed April 2022, https://www.dallasfed.org/research/swe/2021/swe2104/swe2104b

[76] Erin Prater and Nick Lichtenberg, "The pandemic migration's full impact is becoming clear—and it's a 'big deal' for the future of cities and white-collar work," Fortune, April 3, 2022, Accessed April 2022, https://fortune.com/2022/04/03/pandemic-migrations-impact-big-deal-future-cities-remote-work-walkable-urbanism-housing-crisis-homeless-coastal-cities-census-work-from-home/

[77] "Top 100 Best Cities to Work Remote in 2022," Dwellics, 2022, Accessed April 2022, https://dwellics.com/rankings/best-cities-work-remote-america-2022#

WFH provides employees with numerous benefits, such as time savings derived from the reduction of both commutes into the office and preparation time each morning. The Census Bureau found that the average one-way commute in the United States was 27.6 minutes in 2019.[78] Without the need to drive to and from the office, employees on average could save roughly 55 minutes a day. It also enables them to have a more flexible schedule between home and work life.[79]

Benefits also exist for employers. The increase in remote work has led to cost savings for some businesses. For example, Target is reducing the need for dedicated office space in favor of a hybrid work model.[80] Global Workplace Analytics estimates that a typical employer could save $11,000 per half-time remote worker annually, as a result of increased productivity, reduced turnover, and reductions in office space.[81] However, employers may face additional costs from remote work. During the second quarter of 2020, companies worldwide spent $34.6 billion on cloud services, a 30% increase from the previous year.[82] The increased need for cloud services was a result of companies requiring more online services for remote work.

Studies are mixed on how remote work impacts productivity. One study of 16,000 remote workers found that productivity increased 13% between December 2010 and September 2011.[83] A 2015 report surveyed 353 adults 18 or older and found that 77% reported greater productivity when working remotely.[84] In contrast, a study performed by the Becker Friedman Institute for Economics at the University of Chicago found that productivity fell in certain Asian markets as a result of remote work.[85]

Companies that adopt a remote work policy need to consider legal and administrative issues when implementing these agreements. If an employee is working from home and is injured, they are subject to workers' compensation. In the past, courts have held that home offices are extensions of the physical workspace, which would make the employer liable even if the employer does not influence or have control of an employee's home environment.[86] The Fair Labor Standards Act (FLSA) requires overtime pay for non-exempt employees that work more than 40 hours a week.[87] In a normal office, a company can easily record when employees clock in and out. A remote worker's time is harder to track, even if they have an online system to track their hours. Some employers have turned to collaboration tools that can track the time employees spend working, which may help determine if employees are eligible for overtime.[88]

Another issue companies may face when switching to remote working is reimbursement. If an employee needs certain equipment but does not currently own them, companies may be responsible for reimbursing them for their purchases. Some companies may have to compensate employees for internet and phone bills. Although the federal government does not require employers to reimburse employees, the FLSA requires reimbursement if work expenses cause employee earnings to fall below minimum wage. Some states, like California, have expansive reimbursement laws, while others are more lenient.[89] In 2021, a class action was filed against a California company

[78] Mike Friedrich, "Census Bureau Estimates Show Average One-Way Travel Time to Work Rises to All-Time High," Census Bureau, March 18, 2021, Accessed April 2022, https://www.census.gov/newsroom/press-releases/2021/one-way-travel-time-to-work-rises.html
[79] Cheryl Lock, "5 Benefits of a Flexible Schedule Job," Flexjobs, April 9, 2019, Accessed May 2022, https://www.flexjobs.com/blog/post/benefits-flexible-schedule-job/
[80] "Target cutting 985,000 square feet of office space in Minneapolis as it goes to hybrid work model," Chicago Tribune, March 15, 2021, Accessed April 2022, https://www.chicagotribune.com/business/ct-biz-target-minneapolis-wfh-office-space-20210315-ptmyigevpnctxhosrurrbfzpae-story.html
[81] "Latest Work-at-Home/Telecommuting/Remote Work Statistics," Global Workplace Analytics, June 22, 2021, Accessed April 2022, https://global-workplaceanalytics.com/telecommuting-statistics
[82] Angus Loten, "Cloud Spending Hits Record Amid Economic Fallout From Covid-19," The Wall Street Journal, August 3, 2020, Accessed April 2022, https://www.wsj.com/articles/cloud-spending-hits-record-amid-economic-fallout-from-covid-19-11596494981
[83] Nicholas Bloom et al., "Reproduction of 'Does Working from Home Work? Evidence from a Chinese Experiment*'." Quarterly Journal of Economics, 2021, https://nbloom.people.stanford.edu/sites/g/files/sbiybj4746/f/wfh.pdf
[84] Aliah Wright, "Study: Teleworkers More Productive-Even When Sick," SHRM, February 13, 2015, Accessed April 2022, https://www.shrm.org/resourcesandtools/hr-topics/technology/pages/teleworkers-more-productive-even-when-sick.aspx
[85] "Work Flexibility Is Hardly a Holdy Grail," The Wall Street Journal, June 22, 2021.
[86] Sammie Thean and Thomas Kim, "Workers' Comp for Remote Employees: Here's What You Need to Know," Woodruff Sawyer, April 19, 2021, Accessed April 2022, https://woodruffsawyer.com/property-casualty/workers-comp-remote-employees/ .
[87] Ryan Golden, "DOL clarifies FLSA pay requirements for remote employees," HR Drive, September 2, 2020, Accessed April 2022, https://www.hrdive.com/news/dol-clarifies-flsa-pay-requirements-for-remote-employees/584543/
[88] Emily Heaslip, "How to Track Remote Worker Productivity," U.S. Chamber of Commerce, November 22, 2021, Accessed April 2022, https://www.uschamber.com/co/run/human-resources/employee-tracking-tools
[89] H. Scott Johnson, Jr., "Five Facts Employers May Not Know About Remote-Work Arrangements," Feldesman Tucker Leifer Fidell LLP., March 4, 2022, Accessed April 2022, https://www.feldesmantucker.com/five-facts-employers-may-not-know-about-remote-work-arrangements/

alleging that employees were not compensated for internet, insurance, furniture, utilities, and other costs associated with home offices.[90] A more recent lawsuit was filed against Fox Broadcasting Co. LLC in April 2022 that claimed the company owed reimbursement for remote work expenses incurred between March 2020 to the present including electricity and internet.[91] Although the lawsuits have not been resolved, the outcomes may set a precedent regarding what businesses are required to compensate telecommuters.

Federal and state policies regarding the future of remote work for government and private sector employees have been mixed. Some states and members of the government have pushed for a full return to the physical office, stating that the worst of the pandemic is behind us. Others have argued that remote work is beneficial and that organizations should permanently implement it. Although some legislation has been introduced regarding the future of remote work in certain states, nothing definitive has been passed at this time.

In April 2022, Michigan House Republicans proposed a ban on working from home for state workers. Under this proposal, workers who did not work remotely prior to February 28, 2020 would be required to return to the office full time by October 1, 2022. Opponents to this proposal have claimed that it is unconstitutional for legislation to dictate where workers can and cannot work. Others fear that such legislature could push people away from state employment and discourage others from seeking those positions.[92]

On March 10, 2021, a Democratic senator in New York sponsored the "New York City Teleworking Expansion Act." It states that "each agency shall establish a policy and program to allow employees to perform all or a portion of their duties through teleworking to the maximum extent possible without diminished employee performance…thereby eliminating or substantially reducing the physical commute to and from such agency's principal location."[93] As of February 9, 2022, the bill had advanced to a third reading in the New York Senate.

The United States Government Accountability Office (GAO) collected data from 24 major federal agencies that allowed for remote work before and during the pandemic. Although 13 agencies allowed for remote work prior to 2020, all 24 agencies utilized it by April 2020. Some agencies reported that telework accounted for 80% of total work time during the pandemic. Decisions on whether employees will be able to continue to work from home in the future vary by agencies and their mission. The Department of State and the Department of Agriculture are reviewing positions that could allow individuals to work remotely. NASA plans to "allow employees—when they return to on-site work locations—to continue maximum use of flexible work schedule to include more flexible work hours, telework, and remote work arrangements." The Department of Housing and Urban Developments is also considering expanding the number of remote work arrangements that it offers.[94]

Some employers seek to gain a competitive advantage in the labor market by promising to keep remote work indefinitely. Twitter, Facebook, and other companies have switched to permanent remote or hybrid work environments.[95] McKinsey estimates that 20-25% of employees in advanced economies, and 10% of workers in emerging economies, may be able to work remotely three to five days a week following the pandemic. This is roughly five times more employees working remotely than before the pandemic.[96] However, the recent acceleration in work from home policies may recede as longer-term economic trends change. When the nation experiences its next downturn, unemployment will increase, which may cause a shift away from remote work.

[90] Nina Montazeri, "COVID-19 Litigation Is Testing the Limits Of California Expense Reimbursements – Is Your Business Safe?," Fisher Phillips, March 1, 2021, Accessed April 2022, **https://www.jdsupra.com/legalnews/covid-19-litigation-is-testing-the-9749587/**

[91] Maeve Allsup, "Fox Broadcasting Faces Class Suit On Covid Remote Work Expenses," Bloomberg Law, February 24, 2022, Accessed April 2022, **https://news.bloomberglaw.com/daily-labor-report/fox-broadcasting-faces-class-suit-on-covid-remote-work-expenses**

[92] Paula Gardner and Lauren Gibbons, "Michigan Republicans want to forbid remote work for most state staffers," Bridge Michigan, April 14, 2022, Accessed April 2022, **https://www.bridgemi.com/business-watch/michigan-republicans-want-forbid-remote-work-most-state-staffers**

[93] New York State Senate, *New York City Teleworking Expansion Act*, S5536, March 10, 2021, Accessed April 2022, **https://legislation.nysenate.gov/pdf/bills/2021/S5536**

[94] *Federal Telework Increased during the Pandemic, but More Reliable Data Are Needed to Support Oversight,* United States Government Accountability Office, February 2022, **https://www.gao.gov/assets/gao-22-104282.pdf**

[95] Courtney, "25 Companies Switching to Permanent Remote Work"

[96] Lund, *The future of work after COVID-19*

2.7 Labor Force Participation

Key Trends

- **As Is** – The labor force participation (LFP) rate in Texas, as measured by the Bureau of Labor Statistics, was 63.4% in March 2022 compared with 62.3% in the United States. Historically, the LFP rate in Texas has been higher than that of the United States.
- **Future** – According to the Texas Demographic Center, the LFP rate in Texas is forecasted to decline between 2010 and 2035. On a nationwide level, the LFP rate for men is expected to decrease, while the LFP rate for women is forecasted to increase during this period.

Why Does It Matter?

Labor force participation is important to maintain a region's economic health. When labor force participation declines, fewer individuals are contributing to the creation of goods and services, which can have a negative impact GDP.[97]

- **Workers** – Labor force participation has steadily declined over the last two decades and is forecasted to remain flat through 2030. In the short term, this allows employees greater leverage when seeking wage increases.
- **Employers** – In the short term, employers face labor shortages. As a result, organizations may not be able to operate at maximum capacity, and economic activity will remain below its potential. Employers may also face additional costs to attract workers, such as increased employee benefits or higher wages.
- **Publics** – As a result of labor shortages and slower production, the public may face higher costs and wait times for goods and services. The higher costs faced by employers as a result of low LFP may be passed on to the consumer in higher prices.[98]

Labor force participation increased in the 1980s, largely due to increased growth in the LFP rates of women and the entrance of baby boomers into the workforce.[99] By the early 2000s, LFP in the United States reached an all-time peak and began a steady decline until the pandemic when it dropped sharply and partially rebounded. The aging population of baby boomers is one of the reasons for the decline of the LFP rate as some of these individuals retire.[100]

Data from the BLS (Figure 2.6) indicates that the LFP rate has historically been higher in the state of Texas when compared with the United States. In February 2020, prior to the COVID lockdown, the participation rate was 63.4% in Texas. It fell to a low of 59.8% in April 2020 when nonessential businesses closed or had their employees work from home. Following the second quarter of 2020, both Texas and the United States saw LFP rates increase, as workers were able to return to the workforce. As of March 2022, the LFP rate in Texas was 63.4%, an increase of 0.1 percentage points from the year prior. In the United States, the labor force participation rate was 62.4% in March 2022, a 0.9 percentage point increase from the previous year.

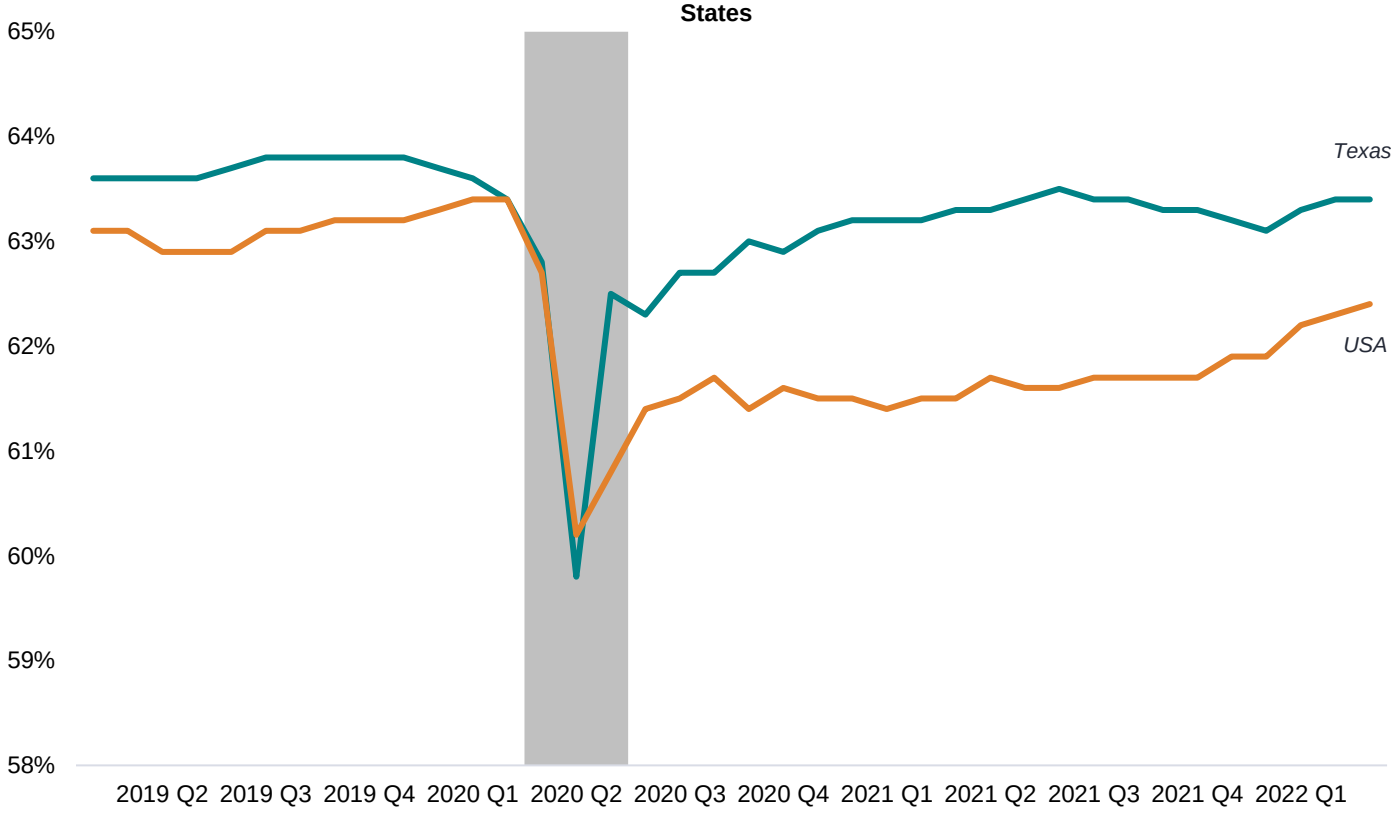
[97] Fernando Martin, "GDP, Labor Force Participation and Economic Growth," Federal Reserve Bank of St. Louis, August 6, 2018, Accessed April 2022, https://www.stlouisfed.org/on-the-economy/2018/august/gdp-labor-force-participation-economic-growth

[98] "CFOs Report Rising Costs That Could Last Through 2022," Federal Reserve Bank of Richmond, December 2, 2021, Accessed April 2022, https://www.richmondfed.org/press_room/press_releases/2021/the_cfo_survey_20211202

[99] Toossi, Mitra, *A century of change: The U.S. labor force, 1950-2050*, Monthly Labor Review, BLS, 2002, https://www.bls.gov/opub/mlr/2002/05/art2full.pdf

[100] Steven Hipple, "Labor force participation: what has happened since the peak?," BLS, September 2016, https://www.bls.gov/opub/mlr/2016/article/pdf/labor-force-participation-what-has-happened-since-the-peak.pdf; David Howard, "Aging Boomers Solve a Labor Market Puzzle," Census, June 21, 2021, Accessed April 2022, https://www.census.gov/library/stories/2021/06/why-did-labor-force-participation-rate-decline-when-economy-was-good.html

Figure 2.6: The Labor Force Participation Rate has Historically been Higher in Texas than the United States



Source: Bureau of Labor Statistics

Comparing the U.S. LFP rate prior to the pandemic (February 2020) to the most recent data (March 2022) by gender, age, and education level provides some insights to what is driving the low participation rate, as Table 2.3 describes. As explained in the workforce retirement section of this literature review, the participation rate of individuals 55 and older has fallen since the pandemic began as some workers decided to retire earlier than planned. During the pandemic, the LFP for women saw a sharper decline than men, as some women had to temporarily leave the labor force to take care of children.[101] Individuals with less education generally have lower participation rates because many of the jobs requiring only a high school degree cannot be performed remotely. As of March 2022, the participation rate for all categories shown in Table 2.3 were lower than the pre-pandemic rate with the exception of individuals ages 16-19. The participation rate for this group increased by 0.3 percentage points since February 2020.

[101] Matt Gonzales, "Nearly 2 Million Fewer Women in Labor Force," SHRM, February 17, 2022, Accessed April 2022, https://www.shrm.org/resourcesandtools/hr-topics/behavioral-competencies/global-and-cultural-effectiveness/pages/over-1-million-fewer-women-in-labor-force.aspx

Table 2.3: National LFP Rates Have Not Recovered to Pre-Pandemic Levels

Labor Force Participation Rate	February 2020	March 2022	Percentage Point Change
Total	63.4%	62.4%	-1.0%
Men	69.3%	68.3%	-1.0%
Women	57.9%	56.8%	-1.1%
Age			
16-19 Yrs.	36.6%	36.9%	0.3%
20-24 Yrs.	73.2%	71.3%	-1.9
25-54 Yrs.	83.0%	82.5%	-0.5
55+ Yrs.	40.3%	38.9%	-1.4
Educational Attainment (25 or older)			
Less than High School	46.0%	45.3%	-0.7
High School Graduate, No College	58.3%	56.9%	-1.4
Bachelor's Degree or Higher	74.0%	73.3%	-0.7

Source: U.S. Bureau of Labor Statistics

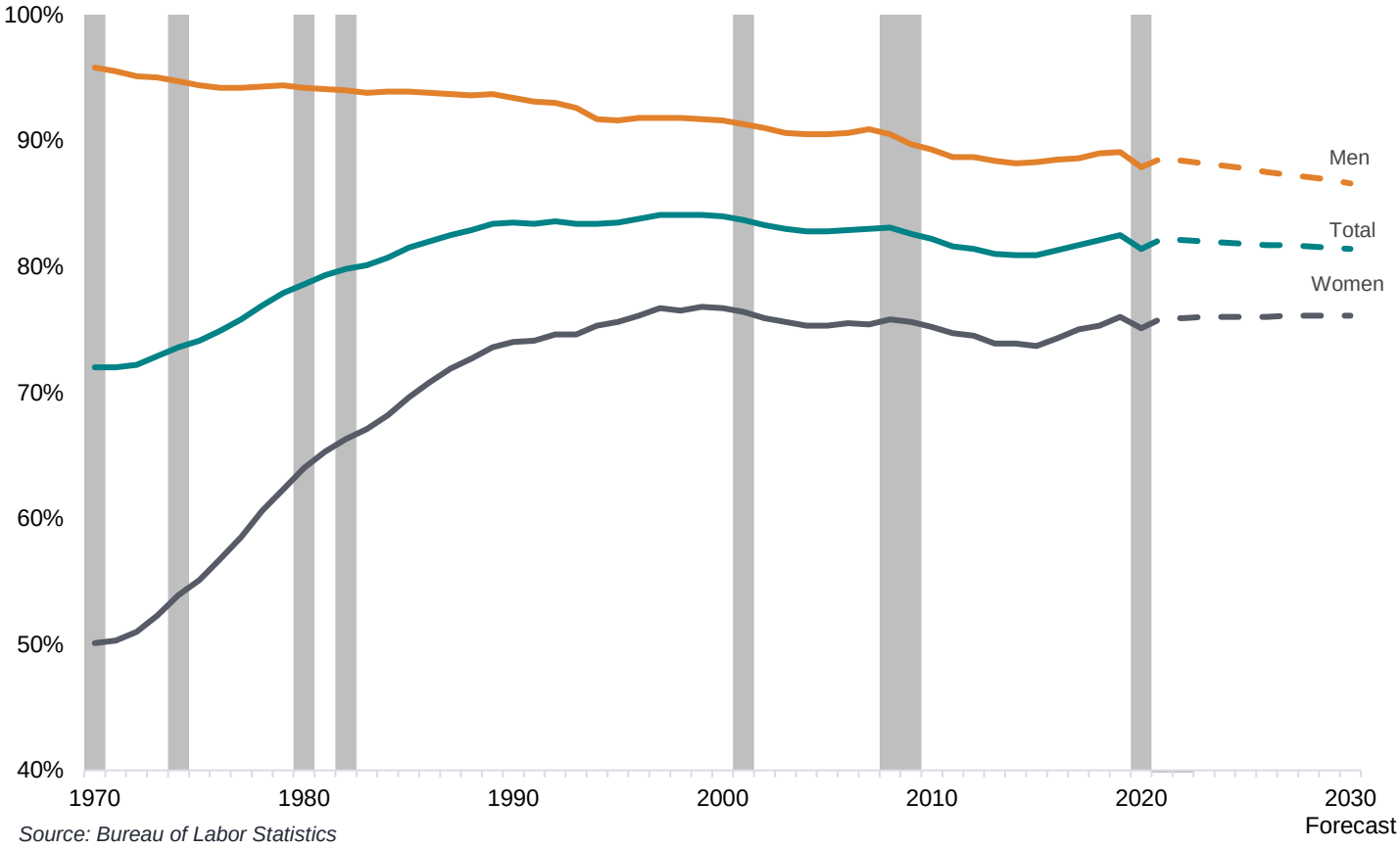
The source of the lag in the recovery of labor force participation to pre-COVID levels is a source of great debate. Some people have not yet returned to the labor force for fear of contracting the virus or because they are caring for children who are attending school online.[102] A survey conducted by the U.S. Chamber of Commerce in November 2021 found that 28% of respondents had not returned to the labor force because their industry was still suffering from the effects of the pandemic and not enough jobs were yet available. Others stated that their families were making enough money to support them and that returning to work was not a priority. Nearly one-fifth of respondents (17%) did not want to return to work until wages increased.[103]

In October 2021, the BLS projected 0.7% annual average employment growth from 2020 through 2030 (Figure 2.7). This rate of growth lags behind that of the period from 2009 through 2019, when the annual average growth was 1.3%. Despite the forecasted growth in employment, labor force participation is expected to continue to decline. By 2030, the labor force participation rate is forecasted to fall to 60.4%. A possible cause for the continued decline of the LFP rate is the shift in demographics caused by the aging baby boom population. Labor force participation for individuals over the age of 55 is expected to be 38.6% in 2030, a 0.6 decline in percentage points from the decade prior. Despite the decline, participation rates for older individuals have increased over the years, possibly due to changes in Social Security.[104]

Between 2020 and 2030, the prime-age (20 to 54) labor force participation rate is expected to remain flat in the United States. The prime-age labor force participation for men at this time is expected to fall to 86.6% by 2030 while the prime-age LFP rate for women is forecast to increase and reach 76.1% by 2030. LFP participation for younger women has increased over the last decade, which could mean fewer women will leave the labor force to care for children.[105]

[102] Chris Chmura, "Economic Impact: Businesses are hiring and wages are up, but workers are still missing," Chmura, October 18, 2021, Accessed April 2022, https://www.chmura.com/blog/workers-are-missing
[103] "NEW – Updated Poll: The COVID-19 Unemployed," U.S. Chamber of Commerce, November 30, 2021, Accessed April 2022, https://www.uschamber.com/workforce/new-updated-poll-the-covid-19-unemployed
[104] "Projections overview and highlights, 2020–30," Bureau of Labor Statistics, October 2021, Accessed April 2022, https://www.bls.gov/opub/mlr/2021/article/projections-overview-and-highlights-2020-30.htm
[105] "Projections overview and highlights, 2020–30," Bureau of Labor Statistics

Figure 2.7: LFP In the United States is Forecasted to Remain Flat in 2030



Source: Bureau of Labor Statistics

Data from the Texas Demographic Center forecasts that the LFP rate for Texas will decline between 2010 and 2035. The Texas LFP rate in 2010 was 65.1% and is forecasted to be 61.3% in 2035. Labor force participation is expected to increase for men but decrease for women between 2010 and 2035. The LFP rate for men was 54.0% in 2010 and is expected to be 55.2% in 2035. The LFP rate for women is expected to fall from 46.0% in 2010 to 44.8% in 2035.

2.8 Workforce Retirement

Key Trends

- **As Is** – The Federal Reserve Bank of Saint Louis estimates that 2.4 million individuals retired early because of the pandemic.[106] However, 1.5 million have re-entered the workforce as of May 2022.
- **Future** – By 2030, the baby boomer population will be 66 years of age or older.[107] The full retirement age is 67, which will allow baby boomers who retire at this age to receive their full Social Security benefits. As a result, the retirement rate is anticipated to increase during this time.

Why Does It Matter?

Workforce retirement creates positions at companies that are typically filled through the promotion of current employees or outside hires.

- **Workers** – Retirement can give employees the opportunity to advance in the company by filling positions left by retirees. A large number of individuals retired as a result of the pandemic. In the long term, the rate of retirement may slow.
- **Employers** – When an employee retires, employers can promote current employees or hire new ones. If there is a labor shortage, employers may find that they are understaffed, which could slow productivity.
- **Public** – If productivity growth declines, the public may face higher prices for goods and services.[108] Additional costs may be levied due to an increased demand for healthcare and social services needed for an aging population.[109]

For many years, the United States has anticipated a significant impact to the workforce as baby boomers start to retire.[110] The pandemic expedited this phenomenon as some workers left the workforce and retired early. The Pew Research Center found that during the third quarter of 2019, 48.1% of Americans 55 or older retired, increasing to 49.6% the following year. As of the third quarter of 2021, 50.3% of U.S. adults 55 or older have retired.[111] The Federal Reserve Bank of St. Louis estimated that of the 4.2 million who left the labor force in August of 2021, 2.4 million retired earlier than planned because of COVID.[112]

As of May 2022, 1.5 million retirees have re-entered the workforce for a multitude of reasons. Some have returned because fears caused by the pandemic have subsided. Other retirees returned to work by telecommuting. Rising costs have also brought individuals back into the labor force, with some seeking employment to obtain health insurance.[113]

[106] Miguel Faria e Castro, "The COVID Retirement Boom," Federal Reserve Bank of St. Louis, November 25, 2021, Accessed April 2022, https://research.stlouisfed.org/publications/economic-synopses/2021/10/15/the-covid-retirement-boom
[107] "2020 Census Will Help Policymakers Prepare for the Incoming Wave of Aging Boomers," Census, December 10, 2019, Accessed April 2022, https://www.census.gov/library/stories/2019/12/by-2030-all-baby-boomers-will-be-age-65-or-older.html
[108] Christopher Lovelock and Robert Young, "Look to Consumers to Increase Productivity," Harvard Business Review, May 1979, Accessed April 2022, https://hbr.org/1979/05/look-to-consumers-to-increase-productivity
[109] Chris Versace and Mark Abssy, "Investing in an Aging Population Amid a Structural Shift in Demographics," NASDAQ, February 4, 2022, Accessed April 2022, https://www.nasdaq.com/articles/investing-in-an-aging-population-amid-a-structural-shift-in-demographics
[110] See Section 2.7.
[111] Richard Fry, "Amid the pandemic, a rising share of older U.S. adults are now retired", Pew Research Center, November 4, 2021, Accessed April 2022, https://www.pewresearch.org/fact-tank/2021/11/04/amid-the-pandemic-a-rising-share-of-older-u-s-adults-are-now-retired/
[112] Castro, "The COVID Retirement Boom"
[113] Abha Bhattarai, " Millions retired early during the pandemic. Many are working again, new data shows," The Washington Post, May 5, 2022, Accessed April 2022, https://www.washingtonpost.com/business/2022/05/05/retirement-jobs-work-inflation-medicare/

Another factor that may influence the rate of retirement is the state in which a person lives. The cost of living, tax rates, and purchasing power may determine how early a person is able to retire. A study conducted in 2021 ranked states as retirement destinations by affordability, wellness, culture, weather, and crime. Overall, Texas ranked as the 28th best state in which to retire. One reason for this ranking was that although Texas does not have income tax, it does have high homeowner insurance rates, due to natural disasters.[114] Affordability is also an issue Texans may face, as the state ranked 29th on a list of affordable states to retire in.[115] As a result, older individuals in Texas may postpone retiring or choose to retire in a more affordable state.

By 2030, the baby boomer population, which represents roughly one-fifth of the population, will be 66 years of age or older.[116] This will likely lead to a decline in labor force participation levels.[117] When these individuals retire, employers will either promote current workers or hire new employees to fill positions. Although these openings may provide both current and prospective employees with opportunities, low labor force participation may make it harder for employers to hire enough workers to replace those that retire. For those companies that are unable to hire enough workers, production may slow, which in turn can slow economic activity.[118] As a result, the general public may face higher prices for goods and services.[119] An aging population will also require regions to invest more in healthcare and social services, which could raise taxes.[120]

[114] Jeff Ostrowski, "The best and worst states for retirement 2021", Bankrate, July 2, 2021, Accessed April 2022, https://www.bankrate.com/retirement/best-and-worst-states-for-retirement/

[115] Adam McCann, "Best States to Retire," WalletHub, January 24, 2022, Accessed April 2022, https://wallethub.com/edu/best-and-worst-states-to-retire/18592

[116] "2020 Census Will Help Policymakers Prepare for the Incoming Wave of Aging Boomers," Census

[117] See Section 2.7.

[118] Mills, Frederick C. "The Role of Productivity in Economic Growth." The American Economic Review 42, no. 2 (1952): 545–57. http://www.jstor.org/stable/1910627

[119] "CFOs Report Rising Costs That Could Last Through 2022," Federal Reserve Bank of Richmond, December 2, 2021, Accessed April 2022, https://www.richmondfed.org/press_room/press_releases/2021/the_cfo_survey_20211202

[120] Chris Versace and Mark Abssy, "Investing in an Aging Population Amid a Structural Shift in Demographics," NASDAQ, February 4, 2022, Accessed April 2022, https://www.nasdaq.com/articles/investing-in-an-aging-population-amid-a-structural-shift-in-demographics

2.9 Industry Regulation

Key Trends

- **As Is** – Federal regulations have increased over the last year. In particular, changes in energy regulations have a significant impact on Texas. Current energy regulations limit waste from oil and gas industries and incentivize renewable energy and related industries such as electric vehicles. With regard to labor regulations, unionization rates have steadily declined for decades.
- **Future** – Long-term goals to reduce fossil fuel emissions are expected to lead to declining employment in the oil and gas sector, while regulations supporting renewable energy sources are expected to boost growth in those industries. National labor regulations are likely to support unionization in the near future under the Biden Administration, but Texas union membership as a percentage of workers is expected to remain well below the national average.

Why Does It Matter?

Federal and state regulations often reduce productivity and output.

- **Workers** – Changes in regulation cause a shift in the type of skills needed. Workers in declining occupations may need to plan to transition to fill in-demand jobs in growing industries.
- **Employers** – Businesses expend time and money adapting to changing regulations, limiting productivity growth in some areas while benefiting other industries which can grow within the regulatory environment.
- **Publics** – Industry regulations are often around public goods such as air or water quality that affect the public as a whole. Regulations also generally limit economic output in restricted industries compared with industries subject to fewer regulations.

Federal and state regulations can create both expected and unforeseen responses from industry, which may in turn impact workforce needs. In a review of regulatory outlooks for the next several years, the key Texas industries most likely to be subject to, or to benefit from, new regulations include oil and gas, renewable energy, automobile manufacturing, airlines, and health care.

The push to reduce fossil fuel emissions has led to increasingly strict regulations on fossil fuel industrial production and emissions from automobiles. These trends are expected to continue, with accelerated decarbonization goals from the Biden administration[121] and proposals to regulate methane at oil wells and ban fracking on federal lands.[122] Such long-term goals to reduce fossil fuel emissions are expected to lead to long-term decline in employment demand in the oil and gas sector. The strategic importance of domestic oil reserves for national security reasons may slow declines in this sector, particularly as the importance of domestic sources has been highlighted by the current Russia-Ukraine war. At the same time, regulations to support renewable energy sources are expected to continue to boost growth in those industries. Over the next ten years, two of the fastest growing occupations are expected to be wind turbine service technicians and solar photovoltaic installers, per BLS projections.[123] Texas led the nation in new renewable energy capacity and storage in 2021, with more than 7,300 megawatts of new projects and nearly 20,000 of storage in construction or advanced development.[124] Emissions regulations and federal purchasing incentives have also encouraged the growth of electric vehicle production, and the market is expected to continue to expand in 2022 and beyond.[125]

International environmental and energy regulations may impact Texas's energy imports/exports. The primary area of impact may be in U.S.-Europe trade as two different geopolitical forces are producing an uncertain future. EU-Texas exports exceed $46 billion annually with $5.3 billion of this being petroleum and coal products.[126] Due to the Russian invasion of Ukraine and resulting suspension of Russian gas supplies to many European nations, Texas could see increased demand for LNG, petroleum, and coal exports to Europe. It is too early to know if European nations will purchase significantly more energy products from Texas, but there are already signs of increased

[121] PWC, "Decarbonization is accelerating: What it means for your company," https://www.pwc.com/us/en/services/esg/library/esg-decarbonization.html

[122] Source: https://www.pwc.com/us/en/industries/energy/library/deals-insights.html Accessed April 2022.

[123] U.S. Bureau of Labor Statistics, "Fastest Growing Occupations," Occupational Outlook Handbook, https://www.bls.gov/ooh/fastest-growing.htm Accessed April 2022

[124] American Clean Power, "Clean Power Quarterly," (2021 Q4)

[125] Ben German, "Analysts: Electric vehicle sales slated for 2022 surge," Axios, (Jan 19, 2022), https://www.axios.com/electric-vehicle-sales-expected-surge-2022-91bee1e9-6d82-4da8-b254-27a61eef17a4.html accessed April 2022

[126] University of Texas, "Texas-EU Business Summit 2022," https://conferences.la.utexas.edu/texaseusummit/#:~:text=Annual%20Texas%20exports%20to%20the%20European%20Union%20exceed,Equipment%20%E2%80%93%20%242.5%20billion%3B%20and%20Machinery%20%241.5%20billion.

tanker traffic from Gulf Coast to the European continent.[127] This increased demand may prove temporary as the EU has a carbon emission trading program in place and therefore will look to decrease fossil fuel imports if feasible,[128] It is possible that the expansion of such carbon reduction policies decreases Texas's ability to competitively export oil & gas in the future to Europe. While Texas companies would benefit from increased trade with the EU, if the EU energy exports do decrease in the future, Texas energy companies would continue to find buyers in developing countries without similar policies.

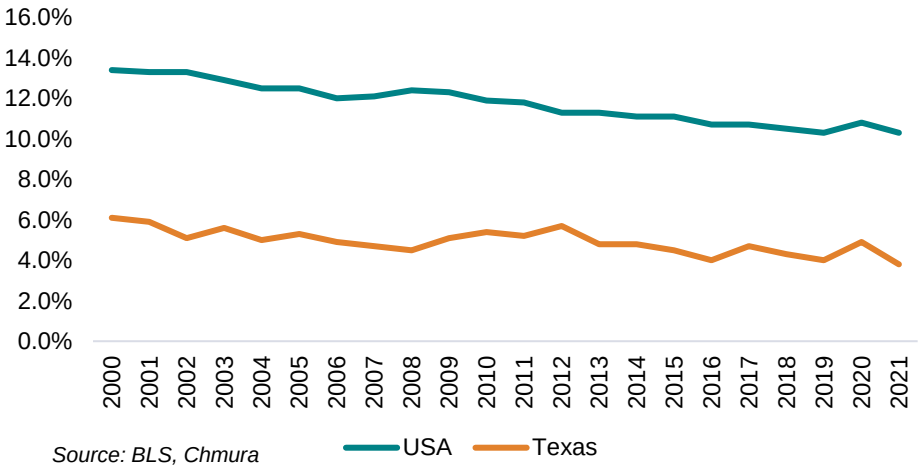
The experience of the pandemic could result in short- and long-term shifts in health and safety standards for some industries. Hospitals and other health care facilities may update standards for personal protective equipment and air filtering as a precaution against continued coronavirus outbreaks or another pandemic. Increased demand for these products and services will support manufacturers and retailers. Telehealth boomed during the pandemic and virtual health visits may be expected to continue to rise in the future, which may result in expanded access to healthcare, particularly for rural areas, and increased demand for healthcare professionals and improved technology to support telehealth. As the airline industry in Texas and in general continues to recover from the pandemic travel shutdown, the International Air Transport Association does not anticipate passenger numbers returning to pre-pandemic levels until 2024.[129]

Literature forecasting unionization trends is sparse; but union membership has been steadily declining for decades, and unionization in Texas can be expected to continue to stay below the national average in the long term. In 2021, union membership as a percentage of wage and salary workers in Texas declined to 3.8%, continuing a generally downward trend since 6.1% in 2000. Union membership as a percentage of employment was up to 4.9% in 2020 as non-union jobs were disproportionately impacted by the pandemic.[130] Union membership in Texas also generally stays well below the national average—since 2000, Texas has averaged 4.9%, compared with 11.8% in the nation.

[127] Texas Monthly, "How Texas Is Rescuing Europe From the Russians," (Apr 2022), **https://www.texasmonthly.com/news-politics/natural-gas-europe-freeport-lng/** Accessed June 2022
[128] European Commission, "EU Emissions Trading System (EU ETS)," https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en
[129] IATA, "Air Passenger Numbers to Recover in 2024," (Mar 1, 2022), **https://www.iata.org/en/pressroom/2022-releases/2022-03-01-01/** Accessed April 2022
[130] Southwest Information Office, "Union Members in Texas – 2021," (Feb 17, 2022), **https://www.bls.gov/regions/southwest/news-release/unionmembership_texas.htm** Accessed May 2022

Looking ahead, national labor regulations are likely to support unionization in at least the near future. At the federal level, the Biden administration appointed a new general counsel and chairman of the National Labor Relations Board, consistent with his intention to be "the most pro-union President leading the most pro-union administration in American History."[131,132] Union membership has also historically risen during periods of war and extended unemployment.[133] While these factors may influence unionization at the national level, the trend for over two decades of lower unionization rates in Texas is expected to continue in the long term.

Figure 2.8: Union Membership Percentage in Texas Has Declined and Stays Well Below National Average



Source: BLS, Chmura

[131] David G. Weldon, "Prepare for Takeoff: NLRB's New Pro-Union Majority Will Soon take Over," (July 30, 2021), https://www.natlawreview.com/article/prepare-takeoff-nlrb-s-new-pro-union-majority-will-soon-take-over Accessed May 2022

[132] The White House, "Remarks by President Biden in Honor of Labor Unions," (Sept 8, 2021), https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/09/08/remarks-by-president-biden-in-honor-of-labor-unions/ Accessed May 2022

[133] Jennifer Schramm, "The Future of Unions," *Workplace Visions*, SHRM, (No. 4 – 2005), https://www.shrm.org/hr-today/trends-and-forecasting/labor-market-and-economic-data/Documents/Visions1005.pdf, Accessed May 2022

2.10 Multilingualism

Key Trends

- **As Is** – In today's global society, it is common for people to speak more than one language. In 2020, of the 26.6 million individuals in Texas who are five years of age or older, more than a third speak a language other than English at home. Of these individuals, 82% speak Spanish.[134]
- **Future** – Increased support for bilingual initiatives in Texas will lead to a greater number of multilingual speakers. As the rate of globalization increases, demand for multilingual workers is expected to grow. Additionally, the fast-growing Hispanic or Latino population in Texas suggests that the number of Spanish speakers will increase.

Why does it Matter?

As communities worldwide become more interconnected, the importance of knowing more than one language increases. Multilingualism is increasingly essential to succeed in an integrated global economy.

- **Workers** – Demand for multilingual workers in the United States more than doubled from 2010 to 2015.[135] In the workplace, multilingual workers experience some benefits over monolingual speakers, such as greater job opportunities and better pay.[136]
- **Employers** – The advancement of technologies and the internet has helped companies expand to different national and international markets. Employers who seek to expand their operations can benefit from a multilingual workforce that can reach a more diverse customer base.
- **Publics** – Multilingual speakers are able to communicate with a larger number of individuals, but those who speak English less then well will need assistance to assimilate into the United States.

Studies have attributed multiple tangible and intangible benefits to being multilingual. According to the U.S. Department of Education, multilingualism provides educational, cognitive, sociocultural, and economic benefits.[137] These include delaying the onset of age-related cognitive decline and illnesses such as Alzheimer's disease, increasing high school graduation rates, and providing greater job opportunities in multiple public and private sectors.

A study by the non-profit New American Economy highlights the growing importance of foreign language skills in the U.S. Job Market.[138] Their study shows that:

- **Demand for bilingual workers in the United States more than doubled.** Job advertisements aimed at bilingual workers more than doubled between 2010 and 2015. The share of job postings targeting bilingual individuals rose 15.7%, over the same time period.
- **Employers seek bilingual workers in both low- and high-skilled positions.** Fifteen of the 25 occupations (60%) with the highest demand for bilingual workers in 2015 were open to individuals with less than a bachelor's degree.
- **Employers are increasingly looking for workers who can speak Chinese, Spanish, and Arabic.** From 2010 to 2015, the number of U.S. job advertisements listing Spanish and Arabic as a desired skill increased by roughly 150%.
- **Some states have a particularly high demand for bilingual workers.** Among them is Texas, which has a considerably higher demand for bilingual speakers.
- **Some employers have a particularly strong demand for bilingual workers.**

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[134] U.S. Census Bureau, American Community Survey, Table S1601; generated by Chmura Economics & Analytics; using data.census.gov; <https://data.census.gov/cedsci/table?q=language%20spoken%20at%20home&g=0400000US48&tid=ACSST5Y2020.S1601> (April 2021).

[135] "Not Lost in Translation: The Growing Importance of Foreign Language Skills in the U.S. Job Market," New American Economy, March 2017, http://research.newamericaneconomy.org/wp-content/uploads/2017/03/NAE_Bilingual_V9.pdf.

[136] Sophie Hardach, "Speaking More than One Language Can Boost Economic Growth," World Economic Forum, https://www.weforum.org/agenda/2018/02/speaking-more-languages-boost-economic-growth/

[137] "Benefits of Multilingualism," U.S. Department of Education, accessed April 2022, https://ncela.ed.gov/files/announcements/20200805-NCELAInfographic-508.pdf.

[138] "Not Lost in Translation: The Growing Importance of Foreign Language Skills in the U.S. Job Market," New American Economy, March 2017, http://research.newamericaneconomy.org/wp-content/uploads/2017/03/NAE_Bilingual_V9.pdf.

Data from Chmura's real-time intelligence (RTI) job posting support the findings of the New American Economy study.

- From 2018 to 2021 job advertisements aimed at bilingual workers rose by 24.7%.
- Fourteen of the 25 occupations with the highest demand for bilingual workers in 2021 were open to individuals with less than a bachelor's degree.
- From 2018 to 2021 job advertisements aimed at Spanish and Arabic speakers rose by 8.1%.
- In 2021 employers in Texas who demanded the most bilingual workers were H&R Block, United Health Group, and A-MAX Auto Insurance.

According to a 2017 report by the World Economic Forum, multilingualism can help boost economic growth. Switzerland, for example, attributes 10% of its GDP to its multilingualism heritage. Britain, on the other hand, is estimated to lose out the equivalent of 3.5% of its GDP every year, because of its population's relatively poor language skills.[139] Multilingualism can also help build trade relations, which in turn boosts economic growth. Research by the Federal Reserve Bank of Dallas (FRBD) indicates that the U.S. obtains tangible economic benefits from its large Spanish-English bilingual population. FRBD estimates suggest that U.S. exports are $160 billion higher and imports $109 billion greater thanks to its strong cultural and linguistic relationship with Spanish-language countries. A Spanish-English bilingual and biliterate workforce is an asset for the U.S. economy, creating opportunities through trade.[140] A study of small and medium-sized companies in Sweden, Germany, Denmark, and France found that those who invested in greater language education were able to export more goods. German companies that invested heavily in multilingual staff added 10 export countries to their market, while companies that invested less missed out on contracts.

Several studies show that multilingualism can boost earning power. In Florida, workers who speak both Spanish and English earn an average of $7,000 per year more than those who only speak English. According to a Canadian study, bilingual men earn 3.6% and bilingual women earn 6.6% more than their English-only peers.

Texas has one of the more comprehensive state bilingual education set of laws in the country. Public schools are required to provide bilingual education programs if 20 or more students with the same home language, other than English, are enrolled in the same grade. Programs such as the English as a Second Language (ESL), Transitional Bilingual, and Dual Language Immersion (DLI) help individuals become bilingual. Texas is one of just five states that require state-funded public pre-kindergarten bilingual education for young English Learner (EL) students.[141]

In 2020, of the 26.6 million individuals in Texas who are five years of age or older, more than a third speak a language other than English at home. Data from the Census indicates that almost 82% of these individuals in Texas speak Spanish as their first or second language compared with 61% in the nation.[142]

Given the importance of Spanish as a second language, the Federal Reserve Bank of Dallas conducted a survey on the use of Spanish in the workplace in the Eleventh Federal Reserve District.[143] The results indicate that Spanish speakers use Spanish extensively in the workplace, indicating direct economic benefits attached to this language skill.

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[139] Sophie Hardach, "Speaking More than One Language Can Boost Economic Growth," World Economic Forum, https://www.weforum.org/agenda/2018/02/speaking-more-languages-boost-economic-growth/

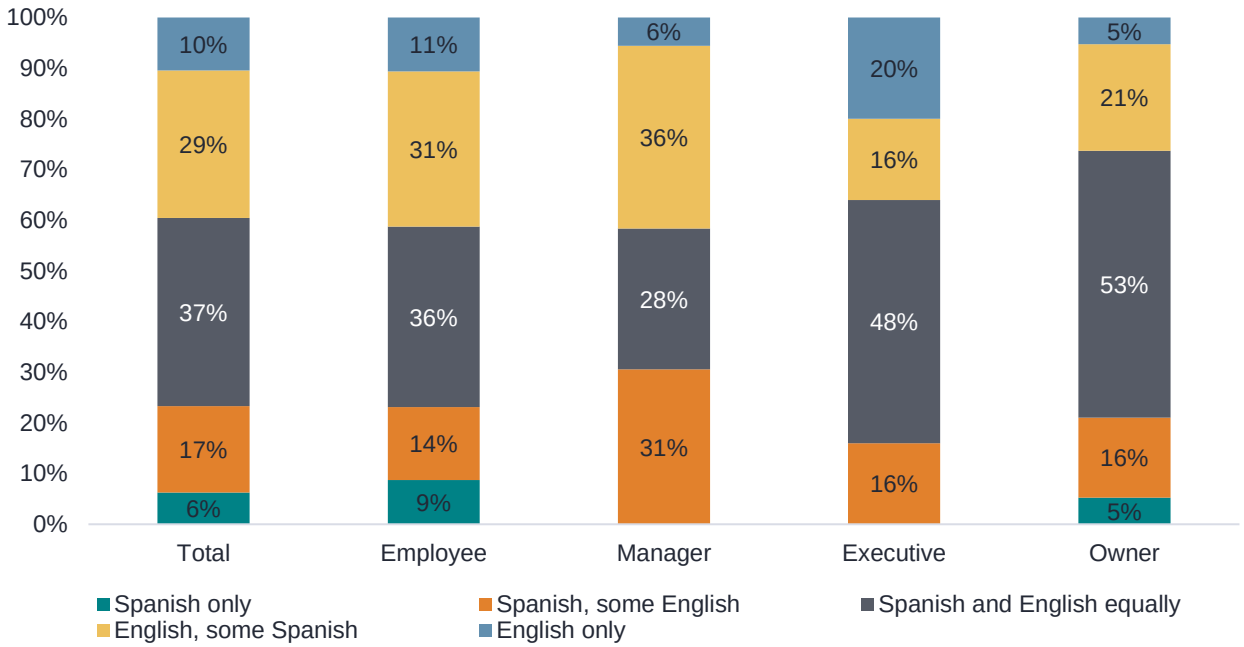
[140] "Se Habla Español: U.S. Yet to Realize Many Benefits of a Growing Bilingual Population," Federal Reserve Bank of Dallas, July 13, 2021, https://www.dallasfed.org/research/economics/2021/0713.

[141] "Texas Early Childhood English Learner Initiative Policy Roadmap," Texas Early Childhood English Learner Initiative, January 2021, https://static1.squarespace.com/static/5f8f3f3a9d12e64da61f653a/t/5fff9ee3fa03ae558177c8b0/1610587878817/texas-early-childhood-english-learner-initiative-policy-roadmap.pdf

[142] U.S. Census Bureau, American Community Survey, Table S1601; generated by Chmura Economics & Analytics; using data.census.gov; <https://data.census.gov/cedsci/table?q=language%20spoken%20at%20home&g=0400000US48&tid=ACSST5Y2020.S1601> (April 2021).

[143] The Eleventh Federal Reserve District consists of Texas, Northern Louisiana, and Southern New Mexico.

Figure 2.9: Spanish Language Use Plays an Important Role in Eleventh District Workplaces



Source: Federal Reserve Bank of Dallas

As Figure 2.9 shows for those who can speak Spanish, Spanish is most used by managers and business owners, with approximately 95% of those employment types reporting that they use it to some extent at work.[144]

Spanish tends to be more widely used in agriculture, mining, and some manufacturing industries, as well as in business-to-consumer services such as sales, call centers, and marketing/advertising.

Looking forward, the Texas Demographic Center projects the Hispanic or Latino population to grow at a rapid rate, increasing its proportion of the total state population. Their projections indicate that the Hispanic or Latino population will more than double its size from under 10 million in 2010 to over 20 million in 2050. Additionally, the Hispanic or Latino population is projected to surpass the non-Hispanic white population in 2022 but will not make up the majority of the state population until after 2050. The growth of the Hispanic or Latino population in Texas suggests that the number of Spanish speakers will increase and remain the primary non-English language.[145]

[144] "Spanish-Speaking Growth in Texas Reinforces Need to Close Education Gaps," Federal Reserve Bank of Dallas, accessed April 2022, https://www.dallasfed.org/research/economics/2021/0803.

[145] "Texas Population Projections 2010 to 2050," Texas Demographic Center, January 2019, https://demographics.texas.gov/Resources/publications/2019/20190128_PopProjectionsBrief.pdf

2.11 Automation

Key Trends

- **As Is** – While replacement of labor with technology has been happening throughout history, the power of robotics and machine learning presents a potentially much larger shift in the nature of work. The pandemic accelerated automation trends.
- **Future** – Scenarios for employment at risk for replacement by automation over the long term (unspecified or roughly 2030-2035) range from 9% to 47% of total employment in the nation.

Why Does It Matter?

Automation has the potential to displace entire types of work, particularly repetitive low- and medium-skill work, but the actual impact depends on speed of adoption once the technology is available, the degree of automation, and the development of new job tasks coinciding with the rise of automation.

- **Workers** – The tasks that make up work will change as automation replaces some tasks and introduces new ones. Workers in jobs which are subject to greater replacement by automation will need to develop new skills to transition to this future of work.
- **Employers** – As automation is increasingly able to replace certain types of work, employers who adopt the new technology can benefit from increased profitability but will also need to incorporate new roles to fully make use of the technology.
- **Publics** – The general population benefits from increasing productivity and economic growth driven by new technology but will also face challenges in transitioning as automation replaces some jobs and tasks.

Technology has substituted for and increased the productivity of human labor throughout history, from agricultural tools replacing manual farm labor to replacing more recent jobs such as telephone operators. The power of robotics and machine learning present a potentially much larger shift in the nature of work in the future. Scenarios of the potential impact of automation on the labor market depend on the speed of adoption, degree of automation, and what types of job tasks may be automated.

The potential speed of adoption is typically presented under different scenarios, and approaches for forecasting automation potential have generally shifted from forecasts by industry or types of occupations to forecasts based on job tasks. Importantly for forecasting workforce demands, this focus on job tasks allows job titles to remain the same or similar over time even as the way the job is performed may change due to technology. This approach also allows for models in which machines are able to become more productive at tasks over time.[146]

In a report for the Boston Consulting Group, Sirkin et al. expect the share of tasks performed by robots to rise from 10% in manufacturing industries worldwide in 2015 to around 25% by 2025.[147] The authors expect four industries to lead in adopting industrial robots: computers and electronic products; electrical equipment, appliances, and components; transportation equipment; and machinery. Other industries like plastics and rubber products; petroleum and coal products; and primary metals have a high percentage of automatable tasks but limited penetration of industrial robots at the time of the report. The authors indicated that these industries are more likely to be impacted in high-wage economies in the near term, with adoption depending on reducing the costs of robotics.

Frey and Osborne classify detailed occupations according to the probability of computerization. Based on those classifications, about 47% of total employment in the USA is at risk of automation over an unspecified period of time.[148] Arntz et al. estimate that using by analyzing tasks within occupations, the automation risk of jobs in the USA drops to 9%.[149] Bughin et al., in a report for McKinsey & Company, also focus on tasks within occupations. The report scenarios indicate by 2030, 3% to 14% of the global workforce will need to

[146] Daron Acemoglu and Pascual Restrepo, "Modeling Automation," *NBER Working Paper Series* (2018) http://www.nber.org/papers/w24321
[147] Harold Sirkin, Miachael Zinser, and Justin Ryan Rose, "The Robotics Revolution: The Next Great Leap in Manufacturing," The Boston Consulting Group (2015).
[148] Carl Frey and Michael Osborn, "The Future of Employment: How Susceptible are Jobs to Computerisation?" *Technological Forecasting & Social Change* 114 (2017) 254-280.
[149] Melanie Arntz, Terry Gregory, and Ulrich Zierahn, "Revisiting the Risk of Automation," *Economics Letters* 159, (October 2017)

switch occupation categories and adapt to automation.[150] The scenarios assume that although about half of all work activities globally could potentially be automated based on currently available or demonstrated technology, the actual work displacement will be lower than half due to technical, economic and social factors. More specifically, the technology has to be invented and incorporated into solutions to automate various tasks. Businesses have to adopt the automated solutions, meaning weighing the associated costs against the costs, supply, and demand of human labor. Economic factors include faster output, possibly increased quality of work, and potentially reduced labor costs. Even if adopting an automation technology makes business sense, the regulatory environment may not be in place and the technology may not have gained social acceptance. All of these factors contribute to the potential rate of automation.

Overall, the various studies agree that certain tasks, specifically routine tasks in controlled conditions, are more susceptible to automation, while more creative and social tasks are at lower risk. When Lumina and the Institute for the Future asked experts about the least essential skills needed for 2030, repetitive learning and rote memorization were unsurprisingly in the list, but coding and AI programming skills also came up. The experts interviewed expect much of the coding can itself be automated, along with scheduling and organizing, planning, language translation, legal research and writing, validation skills, and driving. Higher paying physical labor occupations like electricians and plumbers may be exempt from automation. Skills expected to be in greater demand include those around human connection and communication, such as desigining AI systems, managing reputation, storytelling, cybersecurity, and augmenting physical tasks with AI.[151]

Acemoglu and Restrepo (2018) find several key implications of a task-based model of automation. Wage increases or decreases due to automation will depend on how powerfully the technology affects productivity. This implies that the automation technologies most likely to reduce labor demand are not those that are *most* productive, but instead those that are just productive enough to be adopted but not significantly more cost-saving than what they replace. In other words, such a combination of slight cost savings and slight productivity gains are most likely to displace work tasks. Additionally, to not leave workers behind, automated tasks and new job tasks need to expand at a similar pace for labor to maintain a comparative advantage.[152]

> *The importance of new tasks is well illustrated by the technological and organizational changes during the Second Industrial Revolution, which not only involved the replacement of the stagecoach by the railroad, sailboats by steamboats, and of manual dock workers by cranes, but also the creation of new labor-intensive tasks. These tasks generated jobs for engineers, machinists, repairmen, conductors, back-office workers, and managers involved with the introduction and operation of new technologies (e.g., Landes 1969; Chandler 1977; and Mokyr 1990). Today, as industrial robots, digital technologies, computer-controlled machines, and artificial intelligence replace labor, we are again witnessing the emergence of new tasks ranging from engineering and programming functions to those performed by audio-visual specialists, executive assistants, data administrators and analysts, meeting planners, and social workers.*[153]

Some of these studies present state-level forecasts of automation and employment impacts or focus on specific occupations. An interactive visualization of the Automation and US Jobs report by McKinsey suggests Texas has a technical automation potential of 44.3%, or 10.7 million jobs. By metropolitan statistical area (MSA), impacts range across the state from 42.3% in College-Station-Bryan, TX to 47.8% in Odessa, TX.[154] While no specific time frame is provided for these estimates, a related report uses 2036 as an early scenario on a global scale.[155] Muro et al. (2019) in a report for the Brookings Metropolitan Policy Program estimate an average automation potential

[150] Jacques Bughin, James Manyika, and Jonathan Woetzel, "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation", McKinsey Global Institute (December 2017)

[151] Chmura participated in this session. Institute for the Future and Lumina Foundation, "AI Forces Shaping Work & Learning in 2030: Report on Expert Convenings for a New Work + Learn Future," (Oct 2018), https://www.iftf.org/fileadmin/user_upload/images/ourwork/Work___Learn/IFTF_Lumina_AI_Forces_Work_Learn.pdf

[152] Daron Acemoglu and Pascual Restrepo, "Modeling Automation," *NBER Working Paper Series* (2018) **http://www.nber.org/papers/w24321**

[153] Daron Acemoglu and Pacual Retrepo, "The Race between Man and Machine: Implication of Technology for Growth, Factor Shares, and Employment," *American Economic Review 2018*, 108(6): 1488-1542 DOI: 10.1257/aer.20160696

[154] Automation and US Jobs by McKinsey Global Institute, accessed April 2022, **https://public.tableau.com/app/profile/mckinsey.analytics/viz/AutomationandUSjobs/Technicalpotentialforautomation**

[155] Jame Manyika et al., "A Future that Works: Automation, Employment, and Productivity," McKinsey Global Institute, (2017)

of 46.5% in Texas, ranking it 25th among the states.[156] In this report, results are intended to convey what tasks could potentially be automated with available technology in 2030, though it may be much longer (2050-2060) before the tasks are fully automated.

The accelerating adoption and sophistication of autonomous vehicle technology has also led to increased focus on the potential impacts to long haul trucking. Mohan and Vaishnav (2022) suggest self-driving trucks are most likely to replace long highway trips, particularly in southern, sunny states like Texas where more predictable weather will make it easier for full driving automation. This could incentivize a shift to a transfer hub model, with a reduced demand for long-haul truck drivers but greater demand for short-haul drivers to complete the final miles from a local hub to the final destination. Among three adoption scenarios evaluated, fast adoption assumes 75% of new vehicle purchases incorporate automation technology within ten years of the technology becoming available, compared with medium (48%) and slow (19%) technology adoption.[157] The average, optimistic, and pessimistic adoption scenarios were developed around the average useful life of a long-haul truck (approximately 11 years) and short-haul truck (15 years), which influences fleet turnover and opportunities to incorporate new technologies.[158]

[156] Mark Muro, Robert Maxim, and Jacob Whiton, "Automation and Artificial Intelligence: How Machines are Affecting People and Places," Metropolitan Policy Program at Brookings (January 2019).
[157] Aniruddh Mohan and Parth Vaishnav, "Impact of Automation on Long Haul Trucking Operator-Hours in the United States," Humanities and Social Sciences Communications (2022) 9:82, Accessed April 2022, https://doi.org/10.1057/s41599-022-01103-w
[158] Waschik R, Friedman D, Taylor C, Boatner J et al. (2021) Macroeconomic impacts of automated driving systems in long-haul trucking. Tech Rep, United States. Department of Transportation. Intelligent Transportation

3. Data Analysis

Texas was the second fastest growing state in the nation between 2010 and 2019, with population increasing an annual average 1.6% compared with 0.7% in the nation. Its 1,200 mile border on Mexico provides access to immigrants and a culture that has influenced the state's demographics. In 2020, 39.4% of the population in Texas was Hispanic, compared to 18.2% in the nation. By 2023, the Hispanic population is expected to make up the largest race/ethnicity group in the state. Going forward, the Texas population is expected to continue growing at a faster pace than the nation.

The industry mix and employment growth in Texas reflect a robust economy that is expected to continue growing at a strong pace. For most of the past two decades, employment growth in Texas has outpaced that of the nation. From the first quarter of 2002 through the fourth quarter of 2021, employment rose 32.3% in Texas for an annual average growth rate of 1.4% compared with 10.3% and 0.5%, respectively, in the nation. From 2021 to 2035, employment in Texas is projected to grow at an average annual rate of 1.4%.

All occupation groups are expected to grow through 2035 in Texas. Healthcare (2.6% average annual growth), computer and mathematical (2.4%), and personal care (2.1%) occupations are expected to grow the fastest due to growth in demand for healthcare services and technology. At the detailed occupation level, the fastest growing occupations include personal care aides, nurse practitioners, and information security analysts. Automatable tasks are expected to drive job losses through 2035. Half of the expected losses are in office and administrative support roles, with an anticipated decline of more than 26,400 jobs. Another nearly 15,000 job losses are expected in sales and related occupations, particularly cashiers. More than 9,000 job losses are expected for production workers. These losses are partially offset by growing occupations in these occupation groups, but workers will also need to retrain for growing occupations and for working alongside automation technologies.

Workforce projections based on labor market data help to ground predictions about the future and guide discussions with regional stakeholders. This section reviews long-term forecasts and recent trends from a variety of labor market data sources, most of which are brought together in Chmura's JobsEQ® platform. These include:

- Bureau of Labor Statistics
  - Current Employment Statistics
  - Current Population Survey
  - Local Area Unemployment Statistics
  - Quarterly Census on Employment and Wages
  - Occupational Employment Statistics
- Census Data
  - American Population Survey
- O*NET
- CareerOneStop
- DatabaseUSA
- Real-Time Labor Market Data (Job Posts)
- Resume data

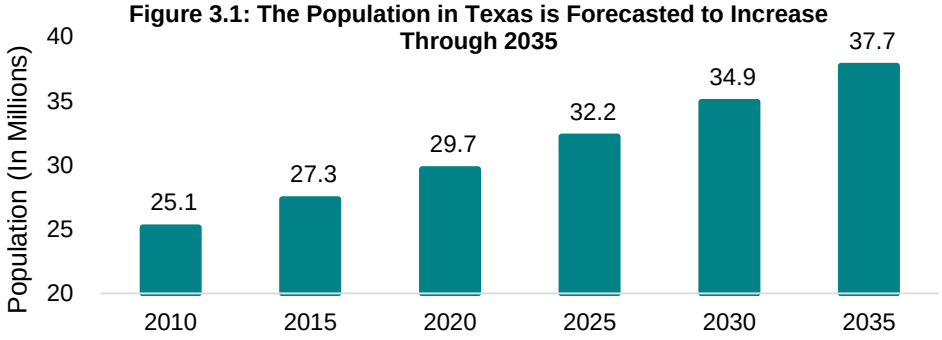
This section also incorporates long-term occupation projections from the Texas Labor Market Information office of the Texas Workforce Commission and demographic projections from the Texas Demographics Center.

3.1 Demographic Analysis

Between 2010 and 2019, Texas was the second fastest growing state in the nation, with population increasing an annual average 1.6% compared with 0.7% in the nation. Its 1,200 mile border with Mexico provides access to immigrants and a culture that has influenced the state's demographics. In 2020, 39.4% of the population in Texas was Hispanic, compared to 18.2% in the nation. By 2023, the Hispanic population is expected to make up the largest race/ethnicity group in the state. 17.0% of the population was foreign born in 2019, compared with 13.6% in the nation. Almost 14% of the population five years or older "speak English less than very well" compared with 8.4% in the nation. Going forward, the Texas population is expected to continue growing at a faster pace than the nation.

3.1.1 Population Projections

Figure 3.1: The Population in Texas is Forecasted to Increase Through 2035



Source: Texas Demographic Center

Unlike the nation, where the pace of population growth is expected to slow to 0.4% annually from 2021 to 2051, compared to an average 0.9% over the prior fifty years,[159] the population in Texas is expected to slow slightly to an annual average of 1.6% from 2018 through 2050, compared to an average 1.7% from 2010 to 2018. This trend is attractive to employers moving to and expanding in the state because "population is the single most important factor in determining the size and composition of the labor force."[160] Figure 3.1 shows an estimated 25.1 million people lived in Texas in 2010 according to the Texas Demographic Center (TDC). By 2035, population is forecasted to grow to 37.7 million, a 49.9% increase. Texas's civilian labor force, which consists of employed and unemployed citizens 16 years of age or older, is expected to increase from 19.0 million in 2010 to 29.6 million in 2035.[161]

The population in Texas has grown due primarily to immigration, and the majority of immigrants come from Mexico. In 2000, 1.9 million Texas residents were born in Mexico, and that number grew to 2.7 million in 2017.[162]

Migration from other states has also helped population growth, and more than 500,000 new out-of-state residents have moved to Texas every year between 2012 and 2019.[163] Individuals that move from these states are often drawn to Texas because of the lower cost of living, lack of personal income tax, and less expensive homes.[164] Between 2000 and 2020, California contributed the highest numbers of migrants moving to Texas in all but one year—the exception was in 2005 when a large number of migrants from Louisiana moved to Texas because of Hurricane Katrina.[165] In 2000, 0.5 million Texas residents were born in California, which increased to 0.8 million in

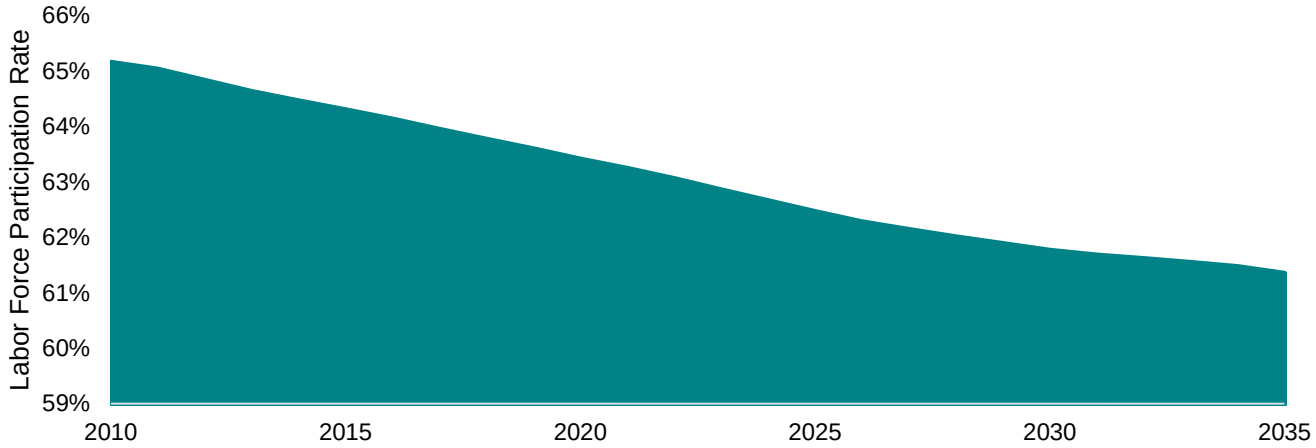
[159] "The 2021 Long-Term Budget Outlook," Congressional Budget Office, March 2021. Accessed May 2022, https://www.cbo.gov/publication/57038
[160] Mitra Toossi, "Labor force projections to 2024: the labor force is growing, but slowly," U.S. Bureau of Labor Statistics, December 2015, Accessed May 2022, https://www.bls.gov/opub/mlr/2015/article/labor-force-projections-to-2024.htm#:~:
[161] Unemployed individuals are those that are currently not employed but have actively looked for work within the last four weeks.
[162] James Gregory, "Texas Migration History 1850-2017," University of Washington, Accessed May 2022, https://depts.washington.edu/moving1/Texas.shtml
[163] "2021 Texas Relocation Report," Texas Realtors, February 10, 2021, Accessed May 2022, https://www.texasrealestate.com/wp-content/uploads/2021RelocationReport.pdf
[164] "Key Reasons Why Millions Are Moving to Texas," AP News, May 2021, Accessed May 2022, https://apnews.com/article/texas-business-census-2020-science-0d436b250dc07111bff4b4f6cdd6682b
[165] Luis Torres and Wesley Miller, "Where Did New Texans Come From During the Pandemic?," Texas Real Estate Research Center, October 2021, Accessed May 2022, https://www.recenter.tamu.edu/articles/research-article/Where-did-new-Texans-come-from-2324

2017.[166] Although roughly 35,000 to 40,000 Texans move to California each year, the migration flows from California to Texas are much larger. The net migration of Californians moving to Texas in 2018 and 2019 was around 45,000 to 50,000 individuals per year.[167]

3.1.2 Labor Force Participation

The labor force participation (LFP) rate is forecasted to continue to decrease in Texas, from 65.1% in 2010 to 61.3% in 2035 (Figure 3.2). In light of the population growth in the state, however, the civilian labor force will expand from 12.4 million in 2010 to 18.2 million in 2035. By comparison, the BLS predicts that the national rate of LFP will fall from 61.7% in 2020 to 60.4% in 2030.

Figure 3.2: The Labor Force Participation Rate Continues to Decline in Texas



Source: Texas Demographic Center

As noted in Section 2.8 of this report, demographic factors such as age play a role in the decline of LFP. Older populations typically have lower labor force participation compared to younger cohorts.[168] The aging baby boom population will continue to put downward pressure on labor force participation since this cohort will be 65 years or older by 2030.

The labor force participation rate in Texas has historically been greater than in the United States. One factor that may influence this is that a smaller percentage of Texas's population has disabilities (9.5%), but a higher percentage of individuals with disabilities are working (44.8%). In the United States, 10.3% of individuals have disabilities but only 42.2% participate in the labor force.

The large number of foreign-born individuals in Texas may also contribute to the higher LFP rate. According to the BLS, foreign-born men are more likely to have higher rates of labor force participation than native born men. According to the 2019 American Community Survey, 17.0% of Texas's population was foreign born, compared to 13.6% in the nation.[169] However, a larger percentage of that population does not speak English fluently (13.7%) compared to the United States (8.4%). Consequently, language barriers may impact the productivity of some of these individuals.

Table 3.1: Labor Force Participation is Greater in Texas Than the USA

	Percent	Value

[166] James Gregory, "Texas Migration History 1850-2017"
[167] "It seems like all of California is moving to Texas. Is that true?," The Kinder Institute for Urban Research, March 3, 2021, Accessed May 2022, https://kinder.rice.edu/urbanedge/2021/03/03/californians-moving-to-texas-covid-migration
[168] Toosi, "Labor force projections to 2024: the labor force is growing, but slowly"
[169] "Labor Force Characteristics of Foreign-born Workers Summary," BLS, May 18, 2022, Accessed May 2022, https://www.bls.gov/news.release/forbrn.nr0.htm/labor-force-characteristics-of-foreign-born-workers-summary#

Economic	Texas	USA	USA	Virginia
Labor Force Participation Rate and Size (civilian population 16 years and over)	64.5%	63.2%	13,962,458	163,555,585
Armed Forces Labor Force	0.4%	0.4%	93,394	1,073,907
Veterans, Age 18-64	4.9%	4.6%	846,005	9,143,042
Mean Commute Time (minutes)	—	—	26.6	26.9
Commute via Public Transportation	1.4%	5.0%	181,273	7,641,160
Union Membership	4.6%	10.8%	—	—
Social				
Enrolled in Grade 12 (% of total population)	1.5%	1.4%	411,701	4,422,344
Disconnected Youth[2]	2.8%	2.5%	45,519	423,273
Children in Single Parent Families (% of all children)	34.4%	34.1%	2,405,770	23,790,005
With a Disability, Age 18-64	9.5%	10.3%	1,627,151	20,187,604
With a Disability, Age 18-64, Labor Force Participation Rate and Size	44.8%	42.2%	729,715	8,509,463
Foreign Born	17.0%	13.6%	4,814,638	44,011,870
Speak English Less Than Very Well (population 5 yrs and over)	13.7%	8.4%	3,607,255	25,615,365

Source: JobsEQ® by Chmura
1. ACS 2015-2019, unless noted otherwise
2. Disconnected Youth are individuals aged 16-19 years old who are (1) not in school, (2) not high school graduates, and (3) either unemployed or not in the labor force

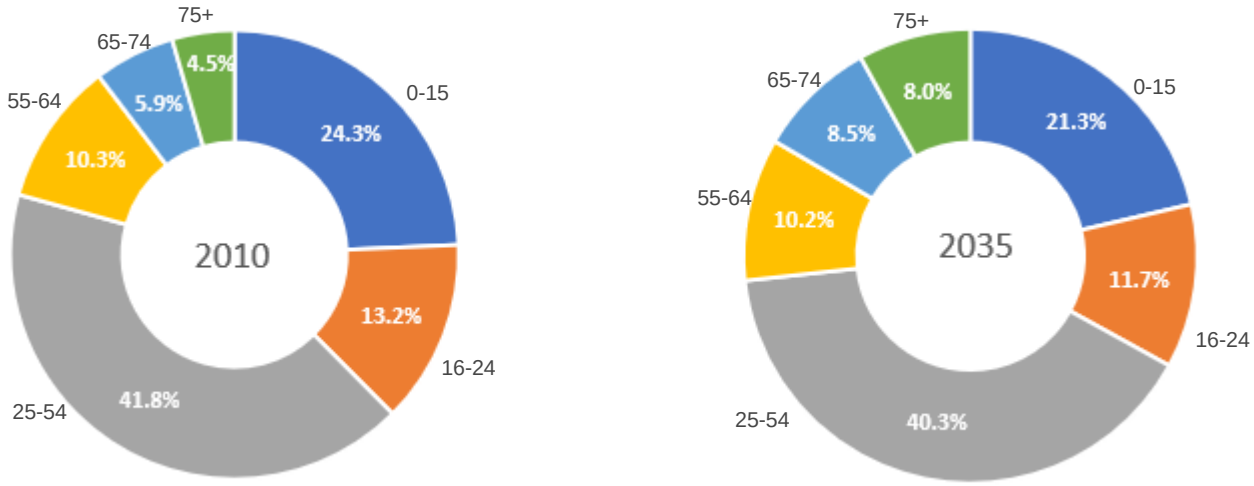
3.1.3 Age

The age cohorts in Texas that are 65 and older are expected to increase in share by 2035, while the percentages in all the other cohorts are expected to decrease when compared with 2010 (Figure 3.3). The share of adults 75 years of age or older will increase from 4.5% in 2010 to 8.0% in 2035. The population of adults 65-74 years of age will also increase during this period, from 5.9% to 8.5%. As noted previously a larger share of older individuals contributes to lower LFP.

Aging populations typically require regions to invest more in healthcare and social services. In 2020, the health care and social assistance industry contributed 7.6% of Texas's gross domestic product (GDP). Between 2021 and 2035, this industry is expected to grow by 110,676 jobs or an annual average 2.0%. Continuing care retirement communities and assisted living facilities will be one of the fastest-growing healthcare industries in Texas—adding 27,928 jobs between 2021 and 2035 at an annual average growth rate of 3.2%.[170]

The share of the Texas population considered "prime age" for working (25-54 years old) is forecasted to decline, decreasing from 41.8% in 2010 to 40.3% in 2035. A decline in the prime-age cohort, coupled with an aging population, may force Texas businesses to hire from outside of the state.

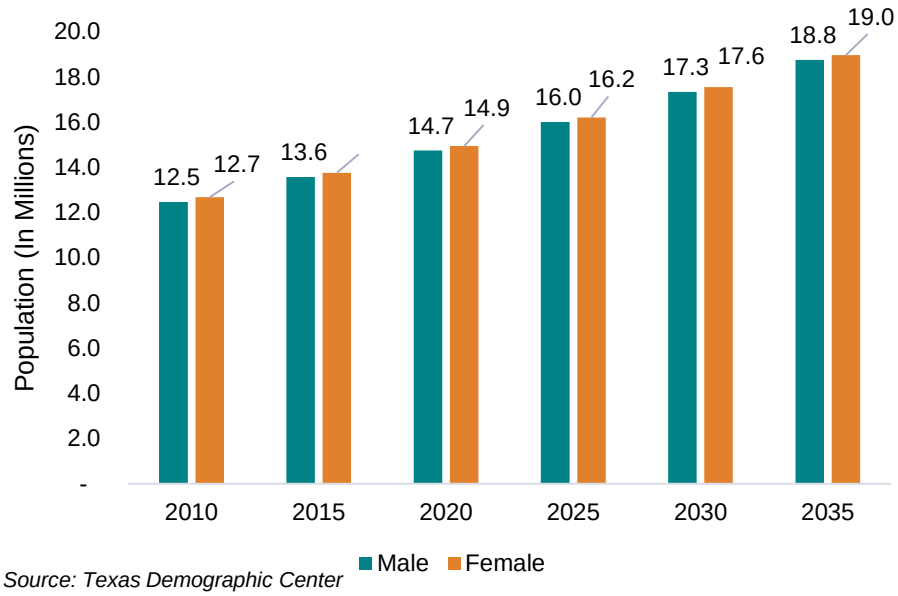
Figure 3.3: The Percent of the Population That is 65 Years or Older Will Increase by 2035



Source: Texas Demographic Center

[170] See Section 3.2.4.

Figure 3.4: The Majority of the Texas Population Are Women



Source: Texas Demographic Center

3.1.4 Gender

Historically, women have made up the majority of the Texas population. As shown in Figure 3.4, there were 12.7 million women in 2010, compared to 12.5 million men, living in Texas. By 2035, the number of women is expected to increase to 19.0 million, while the male population is forecasted to grow to 18.6 million. However, the share of the population made up of women will decline slightly from 50.4% in 2010 to 50.3% by 2035.

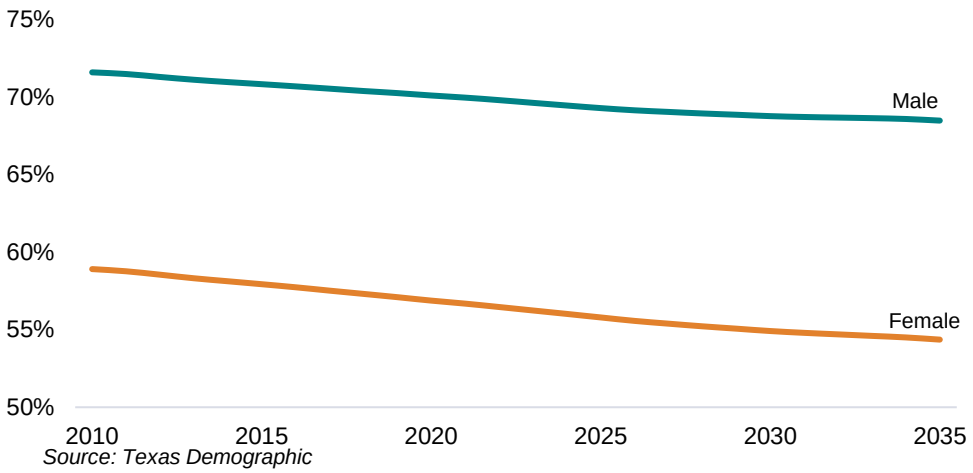
Although women make up a greater share of the population, men are more likely to be part of the Texas labor force. As shown in Table 3.2, the percentage of men as a share of the labor force is expected to increase from 54.0% in 2010 to 55.2% in 2035. The percentage of women is expected to decline, from 46.0% in 2010 to 44.8% in 2035.

Table 3.2: Men Make Up a Larger Percentage of the Labor Force

	Males in Labor Force	Females in Labor Force
2010	54.0%	46.0%
2015	54.2%	45.8%
2020	54.5%	45.5%
2025	54.7%	45.3%
2030	55.0%	45.0%
2035	55.2%	44.8%

Source: Texas Demographic Center

Figure 3.5: LFP Rates Decline for Both Males and Females



Source: Texas Demographic Center

Men have also had higher labor force participation rates than women, as shown in Figure 3.5. LFP rates are expected to decline for both men and women through 2035. The participation rate for men is forecasted to fall from 71.6% in 2010 to 68.5% in 2035. The LFP rate for women is expected to decline from 58.9% in 2010 to 54.4% in 2035. The decline in LFP rates in Texas differs from that of the nation where BLS forecasts the LFP rate will remain flat through 2030, while the LFP rate for men will decline and the rate for women will increase as noted in Section 2.7 of this report.

Improving the labor force participation for women may promote future economic growth. One solution can be to subsidize childcare because these costs cause some women to temporarily leave the workforce. The pandemic exacerbated the issue. In 2020, one in three women said they were considering downshifting their career or even leaving the workforce, versus one in four in 2019.[171]

3.1.5 Race & Ethnicity

Between 2010 and 2035, the number of people in all major racial and ethnic groups is expected to increase (Figure 3.6). By 2023, the Hispanic population is forecasted to become the largest racial or ethnic group in Texas and will grow to 15.8 million by 2035 (or 42.0% of the state's population.) The Pew Research Center predicts that between 2005 and 2050, the Hispanic population in the United States will grow from 42 million to 126 million. Although the Hispanic population will account for 60% of the nation's growth over this period, it will only account for 29% of the population in 2050 compared with 47% for the white population.[172]

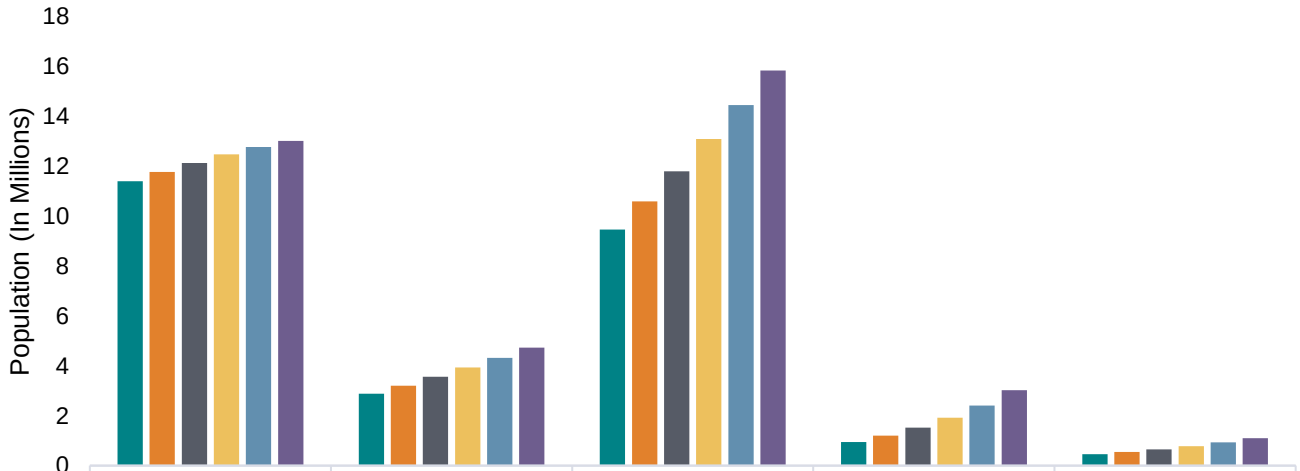
The white population in Texas will be the second largest racial or ethnic group in 2035, increasing by 1.6 million individuals from 2010. The Asian population is expected to see the greatest increase during this period, expanding by 2.9 million individuals. The Black and Other populations are expected to grow by 0.6 million people between 2010 and 2035.[173]

[171] "Women in the Workplace 2021," McKinsey and Company, September 27, 2021, Accessed May 2022, **https://www.mckinsey.com/featured-insights/diversity-and-inclusion/women-in-the-workplace**

[172] Jeffrey Passel and D'Vera Cohn, "U.S. Population Projections: 2005–2050," Pew Research Center, February 11, 2008, Accessed May 2022, **https://www.pewresearch.org/wp-content/uploads/sites/5/reports/85.pdf**

[173] Non-Hispanic Other groups consist of all other race/ethnic groups. People that identify as more than one race are also included.

Figure 3.6: Populations for Major Race and Ethnic Groups Will Increase in Texas



	White	Black	Hispanic	Asian	Other
2010	11.4	2.9	9.5	0.9	0.5
2015	11.8	3.2	10.6	1.2	0.5
2020	12.1	3.6	11.8	1.5	0.7
2025	12.5	3.9	13.1	1.9	0.8
2030	12.8	4.3	14.5	2.4	0.9
2035	13.0	4.7	15.8	3.0	1.1

Source: Texas Demographic Center

Texas has a large number of immigrants, which contributes to the growing Hispanic population. In fact, immigration has helped the Texas population grow, despite the state's declining birth rate. In 2019, 17.1% of the population were immigrants compared with 14.0% in the nation.[174] Because education levels vary, immigrants fill both low- and high-skilled jobs, which are important to maintaining the state's economy. As noted in Section 2.4 of this report, many immigrants are also prime age, which are age cohorts with higher labor force participation levels compared to other cohorts.

Table 3.3: By 2035, the Majority of Texas's Labor Force Will Be Hispanic

	2010	2035
White	48.2%	34.9%
Black	11.5%	13.0%
Hispanic	34.8%	40.8%
Asian	4.0%	8.6%
Other	1.5%	2.7%

Source: Texas Demographic Center

As a result of the population's increasing diversification, the labor force will become more diverse by 2035 (Table 3.3). In 2010, nearly half (48.2%) of the labor force was comprised of white individuals. By 2035, only 34.9% of the labor force is forecasted to be white, and the majority of people in the labor force—40.8%--will identify as Hispanic. The share of Asians in the labor force will more than double, from 4.0% in 2010 to 8.6% in 2035. Black and Other individuals are also expected to make up a larger portion of the labor force in 2035 when compared with 2010.

Some enterprises in Texas may be concerned that the demographic shift will impact work conditions in Texas. For example, a large influx of Hispanic workers could lead to language barriers if workers are not proficient in speaking English.

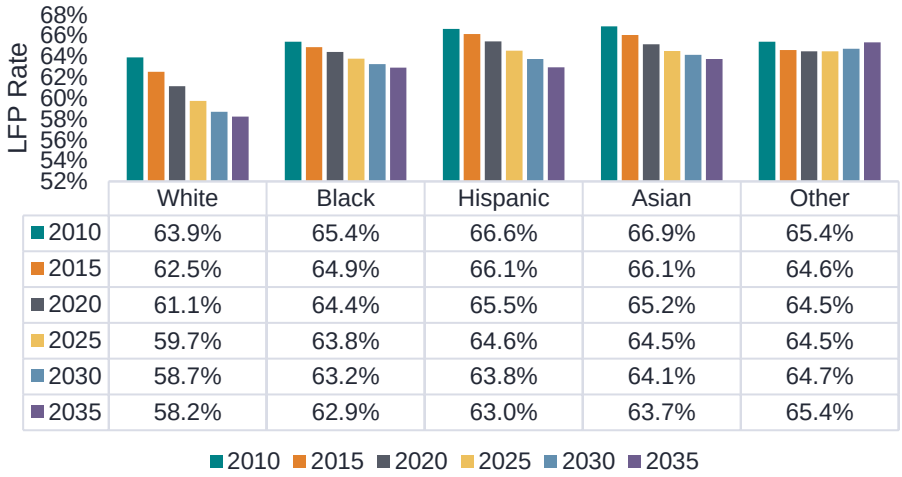
[174] "Immigrants in the United States," American Immigration Council, September 21, 2021, Accessed May 2022, https://www.americanimmigrationcouncil.org/research/immigrants-in-the-united-states#

A 2015 report by the Pew Research Center, however, found that the share of Hispanics five years or older in the United States who spoke English proficiently increased from 59.0% to 68.0% from 2000 to 2013. Over the same period, the percentage of Hispanics five years or older who spoke Spanish at home fell from 78% in 2000 to 73% in 2013.[175]

As noted in Section 2.10, the ability to speak more than one language may provide benefits to employees, employers, and the state. Some studies have found that multilingual employees can earn higher wages than monolingual employees. Multilingualism provides a competitive advantage in non-English speaking countries, opens new potential markets and business partners, and allows organizations and workers to benefit from experts tied to other countries.[176] While multilingualism provides benefits, Texas must also take steps to preserve its unique language and culture, which experts suggest are still crucial in business.[177]

Despite the expected growth for all race and ethnic groups, LFP rates are expected to decline for all of these groups except Others. Specifically, the participation rate for Others is expected to decline slightly from 65.4% in 2010 to 64.4% in 2027 but recover to its previous level by 2035.

Figure 3.7: LFP Rates in Texas Forecasted to Fall for All Race and Ethnic Groups Except Other



	White	Black	Hispanic	Asian	Other
2010	63.9%	65.4%	66.6%	66.9%	65.4%
2015	62.5%	64.9%	66.1%	66.1%	64.6%
2020	61.1%	64.4%	65.5%	65.2%	64.5%
2025	59.7%	63.8%	64.6%	64.5%	64.5%
2030	58.7%	63.2%	63.8%	64.1%	64.7%
2035	58.2%	62.9%	63.0%	63.7%	65.4%

Source: Texas Demographic Center

The decline in labor force participation rates may stem from a lack of educational attainment among racial and ethnic groups. Labor force participation levels rise with higher educational attainment.[178] According to Census's 2020 American Community Survey, 16% of Hispanics in Texas had a bachelor's degree or higher, compared to Asians (59.3%), whites (39.4%), and Blacks (25.6%). The level of educational attainment in Texas has improved slightly compared to 2019 and, with the exception of Hispanics, is greater than the national average in 2020.

Improving the accessibility and quality of education for all race and ethnic groups may help raise the LFP rates for Texas. Many jobs in the United States require postsecondary education or training outside of high school and that number is likely to grow in the future. These jobs also typically pay higher wages than those that only require high school diplomas.[179]

[175] Jens Krogstad et al., "English Proficiency on the Rise Among Latinos," Pew Research Center, May 12, 2015, Accessed May 2022, https://www.pewresearch.org/hispanic/2015/05/12/english-proficiency-on-the-rise-among-latinos/

[176] https://smallbiztrends.com/2019/06/multilingual-workforce.html

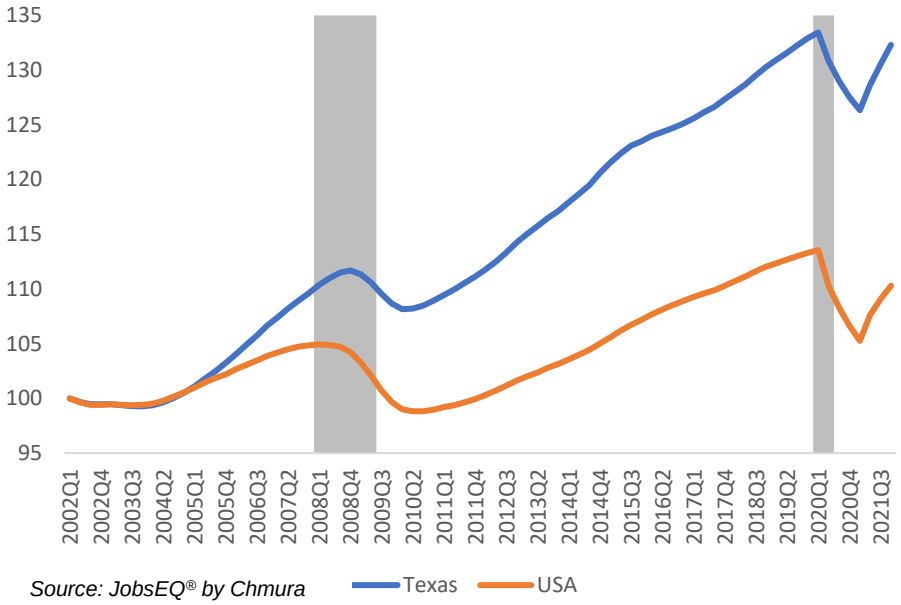
[177] https://www.leadwithlanguages.org/wp-content/uploads/MakingLanguagesOurBusiness_FullReport.pdf

[178] Vernon Brundage, Jr., "Profile Of The Labor Force By Educational Attainment," BLS, August 2017, Accessed May 2022, https://www.bls.gov/spotlight/2017/educational-attainment-of-the-labor-force/pdf/educational-attainment-of-the-labor-force.pdf

[179] Kathleen Coulombe and William Gill, "The Changing U.S. Workforce: The Growing Hispanic Demographic and the Workplace," SHRM, September 2016, Accessed May 2022, https://www.shrm.org/hr-today/public-policy/hr-public-policy-issues/documents/15-0746%20chci_research_report_fnl.pdf

3.2 Industry Analysis

Figure 3.8 Total Employment in Texas Increased at an Average Annual Rate of 1.5% from 2002Q1 to 2021Q4



Source: JobsEQ® by Chmura

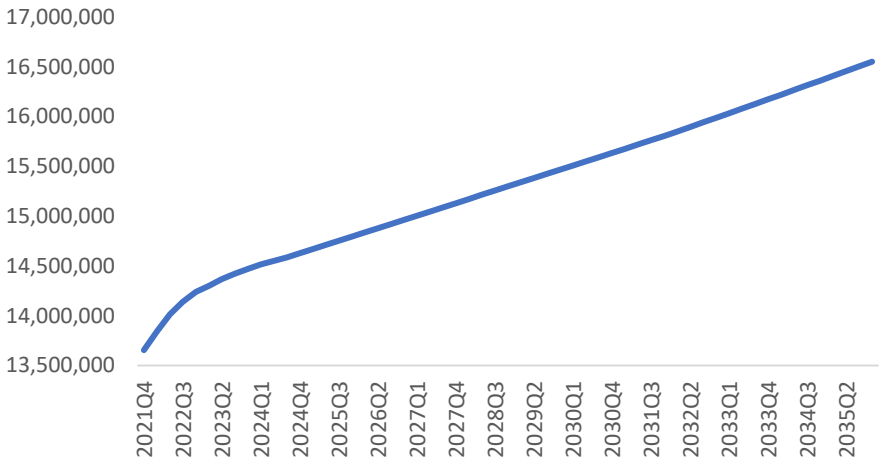
The industry mix and employment growth in Texas reflect a robust economy that is expected to continue growing at a strong pace. In fact, infrastructure, low cost of doing business, strong workforce, and business-friendly policies are among the qualities that put Texas in the top four ranking of "America's Top States for Business" over each of the last ten years according to CNBC.[180]

Based on Site Selection Magazine's analysis, the pipeline for continued growth in Texas remains strong. In 2021, Texas won its tenth straight "Governor's Cup" as "the state with the most qualified capital investment projects the previous calendar year."[181] Charles Schwab, Oracle, Hewlett Packard Enterprise, and Tesla are just a few companies that have moved their headquarters to Texas in recent years. Currently, 49 Fortune 500 companies call Texas home.

[180] "America's Top States for Business in 2019," CNBC, January 27, 2020, Accessed May 2022, https://www.cnbc.com/top-states-past-year-rankings/

[181] "The 2021 Governor's Cups," Site Selection Magazine, March 2022, Accessed May 2022, https://siteselection.com/issues/2022/mar/the-2021-governors-cups.cfm

Figure 3.9 Total Employment in Texas is Projected to Reach 16.6 Million by 2035



Source: JobsEQ® by Chmura

For most of the past two decades, employment growth in Texas has outpaced that of the nation. From the first quarter of 2002 through the fourth quarter of 2021, employment rose 32.3% in Texas for an annual average growth rate of 1.4% compared with 10.3% and 0.5%, respectively, in the nation (Figure 3.8). Similar to the nation, employment in Texas declined sharply during the COVID-19 pandemic. In the four quarters ending with the second quarter of 2020, employment fell 7.8% from a year earlier in Texas compared with an 11.4% loss in the nation over the same period.

Although employment in Texas remains below its pre-pandemic peak, it has been recovering quicker than in the nation. Employment peaked at 13.8 million in the first quarter of 2020 and fell by 117,08 jobs (-0.9%) to 13.7 million in the fourth quarter of 2021. Over the same period, employment fell 2.9% in the nation. As of the fourth of 2021, Texas has recovered an estimated 84% of the jobs lost during the pandemic, compared with 61% in the nation.

Total employment in Texas was 13.7 million as of the fourth quarter of 2021. From 2021 to 2035, employment in Texas is projected to grow at an average annual rate of 1.4% (Figure 3.9). Total employment will reach 16.6 million in 2035—a net gain of 2.9 million jobs over 14 years. The health care and social assistance sector in Texas employed the largest percentage of workers in 2021 at 12.9% (Table 3.3). It was followed by retail trade (10.4%); educational services (9.0%); and accommodation and food services (8.7%). Similar to the rest of the nation, the health care and social assistance proportion of employment in Texas is expected to increase by 2035, in part due to the aging population as described in Section 3.1.2 of this report. Also, similar to the nation, retail trade's proportion of employment in Texas is expected to decline by 2035 as increased use of technology and a shift toward online purchases reduce employment. Table 3.4 is color-coded green to show sectors where the employment share is increasing, red where it is decreasing, and gold where it is un-changed between 2021 and 2035.

Based on location quotient (LQ),[182] Texas is highly specialized in mining, quarrying, and oil and gas extraction with an LQ of 3.96. The presence of the Permian Basin, the largest petroleum-producing basin in the United States, is the main contributor to the state's special-ization. Other sectors in Texas with high LQs are utilities (1.20), and construction (1.19).

[182] The location quotient (LQ) is a measure of the relative size of an industry in a region compared to the average size in the nation. An LQ of 1.0 indicates an industry is the same size in the region as is average in the nation; an LQ of 2.0 means the industry is twice as large in the region compared to average; and an LQ of 1/2 indicates the industry is half as large regionally as average in the nation. By formula, the location quotient is the ratio of an industry's share of total employment within the region to the same industry's share of employment in the nation.

Gross Domestic Product (GDP) is a broader measure of economic activity than employment because it takes into account the total value added[183] created in an economy. The two largest sectors of the Texas economy, in terms of contribution to the state's GDP, are manufacturing and real estate and rental and leasing. Manufacturing makes up 12.8% of Texas's GDP while the real estate and rental and leasing sector makes up 10.1%.[184] The relatively high wages in both of those sectors contribute to its high GDP ranking. The average annual wages in manufacturing was $81,333 in the fourth quarter of 2021 in Texas compared with $70,743 in real estate and rental and leasing and $62,939 for all industries.

Table 3.4 Health Care and Social Assistance Employs the Largest Percentage of People in Texas

NAICS	Sectors	Employment		LQ	GDP (2020)	Avg. Annual Wages (2021Q4)
		2021	2035			
62	Health Care and Social Assistance	12.9%	14.2%	0.89	7.6%	$56,572
44--45	Retail Trade	10.4%	9.0%	1.00	5.5%	$40,090
61	Educational Services	9.0%	8.7%	1.12	5.7%	$52,598
72	Accommodation and Food Services	8.7%	9.2%	1.09	2.3%	$23,286
54	Professional, Scientific, and Technical Services	7.3%	8.0%	1.01	7.5%	$101,535
56	Administrative and Support and Waste Management and Remediation Services	7.1%	7.1%	1.10	3.4%	$51,338
23	Construction	7.0%	6.8%	1.19	5.2%	$63,749
31-33	Manufacturing	6.6%	6.2%	0.81	12.8%	$81,333
48-49	Transportation and Warehousing	5.1%	5.2%	1.03	4.1%	$60,021
52	Finance and Insurance	4.4%	4.4%	1.08	6.8%	$105,289
42	Wholesale Trade	4.4%	4.3%	1.18	7.9%	$94,206
81	Other Services (except Public Administration)	4.3%	4.5%	1.00	2.0%	$36,934
92	Public Administration	3.4%	3.3%	0.72	3.0%	$69,518
53	Real Estate and Rental and Leasing	1.9%	1.9%	1.10	10.1%	$70,743
51	Information	1.6%	1.7%	0.82	3.7%	$105,885
21	Mining, Quarrying, and Oil and Gas Extraction	1.4%	1.4%	3.96	6.9%	$129,693
71	Arts, Entertainment, and Recreation	1.3%	1.6%	0.76	0.7%	$37,264
11	Agriculture, Forestry, Fishing and Hunting	1.2%	1.0%	0.87	0.5%	$30,251
55	Management of Companies and Enterprises	1.1%	1.1%	0.73	1.4%	$146,376
22	Utilities	0.6%	0.6%	1.20	1.9%	$99,267
	Total-All Industries	**100%**	**100%**	**1.00**	**100%**	**$62,939**

Source: JobsEQ® by Chmura

As of the fourth quarter of 2021, the health care and social assistance sector in Texas employed the most workers, accounting for 1.8 million people, followed by retail trade (1.4 million), educational services (1.2 million), and accommodation and food services (1.2 million).[185] From 2021 to 2035, the fastest-growing sector in Texas is projected to be the arts, entertainment, and recreation, increasing at an average annual rate of 2.7% (adding 81,813 new jobs); followed by professional, scientific, and technical services (2.1%, 328,424 new jobs); and health care and social assistance (2.0%, 575,422 new jobs).

The growth in Texas's employment will be disproportionately concentrated between 2021 to 2024, as Texas continues to recover from disruptions caused by the COVID-19 pandemic. From 2021 to 2024, employment in Texas is projected to grow by 958,359 jobs, an average increase of 2.3% per year. Over this period, the fastest-growing sector in Texas is expected to be arts, entertainment, and recreation, increasing at an average annual rate of 6.3% (adding 36,546); followed by mining, quarrying, and oil and gas extractions

$$LQ = \frac{Employment\_in\_industry\_I\_in\_area\_J \,/\, Total\_employment\_in\_area\_J}{U.S.\_employment\_in\_industry\_I \,/\, Total\_U.S.\_employment}$$

[183] Value added is made up of employee compensation, corporate profits, other income such as interest or rent, and taxes paid.

[184] All GDP estimates are presented in current dollars, not adjusted for inflation.

[185] To examine the industrial structure, total employment is organized into sectors based on a designated two-digit North American Industry Classification System (NAICS) code.

(5.4%, 31,399 new jobs). The accommodation and food services sector is projected to add the largest number of jobs (194,526 or 5.2% average annual increase), followed by health care and social assistance (121,092, or 2.2% average annual increase).

From 2024 to 2035, employment in Texas is expected to return to long-term growth trends with all major sectors expanding. Over this period, employment in Texas is projected to grow by 1.9 million jobs, an average increase of 1.1% per year. The fastest-growing sector over this period is expected to be health care and social assistance, increasing at an average annual rate of 2.0% (adding 454,330 new jobs), followed by professional, scientific, and technical services (1.9%, 248,532 new jobs).

Table 3.5 The Health Care and Social Assistance Sector is Projected to Add the most Jobs from 2021 to 2035

NAICS	Sectors	Employment					
		2021	2024	2035	Change (2021-2035)	Avg. Annual (2021-2024)	Avg. Annual (2024-2035)
62	Health Care and Social Assistance	1,766,097	1,887,189	2,341,519	575,422	2.2%	2.0%
44-45	Retail Trade	1,416,905	1,455,141	1,490,401	73,496	0.9%	0.2%
61	Educational Services	1,232,434	1,316,592	1,433,220	200,786	2.2%	0.8%
72	Accommodation and Food Services	1,189,144	1,383,670	1,512,880	323,736	5.2%	0.8%
54	Professional, Scientific, and Technical Services	992,961	1,072,853	1,321,385	328,424	2.6%	1.9%
56	Administrative and Support and Waste Management and Remediation Services	963,533	1,031,760	1,170,741	207,208	2.3%	1.2%
23	Construction	959,939	998,749	1,124,077	164,138	1.3%	1.1%
31-33	Manufacturing	901,374	945,324	1,017,017	115,643	1.6%	0.7%
48-49	Transportation and Warehousing	701,817	760,268	857,749	155,932	2.7%	1.1%
52	Finance and Insurance	607,396	633,714	729,534	122,138	1.4%	1.3%
42	Wholesale Trade	604,949	641,748	704,464	99,515	2.0%	0.9%
81	Other Services (except Public Administration)	589,863	637,698	739,039	149,176	2.6%	1.3%
92	Public Administration	466,582	477,773	538,591	72,009	0.8%	1.1%
53	Real Estate and Rental and Leasing	263,436	278,775	312,819	49,383	1.9%	1.1%
51	Information	224,265	242,602	284,062	59,797	2.7%	1.4%
21	Mining, Quarrying, and Oil and Gas Extraction	184,366	215,765	235,462	51,096	5.4%	0.8%
71	Arts, Entertainment, and Recreation	182,527	219,073	264,340	81,813	6.3%	1.7%
11	Agriculture, Forestry, Fishing and Hunting	160,524	166,369	168,658	8,134	1.2%	0.1%
55	Management of Companies and Enterprises	149,668	159,897	176,497	26,829	2.2%	0.9%
22	Utilities	85,171	86,496	91,183	6,012	0.5%	0.5%
	Total All industries	**13,654,334**	**14,612,693**	**16,550,717**	**2,896,383**	**2.3%**	**1.1%**

Source: JobsEQ® by Chmura

The 10 largest employers in Texas reflect the diversity of its economy (Table 3.6). Dell Technologies, Ericsson, Oracle, and Infosys represent information technology companies. Fort Bliss highlights the importance of the Department of Defense in the state. Mary Kay Holding Corporation is an iconic brand for skin care products. Southwest Airlines represents air travel while Texas A&M University and

The University of Texas at Austin show the importance of higher education in the state. Finally, USAA Federal Savings Bank is one of many financial institutions in Texas.

3.2.1 Target Industry Clusters

Texas Economic Development Corporation targets eight industry clusters[186] for attraction into the state.[187] For the most part, these clusters are contained in the following sectors that are listed here based on largest to smallest employment: health care and social assistance; professional, scientific, and technical services; manufacturing; information; and mining quarrying and oil and gas extraction. In light of the importance of these sectors to Texas, additional detail is provided below. From 2021 to 2035, all of these sectors are projected to grow at a faster pace when compared to the nation.

Table 3.6 Dell Technologies Inc. is One of the Largest Employers in Texas (Each Employ 10,000 or More Workers)

Employer
Dell Technologies Inc.
Ericsson Inc.
Fort Bliss
Infosys Limited
Mary Kay Holding Corporation
Oracle Corporation
Southwest Airlines Company
Texas A&M University
The University of Texas at Austin
USAA Federal Savings Bank

Source: DatabaseUSA, accessed through JobsEQ 2022Q2

[186] Those industry clusters are advanced manufacturing; aerospace, aviation and defense; biotechnology and life sciences; energy; information technology; petroleum refining and chemical products; corporate services; and creative industry.

[187] "Target Industry Clusters," Texas Economic Development Corporation, Accessed May 2022, **https://gov.texas.gov/business/page/target-industries**

3.2.2 Health Care and Social Assistance

Texas has the third-largest elderly population of individuals aged 65 and older in the U.S and is home to 5.2 million baby boomers (29.1% of the labor force).[188] Additionally, the projected fast-growing population of Texas, described in Section 3.1.1 of this report, will lead to increased demand for healthcare and social services. In 2020, the health care and social assistance sector contributed 7.6% of Texas's GDP. The average annual wage in the health care and social assistance sector was $56,572 in the fourth quarter of 2021 in Texas. The largest industry in this sector is general medical and surgical hospitals with 402,301 workers, followed by home health care services (275,243) and offices of physicians (253,253).

As baby boomers retire and the population continues to age, demand for healthcare and social services will increase. Table 3.7 shows that all the industries in Texas that make up this sector by four-digit NAICS are expected to grow over the forecasted period. The table is ranked based on the percentage increase in employment from 2021 to 2035. Employment in the health care and social assistance sector is projected to grow from 1.8 million workers in 2021 to 2.3 million workers in 2035, an average annual rate of 2.0%—compared with 1.4% in the nation. Home healthcare services are expected to add the largest number of jobs (120,769, or 2.6% average annual increase), followed by individual and family services (110,676, or 3.9% average annual increase), general medical and surgical hospitals (76,592, or 1.3% average annual increase), and offices of physicians (63,517, or 1.6% average annual increase).

The LQ for the health care and social assistance sector in Texas is 0.89. The industry with the highest LQ is home health care services, at 1.89. The large elderly population in Texas seeking care from the convenience and comfort of their own homes is the main reason for the state's specialization. Other industries with high LQs are specialty (except psychiatric and substance abuse) hospitals (1.86), and other ambulatory health care services (1.02).

Table 3.7 Individual and Family Services is Projected to be the Fastest Growing Industry from 2021 to 2035

NAICS	Industries	2021	2035	Employment Change (2021-2035)	Avg. Annual (2021-2035)	LQ	Avg. Annual Wages (2021Q4)
6241	Individual and Family Services	157,389	268,065	110,676	3.9%	0.61	$30,561
6233	Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	50,444	78,372	27,928	3.2%	0.64	$32,266
6215	Medical and Diagnostic Laboratories	26,899	39,588	12,689	2.8%	0.98	$69,149
6213	Offices of Other Health Practitioners	90,320	131,068	40,748	2.7%	0.86	$51,351
6219	Other Ambulatory Health Care Services	31,482	45,459	13,977	2.7%	1.02	$56,314
6214	Outpatient Care Centers	66,977	96,707	29,730	2.7%	0.72	$66,830
6216	Home Health Care Services	275,243	396,012	120,769	2.6%	1.89	$24,527
6223	Specialty (except Psychiatric and Substance Abuse) Hospitals	44,583	60,089	15,506	2.2%	1.86	$90,793
6232	Residential Intellectual and Developmental Disability, Mental Health, and Substance Abuse Facilities	39,327	52,956	13,629	2.1%	0.63	$42,117
6222	Psychiatric and Substance Abuse Hospitals	18,306	23,983	5,677	1.9%	0.86	$48,279
6242	Community Food and Housing, and Emergency and Other Relief Services	13,128	17,039	3,911	1.9%	0.75	$44,283
6211	Offices of Physicians	253,253	316,770	63,517	1.6%	1.00	$100,055
6244	Child Day Care Services	91,806	110,963	19,157	1.4%	0.97	$23,608
6221	General Medical and Surgical Hospitals	402,301	478,893	76,592	1.3%	0.76	$73,863
6212	Offices of Dentists	83,766	99,209	15,443	1.2%	0.95	$57,194
6231	Nursing Care Facilities (Skilled Nursing Facilities)	91,102	100,470	9,368	0.7%	0.72	$40,521
6243	Vocational Rehabilitation Services	16,260	17,730	1,470	0.6%	0.62	$34,080
6239	Other Residential Care Facilities	13,512	13,606	94	0.0%	0.91	$54,633
62	**Total-Health care and Social Assistance**	**1,766,097**	**2,341,519**	**575,422**	**2.0%**	**0.89**	**$56,572**

Source: JobsEQ® by Chmura

[188] "Impact of the baby boomer generation," *Texas Labor Market and Career Information,* Accessed May 2022, ***https://lmci.state.tx.us/shared/workingtexasstyle/WTS_Chapter_01.pdf***

Table 3.8 lists the 10 largest health care and social assistance employers in Texas. University of Texas Medical ranked first with 10,000 or more employees, followed by the Baptist Health System and Baylor College of Medicine with 5,000 to 9,999 employees each.

Table 3.8 University of Texas Medical is the Largest Employer in the Health Care and Social Assistance Industry

Employer	Employment
University of Texas Medical BR	10,000 or more
Baptist Health System Inc	5,000 to 9,999
Baylor College of Medicine- Department of Anesthesiology Pediatric Division	5,000 to 9,999
Baylor Scott & White Health LLC	5,000 to 9,999
Country Care Manor	5,000 to 9,999
Harris Health System	5,000 to 9,999
MD Anderson Cancer Center	5,000 to 9,999
Memorial Hermann Greater Heights Hospital	5,000 to 9,999
Methodist Hospital	5,000 to 9,999
Scott & White Medical Center - Temple	5,000 to 9,999

Source: DatabaseUSA, accessed through JobsEQ 2022Q2

3.2.3 Professional, Scientific, and Technical Services

In 2020, the professional, scientific, and technical services sector contributed 7.6% of Texas's GDP. The average annual wage in the sector was $101,535 in the fourth quarter of 2021 in Texas. The largest industry in the professional, scientific, and technical services sector is computer systems design and related services with 241,904 workers, followed by management, scientific, and technical consulting services (197,990); and architectural, engineering, and related services (173,154).

Texas's business-friendly climate and increased remote work flexibility are expected to lead to an increase in employment in the professional, scientific, and technical services sector as some workers move to regions with lower taxes. Table 3.9 shows that all the industries in Texas that make up this sector by four-digit NAICS are expected to grow over the forecasted period. Employment in the professional, scientific, and technical services sector is projected to grow from 992,961 workers in 2021 to 1.3 million workers in 2035, an average annual rate of 2.1%—compared with 0.9% in the nation. Over this period, the fastest-growing industry is expected to be computer systems design and related, increasing at an average annual rate of 3.3% (adding 137,435 new jobs), followed by management, scientific, and technical consulting services (2.8%, or 92,580 new jobs).

The professional, scientific, and technical services sector LQ in Texas is 1.01. The highest LQ by industry is management, scientific, and technical consulting services; and architectural, engineering, and related services—both with an LQ of 1.18. The third highest industry LQ is computer systems design and related services (1.14).

Table 3.9 Computer Systems Design and Related Services is Projected to be the Fastest Growing Industry from 2021 to 2035

NAICS	Industries	Employment				LQ	Avg. Annual Wages (2021Q4)
		2021	2035	Change (2021-2035)	Avg. Annual (2021-2035)		
5415	Computer Systems Design and Related Services	241,904	379,339	137,435	3.3%	1.14	$126,257
5416	Management, Scientific, and Technical Consulting Services	197,990	290,570	92,580	2.8%	1.18	$100,755
5419	Other Professional, Scientific, and Technical Services	91,418	116,033	24,615	1.7%	0.91	$60,477
5418	Advertising, Public Relations, and Related Services	33,706	42,024	8,318	1.6%	0.77	$78,565
5417	Scientific Research and Development Services	32,174	39,900	7,726	1.5%	0.43	$122,588
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	104,401	121,407	17,006	1.1%	1.00	$75,986

Table 3.9 Computer Systems Design and Related Services is Projected to be the Fastest Growing Industry from 2021 to 2035

NAICS	Industries	Employment 2021	Employment 2035	Employment Change (2021-2035)	Employment Avg. Annual (2021-2035)	LQ	Avg. Annual Wages (2021Q4)
5411	Legal Services	102,624	118,911	16,287	1.1%	0.93	$108,953
5414	Specialized Design Services	15,589	18,002	2,413	1.0%	0.80	$61,122
5413	Architectural, Engineering, and Related Services	173,154	198,437	25,283	1.0%	1.18	$104,684
54	**Total-Professional, Scientific, and Technical Services**	**992,961**	**1,321,385**	**328,424**	**2.1%**	**1.01**	**$101,535**

Source: JobsEQ® by Chmura

Table 3.10 lists the 10 largest professional, scientific, and technical services sector employers in Texas. Dell Technologies Inc, Ericsson Inc, Infosys Limited, and Oracle Corporation ranked at the top with 10,000 or more employees.

Table 3.10 Dell Technologies Inc is One of the Largest Employers in the Professional, Scientific, and Technical Services Industry in Texas

Employer	Employment
Dell Technologies Inc	10,000 or more
Ericsson Inc	10,000 or more
Infosys Limited	10,000 or more
Oracle Corporation	10,000 or more
Fluor Corporation	5,000 to 9,999
HKS Inc	5,000 to 9,999
iHeartMedia Inc	5,000 to 9,999
KBR Inc	5,000 to 9,999
Memorial Hermann Health System	5,000 to 9,999
NTT Data Services	5,000 to 9,999

Source: DatabaseUSA, accessed through JobsEQ 2022Q2

3.2.4 Manufacturing

Unlike most states in the nation, manufacturing employment in Texas has grown over the past few decades.[189] As Texas Comptroller Glenn Hegar summarized, "the state's resources make it a natural leader in petroleum and chemical manufacturing, our research institutions have fostered computer-related and other high-tech manufacturing, and our business-friendly environment and skilled labor force have helped create a dynamic automotive manufacturing sector."[190] In 2020, manufacturing was the largest contributor to Texas's economy, making up 12.8% of its GDP. The average annual wages in manufacturing was $81,333 in the fourth quarter of 2021 in Texas.

As of the fourth quarter of 2021, the largest manufacturing industry is aerospace product and parts manufacturing with 51,094 workers, followed by architectural and structural metals manufacturing (46,213); and semiconductor and other electronic component manufacturing (42,393). The presence of two of the largest airlines (Southwest and American), 15 active military bases, and NASA's Johnson Space Center make Texas a leader in aerospace, product, and parts manufacturing—third in the nation for aerospace product and parts manufacturing firms and fourth for exports.[191]

The opening of Tesla's Gigafactory in Austin and the influx of other companies such as Raytheon and DeLorean will boost demand for manufacturing workers over the next several years. Table 3.11 ranks the fastest-growing manufacturing industries (four-digit NAICS) in Texas based on the percentage increase in employment from 2021 to 2035 that employ a minimum of 1,000 workers. Employment in the manufacturing sector is expected to grow from 901,374 workers in 2021 to 996,984 workers in 2035 at an average annual rate of 0.7%—compared with 0.1% in the nation. Over this period, architectural and structural metals manufacturing is projected to add the largest number of jobs (7,137, or 1.0% average annual increase), followed by motor vehicle manufacturing (5,729, or 2.6% average annual increase).

[189] Bruce Wright, "Texas Manufacturing: The Changing World of Made in Texas," Texas Comptroller's Office, March 2018, Accessed May 2022, https://comptroller.texas.gov/economy/fiscal-notes/2018/march/manufacturing.php

[190] "Good for Texas Tour," Texas Comptroller's Offrice, August 14, 2017, Accessed May 2022 https://comptroller.texas.gov/about/media-center/media-kit/manufacturing.php

[191] "Target Industry Clusters," Texas Economic Development Corporation, Accessed May 2022, https://gov.texas.gov/business/page/target-industries

The manufacturing sector LQ in Texas is 0.81. Within manufacturing, communications equipment has the highest LQ at 1.51. Other industries in Texas with high LQs are architectural and structural metals manufacturing (1.34), and computer and peripheral equipment manufacturing (1.33).

Table 3.11 Motor Vehicle Manufacturing is projected to be the Fastest Growing Industry from 2021 to 2035

NAICS	Industries	2021	2035	Employment Change (2021-2035)	Avg. Annual (2021-2035)	LQ	Avg. Annual Wages (2021Q4)
3361	Motor Vehicle Manufacturing	13,415	19,144	5,729	2.6%	0.59	$97,700
3342	Communications Equipment Manufacturing	11,439	14,483	3,044	1.7%	1.51	$156,608
3119	Other Food Manufacturing	13,682	17,280	3,598	1.7%	0.63	$53,294
3359	Other Electrical Equipment and Component Manufacturing	6,961	8,762	1,801	1.7%	0.55	$81,063
3336	Engine, Turbine, and Power Transmission Equipment Manufacturing	4,601	5,672	1,071	1.5%	0.59	$78,335
3341	Computer and Peripheral Equipment Manufacturing	18,367	22,491	4,124	1.5%	1.33	$186,970
3212	Veneer, Plywood, and Engineered Wood Product Manufacturing	5,389	6,592	1,203	1.5%	0.74	$65,096
3121	Beverage Manufacturing	19,089	23,091	4,002	1.4%	0.74	$57,292
3333	Commercial and Service Industry Machinery Manufacturing	2,283	2,747	464	1.3%	0.30	$74,757
3254	Pharmaceutical and Medicine Manufacturing	13,983	16,740	2,757	1.3%	0.48	$108,099
3118	Bakeries and Tortilla Manufacturing	22,830	27,128	4,298	1.2%	0.81	$39,921
3353	Electrical Equipment Manufacturing	8,995	10,650	1,655	1.2%	0.73	$77,683
3372	Office Furniture (including Fixtures) Manufacturing	5,313	6,280	967	1.2%	0.60	$50,786
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	20,811	24,562	3,751	1.2%	0.57	$103,851
3391	Medical Equipment and Supplies Manufacturing	14,805	17,218	2,413	1.1%	0.52	$66,476
3332	Industrial Machinery Manufacturing	7,202	8,358	1,156	1.1%	0.68	$107,404
3323	Architectural and Structural Metals Manufacturing	46,213	53,350	7,137	1.0%	1.34	$61,552
3314	Nonferrous Metal (except Aluminum) Production and Processing	3,513	4,049	536	1.0%	0.70	$78,389
3255	Paint, Coating, and Adhesive Manufacturing	6,262	7,209	947	1.0%	1.07	$79,082
3111	Animal Food Manufacturing	3,933	4,527	594	1.0%	0.65	$71,227
31-33	**Total-Manufacturing**	**901,374**	**996,984**	**95,610**	**0.7%**	**0.81**	**$81,333**

Source: JobsEQ® by Chmura

In 2019, Texas ranked second in the nation based on the number of manufacturing firms with 25,401 companies.[192] Table 3.12 lists the 10 largest manufacturing employers in Texas. Ericsson Inc. ranked first with over 10,000 employees, followed by Nokia Corporation, PepsiCo Inc, and Toshiba with 5,000 to 9,999 employees each.

Table 3.12 Ericsson Inc. is the Largest Employer in the Manufacturing Industry

Employer	Employment
Ericsson Inc	10,000 or more
Nokia Corporation	5,000 to 9,999
PepsiCo Inc	5,000 to 9,999
Toshiba	5,000 to 9,999
Advanced Micro Devices Inc	1,000 to 4,999
Alcon Inc.	1,000 to 4,999
Apple Inc.	1,000 to 4,999
ATCO Rubber Products	1,000 to 4,999
Baker Hughes Company	1,000 to 4,999
Bechtel	1,000 to 4,999

Source: DatabaseUSA, accessed through JobsEQ 2022Q2

3.2.5 Information

The information sector in Texas is projected to grow with companies such as Oracle and Hewlett Packard among the technology firms that have recently announced plans to move their headquarters to the state. In 2020, the information sector contributed 3.7% of Texas's GDP. The average annual wages in the information sector was $105,885 in the fourth quarter of

[192] "Target Industry Clusters," Texas Economic Development Corporation, Accessed May 2022, https://gov.texas.gov/business/page/target-industries

2021 in Texas. The largest industry in this sector is wired and wireless telecommunications carriers with 66,357 workers, followed by data processing, hosting, and related services (42,438); software publishers (31,447); other information services (22,935); and motion picture and video industries (19,417).

In March 2020, many companies across the U.S closed their offices and asked employees to work from home because of the pandemic. This led to an increased reliance on collaborative software such as video conferencing. Table 3.13 shows the industries within the information sector at the four-digit NAICS in Texas ranked by the fastest increase in employment from 2021 through 2035. Employment in the information sector is projected to grow from 224,265 workers in 2021 to 284,062 workers in 2035 an average annual rate of 1.7%—compared with 0.9% in the nation. Over this period, the fastest-growing industry is expected to be motion picture and video industries, increasing at an average annual rate of 5.4% (adding 21,108 new jobs), followed by other information services (3.3%, or 14,266 new jobs), software publishers (2.7%, or 14,192 new jobs), and data processing, hosting, and related services (2.1%, or 12,963 new jobs).

The information sector LQ in Texas is 0.82. The industry with the highest LQ is other telecommunications at 1.49. LQs are also high in wired and wireless telecommunications carriers (1.28), data processing, hosting, and related services (1.17), and satellite telecommunications (1.06).

Table 3.13 Motion Picture and Video Industries is Projected to be the Fastest Growing Industry from 2021 to 2035

NAICS	Industries	2021	2035	Employment Change (2021-2035)	Avg. Annual (2021-2035)	LQ	Avg. Annual Wages (2021Q4)
5121	Motion Picture and Video Industries	19,417	40,525	21,108	5.4%	0.56	$41,453
5191	Other Information Services	22,935	35,898	14,266	3.3%	0.50	$99,681
5112	Software Publishers	31,447	45,713	14,192	2.7%	0.64	$158,171
5182	Data Processing, Hosting, and Related Services	42,438	56,630	12,963	2.1%	1.17	$133,318
5151	Radio and Television Broadcasting	12,605	15,734	3,129	1.6%	0.72	$77,647
5122	Sound Recording Industries	1,830	2,278	448	1.6%	0.64	$46,460
5152	Cable and Other Subscription Programming	1,050	1,195	145	0.9%	0.25	$71,093
5179	Other Telecommunications	10,823	10,624	(199)	-0.1%	1.49	$94,201
5111	Newspaper, Periodical, Book, and Directory Publishers	14,563	14,269	(294)	-0.1%	0.64	$74,055
5173	Wired and Wireless Telecommunications Carriers	66,357	63,543	(2,814)	-0.3%	1.28	$99,316
5174	Satellite Telecommunications	799	739	(60)	-0.6%	1.06	$117,784
51	**Total-Information**	**224,265**	**284,062**	**59,797**	**1.7%**	**0.82**	**$105,885**

Source: JobsEQ® by Chmura

Table 3.14 lists the 10 largest information employers in Texas. AT&T Communications LLC and iHeartMedia Inc ranked at the top with 5,000 to 9,999 employees.

Table 3.14 AT&T Communications is One of the Largest employers in the Information Industry in Texas

Employer	Employment
AT&T Communications LLC	5,000 to 9,999
iHeartMedia Inc	5,000 to 9,999
Exela Technologies	1,000 to 4,999
Google	1,000 to 4,999
Hess Corporation Exploration & Production	1,000 to 4,999
Lone Star College- North Harris College Library	1,000 to 4,999
Rackspace Technology	1,000 to 4,999
Sabre Corporation	1,000 to 4,999
Siemens Plm Software	1,000 to 4,999
Tech Mahindra Ltd	1,000 to 4,999

Source: DatabaseUSA, accessed through JobsEQ 2022Q2

3.2.6 Mining, Quarrying, and Oil and Gas Extraction

Texas is the top crude oil and natural gas producer in the nation. In 2020, Texas accounted for 43% of the nation's crude oil production and 26% of its marketed natural gas production.[193] The mining, quarrying, and oil and gas extraction sector contributed 6.9% of Texas's GDP in 2020. The average annual wage in the mining, quarrying, and oil and gas extraction sector was $129,693 in the fourth quarter of 2021 in Texas. The largest industry in this sector is support activities for mining with 107,287 workers, followed by oil and gas extraction (64,864); and nonmetallic mineral mining and quarrying (10,644).

The Russian invasion of Ukraine has increased the United States' reliance on gas produced in Texas. As the U.S. looks to increase production, hiring in the sector will increase in the short run but return to long-term growth trends as geopolitical tensions ease. Table 3.15 shows the fastest-growing mining, quarrying, and oil and gas extraction industries (four-digit NAICS) in Texas from 2021 to 2035. Employment in the mining, quarrying, and oil and gas extraction sector is projected to grow from 184,366 workers in 2021 to 235,462 workers in 2035, an average annual rate of 1.8%—compared with 1.0% in the nation. Over this period, support activities for mining is expected to add the largest number of jobs, 48,499, which will account for 95% of the employment growth in the mining, quarrying, and oil and gas extraction sector, followed by nonmetallic mineral mining and quarrying (2,219, or 1.4% average annual increase); and oil and gas extraction (1,446, or 0.2% average annual increase). From 2021 to 2035, coal mining is projected to experience modest declines in employment as the state's abundance of natural gas and proliferation of wind energy infrastructure limits the need for fossil fuel produced by coal.

Texas is highly specialized in mining, quarrying, and oil and gas extraction; with an LQ of 1.24. The industry with the highest LQ is oil and gas extraction, with an LQ of 5.94. The presence of the Permian Basin, the largest petroleum-producing basin in the United States, is the main contributor to the state's specialization. Other mining, quarrying, and oil and gas extraction industries in Texas with high LQs are support activities for mining (5.34) and nonmetallic mineral mining and quarrying (1.25).

Table 3.15 Support Activities for Mining is Projected to be the Fastest Growing Industry from 2021 to 2035

NAICS	Industries	Employment					Avg. Annual Wages (2021Q4)
		2021	2035	Change (2021-2035)	Avg. Annual (2021-2035)	LQ	
2131	Support Activities for Mining	107,287	155,786	48,499	2.7%	5.34	$98,812
2123	Nonmetallic Mineral Mining and Quarrying	10,644	12,863	2,219	1.4%	1.24	$72,289
2122	Metal Ore Mining	118	139	21	1.2%	0.03	$70,931
2111	Oil and Gas Extraction	64,864	66,310	1,446	0.2%	5.94	$188,160
2121	Coal Mining	1,453	1,372	(81)	-0.4%	0.44	$111,507
21	**Total-Mining, Quarrying, and Oil and Gas Extractions**	**184,366**	**235,462**	**51,096**	**1.8%**	**1.24**	**$129,693**

Source: JobsEQ® by Chmura

Table 3.16 lists the 10 largest mining, quarrying, and oil and gas extraction employers in Texas. The top three employers are ConocoPhillips, Exxon Mobile Corporation, and National Oilwell Varco with 5,000 to 9,999 employees each.

193 "Texas State Energy Profile," *U.S. Energy Information Administration,* April 15, 2021, Accessed May 2022, https://www.eia.gov/state/print.php?sid=TX

Table 3.16 ConocoPhillips is One of the Largest Employers in the Mining, Quarrying, and Oil and Gas Extraction Industry in Texas

Employer	Employment
ConocoPhillips	5,000 to 9,999
Exxon Mobile Corporation	5,000 to 9,999
National Oilwell Varco	5,000 to 9,999
Schlumberger	1,000 to 4,999
Aker Solutions	1,000 to 4,999
APA Corporation	1,000 to 4,999
Baker Hughes Company	1,000 to 4,999
BP America Inc	1,000 to 4,999
Buckeye Partners LP	1,000 to 4,999
CenterPoint Energy	1,000 to 4,999

Source: DatabaseUSA, accessed through JobsEQ 2022Q2

3.3 Occupation Analysis

3.3.1 Occupation Groups

All occupation groups are expected to grow through 2035 across the state. The fastest growing occupation group is healthcare support, expected to add jobs at an average annual rate of 2.6% from 2021 through 2035. Computer and mathematical occupations are the second fastest, with average annual growth of 2.4%, followed by personal care and service (2.1%). All occupation groups are expected to grow faster in the short term as recovery from the pandemic impact continues. Industries that suffered the heaviest losses like leisure and hospitality are expected to add the most jobs in the short term. Food preparation and serving related occupations are expected to grow at a rate of 4.7% each year through 2024, while arts, design entertainment, sports, and media occupations are expected to grow at a 3.0% average annual rate. Office and administrative support occupations have the slowest long-term growth forecast, followed by production and sales and related occupations, as repetitive tasks in these jobs are expected to be increasingly automatable by 2035. This is also a concern for some transportation and material moving occupations but is somewhat offset by the accelerated growth of e-commerce during the pandemic which is expected to continue in the long-term, albeit at a slower pace than during the pandemic.

Table 3.17: Healthcare, Personal Care, and IT Lead Long Term Growth by Occupation Group

SOC	Occupation Group	Employment			Average Annual Growth		
		2021	2024	2035	2021-2024	2024-2035	2021-2035
31-0000	Healthcare Support	554,584	601,076	794,407	2.7%	2.6%	2.6%
15-0000	Computer and Mathematical	473,488	516,604	659,843	2.9%	2.2%	2.4%
39-0000	Personal Care and Service	307,353	342,409	410,364	3.7%	1.7%	2.1%
21-0000	Community and Social Service	189,072	203,640	250,949	2.5%	1.9%	2.0%
35-0000	Food Preparation and Serving Related	1,142,413	1,311,933	1,462,871	4.7%	1.0%	1.8%
27-0000	Arts, Design, Entertainment, Sports, and Media	202,034	220,577	258,385	3.0%	1.4%	1.8%
23-0000	Legal	106,718	113,933	136,399	2.2%	1.6%	1.8%
29-0000	Healthcare Practitioners and Technical	723,656	768,012	921,440	2.0%	1.7%	1.7%
13-0000	Business and Financial Operations	776,228	831,009	982,394	2.3%	1.5%	1.7%
11-0000	Management	855,810	921,883	1,071,763	2.5%	1.4%	1.6%
19-0000	Life, Physical, and Social Science	110,780	118,561	137,522	2.3%	1.4%	1.6%
53-0000	Transportation and Material Moving	1,182,311	1,274,762	1,457,087	2.5%	1.2%	1.5%
33-0000	Protective Service	290,357	305,449	354,044	1.7%	1.4%	1.4%
49-0000	Installation, Maintenance, and Repair	562,393	599,616	682,682	2.2%	1.2%	1.4%
17-0000	Architecture and Engineering	245,627	261,366	298,089	2.1%	1.2%	1.4%
47-0000	Construction and Extraction	737,735	779,956	887,895	1.9%	1.2%	1.3%
25-0000	Educational Instruction and Library	784,220	842,469	937,436	2.4%	1.0%	1.3%
37-0000	Building and Grounds Cleaning and Maintenance	434,127	464,117	515,589	2.3%	1.0%	1.2%
45-0000	Farming, Fishing, and Forestry	54,123	55,446	60,295	0.8%	0.8%	0.8%
41-0000	Sales and Related	1,361,730	1,421,200	1,496,605	1.4%	0.5%	0.7%
51-0000	Production	705,514	737,339	774,593	1.5%	0.4%	0.7%
43-0000	Office and Administrative Support	1,854,065	1,923,442	1,995,316	1.2%	0.3%	0.5%

Source: Chmura's JobsEQ®, Chmura

3.3.2 Detailed Occupations

The fastest growing occupations at the six-digit Standard Occupations Classification (SOC) code level reflect growth in the underlying industries and structural shifts due to the pandemic. Occupations with high growth forecasts due to short-term recovery from the pandemic are excluded from this analysis as the focus for long-term forecasts is on structural trends rather than short-term fluctuations.[194] Jobs heavily impacted by the pandemic will show rapid growth due to recovery, but that growth is not expected to continue through 2035 and should not be the basis for decision-making based on long-term job demand. For example, employment of motion picture projectionists is expected to grow at an average annual rate of 9.4% through 2024; and ushers, lobby attendants, and ticket takers are expected to grow at an 8.0% rate. This growth is due to recovering jobs lost at movie theatres and in other motion picture and video industries but is not expected to continue in the long-term.

The top two occupations in Texas based on average annual forecast growth from 2021 through 2035 are wind turbine service technicians and solar photovoltaic installers, which reflects the continued expansion of renewable energy sources. Several healthcare-related occupations also make the list (shown in blue in Table 3.18), including nurse practitioners, physical therapist assistants, occupational therapy assistants, and medical and health services managers. Population growth and an aging population with longer life expectancy are driving demand for these occupations. Computer and mathematical occupations (shown in orange) also appear several times in this list, driven by continued growth in the digital economy. Increasing use of massive datasets will drive the need for mathematical acumen of statisticians, data scientists, and computer and information research scientists, while protecting that data and networking will drive demand for information security analysts (cybersecurity). The expansion of remote work and telemedicine stemming from the pandemic will also drive demand for computer occupations. Demand for logisticians reflects the growing transportation and warehousing demand due to the growth of e-commerce over the pandemic.

Table 3.18: Fastest Growing Occupations Reflect Growing Industries and Pandemic Shifts, Excluding Recovery from COVID-19

SOC	Occupation	Avg Ann Wages (2020)	Employment Change 2021-2035	Average Annual Growth 2021-2024	2024-2035	2021-2035
49-9081	Wind Turbine Service Technicians	$55,700	1,888	6.2%	5.8%	5.9%
47-2231	Solar Photovoltaic Installers	$52,200	549	5.5%	5.2%	5.2%
29-1171	Nurse Practitioners	$116,700	16,693	5.2%	4.9%	5.0%
15-2041	Statisticians	$87,300	1,901	4.6%	4.0%	4.1%
15-1212	Information Security Analysts	$113,400	10,198	4.6%	3.9%	4.0%
31-2021	Physical Therapist Assistants	$69,900	5,065	4.2%	3.7%	3.8%
15-2098	Data Scientists and Mathematical Science Occupations, All Other	$104,200	3,543	4.4%	3.6%	3.8%
31-2011	Occupational Therapy Assistants	$69,400	2,447	4.1%	3.6%	3.7%
15-2011	Actuaries	$119,200	1,169	3.7%	3.7%	3.7%
13-1081	Logisticians	$80,900	10,620	4.5%	3.5%	3.7%
11-9111	Medical and Health Services Managers	$110,900	22,978	3.8%	3.6%	3.6%
29-1071	Physician Assistants	$112,200	6,167	3.7%	3.3%	3.4%
15-2031	Operations Research Analysts	$87,100	5,199	3.8%	3.1%	3.3%
15-1221	Computer and Information Research Scientists	$126,300	1,080	3.7%	3.1%	3.3%
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	$109,600	89,551	3.7%	3.1%	3.2%
21-1018	Substance Abuse, Behavioral Disorder, and Mental Health Counselors	$50,900	9,439	3.4%	3.1%	3.1%
31-1122	Personal Care Aides	$21,800	116,640	3.1%	3.1%	3.1%
19-1041	Epidemiologists	$71,700	268	3.3%	3.0%	3.1%
13-2061	Financial Examiners	$82,900	3,500	3.3%	2.9%	3.0%
13-1161	Market Research Analysts and Marketing Specialists	$76,800	24,122	3.7%	2.8%	3.0%

Source: Chmura's JobsEQ®, Chmura

[194] Occupations were excluded if the following two conditions are true: 1) job losses between 2019 and 2020 were worse than the average for all occupations (-4.0%) and 2) employment is forecast to grow faster than average between 2021 and 2024 and then slow between 2024 and 2035.

The fastest growing occupations may not reflect the greatest demand in terms of actual number of jobs needed. Retirements and workers leaving jobs for other occupations also contribute to the total number of new workers required. As shown in the table below, personal care aides are expected to have the greatest change in employment from 2021 to 2035, adding more than 116,600 jobs over this period. Software developers and software quality assurance analysts and testers are expected to add nearly 90,000 workers over this period, followed by general and operations managers (61,750), and registered nurses (57,144). Several transportation and logistics related occupations (shown in green in the table below) are projected to be high in demand, including hand laborers and freight, stock, and material movers; heavy and tractor-trailer truck drivers; stockers and order fillers; and light truck drivers. Growth rates for these occupations are slower over the long-term, as automation may be possible for many of the current tasks with available technology by 2035 (as discussed in Section 2.12 of the literature review). The nature of work in these jobs will change with advances in autonomous vehicles and robotics in warehouses, but demand for workers with skills which complement automation in these occupations will continue to grow. Similarly, demand for customer service representatives and retail salespersons is expected to slow as technology performs more common tasks, but these occupations are still expected to continue adding jobs.

Table 3.19: Healthcare, Retail, and Transportation Workers Expected to Add the Most Jobs, Excluding Recovery from COVID-19 Pandemic Losses

SOC	Occupation	Avg Ann Wages (2020)	Employment Change 2021-2035	Average Annual Growth 2021-2024	2024-2035	2021-2035
31-1122	Personal Care Aides	$21,800	116,640	3.1%	3.1%	3.1%
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	$109,600	89,551	3.7%	3.1%	3.2%
11-1021	General and Operations Managers	$118,900	61,750	2.6%	1.4%	1.7%
29-1141	Registered Nurses	$76,800	57,144	1.8%	1.5%	1.6%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	$34,100	53,282	2.6%	1.2%	1.5%
53-3032	Heavy and Tractor-Trailer Truck Drivers	$47,400	42,773	2.1%	1.1%	1.3%
53-7065	Stockers and Order Fillers	$30,400	40,993	2.0%	1.1%	1.3%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	$27,100	35,293	1.9%	1.0%	1.2%
13-1198	Project Management Specialists and Business Operations Specialists, All Other	$85,900	34,730	2.0%	1.3%	1.4%
43-4051	Customer Service Representatives	$35,700	33,991	1.5%	0.6%	0.8%
47-2061	Construction Laborers	$35,000	33,187	1.7%	1.4%	1.4%
41-2031	Retail Salespersons	$28,500	31,746	1.4%	0.4%	0.6%
13-2011	Accountants and Auditors	$80,200	29,972	2.4%	1.3%	1.6%
31-9092	Medical Assistants	$33,700	27,809	2.7%	2.3%	2.4%
41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	$61,300	26,570	2.7%	1.5%	1.7%
13-1111	Management Analysts	$95,700	24,557	2.9%	2.2%	2.4%
13-1161	Market Research Analysts and Marketing Specialists	$76,800	24,122	3.7%	2.8%	3.0%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	$71,000	24,116	2.2%	1.1%	1.3%
53-3033	Light Truck Drivers	$41,600	23,369	2.7%	1.3%	1.6%
11-9111	Medical and Health Services Managers	$110,900	22,978	3.8%	3.6%	3.6%

Source: Chmura's JobsEQ®, Chmura

Out of the more than 800 detailed occupations analyzed, only 60 occupations (less than 8%) are expected to decline in Texas over the forecast period. Technology advances that render certain types of products and services obsolete will drive these declines. Half of job losses through 2035 (more than 26,400 jobs) are expected in the office and administrative support occupation group (shown in purple in Table 3.20 below), as software continues to replace office tasks such as scheduling, typing, and directing phone calls and data entry is simplified by electronic data collection and advances in handwriting recognition.

Another 28% of total job losses (-14,936) are expected in sales and related occupations (shown in orange below). Most of these job losses are for cashiers (-11,570), as the growth of e-commerce and online shopping and the automation of self-checkout stations combine to reduce demand for these workers.

Production workers, primarily employed in the manufacturing sector, have been facing automation of work tasks for decades as well as offshoring. Through 2035, production occupations (shown in green below) are expected to account for 17% of job losses (-9,035) due to continued automation and offshoring. Specific occupations include inspectors, testers, sorters, samplers, and weighers; sewing machine operators, team assemblers, and power plant operators. These job losses are partially offset by production occupations expected to grow in a more automated facility such as welders, cutters, solderers and brazers; machinists; and computer numerically controlled (CNC) tool programmers. The supply chain issues that surfaced during the pandemic may dampen the employment decline of these occupations as some firms choose to relocate in the United States.

Table 3.20: Office and Administrative Support Positions Account for 50% of Expected Job Losses

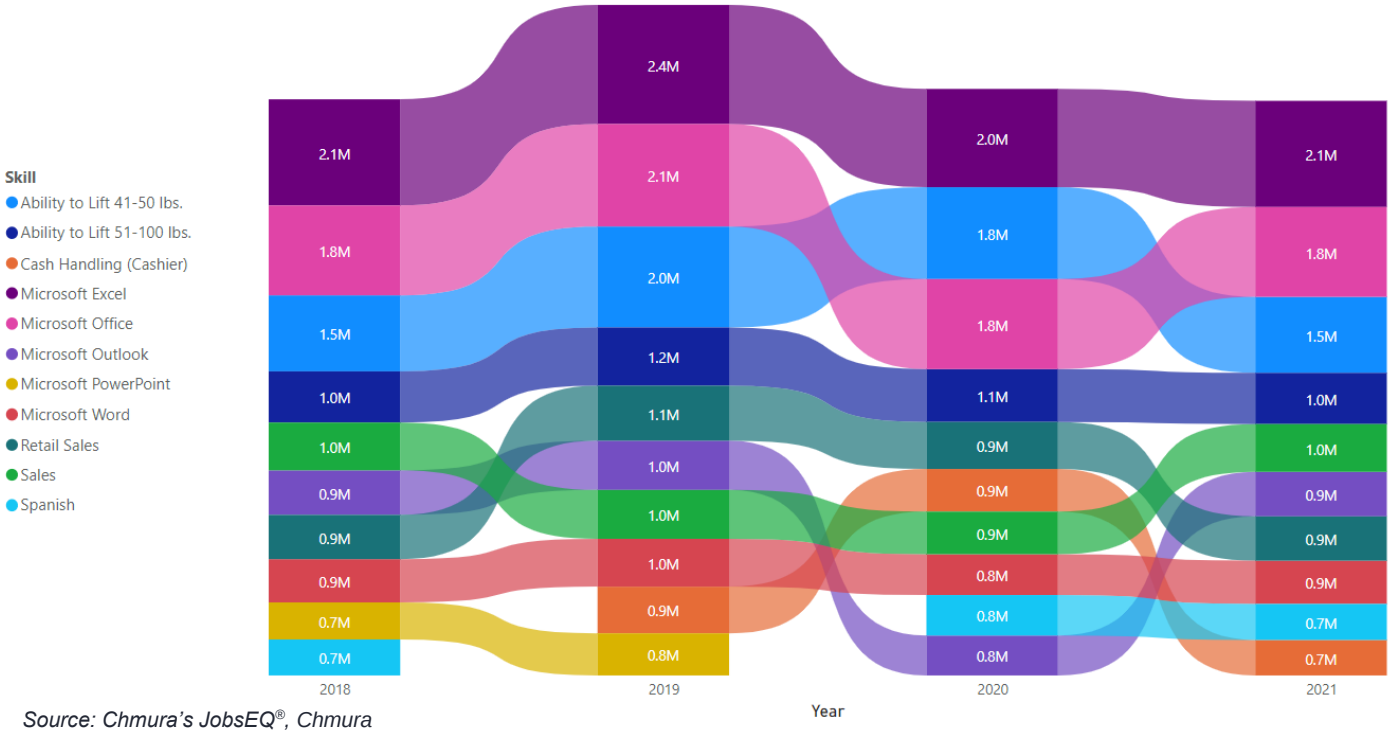
SOC	Occupation	Avg Ann Wages (2020)	Employ-ment Change 2021-2035	Average Annual Growth 2021-2024	2024-2035	2021-2035
41-2011	Cashiers	$23,800	-11,570	0.6%	-0.5%	-0.3%
43-6011	Executive Secretaries and Executive Administrative Assistants	$60,900	-6,804	-0.5%	-1.4%	-1.2%
43-3071	Tellers	$31,000	-4,077	-0.6%	-0.8%	-0.8%
43-9021	Data Entry Keyers	$33,300	-3,834	-0.9%	-1.8%	-1.6%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	$44,000	-3,464	0.3%	-0.7%	-0.5%
43-6012	Legal Secretaries and Administrative Assistants	$50,100	-2,377	-1.1%	-1.6%	-1.5%
41-9041	Telemarketers	$32,500	-2,322	0.0%	-1.6%	-1.3%
43-4151	Order Clerks	$34,500	-1,747	-0.2%	-1.2%	-1.0%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	$37,300	-1,634	0.7%	-0.3%	-0.1%
43-9022	Word Processors and Typists	$39,500	-1,079	-2.8%	-3.7%	-3.5%
41-9091	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	$40,200	-1,043	-1.1%	-1.6%	-1.5%
43-2011	Switchboard Operators, Including Answering Service	$28,500	-1,043	-0.5%	-1.7%	-1.5%
43-3051	Payroll and Timekeeping Clerks	$45,100	-915	0.2%	-0.7%	-0.5%
51-6031	Sewing Machine Operators	$24,900	-863	0.7%	-1.0%	-0.7%
51-2092	Team Assemblers	$32,900	-789	0.8%	-0.3%	-0.1%
43-5021	Couriers and Messengers	$29,100	-738	0.5%	-0.6%	-0.3%
43-4141	New Accounts Clerks	$36,400	-628	-0.5%	-0.8%	-0.7%
51-8013	Power Plant Operators	$79,900	-601	-1.7%	-1.8%	-1.8%
43-4071	File Clerks	$35,500	-532	0.2%	-0.6%	-0.4%
27-1023	Floral Designers	$26,600	-518	-0.4%	-1.4%	-1.2%

Source: Chmura's JobsEQ®, Chmura

3.3.3 Skills

In addition to preparing for future high-growth occupations, Texas should also prepare workers with the skills necessary to do these jobs. Recent growth in skills requested in online job ads provides insight into the demand for tasks now and in the future.[195] Between 2018 and 2021, the top ten skills requested in online ads in Texas have been very stable. Demand for Microsoft Office products, especially Excel and Word, regularly top the list of skills needed to fill open positions, which supports the long-term forecast decline of occupations like word processors and typists, secretaries, and administrative assistants. The ability to lift up to 100 pounds reflects demand for transportation and warehousing occupations due to the growth of e-commerce and online sales. Demand for retail sales and cash handling (cashier) skills declined over the pandemic, consistent with long-term expectations of declines in these jobs due to automation and continued movement away from brick-and-mortar stores. Also consistent with long-term expectations of the importance of multilingualism in Texas, Spanish ranked ninth in the list of top ten skills requested in online ads for both 2020 and 2021.

Figure 3.10: Top Skills Requested in Online Job Ads in Texas Show Skills That Software May Replace Long-Term



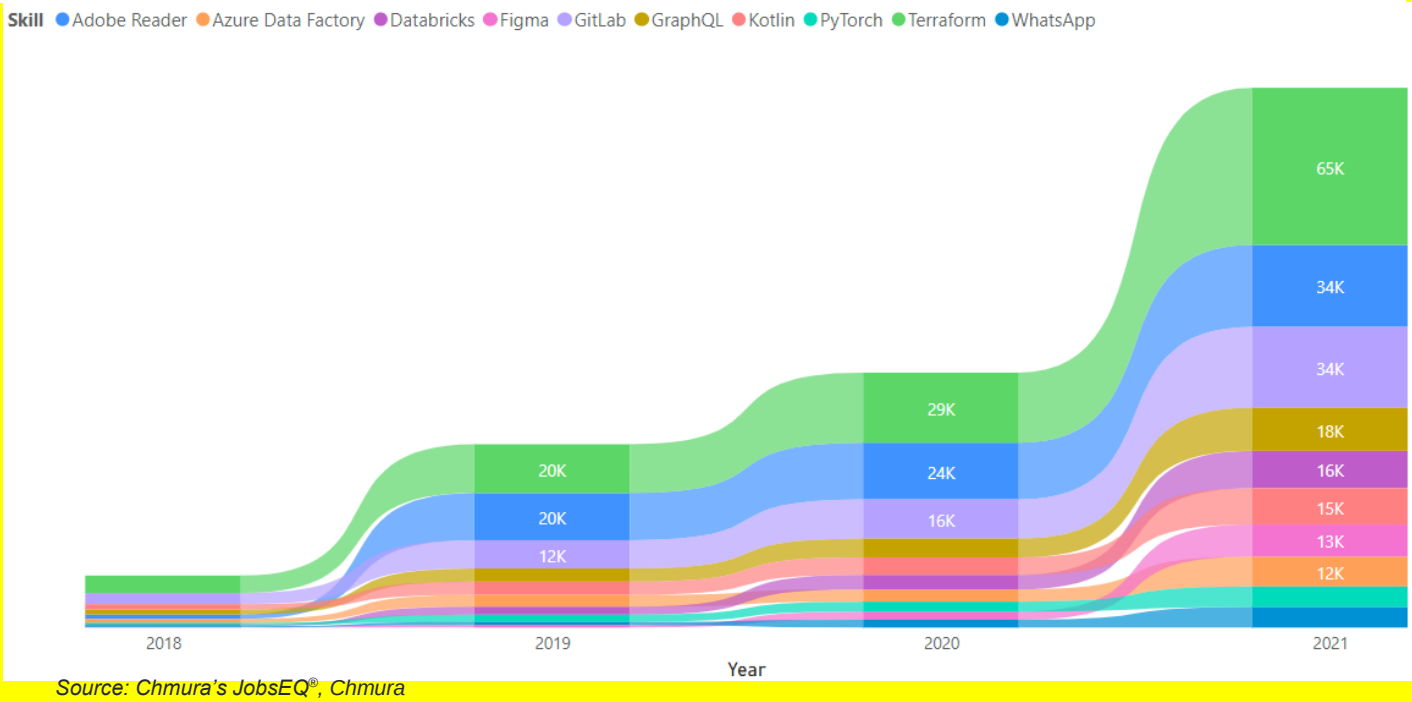
Source: Chmura's JobsEQ®, Chmura

The top ten fastest growing skills between 2018 and 2021 identify some of the software rising to replace certain tasks.[196] Demand for Terraform in ads rose 803% from more than 7,000 ads in 2018 to more than 65,000 ads in 2021. Terraform is an open-source software tool which aids in data center infrastructure with human-readable configuration files.[197] GitLab is a DevOps platform to develop and operate software, while Azure Data Factory and Databricks broadly load, store, and integrate data. Languages gaining popularity include Kotlin, a general-purpose programming language, and GraphQL, an API query language. Figma is a free online user interface (UI) design tool, and PyTorch is an open source framework for researching and deploying machine learning. WhatsApp, an instant-messaging platform, has grown due to an increase in job ads from its parent company, Meta (formerly Facebook).

[195] Data in this section come from Chmura's Real Time Intelligence in JobsEQ®, updated daily from more than 40,000 online sources.
[196] Skills requested in less than 7,500 ads in 2021 were excluded from this analysis.
[197] "What is Terraform", Introduction to Teraform, HashiCorp, accessed May 2022 https://www.terraform.io/intro.

The rapid growth/decline and wide variety of software and tools demonstrates the impracticality of predicting specific types of languages and tools needed in 2035, but the data suggest some commonalities. Free and open-source technologies can more easily reach larger audiences, but there is a place for paid services that demonstrate significant returns in time savings and other costs. The popularity of tools such as PyTorch and Figma, which allow workers to incorporate the latest developments in machine learning without being an expert in the field and bring collaborators without UI design expertise into designing, also demonstrate the potential to automate even highly specialized tasks. Workers in jobs insulated from automation at present will need to develop news skills continually among the shifting landscape of what is automatable. The geography of demand for these skills may also change as remote and hybrid work enable workers and employers to match over longer distances, as discussed in the Section 2.6 of the literature review.

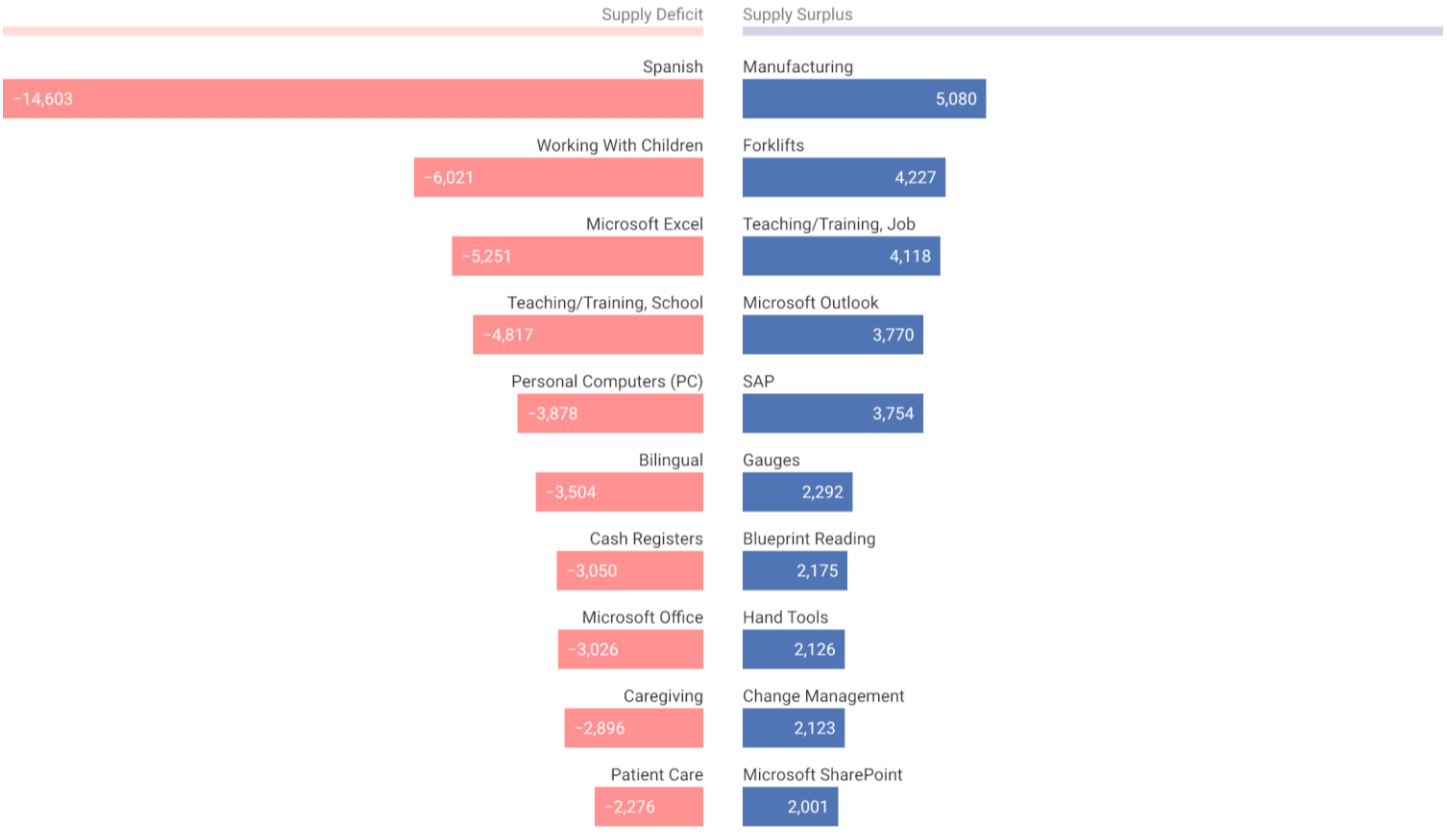
Figure 3.11: Fastest Growing Skills Replace Technical Expertise with Specialized Software



Source: Chmura's JobsEQ®, Chmura

Comparing the skills in-demand with resumes collected via online sources reveals potential gaps in workforce skills. In the figure below, the left side of the chart in red shows potential deficits, where there is more demand per online job postings for a skill than there is supply of those skills per online resumes. The right side of the chart in blue shows potential surpluses, where there is a larger number of skills listed in resumes than there are job ads requesting those skills. The largest potential deficit is for the Spanish language, with a potential supply gap of more than 14,600 openings. Bilingual also makes the top ten, with a gap over 3,500. Reflecting the current difficulty obtaining childcare due to the pandemic, working with children, teaching/training, and caregiving also make the top ten supply deficits. Many of the potential supply surpluses are related to production occupations, including manufacturing, forklifts, gauges, blueprint reading, and hand tools. The gap between supply and demand for these skills may close in the short term as Texas is successful in attracting manufacturers to locate and expand in the state. By 2035, many of these skills are likely to be automated and increase the supply surplus.

Figure 3.12: Largest Skills Supply Deficit is in Language and Child Care, With A Potential Surplus of Manufacturing Skills



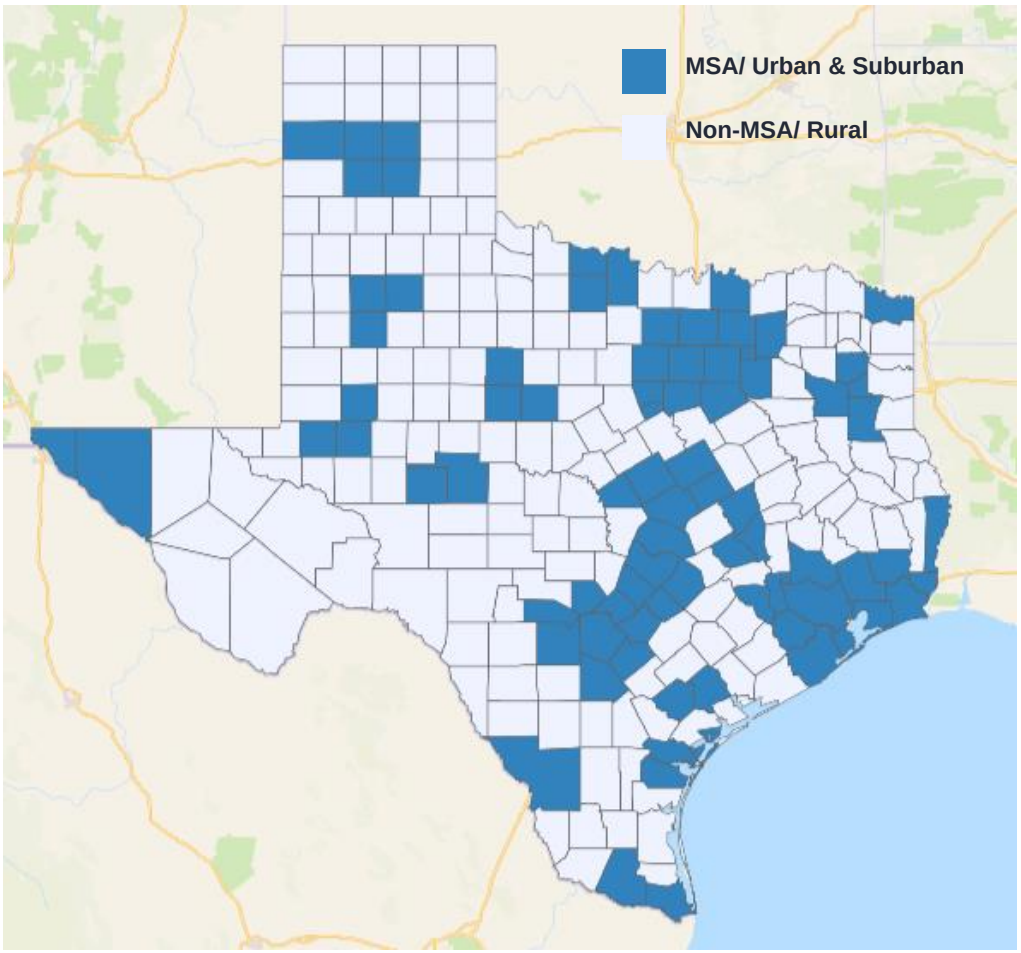
Source: JobsEQ®
Data as of 2021Q4; openings and candidate sample compiled in January 2021

3.4 Regional Analysis

Texas is the second-largest state in the nation, with significant regional variation across its nearly 269,000 square miles. The unique natural resources, particularly oil and gas and agriculture; the border with Mexico; and historical growth patterns support this variation.

To analyze long-term trends between urban and rural areas, Chmura defines urban and suburban areas as those counties that are contained in a metropolitan statistical area (MSA)[198]. The 15 Texas MSAs are shown in dark blue in the figure to the left. The light blue counties are outside of MSA boundaries and represent rural areas for this analysis. Together, the rural areas account for 174 of the 254 counties in Texas, while urban and suburban areas in the MSAs account for 90% of employment in the state.

Figure 3.13: Urban Areas Account for 90% of Employment in Texas



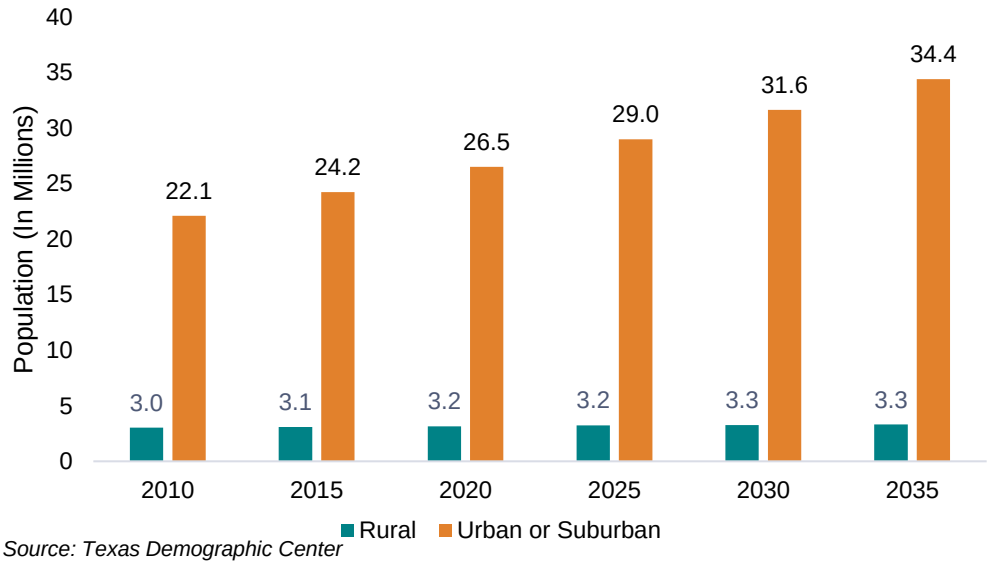
Source: Chmura's JobsEQ®

[198] The counties that comprise MSAs have a high degree of social and economic integration. They are mainly defined based on commuting patterns between counties.

3.4.1 Demographics

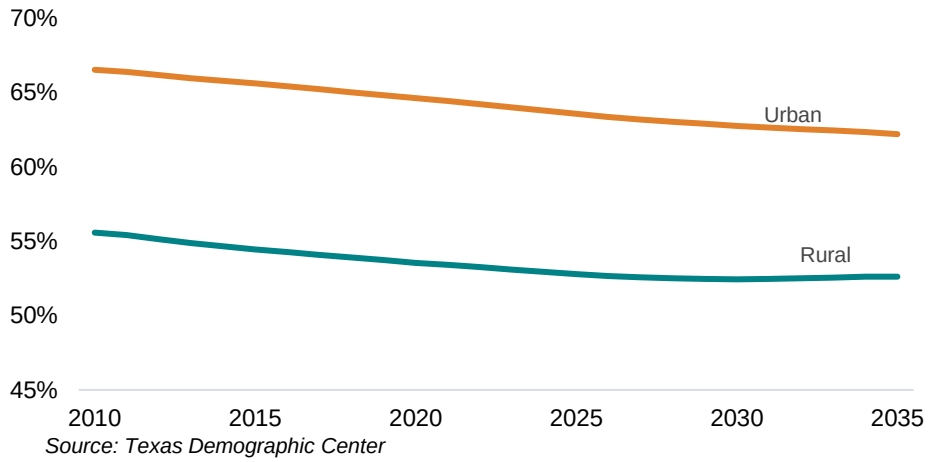
As shown in Figure 3.14, a majority of Texas's population lives in urban areas and is forecasted to continue to do so. In 2010, 22.1 million Texans lived in urban areas, which represented 88% of the total population. The population in urban areas of Texas is expected to increase to 91.0% of the total state population by 2035 or 34.4 million individuals. Only 3.0 million individuals (12.0%) lived in rural Texas in 2010. By 2035, there are estimated to be 3.3 million individuals living in rural Texas, or 9.0% of the total population.

Figure 3.14: The Populations of Rural and Urban Texas Continue to Grow



Source: Texas Demographic Center

Figure 3.15: LFP Rates Decline for Rural and Urban Counties



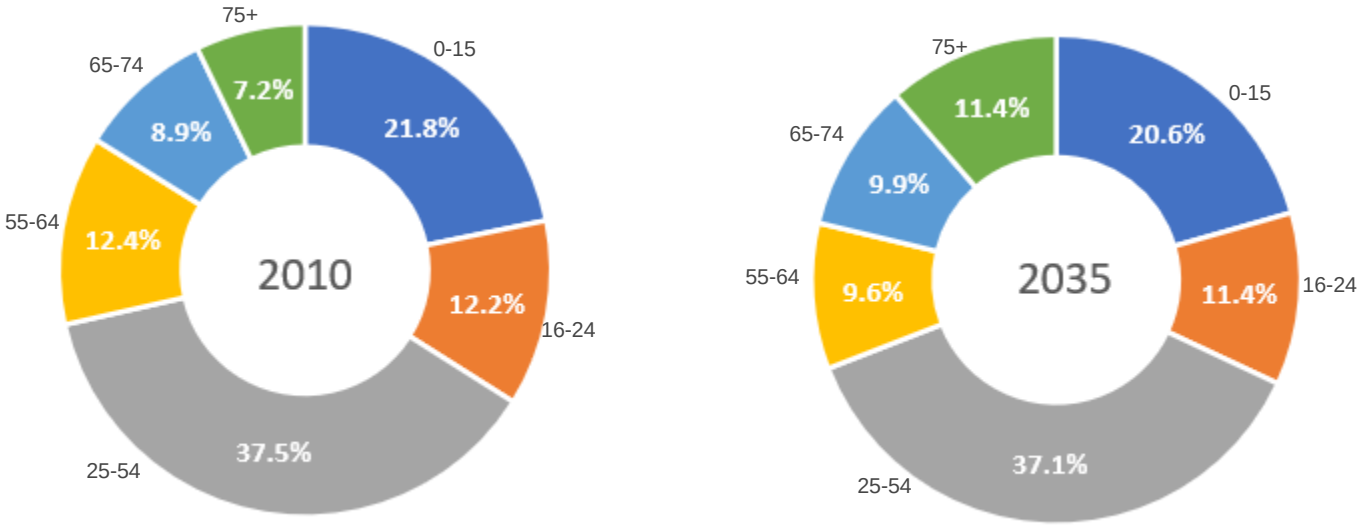
Source: Texas Demographic Center

Labor force participation has declined in rural and urban areas over the last decade and is forecasted to continue to fall. In rural areas, the LFP rate is expected to fall from 55.6% in 2010 to 52.6% in 2035. The LFP rate for urban areas is forecasted to decline from 66.5% in 2010 to 62.2% in 2035. This downward trend of labor force participation rates is similar to that of the state as a whole and the nation.[199]

[199] See Section 3.1.

By 2035, the percentage of rural Texans 65 and older will make up a greater share of the population when compared with 2010. As shown in Figure 3.16, the share for the age cohort for individuals 75 years of age or greater is expected to increase from 7.2% in 2010 to 11.4% by 2035. The percentage of individuals 65 to 74 will grow from 8.9% to 9.9% during this period. The share of all age cohorts for individuals younger than 65 will decrease during this period.

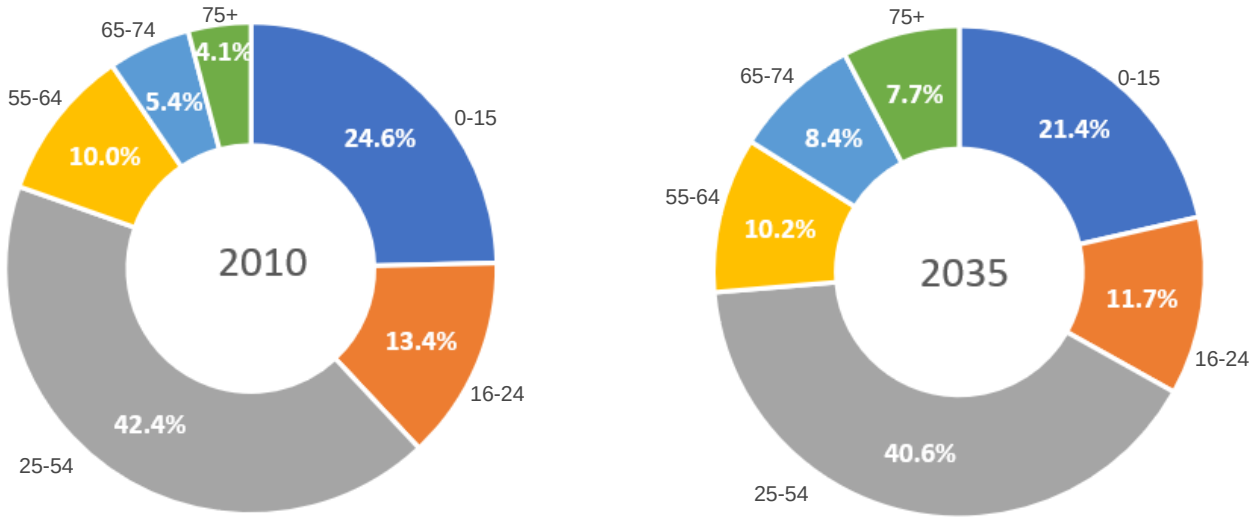
Figure 3.16: The Percentage of Rural Texans 65 or Older Will Grow by 2035



Source: Texas Demographic Center

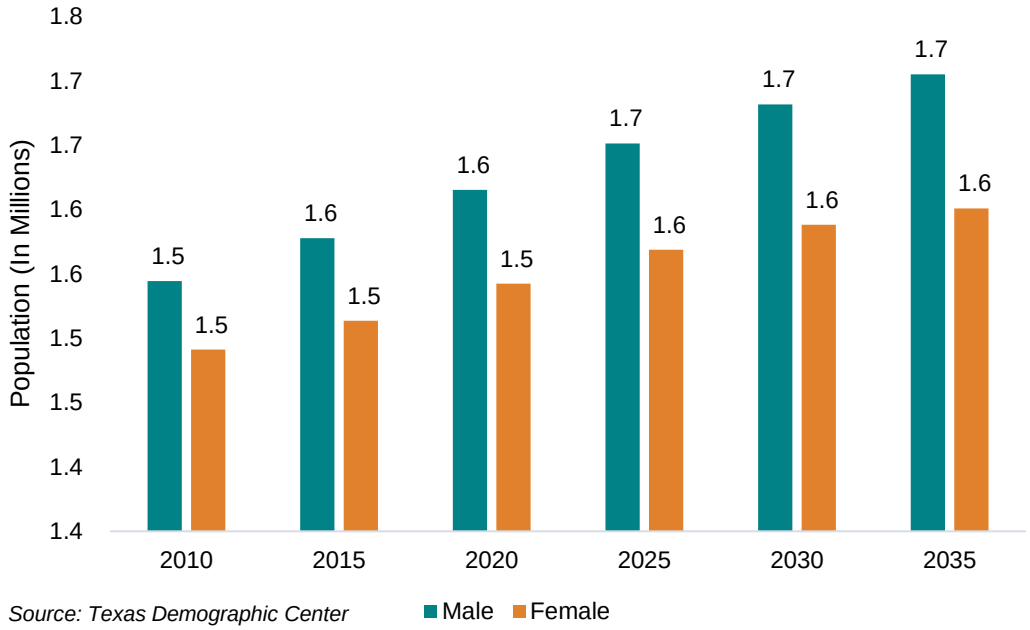
The age distribution of urban Texas is similar to that of the state. The younger age cohorts are forecasted to make up a smaller share of the total population, while the share made up of individual 55 and older is expected to grow. The share of individuals older than 75 almost doubles between 2010 and 2035, from 4.1% to 7.7%.

Figure 3.17: The 55 and Older Population of Urban Texas Continues to Grow



Source: Texas Demographic Center

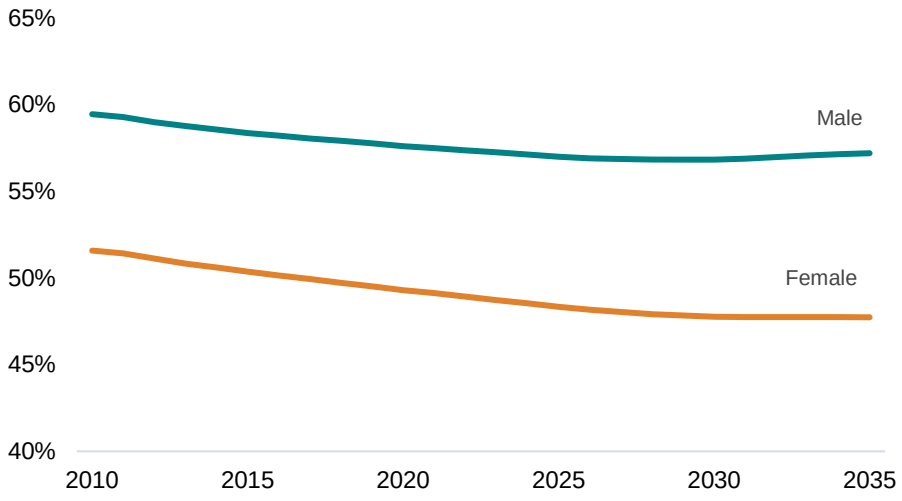
Figure 3.18: The Majority of Rural Texas's Population are Male



Source: Texas Demographic Center

In rural Texas, the majority of the population are men. In 2010, 1.5 million men (or 50.9% of the population) lived in rural areas. By 2035, the number of men in rural areas is expected to increase to 1.7 million, representing 51.6% of the total rural population. Although the number of women in rural Texas is expected to increase from 1.5 million in 2010 to 1.6 million in 2035, the percent of the total population that is female is expected to fall from 49.1% to 48.4% during that period.

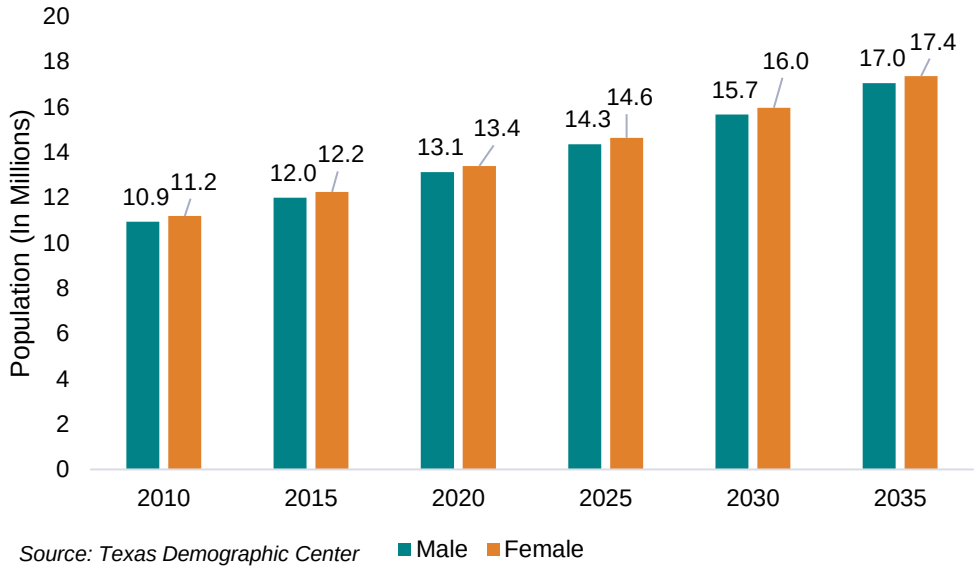
Figure 3.19: LFP Rates Fall for Men and Women in Rural Texas



Source: Texas Demographic Center

The labor force participation rate is expected to decline for both men and women living in rural Texas. For men, the LFP rate is expected to fall from 59.4% in 2010 to 57.2% in 2035. The LFP rate for women is forecasted to fall from 51.6% in 2010 to 47.7% in 2035.

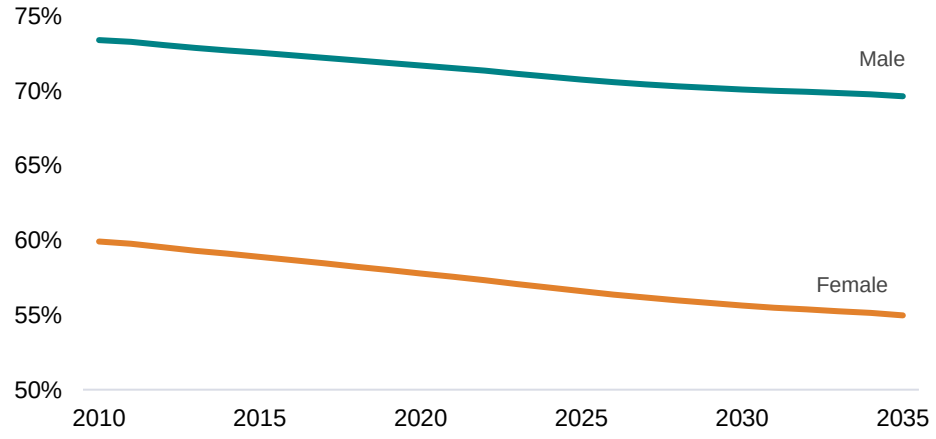
Figure 3.19: The Majority of the Urban Population Consists of Women in Texas



Source: Texas Demographic Center

In urban parts of Texas, the majority of the population is made up of women. In 2010, there were 11.2 million women living in urban Texas, which represented 50.6% of the total urban and suburban population. By 2035, the female population is expected to grow to 17.4 million, but the percentage of the urban population made up of women is expected to shrink to 50.5%. There were 10.9 million men living in urban Texas in 2010 (49.4% of the population) and that number is forecasted to grow to 17.0 million (or 49.5%) by 2035.

Figure 3.20: LFP Rates Continue to Fall For Males and Females in Urban Texas



Source: Texas Demographic Center

Similar to rural Texas, the labor force participation rates for men and women living in urban Texas are expected to continue to decline. The LFP rates for urban men and women in 2010 were 73.4% and 59.9%, respectively. By 2035, the rates are forecasted to fall to 69.6% for men and 55.0% for women.

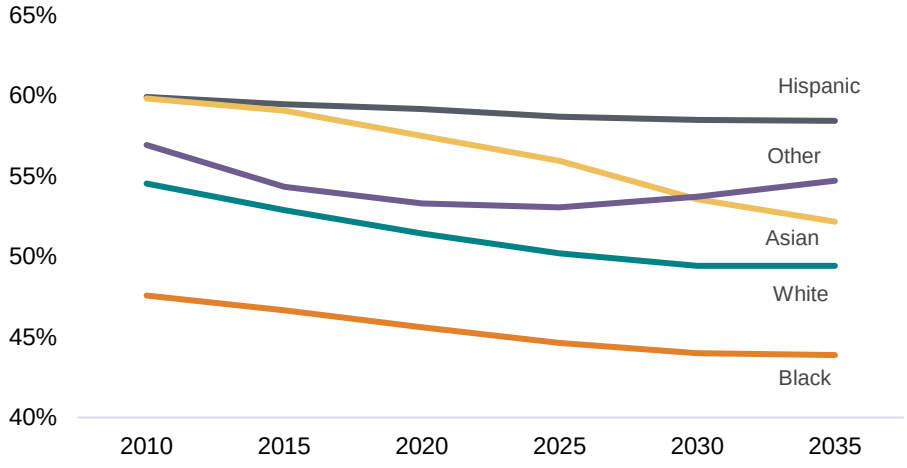
In rural Texas, the majority of the population identifies as white, followed by Hispanic, Black, Other, and Asian. The percentage of the population in rural areas that identifies as Hispanic is expected to increase in the future, alongside the Black, Asian, and Other groups. Although the white population has been declining in rural Texas since 2010, it is forecasted that the majority of the total rural population will remain white in 2035.

Figure 3.21: The White Population is Decreasing in Rural Texas as Birth Rates Decline and Out-Migration Rises

	White	Black	Hispanic	Asian	Other
2010	1.80	0.22	0.95	0.02	0.04
2015	1.77	0.23	1.03	0.02	0.05
2020	1.74	0.23	1.11	0.02	0.06
2025	1.70	0.23	1.20	0.02	0.06
2030	1.66	0.23	1.29	0.02	0.07
2035	1.60	0.23	1.37	0.03	0.07

Source: Texas Demographic Center

Figure 3.22: LFP Rates in Rural Texas Will Decrease for Most Ethnic and Race Groups

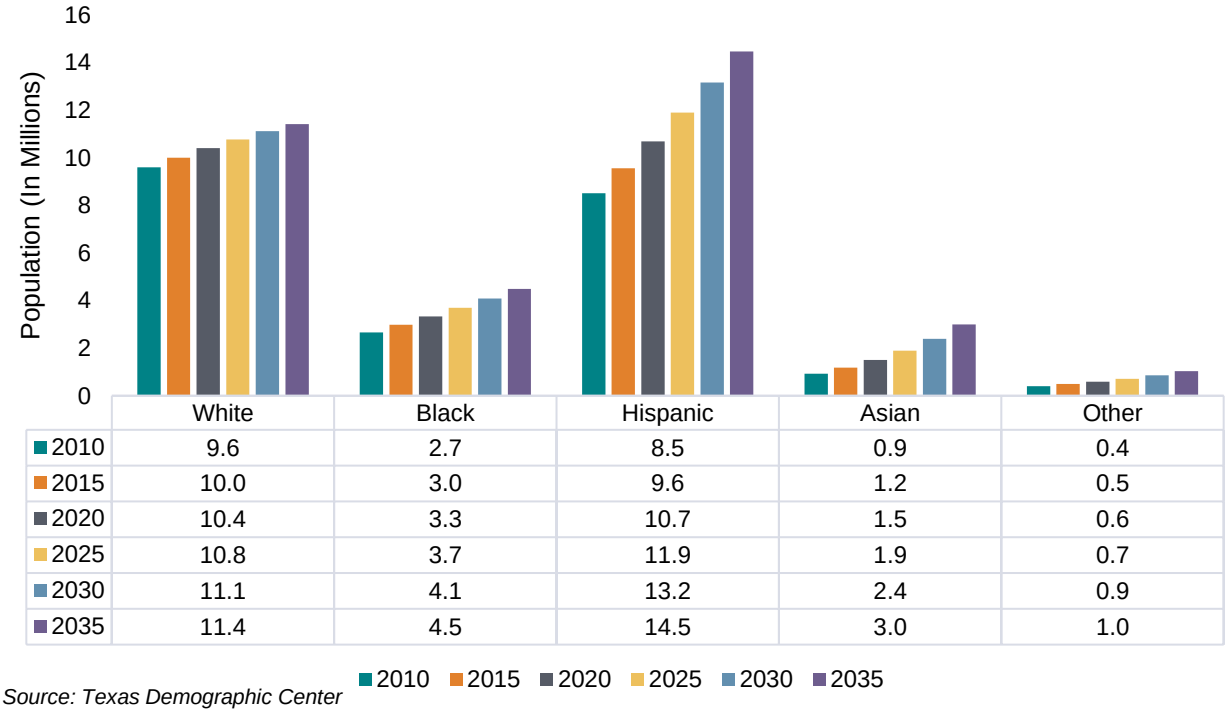


Source: Texas Demographic Center

The labor force participation rates are forecasted to decline for all racial and ethnic groups in rural Texas. Although the LFP rate for Others is expected to increase after 2025, it will not surpass its 2010 rate by 2035. The remaining race and ethnic groups do not show any signs of improving their LFP rates in the future.

The diversity of urban Texas mirrors that of the state. Although the population was once largely composed of whites, the majority of the population will likely be Hispanic in the future. Data from the 2020 Census found that 39.7% of the state's population was white and 39.2% were Hispanic. It is likely the Hispanic population will represent the majority by 2035. The Black, Asian, and Other populations will also grow during this time.

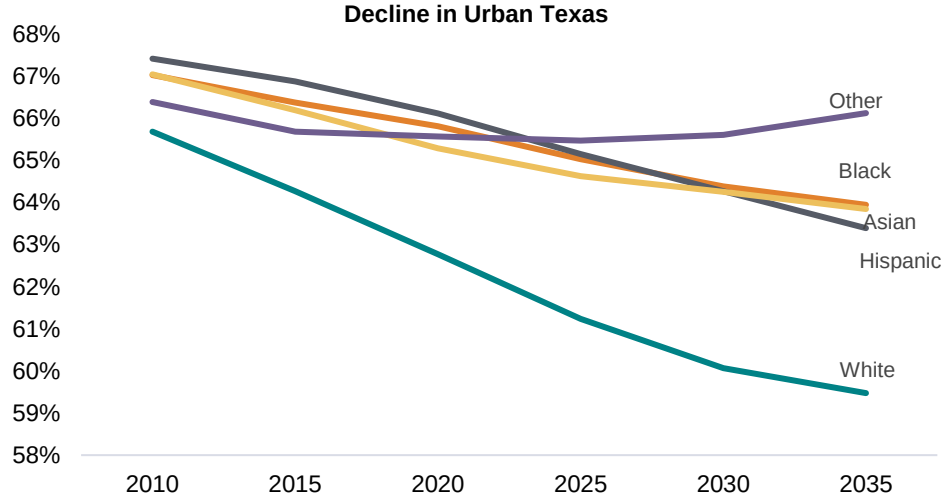
Figure 3.23: The Hispanic Population in Urban Texas is Projected to Grow Through 2035



	White	Black	Hispanic	Asian	Other
2010	9.6	2.7	8.5	0.9	0.4
2015	10.0	3.0	9.6	1.2	0.5
2020	10.4	3.3	10.7	1.5	0.6
2025	10.8	3.7	11.9	1.9	0.7
2030	11.1	4.1	13.2	2.4	0.9
2035	11.4	4.5	14.5	3.0	1.0

Source: Texas Demographic Center

Figure 3.24: LFP Rates for Ethnic and Race Groups Will Largely Decline in Urban Texas

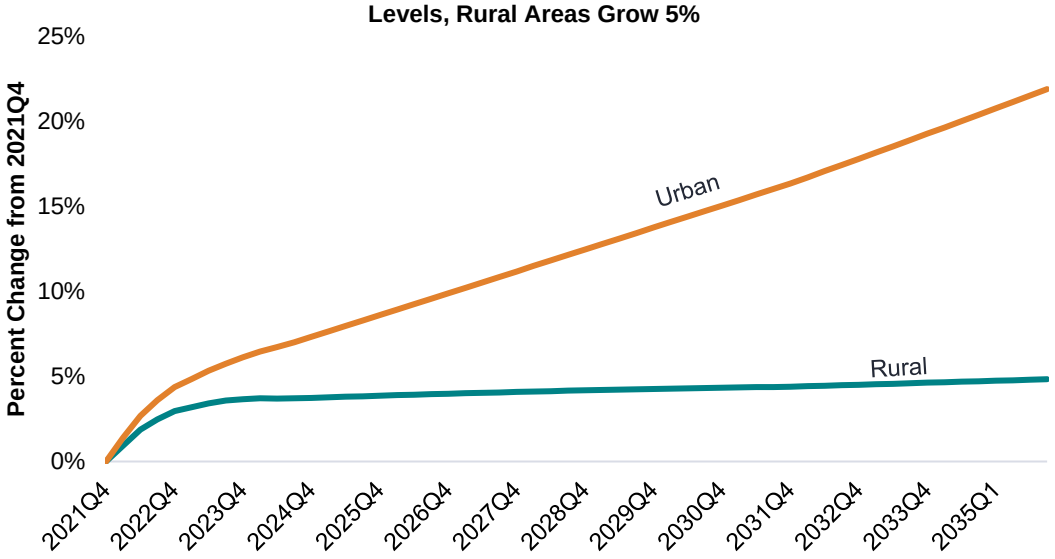


Source: Texas Demographic Center

Similar to both the state and rural Texas, LFP rates for urban and suburban ethnic and race groups are forecasted to decline between 2010 and 2035. The LFP rate for Others is expected to grow slightly after 2025, but the remaining groups will have lower LFP rates.

3.4.2 Industry

Figure 3.25 Urban Employment Expected to Grow 22% by 2035 from 2021 Levels, Rural Areas Grow 5%



Source: JobsEQ® by Chmura
Data represent a four quarter moving average

Employment in urban is projected to grow at a faster rate than rural areas (Figure 3.25). From 2021 to 2035, employment in urban areas is projected to grow from 12.3 million in 2021 to 14.8 million in 2035 (a 1.6% average annual increase) while rural areas are expected to grow more slowly, from 1.1 million to 1.2 million (a 0.3% average annual increase).

Table 3.21 shows the proportion of employment by industry sector in urban and rural areas. In 2021, both urban and rural areas have the largest proportion of their employment in the health care and social assistance industry, 13.1% and 13.3% respectively. Relative to rural areas, urban areas have a higher proportion of professional, scientific, and technical services; administrative and support and waste management and remediation services; finance and insurance; transportation and warehousing; and wholesale trade workers. Rural areas have a higher proportion of agriculture, forestry, fishing and hunting; manufacturing; mining, quarrying, and oil and gas extraction; and public administration.

Table 3.21 Industry Mix Diverges Between Urban and Rural Areas

		Urban and suburban		Rural	
NAICS	Industry	2021	2035	2021	2035
62	Health Care and Social Assistance	13.1%	14.4%	13.3%	14.9%
44-45	Retail Trade	10.5%	9.1%	11.1%	9.7%
61	Educational Services	9.2%	8.8%	9.9%	9.5%
72	Accommodation and Food Services	9.0%	9.4%	8.2%	8.9%
54	Professional, Scientific, and Technical Services	7.3%	7.9%	2.5%	2.7%
56	Administrative and Support and Waste Management and Remediation Services	7.1%	7.0%	3.8%	3.8%
23	Construction	7.0%	6.8%	8.0%	8.0%
31-33	Manufacturing	6.5%	6.1%	9.3%	8.9%
48-49	Transportation and Warehousing	5.4%	5.4%	3.5%	3.5%
52	Finance and Insurance	4.5%	4.4%	2.4%	2.2%
81	Other Services (except Public Administration)	4.4%	4.6%	4.2%	4.4%
42	Wholesale Trade	4.3%	4.1%	2.8%	2.7%
92	Public Administration	3.3%	3.2%	5.6%	5.6%
53	Real Estate and Rental and Leasing	2.0%	2.0%	1.2%	1.2%
51	Information	1.6%	1.7%	0.7%	0.7%

Table 3.21 Industry Mix Diverges Between Urban and Rural Areas

NAICS	Industry	Urban and suburban 2021	Urban and suburban 2035	Rural 2021	Rural 2035
71	Arts, Entertainment, and Recreation	1.4%	1.7%	0.9%	1.1%
55	Management of Companies and Enterprises	1.2%	1.1%	0.2%	0.2%
21	Mining, Quarrying, and Oil and Gas Extraction	1.2%	1.2%	3.4%	3.8%
22	Utilities	0.6%	0.5%	1.1%	1.0%
11	Agriculture, Forestry, Fishing and Hunting	0.6%	0.5%	7.7%	7.2%

Source: JobsEQ® by Chmura
Data represent a four-quarter moving average

Figure 3.26 Employment in the Agriculture, Forestry, Fishing and Hunting Industry is Concentrated in Rural Areas

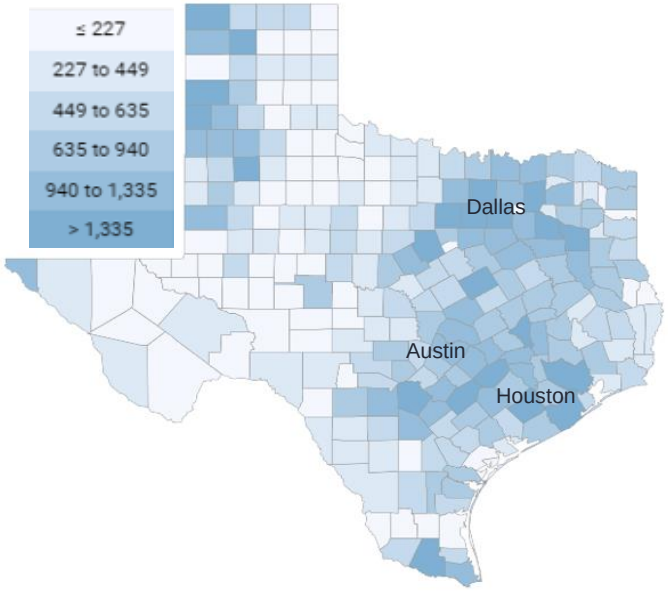


Figure 3.26 shows employment of the agriculture, forestry, fishing, and hunting industry by county in Texas. Employment in this industry is concentrated in rural areas, especially in eastern Texas. In 2021, 7.7% of workers in rural Texas were in the agriculture, forestry, fishing, and hunting industry, a greater proportion than in urban areas (0.6%). This industry is expected grow at an average annual rate of 1.0% in urban areas but decline at a rate of 0.2% in rural areas through 2035.

Figure 3.27 shows employment of the mining, quarrying, and oil and gas extraction industry by county in Texas. The biggest Texas oil and gas fields are located in the Permian Basin in western Texas and account for 15% of U.S. oil production.[200] In 2021, 3.4% workers in rural Texas work in the mining, quarrying, and oil and gas extraction industry, a greater proportion than in urban areas (1.2%). The industry is expected to grow slightly slower in rural areas (1.3%) compared with urban (1.8%).

Figure 3.28 shows employment of the manufacturing industry by county in Texas. In 2021, 9.3% of rural workers work in the manufacturing industry, a greater proportion than in urban areas (6.5%). Manufacturing employment is expected to be stagnant in rural areas (0.0%), while growing in urban (1.0%).

[200] "Oil and Gas Map of Texas," *Texas Bureau of Economic Geology,* Accessed May 2022, **https://www.beg.utexas.edu/files/content/beg/research/starr/Oil%20and%20Gas%20Map%20of%20Texas%202018.pdf**

Figure 3.27 Employment in the Mining, Quarrying, and Oil and Gas Extraction Industry is Concentrated in Rural Areas

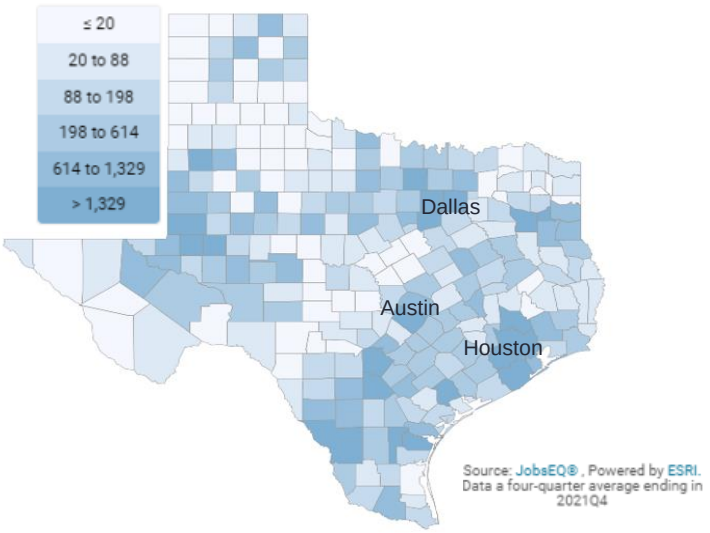
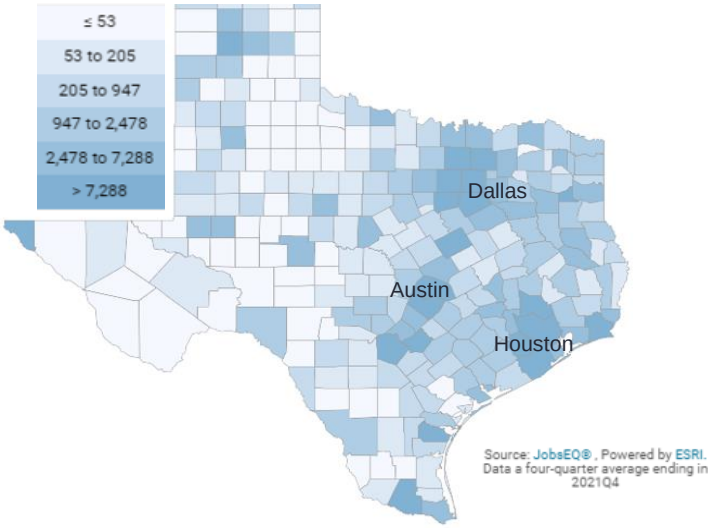


Figure 3.28 Employment in the Manufacturing Industry is Concentrated in Rural Areas



3.4.3 Occupation

The occupation mix and job demand in rural and urban/suburban areas is driven by the different mix of industries in the regions.

In both urban and rural areas, the occupation groups projected to grow the fastest are healthcare support. These occupations support the growing and aging population across the state and are expected to grow at an average annual rate of 2.7% in urban areas and 1.7% in rural areas between 2021 and 2035. The next fastest growing occupation group is for computer and mathematical occupations (+2.3% average annual growth) in urban areas, reflecting the rapid growth in information technology in Texas cities. In rural areas, the second-fastest growing occupation group is community and social service occupations (+1.1%), reflecting investments in community health around substance abuse, mental health, health education, and counselors.

Consistent with overall population and employment growth expectations, all occupation groups are expected to grow slower in rural areas when compared with urban areas. Within urban areas, all occupation groups are expected to grow, while three groups are forecast to decline in rural areas. Specifically, office and administrative support (-0.5%), sales and related (-0.5%), and production occupations (-0.2%) are projected to lose employment in rural areas due to a combination of declines in related industries, increasing adoption of automation technologies, and offshoring.

Table 3.22: Healthcare Support is the Fastest Growing Group in Both Urban and Rural Areas

		Emp Change 2021-2035		Avg Ann Growth 2021-2035	
SOC	Occupation	Urban	Rural	Urban	Rural
11-0000	Management	198,414	2,830	1.8%	0.2%
13-0000	Business and Financial Operations	182,296	2,843	1.7%	0.5%
15-0000	Computer and Mathematical	157,810	1,462	2.3%	0.6%
17-0000	Architecture and Engineering	48,213	837	1.4%	0.4%
19-0000	Life, Physical, and Social Science	24,395	729	1.6%	0.6%
21-0000	Community and Social Service	57,747	3,218	2.1%	1.1%
23-0000	Legal	28,031	627	1.8%	0.7%
25-0000	Educational Instruction and Library	148,928	3,108	1.4%	0.3%
27-0000	Arts, Design, Entertainment, Sports, and Media	51,231	1,124	1.8%	0.6%
29-0000	Healthcare Practitioners and Technical	186,931	6,311	1.8%	0.7%
31-0000	Healthcare Support	221,933	13,928	2.7%	1.7%
33-0000	Protective Service	61,521	930	1.6%	0.2%
35-0000	Food Preparation and Serving Related	306,483	12,467	1.9%	0.9%
37-0000	Building and Grounds Cleaning and Maintenance	77,828	1,568	1.3%	0.3%
39-0000	Personal Care and Service	98,495	3,266	2.2%	1.0%
41-0000	Sales and Related	127,744	-6,832	0.7%	-0.5%
43-0000	Office and Administrative Support	132,863	-8,375	0.5%	-0.5%
45-0000	Farming, Fishing, and Forestry	5,422	606	1.3%	0.2%
47-0000	Construction and Extraction	136,462	8,191	1.4%	0.7%
49-0000	Installation, Maintenance, and Repair	110,798	4,053	1.4%	0.6%
51-0000	Production	66,747	-1,819	0.7%	-0.2%
53-0000	Transportation and Material Moving	255,382	6,946	1.6%	0.5%

Source: Chmura's JobsEQ®, Chmura

At the detailed occupation level, several occupations top the list of those expecting the fastest growth for both urban and rural areas. After accounting for occupations with growth forecasts primarily due to recovery from the pandemic, the top 50 detailed occupations in

both regions were reviewed for commonalities. The 35 occupations shown in the table below are common to both regions as top occupations expected to add the largest number of jobs by 2035. As in Texas overall, many of these jobs are tied to growth in healthcare, e-commerce, and information technology. Occupations such as construction workers and teachers are tied to the population growth expected across the state.

Table 3.23: Many of the Same Occupations Top the Lists of Job Demand for Both Urban and Rural Areas

		Emp Change 2021-2035		Avg Ann Growth 2021-2035	
SOC	Occupation	Urban	Rural	Urban	Rural
31-1122	Personal Care Aides	106,568	8,402	3.2%	2.3%
53-3032	Heavy and Tractor-Trailer Truck Drivers	38,757	1,857	1.4%	0.6%
29-1141	Registered Nurses	54,091	1,840	1.7%	0.6%
11-1021	General and Operations Managers	55,739	1,570	1.7%	0.7%
47-2061	Construction Laborers	30,832	1,501	1.5%	0.6%
11-9111	Medical and Health Services Managers	21,204	1,257	3.7%	2.6%
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	15,193	983	1.4%	0.8%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	47,564	936	1.5%	0.5%
31-9092	Medical Assistants	26,499	907	2.4%	1.5%
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	75,582	901	3.1%	1.1%
11-9021	Construction Managers	15,852	887	2.0%	1.0%
53-7065	Stockers and Order Fillers	39,057	792	1.4%	0.3%
29-2061	Licensed Practical and Licensed Vocational Nurses	17,010	771	1.8%	0.7%
31-1131	Nursing Assistants	18,572	752	1.7%	0.5%
25-3031	Substitute Teachers, Short-Term	16,845	751	1.6%	0.6%
47-2111	Electricians	16,621	748	1.7%	0.8%
33-3051	Police and Sheriffs Patrol Officers	12,201	707	1.6%	0.7%
29-1171	Nurse Practitioners	15,779	689	5.0%	3.7%
21-1093	Social and Human Service Assistants	9,483	676	2.6%	1.7%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	33,437	654	1.2%	0.3%
11-3031	Financial Managers	20,233	646	2.6%	1.5%
13-2011	Accountants and Auditors	26,709	506	1.6%	0.5%
13-1111	Management Analysts	21,167	503	2.3%	1.2%
13-1161	Market Research Analysts and Marketing Specialists	20,153	485	2.9%	1.6%
43-6013	Medical Secretaries and Administrative Assistants	18,699	477	1.7%	0.7%
41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	23,068	444	1.7%	0.7%
53-7051	Industrial Truck and Tractor Operators	15,485	424	1.5%	0.5%
53-3033	Light Truck Drivers	22,185	389	1.7%	0.5%
23-1011	Lawyers	16,721	364	1.8%	0.6%
37-3011	Landscaping and Groundskeeping Workers	17,498	338	1.4%	0.3%
13-1081	Logisticians	9,491	331	3.7%	2.3%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	20,497	326	1.3%	0.3%

Table 3.23: Many of the Same Occupations Top the Lists of Job Demand for Both Urban and Rural Areas

SOC	Occupation	Emp Change 2021-2035		Avg Ann Growth 2021-2035	
		Urban	Rural	Urban	Rural
25-9045	Teaching Assistants, Except Postsecondary	15,866	300	1.2%	0.2%
13-1198	Project Management Specialists and Business Operations Specialists, All Other	31,215	275	1.4%	0.2%
13-1071	Human Resources Specialists	14,888	261	1.9%	0.6%

Source: Chmura's JobsEQ®, Chmura

Of the top 50 occupations expected to add the most jobs through 2035, 15 made the list for only urban areas. These include retail salespersons, customer service representatives, and office clerks, where growth in urban and suburban areas may be expected to offset forecasted declines in the occupations in other areas due to automation. The list also includes managerial and professional services occupations like bookkeeping, accounting, and auditing clerks, computer and information systems managers, and financial and investment analysts, which support the greater concentration of professional and business services in urban areas.

Table 3.24: Top Occupations Adding Jobs Only in Urban Areas Reverse Rural Trends

SOC	Occupation	Emp Change 2021-2035		Avg Ann Growth 2021-2035	
		Urban	Rural	Urban	Rural
41-2031	Retail Salespersons	31,786	-1,399	0.7%	-0.4%
43-4051	Customer Service Representatives	29,090	-1,019	0.8%	-0.5%
43-9061	Office Clerks, General	21,826	-1,190	0.6%	-0.4%
25-2021	Elementary School Teachers, Except Special Education	20,278	238	1.1%	0.1%
15-1232	Computer User Support Specialists	16,251	97	1.8%	0.3%
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	15,392	212	1.1%	0.1%
15-1211	Computer Systems Analysts	13,573	-88	1.7%	-0.2%
41-3021	Insurance Sales Agents	11,413	61	1.8%	0.2%
43-1011	First-Line Supervisors of Office and Administrative Support Workers	11,287	-538	0.7%	-0.5%
43-4171	Receptionists and Information Clerks	11,287	19	1.0%	0.0%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	10,608	-671	0.5%	-0.5%
11-3021	Computer and Information Systems Managers	10,562	128	2.1%	0.7%
13-2098	Financial and Investment Analysts, Financial Risk Specialists, and Financial Specialists, All Other	9,601	73	1.6%	0.3%
25-2022	Middle School Teachers, Except Special and Career/Technical Education	9,431	114	1.1%	0.1%
53-1047	First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	9,422	150	1.3%	0.3%

Source: Chmura's JobsEQ®, Chmura

Another 15 occupations are unique to the top occupations expected to add jobs in rural areas. Farmworkers and laborers top the list, and agricultural equipment operators rank 4th, reflecting the importance of the agricultural sector in rural Texas. Parts of rural Texas are also ideal for wind turbines to collect renewable energy—Texas is already a national leader, and demand for wind turbine service technicians is expected to grow at an average annual rate of 4.8% in rural areas of the state through 2035. Demand for increased access to healthcare and community services is also reflected in the growth of occupations such as substance abuse, behavioral disorder, and mental health counselors; speech language pathologists; child, family, and school social workers; EMTs; and therapists and therapist assistants.

Table 3.25: Rural Areas are Expected to Need More Agriculture, Energy, and Healthcare Support Workers

		Emp Change 2021-2035		Avg Ann Growth 2021-2035	
SOC	Occupation	Urban	Rural	Urban	Rural
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	2,530	1,223	1.5%	0.9%
21-1018	Substance Abuse, Behavioral Disorder, and Mental Health Counselors	8,702	595	3.2%	2.3%
47-2073	Operating Engineers and Other Construction Equipment Operators	8,482	581	1.4%	0.6%
45-2091	Agricultural Equipment Operators	748	418	2.1%	1.7%
49-9081	Wind Turbine Service Technicians	1,435	357	6.1%	4.8%
29-1127	Speech-Language Pathologists	6,725	341	3.0%	1.6%
21-2011	Clergy	6,556	334	1.9%	0.9%
21-1021	Child, Family, and School Social Workers	5,711	326	2.0%	1.0%
33-2011	Firefighters	5,790	324	1.8%	0.8%
29-1123	Physical Therapists	6,811	296	2.6%	1.4%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	8,687	283	1.4%	0.5%
47-2152	Plumbers, Pipefitters, and Steamfitters	8,756	280	1.3%	0.5%
29-2042	Emergency Medical Technicians	3,504	279	1.8%	0.9%
29-1126	Respiratory Therapists	4,642	261	2.8%	1.7%
31-2021	Physical Therapist Assistants	4,695	261	3.9%	2.7%

Source: Chmura's JobsEQ®, Chmura

4. Focus Group Findings

4.1 Introduction

Between June 7th and 16th, Points Consulting (PC) facilitated 12 focus groups with residents of Texas on various topics related to the "Future of Work." Most of the 123 participants were average employed Texans, though one focus group was focused on leaders within the economic development, workforce development and higher education sectors (i.e.: public sector leaders). PC also arranged interviews with the three Commissioners for the Texas Workforce Commission (TWC) in order to discuss the team's findings. More details on all focus group participants are contained in **Appendix A**.

A questionnaire for leading the focus groups was developed by PC and approved by leaders at TWC in Spring 2022. The questionnaire (shown in **Appendix B**) was used as a guideline, which was not adhered to strictly. PC's facilitators sought organic conversations that touched on each of the key topic areas, but typically allowed the participants to lead us into those conversations.

Lastly, PC clearly expressed a commitment to respondents' privacy. For that reason, no comments are directly attributable to any one individual and PC will not be releasing the recordings of the focus groups or any participants names to TWC. Quotes from anonymous focus group participants are utilized in quote boxes throughout this report to support the points being made in the narrative summary.

4.2 Overarching Themes

4.2.1 Artificial Intelligence (A.I.) and Automation

> *"Everything is some sort of smart device — smart TV, smart refrigerator, but what's lacking is the individual. We're surrounded by technology and electronics that are 'smart', but it has dumbed us down. It's scary the extent to which it has dumbed us down"*

When confronted with the possibility that their jobs could eventually be replaced by A.I. and automation, most respondents did not agree, while a few were fully in accord with this possibility. Even those who considered it a strong possibility were split on whether an AI-dominated future represents a net social positive or a net negative.

Many acknowledged that there were aspects of their work that could be automated, but they tended to believe that the most critical parts of their work (usually either highly analytical, creative, personal, or a combination of the three) are irreplaceable. While a subset of respondents was quick to depict a future where most jobs had been replaced, the majority saw this as a negative or even catastrophic scenario. On the other hand, some participants had a more positive outlook on the use of A.I. and automation in the workplace. Also, respondents that worked in the technology sector pointed out how the automation of repetitive and time-consuming tasks had aided them in their work — allowing them to focus on more important and engaging responsibilities.

Several participants highlighted self-serve options in retail such as self-checkout and kiosks as more efficient ways to conduct commerce. Reactions on this front were not uniformly positive, however. Many respondents mentioned how they preferred interacting with real people as opposed to bots or other forms of automated interfaces, since they felt that these systems are not yet optimal or user-friendly. This particular concern did have some correlation with age, with respondents over 40 tending to prefer more human interaction.

A potential reason for participants' lack of concern regarding A.I. displacing jobs might be due to a lack of awareness of the latest developments in the field. The history of innovation is evidence enough that, indeed, many of the jobs that currently exist will not exist in 15-20 years. This seems to point to the economic principle of thinking "at the margin." In most cases, workers are correct to point out that they will not be full-scale replaced. However, if their job requires 20% less labor-time, over the course of 10-15 years, their employers will certainly figure out how to employ fewer of those workers, and to get them to more distinctly focus on the tasks that are not replaceable. As an example, only a few participants had either seen robotic automation in their workplace or had considered implementing it themselves, but most all participants noted the adoption of certain tools and devices that marginally reduced their labor requirements.

Among the mentions of widescale changes due to AI tools and technology there were a few acute examples. One participant explained how robotic welders were employed in a job site, but they were not as accurate in their work, or as clean as their human counterparts. Whereas another participant had considered investing in robotic cleaning technology due to janitorial labor shortages.

4.2.2 The Great Resignation

> *"The place where I work has many openings right now. I've been working here for 16-years and I've never seen as many openings as I do right now. I think no one wants to work."*

Many, if not the majority of participants, noted how the pandemic and ensuing isolation resulted in a time of personal reflection. In numerous cases, people considered the costs and benefits of their employment situation. At the same time, with labor market shifts and shortages, new opportunities became available, many of which had lower demands and expectations on their time, energy, and location of work. Workers with the most physically and emotionally demanding positions seemed to be the most likely to shift employment. That definition spans a wide array of industries from high-skilled professional jobs (technology, sales, etc.) to service jobs (food/beverage and retail).

The demands on workers have shifted and decreased in many cases. But some still in the typical 9-5 work cycle report that pressures and expectations at the workplace are stronger than ever. When asked why, respondents noted the lack of eligible employees to relieve them of their positions and/or take up additional shifts. It was common for respondents to mention how they had seen many "help wanted" signs posted around businesses in their area. This is despite the fact that Texas has received 174,000 migrants on net in the five quarters after the pandemic began, which is higher compared to the 109,000 migrants in the previous five quarters.[201]

When asked about labor shortages in their place of work, several respondents mentioned that they were short-staffed and presented ideas as to why that is the case. Some suggested that younger generations had no interest in working and lacked a strong work ethic. Others said many workers felt entitled and demanded more flexibility, benefits, and pay than employers were willing or able to provide. On the other hand, a few respondents mentioned that workers were now less inclined to work in the typical in-office fashion after having experienced the increased flexibility of remote work, gig work, and other hybrid forms of employment. (This point ties directly to the gig work phenomenon, addressed later in this report). At least part of the lament of employers and HR departments for the lack of workers is explainable by the existence of new options for making a living that simply have not existed until very recently. Lastly, a few others commented that low wages relative to expectations were the main driver of labor shortages.

When polled, participants in the public sector group democratically selected labor shortages as the most influential factor on the future of work in Texas. These respondents offered several suggestions as to why they believed labor shortages to be the most important, with the development of technology and A.I. selected as the primary reason. In general, participants indicated that although advancements in technology may serve to create more high-skilled jobs, the net effect to the labor supply will be negative due to job losses among lower skilled workers. The leaders predict that both employers and public sector partners will be forced to invest in retraining and workforce development to deal with labor shortages, as well as improved technology and automation processes to simplify roles and cope with the lack of available workers.

[201] Wenli Li, and Yichen Su, "Largest Texas Metros Lure Big-City, Coastal Migrants During Pandemic," *Federal Reserve Bank of* Dallas (2021), Accessed July 2022, **https://www.dallasfed.org/research/swe/2021/swe2104/swe2104b.aspx**

4.2.3 Generational Differences

"We're in a society where people are 'keyboard warriors', but they won't look each other in the eye when in person. When it's all said and done that's the generation that I'm bringing into my workforce now. If they don't have a good work attitude, they aren't worth the investment. I can train skills, but I can't train attitudes."

As shown in Tables 1 through 9, respondents across the focus groups represented a variety of age groups, which highlighted the differences in viewpoints among generations. The starkest discrepancy in perspectives arose when discussing the recent labor shortages and their possible underlying causes. In general, older participants ascribed the lack of labor supply to an unwillingness in younger generations to work hard. Several participants who were business owners pointed out how they were having a hard time hiring qualified employees. They suggested that, in their view, students and young people no longer showed much interest in trade schools.

On the other hand, younger participants were more inclined to attribute labor shortages to undesirable working conditions. Though a few conceded that laziness may be a factor for some in their generation, the most commonly cited reason was a lack of pay that was commensurate with their level of education. Participants that had worked fast food or retail jobs mentioned that the level of effort required in those positions did not match up to the low wages they were receiving.

"There's a big difference in other parts of the world in how they approach their work-life balance. And I think people in the US are starting to recognize that, and younger generations are changing their priorities. They're prioritizing time with family more than higher salaries sometimes."

The issue of work-life balance also arose in this discussion. Younger people tended to emphasize the importance of maintaining a balance between work and their personal lives. This was reflected in their responses to questions regarding working from home and gig work. In both cases, having increased flexibility when compared to the traditional in-office jobs was one of the key factors that seemed to influence younger participants' positive views. Several older respondents remarked how some of their younger employees (or even their own children) seemed less inclined to work full-time hours when asked why the younger cohort often complained of the lack of free time and flexibility.

Robin Chase, the co-founder of the car-sharing service, Zipcar, is quoted as saying: "My father had one job in his life, I've had six in mine, my kids will have six at the same time." This was reflected in the focus groups by the fact that many under the age of 30 seemed comfortable collecting income from a variety of often infrequent and unpredictable sources (i.e.: gigs obtained via online platforms, a time-flexible part-time job, market research participation, etc.). Underlying these claims is the fact that teenagers and young adults have more creative options for making a living than prior generations. For young people in these positions, they see little advantage in committing oneself wholly to a single employer (particularly given the perceived low pay, lack of benefits, and encumbrances on their freedom). Older workers, on the other hand, are likely to see these attitudes as entitled and lazy.

In the midst of this, it is interesting to note that so many participants on both ends of the age poles fail to see how dramatically the landscape of work has changed within a single generation. Younger workers do not know what it was like before they entered the workforce. Older workers do not understand the processes and technologies that are commonplace to younger workers.

Participants of all ages were able to find common ground on certain topics. For instance, respondents viewed working from home favorably regardless of age. Also, participants from all generations were mostly unconcerned with the prospect of A.I. replacing them in the near or distant future. Also, age did not seem to be a factor in determining whether a participant was more likely to engage in gig work, either part-time or full-time.

4.2.4 Flexible Work, Remote Work & Work from Home

> *"COVID forced employers to explore the option of remote work. And I think they realized that people can be just as efficient in their home as in their office."*

In most groups, around half of the participants were either working fully from home or in a hybrid arrangement, such as only working some days in the office. The majority of respondents spoke favorably of their experience working from home, and many preferred it to working on-site. In fact, when polled on what would be the most influential factor on the future of work, they consistently ranked working remotely as the most important.

Participants enjoyed not having to commute, and many claimed they were more productive in their home than in an office environment. Several respondents in rural and suburban areas noted how remote work provided an expanded market of job opportunities that was hugely beneficial to their households and their community, in general. One respondent poignantly noted that if not for remote work everyone in her town would have to choose between working for Walmart or the local prison.

> *"There's no social connection. I think people thrive better around people. I worked from home out of necessity — it wasn't really a choice."*

Respondents also shared their thoughts on the negative aspects of working remotely. The most commonly cited unfavorable point was a lack of social interaction. Others also highlighted how it took some discipline not to become lazy or complacent when working from home. A handful of participants also complained about having to use their own equipment for work, rather than having access to the company's resources at the office. Additionally, those who were not as familiar with technology struggled to resolve and troubleshoot issues on their own.

Locational changes were common among participants, many having moved to Texas just within the past few years. A smaller subset also mentioned that they are considering moving elsewhere, for a combination of personal, political, and family reasons. Interestingly, none of the participants reported moving to Texas because of the opportunity to work remotely but now many felt both confident and comfortable to continue working remotely. Though this may seem like an irrelevant qualification, it is important for setting expectations of future workforce migration. Some have predicted that work-from-home opportunities will liberate people to move to wherever they want, but the data seem to suggest that it is actually incentivizing more people to stay-put than have had that opportunity in past generations.

4.2.5 Employer Monitoring & Analytics

The rise in flexible work arrangements is correlated with another, less wholesome trend. As employers lose the ability to consistently see their employees at their workspace, it has led to executives at many companies to seek out other means for monitoring engagement and productivity. When asked if their employer was monitoring their productivity, many participants mentioned that — to their knowledge — they were not being heavily monitored or micro-managed. Respondents typically claimed that employers relied on software such as Teams, Slack, and other similar productivity platforms in order to keep in touch with their superiors. Despite these claims, a handful of respondents confessed to behaviors that belie a level of paranoia about their employers' extent of monitoring and tracking, (e.g.: "I do move the mouse every once and a while just so they know that I'm actually working").

The focus-groups were not highly populated with large business owners and high-level managers at large companies — audiences who are typically the most suspicious of the benefits of remote work. The focus groups were heavily attended by supervisors and mid-level managers, however, who have a tempered view of the situation. Mid-level managers personally benefit both from flexible and remote work and experience some accountability challenges with their direct reports. Those who supervised remote workers remarked how a certain amount of trust is needed between both parties, since they cannot be fully sure that their employees are being as productive as expected. Some participants shared that some of their employees had taken advantage of that trust by doing non-work-related activities during work time, whereas others were more concerned with their employees getting their tasks completed in a timely manner, and not exactly when and how they got them done.

4.2.6 Adjusting to Technology

"A couple of years back not everybody had to be tech-savvy…but nowadays you cannot get away with not being tech-savvy, otherwise you will feel handicapped."

When respondents were asked about how their skills should change and adapt over the next 15 years, the majority acknowledged that they should develop their technology skills. Most participants seemed to be aware of the need to adapt to and learn new technology-based skills in order to remain relevant in the workforce. No industry was exempt from these sentiments including those traditionally considered very blue-collar, such as oil and gas extraction, and transportation. Pressing into what respondents actually meant by "tech skills" revealed a wide-variety of responses. For some, technological skills simply meant basic aptitude with computers and smart devices. Others provided detailed explanations related to specific programming languages, data analytics skills, and information technology systems.

The rise of flexible work and the increased dependency on software and tools that facilitate working from home necessitate a certain level of familiarity with technology and the ability to provide your own tech support if the need arises. Respondents spoke favorably of software such as Zoom and instant messaging applications that allowed them to communicate more easily. While not exclusively an age-based issue, many in their 40s and over were uncomfortable with the lack of face-time and relationships. Teachers across multiple focus groups were also wary of the increase in the use of this sort of technology due to the effect observed on their students. They mentioned how their students behaved differently in the classroom post-COVID. Students were commonly described as less social and less driven in the classroom environment after taking remote classes for several semesters.

4.2.7 Future of Education

"They're now accepting people without college degrees if they have work experience. Before it used to be 'we aren't going to talk to you if you don't have a college degree.' A lot of people are getting the opportunity to try jobs they would've had to go back to school for; or that they simply weren't qualified for."

Respondents shared their thoughts on what the future of education may look like, as well as possible solutions for how schools and colleges can address the apparent mismatch between what is being taught and what is actually needed in the workplace. The consistent point of emphasis when discussing education was technology and how to prepare students to adequately carry out and adapt to what is expected of them at work. Some participants proposed that there be a higher degree of interaction between industries and learning institutions. Others believed that more students should forego college and instead opt for trade schools, citing labor shortages in those fields and the prospect of earning high wages.

Representatives in the public sector focus group were, unsurprisingly, very interested in discussing this topic and understanding industry and workforce trends. These leaders were open to many options that higher-education and workforce development might be able to employ. Some even had rather bold ideas for shaking up the status quo including deploying short-term or "badge" based training wide-scale, utilizing sector development strategies to compete with other regions of the US, and targeting specific individuals for retraining programs based on those individuals' profiles. Others in the public sector group also recognized the constraints they are under as public institutions in their ability to adopt new technologies and processes quickly.

Education was not discussed exclusively in terms of formal education, since participants also emphasized the importance of continuing education and self-teaching new skills in order to keep up with the rapidly evolving world of work. Some respondents were able to learn new skills using online courses and essentially reinvent themselves and move on to different career tracks post-COVID. In many cases, participants used their extra time at home to amp up their skills to facilitate these transitions using platforms such as Kahn Academy, Coursera, Udacity, and others. In fact, several participants mentioned that the availability and accessibility of online courses also allows young people to bypass the formal college education route and instead obtain the required skills needed to land jobs on their own. Some suggested that jobs were now easier to come by. For instance, one participant mentioned how some airlines are reducing the amount of

flight hours needed to be a commercial pilot. Thus, recent labor shortages may mean that employers might have to be less selective — creating an opportunity for workers to enter certain fields with less barriers to entry.

4.2.8 Effects of COVID

> *"Before COVID, I was working 60 hours a week, and I was traveling the world, but my life was nuts. I was overworked. I was tired, and I was worn out. Now I get to choose how much I work. I've been able to craft a lifestyle [that] I desire."*

Participants had a mixed response when asked if they were better off in their work situation post-COVID. Respondents who ran businesses from their home such as daycares, dog-sitting or hair salons were greatly negatively impacted during COVID, and several mentioned that they still are not faring as well as they did previously. At least half of the rank-and-file workforce, however, said that they were able to reinvent their careers and learn new skills which have helped them switch fields, and move into careers that more closely align with their interest and work-life balance desires.

As previously mentioned, in the Great Resignation section of this report, a great many respondents used the COVID-induced economic lock-downs and stay-at-home orders as an opportunity to reflect on their work lives. Some came out of it with renewed passion, some decided to change direction voluntarily, while others lost their job involuntarily. It is noteworthy that roughly 18 months after the repeal of state-wide lockdowns that none of the focus group participants remained involuntarily unemployed. Some were still charting a path for their next steps in life but did not report being greatly inhibited by an inability to find work.

4.2.9 Gig Work

On the topic of gig work, PC's facilitators specifically instructed participants to think broadly about the topic. When the term "gig work" is used, people tend to envision services such as ride-sharing and food delivery (e.g.: Uber, Door Dash, etc.). The gig economy also includes professionals doing contract work in virtually all industries. The options are virtually limitless, but some fields cited by participants included finance, design, software development, oil and gas, and consulting. Numerous participants were also earning side hustle income with the help of platforms such as Upwork, Fiverr, and Freelancer.com. Gig work also encompasses very short-term engagements which effectively supplement income (such as Task Rabbit, G2, and incentive-based market research platforms).

Every focus group contained several respondents who participated in the gig economy, either full-time or as a "side hustle". These participants spoke favorably of the ability to control how much they worked and when. One particularly revealing component of this conversation was how universally common gig work was among participants. It is generally supposed that gig work is most common among low-skill, lower-income, and urban-dwelling audiences. What our focus groups revealed was that high-earners were actually *more* likely to engage in the gig economy. Area of residency was fairly non-predictive as well, as gig work was just as common among rural and suburban dwellers as urban residents. Age was the one demographic that followed the expected lines, with older workers being less likely to engage in the gig economy.

Those that solely engaged in contract work cited flexibility as the principal reason they chose this form of work over a salaried position. When asked if they would be willing to switch to full-time work if they had the chance, most respondents said they would decline the opportunity. They pointed out how they were well-off financially thanks to their contract work, so they had no need to pursue a different form of employment. These workers prioritized setting their own schedules and being able to spend time with their families over a steady and more predictable job with set benefits. Lastly, it is also worth noting that some of the more ubiquitous options for gig or contract work, such as ridesharing or food delivery are not available, or only available in a very reduced capacity in more rural areas.

4.2.10 Multilingualism

> *"I can work with more clients because I take on all of the Spanish-speaking people. It just expands my ability to serve and the kinds of different contract work I can take."*

The advantages of being multilingual appeared to be mainly location-based. If Spanish was commonly used in their geographic area, workers considered it to be a strong benefit to be proficient in the language.

Some participants mentioned that they had benefitted in their work from being able to speak more than one language. It served to open-up more business opportunities for some, since they had a larger client pool, while others pointed out that being bilingual helped them land a particular job. A fair amount of the participants in the Spanish group stated that proficiency in Spanish has aided their careers. On the other hand, many respondents who were not multilingual expressed a desire to gain proficiency in another language, highlighting the potential for landing roles that interest them that require some level of proficiency in a second language. They also recognized the likely importance of acquiring some level of proficiency in Spanish for the future, as the Hispanic population in Texas keeps trending upwards.

Appendix A: Focus Group Participant Demographics

The following are high-level statistics on focus group participants and their demographics.

- FG 1 (June 7, 10:30 AM PT): 9 participants
- FG 2 (June 8, 9:00 AM PT): 8 participants
- FG 3 (June 8, 1:00 PM PT): 10 participants
- FG 4 (June 9, 10:00 AM PT): 11 participants
- FG 5 (June 9, 1:00 PM PT): 11 participants
- FG 6 (June 13, 9:00 AM PT): 12 participants
- FG 7 (June 14, 10:00 AM PT) ***Spanish**: 8 participants
- FG 8 (June 28, 2:00 PM PT) ***Public Sector Leaders**: 11
- FG 9 (June 15, 9:00 AM PT): 12 participants
- FG 10 (June 15, 1:00 PM PT): 9 participants
- FG 11 (June 16, 10:00 AM PT): 10 participants
- FG 12 (June 16, 2:00 PM PT): 12 participants

Total Participants (Excluding Group 8 and commissioner interviews): 112

Total Participants (Including Group 8): 123

A.1 Participant Demographics

PC intentionally sought a representative sample of participants according to age, race/ethnicity, educational level, rural/urban residency, household income level, industry, and size of employing organization. Statistics in Tables 1 through 9 display the demographics of participants. To demonstrate how closely the cohort matches average Texans, statistics comparing the distribution of participants and the state of Texas, in general, are displayed in Tables 10 through 14.

Table 1: Race/Ethnicity Distribution of Participants

Caucasian (Non-Hispanic)	50	44.6%
Hispanic (Any Race)	35	31.3%
African American	15	13.4%
Asian	9	8.0%
Other, Mixed Race	3	2.7%
Grand Total	**112**	**100.0%**

Table 2: Gender Distribution of Participants

Female	61	54.5%
Male	51	45.5%
Grand Total	**112**	**100.0%**

Table 3: Age Distribution of Participants

18-29	25	22.3%
30-44	37	33.0%
45-59	34	30.4%
60-64	9	8.0%
65+	7	6.3%
Grand Total	**112**	**100.0%**

Table 4: Education Level Distribution of Participants

High School Graduate	15	13.4%
Some College	20	17.9%
Associate Degree	1	0.9%
College Graduate	39	34.8%
Some Postgraduate Education	2	1.8%
Postgraduate Degree	35	31.3%
Grand Total	**112**	**100.0%**

Table 5: Employment Status Distribution of Participants

Full-time	84	75.0%
Part-time	28	25.0%
Grand Total	**112**	**100.0%**

Table 6: Industry Distribution of Participants

Professional, Scientific, & Technical Services	31	27.7%
Educational Services	24	21.4%
Health Care & Social Assistance	10	8.9%
Administrative & Support Services & Waste Management & Remediation Services	9	8.0%
Other Services (except Public Administration)	8	7.1%
Retail Trade	7	6.3%
Transportation & Warehousing	5	4.5%
Accommodation & Food Services	4	3.6%
Management of Companies & Enterprises	4	3.6%
Arts, Entertainment, & Recreation	3	2.7%
Information	3	2.7%
Agriculture, Forestry, Fishing & Hunting	1	0.9%
Construction	1	0.9%
Utilities	1	0.9%
Wholesale Trade	1	0.9%
Grand Total	**112**	**100.0%**

Table 7: Community Type Distribution of Participants

Suburban	50	44.6%
Urban	44	39.3%
Rural	18	16.1%
Grand Total	**112**	**100.0%**

Table 8: Income Range Distribution of Participants

<$14,999	7	6.3%
$15,000 - $34,999	24	21.4%
$35,000 - $74,999	40	35.7%
$75,000 - $149,999	36	32.1%
$150,000+	5	4.5%
Grand Total	**112**	**100.0%**

Table 9: Employer Size Distribution of Participants

Large	39	34.8%
Medium	33	29.5%
Small	22	19.6%
Self-Employed	18	16.1%
Grand Total	**112**	**100.0%**

A.2 Participant Demographics Compared to Texas Demographics

Table 10: Gender Distribution Comparison

Female	54.5%	50.3%	4.2%
Male	45.5%	49.7%	(4.2%)

Source: US Census Bureau

Table 11: Race/Ethnicity Distribution Comparison

Caucasian (Non-Hispanic)	39.7%	40.3%	(0.6%)
Hispanic (Any Race)	39.3%	40.2%	(0.9%)
African American	11.8%	13.2%	(1.4%)
Asian	5.4%	5.5%	(0.1%)
Other, Mixed Race	3.0%	2.2%	0.8%

Source: US Census Bureau

Table 12: Age Distribution Comparison[202]

18-29	22.3%	26.1%	(3.8%)
30-44	33.0%	27.0%	6.0%
45-59	30.4%	23.8%	6.6%
60-64	8.0%	6.9%	1.2%
65+	6.3%	16.3%	(10.0%)

Source: US Census Bureau

[202] Workers aged 65+ are underrepresented because this group is more likely to be retired than younger cohorts, and PC was looking for those active in the workforce.

Table 13: Education Distribution Comparison[203]

High school graduate	13.4%	25.9%	(12.5%)
Associate degree	0.9%	7.8%	(6.9%)
Some college	17.9%	22.9%	(5.0%)
College Graduate	34.8%	17.3%	17.5%
Postgraduate Degree	31.3%	9.4%	21.9%

Source: US Census Bureau

Table 14: Income Range Distribution Comparison

<$14,999	6.3%	9.9%	(3.6%)
$15,000 - $34,999	21.4%	17.3%	4.1%
$35,000 - $74,999	35.7%	29.9%	5.8%
$75,000 - $149,999	32.1%	28.1%	4.0%
$150,000+	4.5%	14.8%	(10.3%)

Source: US Census Bureau

[203] Less-educated participants were underrepresented compared to Texas levels given that this group is less likely to be employed than those with higher levels of education.

Appendix B: Focus Group Question Guide

B.1 Introduction

Hi, I'm _____ with Points Consulting. We are here today to discuss how the World of Work has changed recently and, more importantly, what it might look like in the long-term (say next 15-years). The Texas Workforce Commission (TWC) has engaged our team to conduct these focus groups. They are interested in understanding the future of work for the sake of their own planning and market research. We will be asking you some open-ended questions and also presenting you with some fictionalized vignettes and gauging your reactions.[204]

We want you to know that your information is strictly confidential. We will share no names, email addresses, or other personal details. We will provide a summarized report to TWC about the key themes and trends from the conversations, as well as a summary of participants by location, race/ethnicity, etc. So, please be open and straightforward with us in your answers. And do not feel that you need to respond to any questions that you wish to keep private.

The world of work has been rapidly changing — we can see trends such as artificial intelligence, analytics, and automation revolutionizing the world economy. Also, the power of technology impacting the rise of remote work, which the pandemic has accelerated. While technology is certainly driving future trends, trends such as renewable energy, immigration and multilingualism, demographic changes, and international connectivity and trade are also having an impact. All that said as background, we're here to discuss the emerging trends that will impact the Texas Workforce now and in the future.

Firstly, let's all get to know each other a little bit. I'll identify each person. Please introduce yourself by saying your name, what city you live in, and your favorite thing about Texas.

B.2 Expectations about the Future of Work

- We know the world is turbulent right now with upcoming elections, international conflict, inflation, etc. We are not primarily interested in those issues. Think longer-term. What trends do you see having the biggest impact on the Future of Work in the next 15-years? [Activate Zoom poll, select top 3]
    - Flexible work location (work-from-home)
    - Flexible working arrangements (gig and contract work)
    - Workers being replaced by machines and software
    - Health and safety restrictions at the workplace
    - Labor shortages
    - Migration to/from Texas from within the United States and other countries
    - Shifts in the types of skills required and jobs available
    - Environmental factors
    - International trade
    - Industry regulation
- [After shutting down poll and displaying results]. Why did you answer the way that you did?
    - Which of those trends would have the most effect on you and your household?
    - Which of those trends do you think will have the most effect on your children/grandchildren/young persons in your life?
- If you are employed, how has your company responded to the labor shortage over the past 12 months? (for example, increasing hours, cutting shifts, increasing pay or benefits, etc.)
- How do you think economic opportunity may change in rural vs urban areas over the next 15 years?

Now we will be presenting you with a vignette (or short story). As you listen, consider whether you've had any similar experiences in your work.

[204] At the approval of TWC, participants who fully participated in the hour-long sessions were provided a $50 incentive bonus.

Vignette #1: Martina works for a property management company that leases apartments in a college town. She is dreading how busy she will be since the new semester will be starting soon—especially having to coordinate and schedule all the showings, which is always a hassle. What she didn't know, however, was that her boss was setting up an orientation today at the office to tell everyone about the new software system the company will be implementing. This new A.I. software will handle all scheduling and basic questions from prospective tenants via text and e-mail. Martina couldn't believe what she was hearing. "I won't have to answer the same question 30 times today?", she thought. Suffice it to say Martina was happy to welcome her new A.I. coworker to the team.

Has anybody had such experiences?

- Think creatively! Can you think of ways that your daily workflow may be altered by AI and software programs over the next few years?

B.3 COVID Effects

- Did the COVID-19 pandemic affect your employment situation in any way during the 2020/21 time period?
- Has your employment situation been affected in the post-pandemic period (since 2021)?
- [Base follow-up questions on the responses from the attendees]
- If you became unemployed, how long did it take you to find work? Did you shift to a different industry? If so, do you think you are better or worse off in the long run?
- If you shifted jobs…why?
    - What if anything helped your transition to the new job?
- If you kept the same job…why?
- Overall, are you better or worse off in your employment situation in relation to the pandemic?

B.4 Work from Home (WFH)

Our next vignette is on the topic of work-from-home and some of the opportunities and challenges it may present. Think about whether similar issues may occur in your industry, and how that may affect you, your coworkers, and your customers.

Vignette #2: Hannah has worked at the front desk of a medical office in her small town for the past 20 years. She enjoys the good relationships she has with her coworkers and other specialists' offices in the area. There used to be 10 people in her office and now there are three. Over the past year, several doctors in her office have retired and some others have left voluntarily, and their positions have not been replaced. Increasingly, she is asked to coordinate with telehealth specialists from across the country to communicate with patients and make diagnoses. Though she knows many patients appreciate the shift, she is starting to feel more like she works at a call center than at a doctor's office.

- If employed, is your job accommodating for WFH or not? [If not, how do you feel about WFH being such a big aspect of national conversation?]
- Have you or anybody else in your household worked remotely during the period of the past 24 months? Did that pattern change compared to how it was prior to the pandemic?
- What are some the positive aspects of WFH?
- What are some of the negative aspects of WFH?
- Does your employer prefer you to WFH or WFO?
- [If the participant has worked/is working from home] For you personally, is working from home preferable to working on-site?
- Do you think your employer agrees with this assessment?
- Do you feel your work-life balance has shifted due to WFH opportunities? How so? Is it better or worse?

B.5 Gig Work Related

Studies have ranked Texas as one of the most favorable environments for gig work. Gig work includes independent contractors and freelancers that do short-term work for numerous clients. Some examples of non-traditional forms of work could include ride sharing/food delivery/AirBnB rentals, etc. Some industries that are strong in contract workers include fields such as accounting, web development, and graphic design.

- Have you done freelance or contract work, either as your main source of income or as a side hustle? (Tell us more about that).
- Does the availability of gig work affect your interest in having a full-time or part-time job?
- [If any participants do gig/contract work exclusively] What motivates you to pursue gig work over a full-time position?
- What do you see being some of the benefits and challenges of gig/contract work opportunities for you and others in your community?

B.6 Automation

Machines have replaced work throughout history, whether specific tasks as on a manufacturing line or entire jobs like phone switch operators. It also creates new opportunities for work, such as repairing machines and freeing up time from automated tasks to do more productive activities.

- How has automation affected your work? How has it affected you in your everyday life?
- Does the prospect of automation make you concerned about your job security in your current employment situation?
- Business have also been incorporating artificial intelligence into their services. A.I.is currently incorporated into the workplace through chatbots in call centers and websites, personalization of product searches and ads, and various analytics, for example.
    - Does the use of A.I. as a tool in the workplace concern you or excite you?
    - Has it been implemented in some form in your workplace?
    - How do you think A.I. could affect your work in the future?

B.7 Other Business/Corporate Issues

The next vignette relates to changes that may affect all industries in a variety of ways. Think about whether you've experienced this, and how you feel about it.

Vignette #3: Victor works at an auto parts manufacturer. The multi-national company that owns the local factory recently implemented some "productivity enhancing" systems. A device has been installed at his workstation that tracks how long he spends on each stage of production. There are cameras all over the plant with facial recognition built in. And, to make things worse, a board has been installed in the break room showing how quickly each department is finishing their tasks each day. He is so worried about it that he bought a burner phone recently just for bringing to the plant in case they try to install some type of tracker to his phone when he's not looking.

Another common trend, especially for larger businesses, has been the ability for HR departments to measure many metrics in a more scientific fashion (I.e.: employee satisfaction, productivity, connectivity within the company, etc.)? Have you seen the rise of "analytics" affecting your job? How do you feel about this?

- Over the past 24 months, businesses have focused much more heavily on Diversity, Equity and Inclusion (DEI) initiatives. Have you experienced this within your company culture? Where do you see this trend going? And how could it affect the future of your workplace?
- Do you consider yourself multilingual? Has that helped you in your job in any way? Has that helped you land a job? Do you consider multilingualism to be an advantage in your field of work?

B.8 Conclusion

- How do you think that your skills should be modified/changed over the next 15-years to adjust to the changes in the future of work that we have discussed?
- What are some positive aspects of the Future of Work that you are excited or positive about?
- Any other final questions, comments, or concerns?