Transitioning to College and Work
Part 3: Labor Market Analysis in Houston and Texas

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Houston Education Research Consortium

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Part 3 of the Houston Longitudinal Study on the Transition to College and Work (HLS) examined:

- Supply and demand for labor in the Houston area and Texas, including an examination of the Texas Higher Education Coordinating Board's (THECB) *60×30TX* strategic plan;
- In-demand occupations and skills in the Houston area; and
- Early career wages and unemployment receipt among high school graduates from the Houston Independent School District (HISD).

Results indicated the Houston area and Texas are projected to fall 20 and 10 percentage points short, respectively, of reaching the *60×30TX* goal, an effort aimed at ensuring 60 percent of Texans ages 25-34 complete a postsecondary credential by 2030. Regardless, data showed a positive relationship between education and earnings. The higher wages associated with a postsecondary credential might be related to the short supply of high-skilled workers in the Houston area and Texas.

Many Houston-area jobs required high levels of education and paid competitive annual wages. However, occupations with low supply growth and high demand growth required only moderate levels of education but high levels of interpersonal skills.

An analysis of HISD graduates seven years after high school uncovered considerable gaps in early career wages and unemployment insurance receipt by gender, race and ethnicity, and economic disadvantage. In particular, female graduates continued to earn less than males, and black and Asian graduates earned less than whites. The results ultimately showed students who completed a postsecondary degree or certificate often earned higher wages than peers with only a high school diploma.

Key Findings

Supply and demand for labor in Houston and Texas

- Nearly 40 percent of the Houston-area workforce and 50 percent of the Texas workforce are expected to have some form of postsecondary credential by the end of 2030.
- The Houston area and Texas are projected to fall short of the *60×30TX* goal by 20 and 10 percent, respectively.
- Workers with postsecondary credentials earned higher wages than workers with no postsecondary credentials.
- Workers with bachelor's degrees or more earned higher wages than workers with associate's degrees.
- In both the Houston area and Texas, demand for workers with postsecondary degrees increased faster than supply.

Key Findings

Occupations and skills in the Houston area

- Occupations characterized by high levels of education often paid competitive annual wages.
- Occupations classified as low supply growth rate, high demand growth rate typically required some level of postsecondary education (e.g., 1-2 years beyond high school) and generated competitive wages.
- There was a positive association between analytical skills and wages.
- Interpersonal skill development might be a fruitful area for investment among policymakers concerned with local economic conditions.

Early career wages and unemployment insurance receipt among HISD graduates

- There were gaps in early career wages and unemployment insurance receipt by gender, race and ethnicity, and economic disadvantage.
- Course grades and the number of college-level credits earned were positively and significantly associated with earnings.
- With the exception of an associate's degree, completing a postsecondary credential was associated with higher earnings.

Background

Texas is the second largest state economy in the U.S., and, prior to the Covid-19 pandemic, showed signs of significant employment and income advancement for the next several years ("Best States for Business: Texas," 2018). Education may be key to sustaining this economic growth. Across the nation, there is a positive relationship between a state's level of educational achievement and its economic improvement (Hanushek, Ruhose, & Woessman, 2013). Ensuring all Texas students have access to a high-quality education may help sustain this economic vitality and weather the current recession.

Aside from education's role in economic growth, technological innovations increase the demand for more advanced skill sets in the labor market (Goldin & Katz, 2007, 2008). Projections show "by 2020, 65 percent of all jobs will require some form of postsecondary education or training" (Carnevale, Smith, & Strohl, 2013, p. 15). Moreover, the skills required by employers are evolving. Nationwide, the fastest growing occupations are in healthcare; community services and arts; and science, technology, engineering, and mathematics (STEM) (Carnevale, Smith, & Strohl, 2013). Jobs in these fields may require specialized training, or analytical and interpersonal skills that are different from those in traditional blue-collar jobs.

In addition to the benefits an educated populace can provide to the national economy and employers, workers with college degrees and certificates benefit from higher earnings. In 2015, the median annual income for adults with a bachelor's degree was $24,600 higher (67%) than it was for adults with a high school diploma (Ma, Pender, & Welch, 2016).

In light of the positive role education can play in the economy and in workers' lives, state policymakers and practitioners are paying close attention to how to prepare the students of today for the jobs of tomorrow. A 2012 report released by the National Center for Higher Education Management Systems (NCHEMS) found troubling rates of college completion for the state of Texas: only one in five 8th graders completed a postsecondary certificate or degree within six years of graduating high school. These low rates of postsecondary credential completion are concerning given the strong relationship between education and earnings.

To meet the demands of a job market increasingly dependent on a highly-educated workforce, the THECB launched the *60×30TX* strategic plan, which aims to ensure 60 percent of Texas adults ages 25-34 have a postsecondary degree or certificate by 2030. The plan also aspires to have Texas students complete a postsecondary education aligned with the skills sought in the job market.

This study aimed to:

- Examine supply and demand trends in the Houston area and Texas, including a focus on the feasibility of *60×30TX*;
- Describe occupations and skills in great demand in the Houston area; and
- Analyze HISD high school graduates' early career wages and unemployment insurance receipt.

The Houston Education Research Consortium (HERC) research team used multiple data sources for these analyses, including data from HISD, the largest Texas school district. The report concludes with a discussion and policy recommendations.

Research Questions

This report is divided into three sections that address different research questions:

Section I: Supply and demand for labor in Houston and Texas

1. What is the likelihood that the Houston area and Texas will achieve the *60×30TX* goal?
2. What are the economic returns to education?
3. How have supply and demand for education changed over time?

Section II: Occupations and skills in the Houston area

1. What is the typical education required, the average annual wage earned, and the primary skills needed for occupations in Houston?

Section III: Early career wages and unemployment insurance receipt among HISD graduates

1. What are the early career wages for HISD high school students? How many receive unemployment insurance?
2. Are there differences in early career wages and unemployment insurance by demographic, socioeconomic, and academic characteristics or the level of education?

Section I: Supply and demand for labor in Houston and Texas

Achieving the *60×30TX* goal may help Houston and Texas maintain economic competitiveness and weather the current economic recession by developing a high-skilled workforce that can meet the demands of a changing economy (Goldin & Katz, 2007, 2008). This section operationalized *skills* as workers' level of education (i.e., high school or less, associate's degree, bachelor's degree or higher). The analyses began by tracing historical trends of labor force composition by postsecondary degree type through 2016 and forecasts through 2030. This work answered the key question of whether the Houston area and Texas would achieve the *60×30TX* goal. Next, historical trends and forecasts were produced to show whether it paid to earn a postsecondary degree. Finally, estimates of supply and demand in the Houston area and Texas were produced in an effort to address whether there was a gap between workers' levels of education and the levels of education required by employers.

Data, measures, and analytic strategy

The data came from the Current Population Survey (CPS), a monthly survey of U.S. households administered by the Bureau of Labor Statistics at the U.S. Department of Labor. The analyses covered 1979-2016[1] in Texas and the Houston area and were limited to adults ages 25-55. A more detailed description of the sample may be found in Appendix A. The variables included were age, years of education[2], years of work experience[3], hourly wage[4], family size, gender, and race and ethnicity (i.e., white vs. non-white)[5]. Please see Appendix I for additional information on the methodology.

1 **Nearly 50 percent of the Texas workforce and 40 percent of the Houston area workforce are expected to have some form of postsecondary credential by the end of 2030.**

Labor force composition by postsecondary degree type

Figure 1 illustrates the trends in labor force composition by postsecondary degree type between 1990 and 2016. The x-axis of the graphs shows the year, while the y-axis of the graphs shows the share of the labor force in Texas or the Houston area that has a bachelor's degree or more (green line) or an associate's degree (red line). For example, in 1990 about 25 percent of Texas workers had a bachelor's degree or more and 10 percent had an associate's degree. The remaining 65 percent had no postsecondary degree.

[1] Although the analyses included data from all years, graphs in this report begin with 1990 for comparability across Texas and the Houston area.
[2] Before 1992, educational attainment was measured by asking the highest grade ever attended and whether it was completed. Since 1992, the question asked the highest level of school completed or the highest degree received. This discontinuity was taken into account in the analysis. Unfortunately, the CPS data did not allow the researchers to distinguish occupational certificates.
[3] Work experience was not provided in the CPS data and was approximated using *potential years of experience* by the following formula: age - 6 - years of education.
[4] Hourly wages were calculated using the following formula: income ÷ (weeks worked per year × hours worked per week). Income was adjusted for inflation.
[5] Racial and ethnic subgroups (e.g., black, Hispanic, Asian) could not be disaggregated due to sample size issues.

After 2016, the estimates are called *projections* because the future is predicted with uncertainty. The shaded regions around the dotted green and red lines are called *95 percent confidence intervals*: analyses suggest there is a 95 percent chance the actual numbers will fall in this shaded region. For example, in 2030, there is a 95 percent chance the percentage of the labor force with at least a bachelor's degree will be between 25-55 percent in Texas and 20-40 percent in the Houston area.[6] Because the future is predicted, estimates are subject to error, and readers are encouraged to exercise caution when interpreting the results.

The graphs show that between 1990 and 2016, the share of the labor force with a bachelor's degree or more increased, whereas the share of the labor force with an associate's degree remained relatively low and stable. This was true for both Texas and the Houston area. In 2016, roughly 36 percent of the Texas labor force and 38 percent of the Houston labor force had at least a bachelor's degree. In 1990, about one-quarter of Texas workers and one-third of Houston workers had a bachelor's degree or more, so this represented an increase. However, the share of workers with an associate's degree hovered around 10 percent in both Texas and Houston throughout the same time period.

Keeping in mind that the projections may not be exact, Figure 1 plots trends in labor force composition through 2030. According to predictions, workers with a bachelor's degree or more will continue to make up a larger share of the workforce than workers with an associate's degree. The share of workers with bachelor's degrees or more is also predicted to continue increasing in Texas, whereas in the Houston area, it will decrease slightly. It is unclear why these projections show a decrease in the share of workers with a bachelor's degree or more in Houston. Additionally, the share of the labor force with an associate's degree will remain stable at about 10 percent in both Texas and Houston.

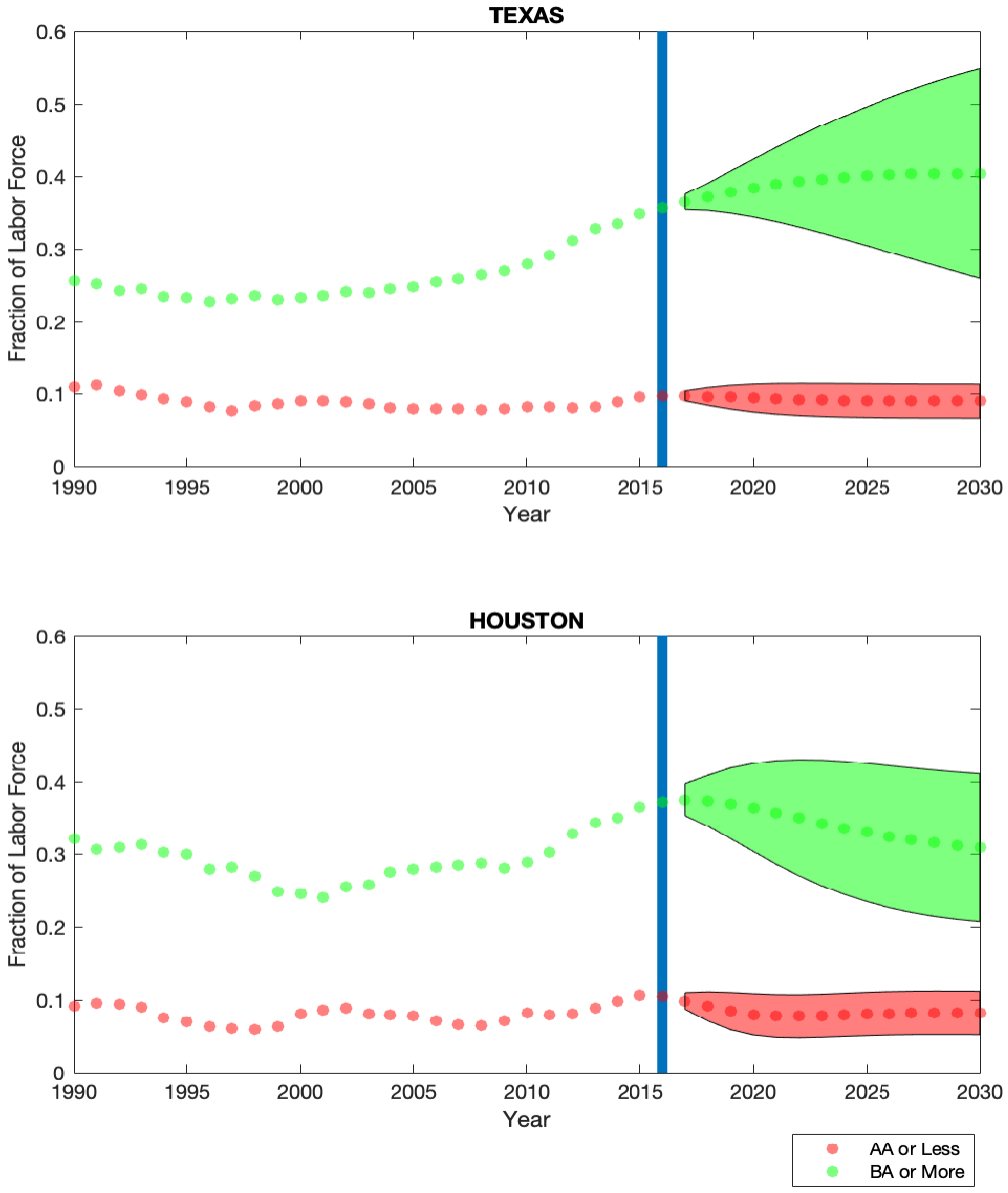
The findings suggest by the end of 2030, nearly 50 percent of the workforce in Texas and 40 percent of the workforce in the Houston area are expected to have some form of postsecondary credential. Therefore, Texas and Houston are projected to fall short of the *60×30TX* goal by 10 and 20 percent, respectively.

[6] If the labor force composition in 2030 is toward the higher end of the projections (i.e., the top part of the confidence intervals), then Texas will meet the *60x30TX* goal and Houston will come close.

2

Texas and the Houston area are projected to fall short of the *60×30TX* goal by 10 and 20 percent, respectively.

Figure 1. Labor force composition by postsecondary degree type, 1990-2030



Notes: The sample was limited to individuals between 25-34 years old. All series were six-year moving averages after model estimation at yearly frequencies. The shaded regions after 2016 are 95% confidence intervals. Please see Appendix I for additional details.

3 Workers with postsecondary credentials earn higher wages than workers with no postsecondary credentials.

Wage premiums by postsecondary degree type

Next, evidence on the economic returns to a postsecondary education is provided. This was demonstrated using a measure called the *wage premium*, which referred to how much higher the hourly wage of workers with some form of postsecondary credential was compared to workers with no postsecondary credential. Figure 2 illustrates the wage premiums for workers with associate's degrees and bachelor's degrees or more (relative to workers with no postsecondary credential) in Texas and the Houston area. Estimates of wage premiums for both groups are plotted from 1990-2016 and projections are plotted through 2030. The x-axis of the graphs shows the year, while the y-axis of the graphs shows the wage premium for workers with an associate's degree (red line) or a bachelor's degree or more (green line). For example, in 1990, the wage premium for Texas workers with an associate's degree or a bachelor's degree or more was the same: workers with these degrees earned close to 50 percent higher wages than workers with no postsecondary degree.

After 2016, the estimates are called *projections* because the future is predicted with uncertainty. The shaded regions around the dotted red and green lines are called *95 percent confidence intervals*: the analyses suggest there is a 95 percent chance the actual numbers will fall in this shaded region. For example, in 2030, there is a 95 percent chance Texas workers with a bachelor's degree or more will earn 105-285 percent more than workers with no postsecondary degree and there is a 95 percent chance Houston workers with a bachelor's degree more will earn 140-270 percent more than workers with no postsecondary degree. Note the confidence intervals for the associate's degree wage premium overlap with the confidence intervals for the bachelor's degree or more wage premium. The analyses cannot determine whether the wage premium for a bachelor's degree or more will be meaningfully different from the wage premium for an associate's degree. In sum, because this is a prediction and subject to error, readers should exercise caution when interpreting the results.

Overall, the graphs provided evidence of economic returns to higher levels of education in Texas. The wage premiums for associate's and bachelor's degrees or more were always positive, which meant workers with a postsecondary credential typically earned more than workers with no postsecondary credential. In 2016, workers with at least a bachelor's degree earned an hourly wage 140 percent higher than that of workers with no postsecondary degree. Workers with an associate's degree earned an hourly wage 80 percent higher than that of workers with no postsecondary degree. In addition, both graphs showed the wage premium for a bachelor's degree more was generally higher than the wage premium for an associate's degree, suggesting it paid to pursue advanced education.

4 Workers with bachelor's degrees or more earned higher wages than workers with associate's degrees.

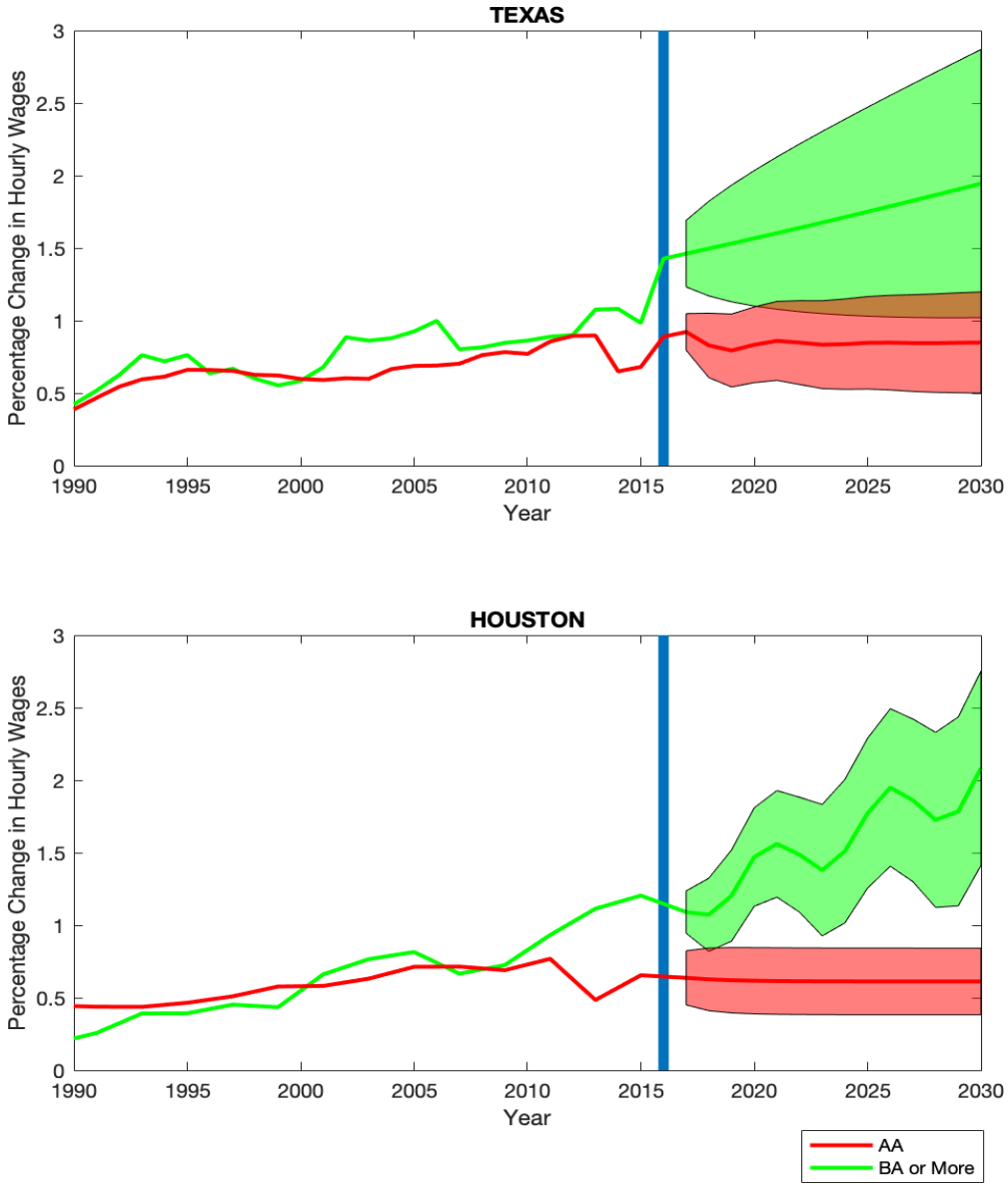
Keeping in mind the projections may not be exact, in 2030, the hourly wage of Texas workers with a bachelor's or more will be 195 percent higher than that of workers with no postsecondary degree.[7] The real hourly wage of workers with an associate's degree is also predicted to be 85 percent greater than that of workers with no postsecondary degree.

In the Houston area, there were positive wage premiums for workers with some form of postsecondary credential, relative to workers with no postsecondary credential. In 2016, workers with at least a bachelor's degree earned nearly 120 percent more than workers with no postsecondary degree, and workers with an associate's degree earned nearly 65 percent more than those with no postsecondary degree. By 2030, Houston workers with a bachelor's degree or more are projected to earn around 205 percent more than workers with no postsecondary degree. In contrast, the projected wage premium for workers with an associate's degree is projected to flatline around 60 percent after 2016. While this number is substantially lower, it still provides evidence of economic returns to a two-year degree.

In summary, there was evidence of returns to postsecondary education at the state and regional levels. Compared to workers with no postsecondary degree, workers with a bachelor's degree or more or an associate's degree earned higher wages. Moreover, workers with a bachelor's degree or more earned higher wages than workers with an associate's degree. These wage premiums are expected to continue into the future.

[7] It is important to note the wide confidence intervals for these trends make it difficult to interpret these estimates with certainty, so readers are encouraged to exercise caution when interpreting the results. For example, based on the estimates, the wage premiums of a bachelor's degree or more (relative to no postsecondary degree) may be 105-285 percent in Texas. Yet, even at the lower end of the estimates, workers with more education are predicted to earn higher wages.

Figure 2. Estimates of wage premiums by postsecondary degree type, 1990-2030



Notes: All series were six-year moving averages after model estimation at yearly frequencies. The shaded regions after 2016 are 95% confidence intervals. Please see Appendix I for additional details.

5 In both Texas and the Houston area, demand for workers with postsecondary degrees increased faster than supply.

Supply and demand for labor by postsecondary degree type

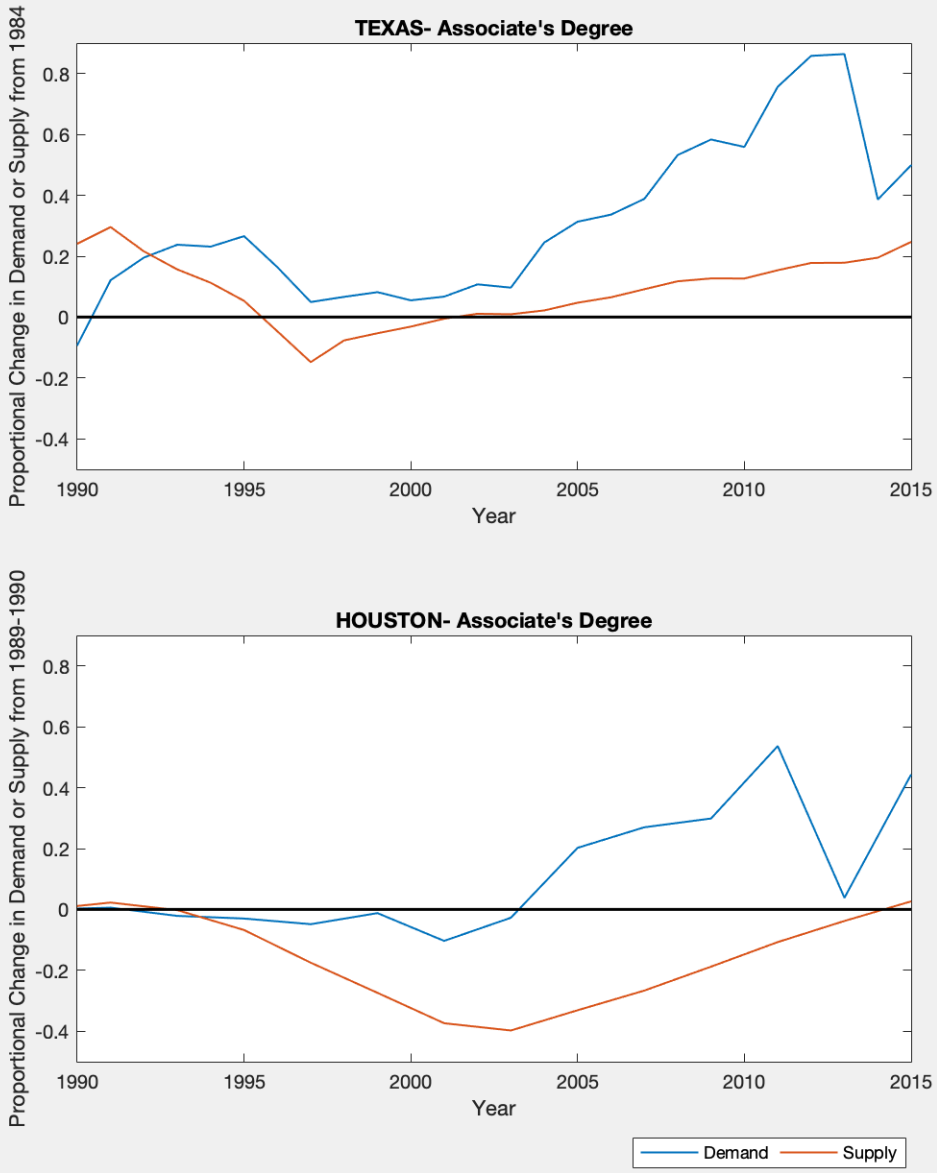
In this section, trends in the supply and demand for labor by postsecondary degree type in Texas and the Houston area are examined. Influenced by Goldin and Katz (2007, 2008), the goal of this analysis was to determine the *skills gap*, or the shortfall between the supply and demand for skilled workers (relative to unskilled workers). For this analysis, skilled workers were individuals who earned an associate's degree or a bachelor's degree or more, while unskilled workers did not have a postsecondary credential.

While a measure of supply could be constructed from the data using information on the total number of hours worked, the demand for workers with a given level of education was not available. The economic model estimated demand, in part, using the wage premiums calculated earlier. Complete details on how demand was calculated are available in Appendix I.

Figures 3-4 plot trends in the changing supply and demand for workers with an associate's degree (Figure 3) and workers with a bachelor's degree or more (Figure 4). The x-axis of the graphs shows the year, while the y-axis of the graphs shows the proportional change in supply or demand relative to 1984 (Texas graphs) or 1989-1990 (Houston graphs). A value of 1 on the y-axis means that since 1984 or 1989-1990, the supply or demand increased 100 percent. A negative value on the y-axis means since 1984 or 1989-1990, the supply or demand decreased. The red line plots the supply trend and the blue line plots the demand trend. For example, in 2015 in Texas, the supply of bachelor's degrees or more increased by about 0.50 (50 percent) since 1984, while the demand for bachelor's degrees or more increased by more than 2.00 (200 percent) since 1984. By 2015, the demand for Texas workers with a bachelor's degree or more increased more than the supply.

In Texas and the Houston area, the demand for workers with postsecondary degrees increased faster than the supply. The figures also show Houston experienced slower growth in the supply of workers with bachelor's degrees or more, despite the demand being just as high as the demand in Texas. In both Texas and the Houston area, there was a shortage of educated workers.

Figure 3. Change in supply and demand for associate's degrees, 1990-2015



Notes: All series were six-year moving averages after model estimation at yearly frequencies. Please see Appendix I for additional details.

Figure 4. Change in supply and demand for bachelor's degrees or more, 1990-2015

Notes: All series were six-year moving averages after model estimation at yearly frequencies. Please see Appendix I for additional details.

Implications

Under the status quo, Texas and Houston are expected to fall short of achieving the *60×30TX* goal. This is especially concerning in Houston since the predictions show a widening wage gap between workers with higher and lower levels of education. Additionally, although the Texas and Houston labor markets showed high demand for workers with college degrees, there were not enough qualified workers to fill that demand. Without raising college completion rates in Texas and Houston, employers may need to reach out to workers from other states, leaving the state and region's own workers behind. Together, the findings highlighted some reasons why students in Texas and Houston should pursue an education beyond high school and why policymakers concerned with economic growth might want to partner with schools and districts, as well as higher education institutions.

Section II: Occupations and skills in the Houston area

In order to achieve *60×30TX*'s goals, state and regional policymakers should know which occupations and skills are desired in the local economy and in which areas there are shortfalls. This information can help inform decisions about how to structure PK-12 and higher education in order to facilitate pathways into particular fields and ensure students have the knowledge and training required by the job market. This section of the report analyzed the typical education required, the average annual wage, and the primary skills needed for occupations in the Houston area. Using data from the Bureau of Labor Statistics, a system to classify occupations by growth in supply and demand was developed. Information from the Occupational Information Network was also used to create four skill indices and compare them across job categorizations.

Data, measures, and analytic strategy

This analysis used multiple datasets and sources to define occupational categories and skills. Please see Appendix J for information on the methodology. Occupation-level data for the Houston area were used to examine growth in the number of jobs and growth in the average wages for each occupation between 2005-2007 and 2014-2016. The data were used to place each job in supply and demand growth categories:

Supply growth categories

- Occupations that experienced higher growth in the number of jobs than the job growth rate for the region were defined as *high supply growth rate* occupations.
- Occupations that experienced lower growth in the number of jobs than the job growth rate for the region were defined as *low supply growth rate* occupations.

Demand growth categories

- Occupations that experienced higher growth in the average wage than the wage growth rate for the region were defined as *high demand growth rate* occupations.
- Occupations that experienced lower growth in the average wage than the wage growth rate for the region were defined as *low demand growth rate* occupations.

In the analyses that follow, occupations are described in terms of their supply and demand growth simultaneously. Occupations fell into one of four categories:

1. Low supply growth rate, low demand growth rate
2. High supply growth rate, low demand growth rate
3. Low supply growth rate, high demand growth rate
4. High supply growth rate, high demand growth rate

Occupations were also are summarized by the following nine-category system:

1. Officials and managers (e.g., chief executives, sales managers)
2. Professionals (e.g., accountants, engineers)
3. Technicians (e.g., dental hygienists, pharmacy technicians)
4. Sales workers (e.g., cashiers, sales representatives)
5. Administrative support workers (e.g., legal secretaries, office clerks)
6. Craft workers (e.g., carpenters, machinists)
7. Operatives (e.g., parking lot attendants, taxi drivers)
8. Laborers and helpers (e.g., painters, plumbers)
9. Service workers (e.g., bartenders, waiters)

For the two categorizations, the typical education required, average annual wage, and primary skills needed for each occupation were calculated. The four skills examined included blue-collar; white-collar: routine; white-collar: non-routine, analytical; and white-collar: non-routine, interpersonal. These skills are defined in Table 1.

Table 1. Occupational skills definitions

Blue-collar	• Required low levels of education • Was physically-demanding
White-collar: routine	• Required low to medium levels of education • Involved problem-solving and repetitive activities
White-collar: non-routine, analytical	• Required medium to high levels of education • Involved problem-solving and mathematical/formal reasoning
White-collar: non-routine, interpersonal	• Required medium to high levels of education • Involved problem-solving and in-person interactions/management

Job category composition of each supply-demand growth category

Table 1 shows the job category composition of each supply-demand growth category. While professionals were highly represented in all four categories, they were especially concentrated in the high supply growth rate, low demand growth rate category. This might not be surprising given the importance of the oil and gas industry to the region, but it suggested there might be a greater need for non-professional workers. The share of officials and managers in each supply-demand growth category was relatively low. However, the group appeared to have the highest concentration in the low supply growth rate, high demand growth rate category. There was a similar pattern with laborers.

Table 2: Job category composition of each supply-demand growth category

EEOC job classification	*Supply-demand growth classification*			
	Low supply growth rate, high demand growth rate	Low supply growth rate, low demand growth rate	High supply growth rate, high demand growth rate	High supply growth rate, low demand growth rate
Officials and managers	10.69	2.63	6.67	1.69
Professionals	25.19	23.16	29.17	44.38
Technicians	5.34	7.89	9.17	7.87
Sales workers	0.76	5.26	0.83	2.81
Administrative support workers	9.16	14.21	4.17	8.43
Craft workers	16.03	17.37	17.50	9.55
Operatives	14.50	17.37	16.67	10.11
Laborers and helpers	7.63	3.16	4.17	2.25
Service workers	10.69	8.95	11.67	12.92
Total	*100.00*	*100.00*	*100.00*	*100.00*

Sources: Occupational Employment Statistics, 2005-2007 and 2014-2016; Texas Workforce Commission Future Job Growth by Occupation Projections, 2015; Occupational Information Network 22.1 Database; and U.S. Equal Employment Opportunity Commission Job Classification Guide, 2010.

There was a positive association between analytical skills and wages.

Education, wages, and skills by job category

Table 2 shows education, wages, and skills by job category. The first column lists the job categories, the second column shows the typical education required by jobs in that job category, and the third column shows the average annual wage paid to jobs in that job category. As mentioned briefly, measures that determine the skills required by each job (blue-collar; white-collar: routine; white-collar: non-routine, analytical; white-collar: non-routine, interpersonal) were created; details on the methods are available in Appendix J. The measures generated have no real-world interpretation; of note, higher values on the measure meant occupations in the job category were more likely to require the skill, while lower values on the measure meant occupations in the job category were less likely to require the skill.

With respect to education and wages, occupations characterized by high levels of education, in general, had high annual wages. For example, officials, managers, and professionals typically required 15.6-17.5 years of schooling (about the length of time to earn a bachelor's or master's degree) and earned $82,054-$121,934 per year. There also appeared to be a positive association between analytical skills and wages: the four highest-paying jobs had the four highest scores on the analytical index. Officials and managers, by far, had the highest levels of interpersonal skills. The table also shows technicians and administrative assistants scored high on the routine index. Based on the typical education required, these occupations might be characterized as requiring some college education (i.e., postsecondary certificate, associate's degree) and being semi-professional. Not surprisingly, craft workers, laborers and helpers, and operatives showed the highest levels of blue-collar skills and required the fewest years of education.

Table 3. Education, wages, and skills by job category

EEOC job classification	*Typical education required (in years)*	*Average annual wage*	*Skill*			
			Blue-collar	White-collar: routine	White-collar: Non-routine, analytical	White-collar: non-routine, interpersonal
Officials and managers	15.6	$121,934	-0.74	-0.22	0.45	1.34
Professionals	17.5	$82,054	-0.70	-0.11	0.76	0.34
Technicians	13.9	$56,379	-0.07	0.84	0.14	-0.06
Sales workers	12.3	$59,499	-0.90	-0.25	0.36	-0.42
Administrative support workers	12.3	$39,470	-0.97	0.87	-0.29	-0.72
Craft workers	12.0	$43,592	1.02	-0.10	-0.06	-0.15
Operatives	11.8	$37,560	0.80	0.06	-0.64	-0.01
Laborers and helpers	11.3	$30,052	0.83	-0.68	-0.57	-0.29
Service workers	11.8	$32,782	-0.36	-0.39	-0.59	0.06
Total	*14.0*	*$58,189*	*-0.05*	*0.03*	*-0.01*	*0.01*

Sources: Occupational Employment Statistics, 2005-2007 and 2014-2016; Texas Workforce Commission Future Job Growth by Occupation Projections, 2015; Occupational Information Network 22.1 Database; and U.S. Equal Employment Opportunity Commission Job Classification Guide, 2010.

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Occupations classified as low supply growth rate, high demand growth rate typically required some level of postsecondary education and generated competitive wages.

Education, wages, and skills by supply-demand growth category

Next, education, wages, and skills are summarized by supply and demand growth rates. These results are shown Table 3. Table 3 has the same structure as Table 2 except that instead of listing job categories in first column, it lists the supply-demand growth categories in the first column. Low supply growth rate, low demand growth rate occupations required the lowest levels of education and earned the least amount of money. The skills required by these occupations were less analytical and interpersonal, but somewhat more blue-collar and routine. A significant share of these occupations was professional, although a number of administrative support workers, craft workers, and operatives fell into this category as well. In results not shown, 59 percent of sales and 46 percent of administrative occupations were classified as low supply growth rate, low demand growth rate.

High supply growth rate, low demand growth rate occupations required the most years of schooling and earned $55,923 per year. They scored highest on the analytical and interpersonal skill indices and lowest on the blue-collar and routine skill indices. The plurality of these occupations was professional. Given their levels of education, wages for these occupations might be lower than expected because of the high supply growth rate of professional workers in the Houston area.

The high supply growth rate, high demand growth rate category earned the highest amount of money and required the second most years of education. This category exhibited high levels of blue-collar,

routine, and analytical skills, but the lowest level of interpersonal skills. Professionals, craft workers, and operatives were the three most common occupation groups in this category. In the Houston area, occupation groups which contained these semi-skilled workers showed high supply growth rates as well as high demand growth rates.

The final category is the low supply growth rate, high demand growth rate category. This group of occupations exhibited the highest growth rate in wages, but the lowest growth rate in the number of jobs. These occupations required, on average, 13.8 years of education (about the length of time to earn an associate's degree) and earned $66,660 per year. They were characterized by lower levels of blue-collar and analytical skills, but higher levels of interpersonal and routine skills. In results not shown, it was found nearly 47 percent of occupations in the officials and managers category was classified as low supply growth rate, high demand growth rate.

Table 4. Education, wages, and skills by supply-demand growth category

Supply-demand classification	*Typical education required (in years)*	*Average annual wage*	*Skill*			
			Blue-collar	White-collar: routine	White-collar: Non-routine, analytical	White-collar: Non-routine, interpersonal
Low supply growth rate, high demand growth rate	13.8	$66,660	-0.04	0.05	-0.12	0.09
Low supply growth rate, low demand growth rate	13.4	$47,508	0.02	0.09	-0.20	-0.07
High supply growth rate, high demand growth rate	13.9	$69,079	0.20	0.07	0.16	-0.17
High supply growth rate, low demand growth rate	14.9	$55,923	-0.28	-0.07	0.19	0.16
Total	*14.0*	*$58,176*	*-0.05*	*0.03*	*-0.01*	*0.01*

Sources: Occupational Employment Statistics, 2005-2007 and 2014-2016; Texas Workforce Commission Future Job Growth by Occupation Projections, 2015; Occupational Information Network 22.1 Database; and U.S. Equal Employment Opportunity Commission Job Classification Guide, 2010.

Implications

Overall, occupations classified as low supply growth rate, high demand growth rate typically required some level of postsecondary education (e.g., one-two years beyond high school) and earned high wages. These occupations scored high on interpersonal skills, and included a higher number of officials and managers. Education was certainly an important factor in the labor market. However, the findings from this analysis showed education might not correlate perfectly with supply and demand growth rates. It is impossible to predict how the Houston economy will grow and change in the long-term. Yet, in the short term, it appears interpersonal skill development may be a fruitful area and one in which policymakers concerned with local economic conditions should invest.

Section III: Early career wages and unemployment insurance receipt among HISD graduates

The previous two sections of this report focused on educational and workforce patterns for individuals in Texas and the Houston area. In this section, the analyses focused on HISD students and examined two labor market outcomes, early career wages and unemployment insurance receipt. The results may be useful to PK-12 practitioners and policymakers interested in college and career readiness and in exploring ways in which they can ensure positive, long-term outcomes for students.

Data, measures, and analytic strategy

The first piece of the analyses explored early career wages for HISD students who were high school seniors in fall 2006-2008 and were working in Texas in spring 2014-2016. The outcome variable measured wages approximately seven years after high school. Summary statistics on average annual wages for the sample and by demographic and socioeconomic groups (N = 12,434) were produced. The second piece of the analyses used ordinary least squares regression to examine whether student characteristics explained the variation in wages (N = 10,996).[8] The third piece of the analyses explored the percentage of students receiving unemployment insurance. Comparisons across student demographic and socioeconomic characteristics were made (N = 12,497).[9] Please see Appendix K for additional information on the methodology.

Wages

Table 5 presents early career wages for HISD students. Seven years after high school, the average annual wage for the sample was $30,966. However, wages varied substantially across demographic and socioeconomic groups. Female students earned $28,612 while males earned $33,830. The wage gap between economically disadvantaged and non-economically disadvantaged students was around $4,000 per year. Among racial and ethnic groups, white students earned the most ($39,065), followed by Asian ($38,080), Hispanic ($32,254), and black students ($25,585). The black-white wage gap was more than $13,000.

To determine which student characteristics were related to earnings, ordinary least squares regression (OLS) models were estimated. The outcome was the natural log of second quarter wages. Therefore, the coefficients from the results might be interpreted as percent changes (e.g., a one-point change in course grades increased wages by 11 percent). The analysis was limited to students who graduated high school in spring 2007-2009.

Table 6 shows the results from the OLS regression models predicting log wages. In Model 1, females earned 13 percent less than their male counterparts, while black students earned 39 percent less than their white counterparts. In this initial model, there were no statistically significant differences in earnings

[8] The sample for the wage regression analyses was smaller than the sample for the wage summary statistics because the regression models were limited to students who graduated high school in spring 2007-2009 and were not missing National Student Clearinghouse data on postsecondary attainment.

[9] The sample for the unemployment insurance analysis differed from the samples for the wage regression analysis and the wage summary statistics because the unemployment insurance sample included individuals who were working or who received unemployment insurance.

for Hispanic and Asian students compared to white students, although the coefficients were negative. Economically disadvantaged students earned 6 percent less than non-economically disadvantaged students.

Table 5. Annual wage by demographic and socioeconomic background

	Average	N
All students	$30,965	12,434
Gender		
Male	$33,830	5,608
Female	$28,612	6,826
Race/ethnicity		
White	$39,065	1,589
Black	$25,585	4,456
Hispanic	$32,254	5,896
Asian	$38,080	493
Economic disadvantage		
Non-disadv.	$33,443	4,795
Disadv.	$29,410	7,639

Notes: HERC multi-year data. Sample was limited to high school seniors in fall 2006-2008 who were present in the wage data in spring 2014-2016. Native American respondents were excluded due to small sample size.

In Model 2, controls for 11th-grade composite TAKS scores (and the exempt dummy), course grades, and the number of college-level credits earned were added. A student's 11th-grade test score was not a significant predictor of wages, although exemption status strongly predicted lower wages. This was not surprising since the large majority of exempt students were in special education. In contrast, course grades and the number of college-level credits earned were positively and significantly associated with earnings. After adding these controls, Asian students appeared to earn less than white students, while the coefficient on economic disadvantage became marginally significant. Without control variables, females earned 13 percent lower wages than males. However, after adding all control variables (Model 3), the gender gap widened: females earned 21 percent lower wages than males. In contrast, control variables seemed to narrow black-white differences in wages. Without control variables, black students earned 39 percent less than white students, but after adding all control variables (Model 3), black students earned 21 percent less than white students.

Model 3 accounted for the highest degree completed, with students earning no postsecondary credential as the reference group. With the exception of an associate's degree, completing a postsecondary credential was associated with higher earnings. For example, individuals with a master's degree or higher earned higher wages than individuals with no postsecondary credential by a factor of 74 percent. After controlling for educational attainment, Hispanic students earned 12 percent higher wages than white students, black students earned 21 percent lower wages than white students, and Asian students earned 10 percent lower wages than white students. In this final model, the role of economic disadvantage and

college-level credits were rendered insignificant, while gender, TAKS exemption, and grades remained powerful predictors of wages.

Table 6. OLS regression models predicting log wages

Variable	Model 1			Model 2			Model 3		
	β	S.E.	Sig.	β	S.E.	Sig.	β	S.E.	Sig.
Female	-0.13	(0.02)	***	-0.19	(0.02)	***	-0.21	(0.02)	***
Race/ethnicity (ref. = White)									
Black	-0.39	(0.04)	***	-0.26	(0.03)	***	-0.21	(0.03)	***
Hispanic	-0.05	(0.05)		0.05	(0.04)		0.12	(0.04)	**
Asian	-0.07	(0.05)		-0.12	(0.04)	*	-0.10	(0.04)	*
Economically disadvantaged	-0.06	(0.02)	***	-0.03	(0.02)	+	-0.01	(0.02)	
11th-grade composite TAKS score				0.02	(0.02)		0.00	(0.02)	
Exempt from TAKS				-0.26	(0.04)	***	-0.23	(0.04)	***
Course grades (in 10s)				0.17	(0.02)	***	0.11	(0.02)	***
Number of college-level credits				0.04	(0.01)	***	0.01	(0.01)	
Highest degree completed (ref. = No postsecondary credential)									
Certificate/diploma							0.12	(0.04)	**
Associate's degree							0.01	(0.04)	
Bachelor's degree							0.36	(0.02)	***
Master's/doctorate/prof. degree							0.74	(0.07)	***
Intercept	8.97	(0.04)	***	7.46	(0.18)	***	7.83	(0.16)	***

Notes: HERC multi-year data. Sample was limited to high school seniors in fall 2006-2008 who graduated from high school the following spring, were present in the wage data seven years after high school, and had non-missing data on postsecondary attainment (N = 10,996). Native American respondents were excluded due to small sample size. The model included cohort fixed-effects and standard errors were clustered at the school level. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests)

"Is unemployment insurance the same thing as unemployment?"

In short, the answer is no. Not all unemployed persons file claims for unemployment insurance. In addition, people may still be unemployed once their unemployment benefits expire. Therefore, unemployment insurance receipt is an underestimate of unemployment overall.

Unemployment insurance

Next, data on unemployment insurance receipt are examined. These results are shown in Table 7. Overall, only 3 percent of students in the sample received unemployment insurance benefits. A higher share of males (3.5 percent) earned unemployment insurance than females (2.3 percent). Black students had the highest rate of unemployment insurance receipt (4.3 percent), followed by Hispanic (2.3 percent), Asian (1.2 percent), and white (1.1 percent) students. In terms of socioeconomic status, a higher share of economically disadvantaged students (3.3 percent) received unemployment insurance benefits than non-economically disadvantaged students (2.1 percent).

Table 7. Unemployment insurance receipt by demographic and socioeconomic background

	Percent	N
All students	2.8	12,497
Gender		
Male	3.5	5,642
Female	2.3	6,855
Race/ethnicity		
White	1.1	1,591
Black	4.3	4,490
Hispanic	2.3	5,921
Asian	1.2	495
Economic disadvantage		
Non-disadv.	2.1	4,812
Disadv.	3.3	7,685

Notes: HERC multi-year data. Sample was limited to high school seniors in fall 2006-2008 who were present in either the wage data or the unemployment insurance data. Native American respondents were excluded due to small sample size.

8 There were gaps in early career wages and unemployment insurance receipt by gender, race and ethnicity, and socioeconomic status.

Implications

The analysis of labor market outcomes among HISD students showed there were gaps in early career wages and unemployment insurance receipt by gender, race and ethnicity, and socioeconomic status. Although many of these gaps were rendered insignificant with control variables in the wage regression analysis, females continued to earn less than males and blacks and Asians earned less than whites. Although these gaps might reflect broader social issues like misogyny and discrimination in the workplace, they should be considered when developing college and career readiness programs for high school students. Grades in courses taken during the 12th grade positively predicted early career wages, even after accounting for postsecondary attainment. Continuing to provide struggling students with academic support in high school, in addition to information and personal assistance in the college application process, may be effective in improving the workforce outcomes of HISD graduates.

HISD has implemented a number of innovative programs aiming to improve college readiness among its students. For example, during the 2018-2019 school year, the district launched Project Explore, a college readiness initiative targeting high-achieving middle-school students. The students in the analyses did not have opportunities to participate in this program or HISD's recent college readiness efforts because they did not yet exist, so it is possible outcomes for future cohorts will be different.

Discussion

The labor market analyses indicated under the status quo, Texas is projected to fall short of the *60×30TX* goal by 10 percentage points, while Houston is projected to fall short by 20 percentage points. However, hourly wages of workers with a postsecondary credential are projected to remain higher than hourly wages of workers with no postsecondary credential. In 2030, Texas workers with a bachelor's degree or more are projected to earn 195 percent more than workers with no postsecondary credential. The economic returns to earning an associate's degree are also projected to remain higher than the economic returns to earning no postsecondary credential, highlighting the importance of completing a degree beyond the high school level. Higher wages for workers with an associate's degree or a bachelor's degree or more were likely tied to supply and demand. The analysis found there was a gap between the levels of education workers in Texas and the Houston area had and the level of education employers required. There was an unmet demand for high-skilled labor in these economies. Policymakers ought to identify strategies to help students obtain postsecondary credentials. Otherwise, economic growth may slow or employers may need to attract more educated workers from other parts of the country.

The typical education required, the average annual wage, and the primary skills needed for occupations in the Houston area was explored. In general, occupations requiring high levels of education also offered high annual wages. Analytical and interpersonal skills appeared to provide the greatest returns in the labor market. For example, the four highest-paying jobs scored the highest on the analytical index. However, occupations considered low supply growth rate, high demand growth rate — the category that identified where there might be room to grow — typically required moderate levels of education and generated high wages. These occupations scored high on interpersonal skills and include a greater number of officials and managers. Equipping students with interpersonal skills, in addition to academic knowledge, may help students become prepared for the needs of Houston's growing economy.

Finally, seven years after high school, there were considerable gaps in early career wages and unemployment insurance receipt by gender, race and ethnicity, and economic disadvantage among HISD graduates. Even after accounting for background characteristics, females continued to earn lower wages than males and black and Asian students earned lower wages than white students. In addition, the grades students received in their senior year courses strongly predicted early career wages. With the exception of associate's degrees, postsecondary attainment increased wages among high school graduates. Furthermore, a significantly higher share of males and racial and ethnic minorities received unemployment insurance. Strong academic supports and expanding college and career readiness efforts may help students become successful in the path to college and the workforce.

This report points to a strong link between completing a postsecondary credential and positive labor market outcomes. It also highlights the importance of paying attention to the dynamics of the Houston area and Texas labor markets due to the higher demand for particular occupations and skills. Leaders in PK-12 and higher education are encouraged to partner with employers and policymakers on initiatives that can prepare students for both college and the workforce, as well as meet the demands of the Houston area and Texas economies.

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