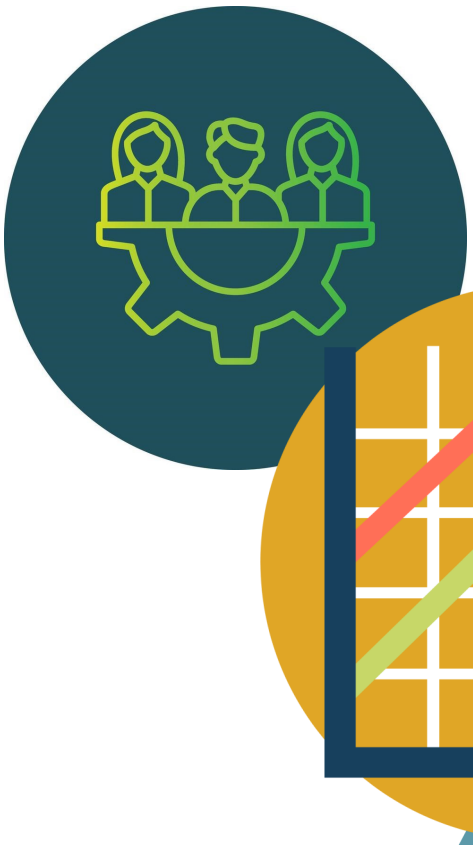
Iowa Workforce Development

IOWA'S WORKFORCE & ECONOMY

2025



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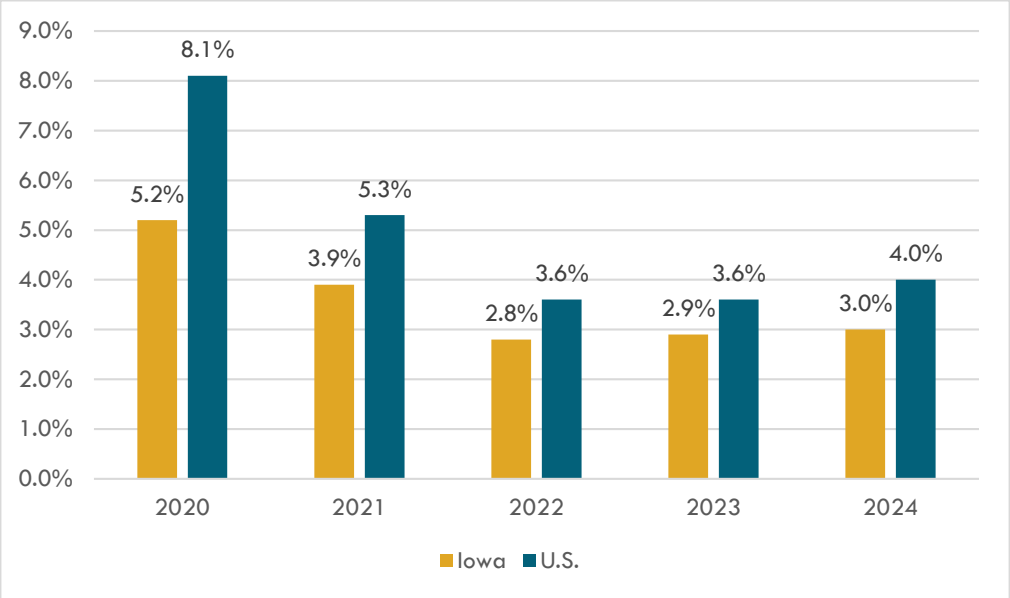
State and Local Labor Force Trends

Written by Kris Henze

Unemployment Rates, Iowa and the Nation

The statewide annual average unemployment rate increased slightly to 3.0 percent in 2024 from 2.9 percent in 2023. The U.S. rate for 2024 increased to 4.0 percent (see chart below). Based on the state rankings for 2024, South Dakota had the lowest jobless rate among the states at 1.8 percent. Hawaii, Iowa, Maryland, Minnesota, Montana and Wisconsin tied for seventh at 3.0 percent and Nevada had the highest unemployment rate at 5.6 percent.

Iowa and U.S. Unemployment Rates, 2020-2024



Source: Labor Market Information Division, Iowa Workforce Development, in cooperation with the Bureau of Labor Statistics, U.S. Department of Labor.

The number of unemployed people in the state averaged 52,200 in 2024, up from the prior year's 50,200. Men accounted for 53 percent of the unemployed compared to 47 percent for women. Minorities and youth continued to experience the highest rates of unemployment: youth, 16 to 19 years (6.2 percent), Black or African American (3.4 percent) and Hispanic (7.4 percent). Workers with less education continued to experience a higher unemployment rate than better educated members of the labor force: those with less than a high school diploma (5.3 percent), high school graduates with no college (4.6 percent), some college or associate degree (2.7 percent) and bachelor's degree and higher (0.9 percent).

Unemployment Rates in Metropolitan Statistical Areas (MSAs) for 2024

All the state's metropolitan statistical areas (MSAs) unemployment rates either remained the same or increased in 2024 (see table below). County unemployment rates increased in 43 counties, decreased in 34 and were unchanged in 22 from 2023 to 2024 (see map below). The Ames and Iowa City MSAs had the lowest rate of the nine major labor market areas at 2.4 percent. The Davenport-Moline-Rock Island MSA had the highest jobless rate at 4.6 percent. Jobless rates for all 99 counties ranged from a low of 1.9 percent in Osceola County to a high of 5.7 percent in Marshall County.

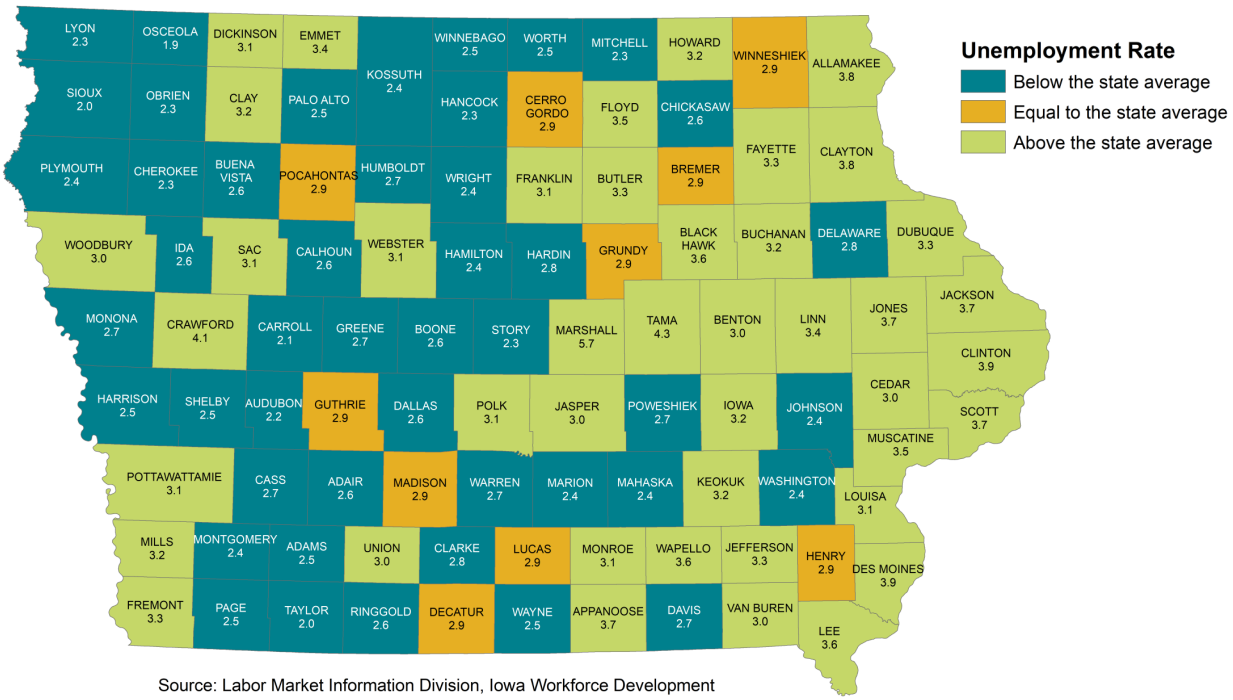
Metropolitan Statistical Area (MSA)

Labor Force Summary 2024 Annual Averages

Metropolitan Statistical Area (MSA)	Labor Force	Employed	Unemployed	Unemployment Rate 2023	Unemployment Rate 2024
Ames	69,600	67,900	1,700	2.3	2.4
Cedar Rapids	146,200	141,300	4,900	3.3	3.3
Davenport-Moline-Rock Island*	189,500	180,700	8,800	4.3	4.6
Scott County (Iowa Portion)	90,100	86,800	3,300	3.3	3.7
Des Moines-West Des Moines	413,200	400,900	12,200	2.7	3.0
Dubuque	53,500	51,800	1,700	3.0	3.3
Iowa City	99,900	97,500	2,400	2.4	2.4
Omaha-Council Bluffs*	527,800	512,100	15,600	2.5	3.0
Harrison County (Iowa portion)	7,800	7,600	200	2.6	2.5
Mills County (Iowa portion)	7,200	7,000	200	2.7	3.2
Pottawattamie County (Iowa portion)	46,800	45,400	1,500	3.0	3.1
Sioux City*	76,500	74,300	2,200	2.8	2.9
Woodbury County (Iowa portion)	56,100	55,400	1,700	2.9	3.0
Waterloo-Cedar Falls	88,200	85,200	3,100	3.0	3.5

Source: Labor Market Information Division, Iowa Workforce Development.
*Metropolitan Statistical Area includes counties in a neighboring state.

2024 Annual Average Unemployment Rates by County

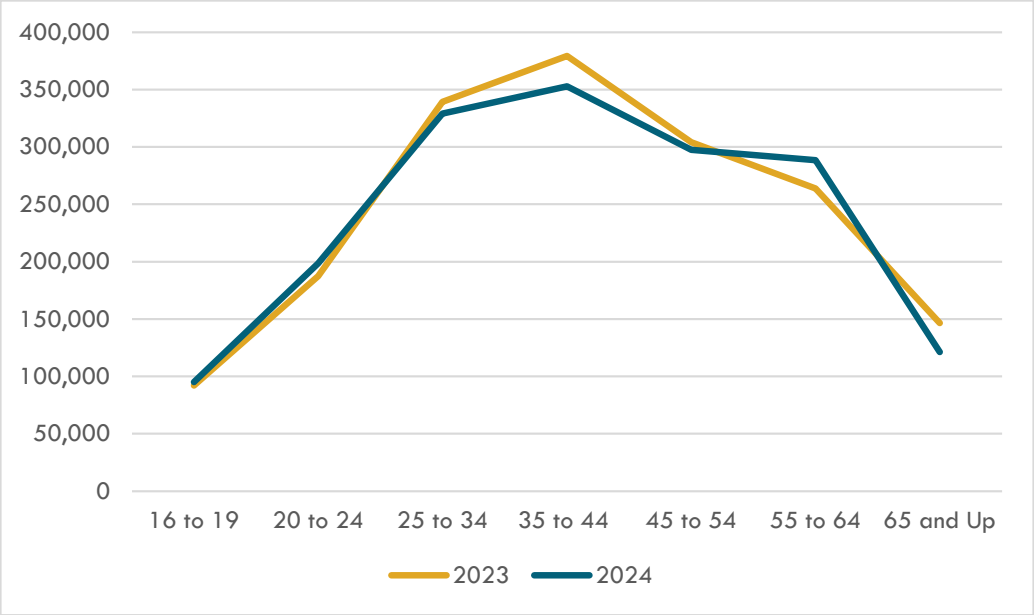


Source: Labor Market Information Division, Iowa Workforce Development

Labor Force by Age Group

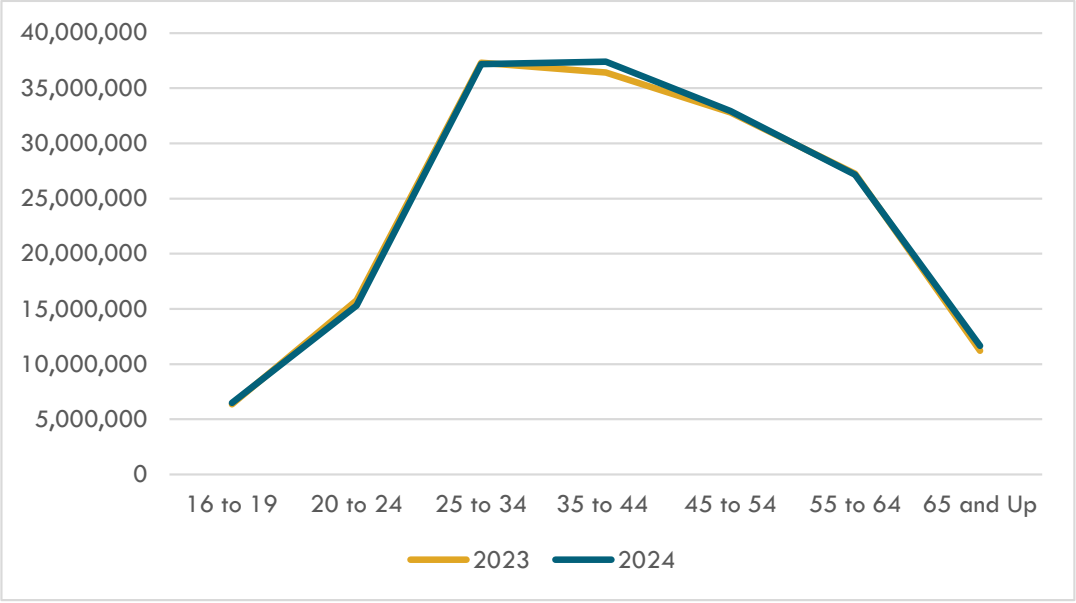
The 35 to 44 year old age group saw the largest drop in their labor force numbers from 2023 to 2024, however they still make up the largest share of Iowa's labor force. Nationally, this age group saw an increase of almost a million people from 2023 to 2024 (see the charts below). The 55 to 64 year olds saw a 9 percent increase in their labor force numbers in 2024. The number one reason people in Iowa gave in 2024 for not being in the labor force was due to retirement (60.8%) followed by in school (14.0%).

Labor Force by Age Group for Iowa



Source: Census Bureau, Current Population Survey

Labor Force by Age Group for the Nation



Source: Census Bureau, Current Population Survey

Iowa Nonfarm Employment Trends

Written by James Morris

Overview

Iowa business establishments added 3,300 jobs in 2024. This is a relatively small gain of 0.2 percent that lifts total nonfarm employment to 1,596,500 jobs. The state had previously averaged 28,300 jobs added per year from 2021-2023. This slowing is not unlike the U.S. trend which also revealed some deceleration in job growth. The nation added 2.1 million jobs compared to 2023, an increase of 1.3 percent. The U.S. had previously averaged a 3.1 percent growth rate from 2021-2023. This is partially explained by the economy exiting the COVID-19 pandemic quarantine measures and industries rebuilding staffing levels during the years immediately preceding 2020. These efforts did show up as a contraction in the economy, albeit a very short one (NBER, 2023). Total nonfarm employment achieved pre-pandemic levels for the nation in March 2022; for Iowa, it was seven months later in October of that same year.

Private industries were little changed compared to 2023 due to service industry gains (+2,400) overpowered goods-producing industry losses (-3,000). Government gained 3,800 jobs with gains split between state and local governments. Many of these jobs added were related to public education at local K-12 schools and the state's public universities.

Figure 1: Iowa Total Nonfarm Employment by Industry (2019-2024

INDUSTRY TITLE	2019	COVID-19 2020	2021	2022	2023	2024	Change 2023-2024 Number	Change 2023-2024 Percent
Mining and Logging	2,400	2,300	2,300	2,300	2,300	2,300	0	0.0%
Construction	78,100	76,500	78,300	81,000	83,600	84,600	1,000	0.0%
Manufacturing	226,000	216,600	218,000	223,900	226,300	222,400	-3,900	1.2%
Durable Goods	130,200	121,800	121,500	125,200	126,000	123,600	-2,400	-1.7%
Non-Durable Goods	95,800	94,800	96,500	98,700	100,300	98,800	-1,500	-1.9%
Trade, Transportation, and Utilities	310,600	300,800	308,500	313,200	312,900	311,800	-1,100	-1.5%
Wholesale Trade	66,300	64,800	64,700	66,500	67,700	67,900	200	-0.4%
Retail Trade	175,000	168,100	173,400	174,800	174,000	173,400	-600	0.3%
Transportation, Warehousing, and Utilities	69,300	68,000	70,500	72,000	71,100	70,500	-600	-0.3%
Information	21,300	19,100	18,800	19,100	18,600	18,000	-600	-0.8%
Financial Activities	110,100	109,300	109,200	108,600	107,900	106,100	-1,800	-3.2%
Finance and Insurance	95,100	94,900	94,600	93,900	93,400	91,600	-1,800	-1.7%
Real Estate and Rental and Leasing	15,000	14,300	14,600	14,700	14,500	14,500	0	-1.9%
Professional and Business Services	139,600	135,000	140,900	146,200	146,200	145,900	-300	0.0%
Professional, Scientific, and Technical Services	53,100	52,400	53,500	55,700	57,500	58,100	600	-0.2%
Management of Companies and Enterprises	20,700	21,100	22,400	24,000	24,400	25,600	1,200	1.0%
Administrative and Support and Waste Management and Remediation Services	65,800	61,500	65,000	66,600	64,300	62,200	-2,100	4.9%
Education and Health Services	236,100	223,900	226,100	228,600	235,500	240,100	4,600	-3.3%
Private Educational Services	39,400	35,100	37,500	39,800	42,800	42,900	100	2.0%
Health Care and Social Assistance	196,700	188,800	188,600	188,800	192,700	197,200	4,500	0.2%
Leisure and Hospitality	144,400	118,500	128,400	136,700	141,200	143,100	1,900	2.3%
Arts, Entertainment, and Recreation	21,600	16,400	18,200	20,100	20,700	21,300	600	1.3%
Accommodation and Food Services	122,900	102,200	110,200	116,600	120,500	121,800	1,300	2.9%
Other Services	58,200	54,400	54,600	55,600	55,800	55,600	-200	1.1%
Government	260,500	251,900	254,000	257,800	262,800	266,600	3,800	-0.4%
Total Nonfarm	**1,587,200**	**1,508,300**	**1,539,100**	**1,572,900**	**1,593,200**	**1,596,500**	**3,300**	**0.2%**

Source: Bureau of Labor Statistics, Current Employment Statistics (CES).

2024 by Industry

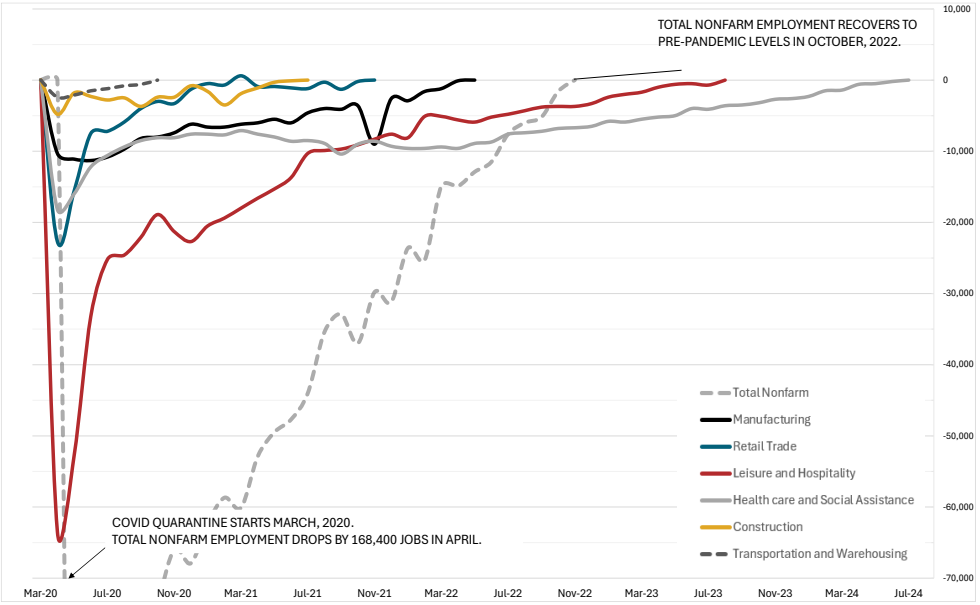
Health care and social assistance added the most jobs in 2024 (+4,500). This sector saw similar gains in 2023 following little change from the previous two years. Health care and social assistance generally trends upward during most years due to unwavering demand for services within doctor's offices and hospitals; however, nursing and residential industries and social assistance added more jobs in 2024. Leisure and hospitality gained 1,900 jobs. This increase was largely fueled by accommodation and food services (+1,300), although arts, entertainment, and recreational industries still improved compared to 2023 (+600). This sector was most affected by COVID-19 measures as social distancing temporarily shut down non-essential services. Corporate offices added 1,200 jobs. This sector was one of the least affected industries from COVID-19 due to a large percentage of workers able to work from home. Other increases include construction (+1,000). This is an expansion on an all-time high for this sector. Professional, scientific, and technical services increased slightly (+600). This sector would include legal, accounting, and engineering industries among others.

Conversely, manufacturing lost the most jobs since 2023 (-3,900). Most of these losses stem from durable goods factories trimming payrolls (-2,400). Machinery manufacturing layoffs were the main cause of this over-the-year change. Non-durable goods factories lost jobs in 2024 (-1,500). This sector was hampered by a plant closing within food production (Iowa Public Radio, 2024). Administrative support, waste management, and remediation services shed 2,100 jobs. This sector lost a similar amount in 2023 (-2,300). This is a symptom of businesses utilizing less temporary help due to a changing business climate. Finance and insurance was markedly down in 2024 (-1,800). Most of the movement stems from cutbacks within credit intermediation and related activities. This sector has been steadily trending down since 2019.

Ending the Pandemic Period

Both Iowa and the nation began to feel the effects of the COVID-19 pandemic quarantine in April 2020. This effort to stop the spread of the virus led to a substantial job loss in 2020, one that would take thirty months to recover. All sectors have recovered and surpassed pre-COVID levels except for those that are decreasing for economic reasons. This is most evident in Iowa's finance and insurance sector which trails 2019 levels by 3,500 jobs. Information services also is down from the 2019 level, shedding 3,300 jobs over those five years. Other personal services are down 2,600 jobs. This may be partially due to lessening demand for non-essential services such as repair and maintenance along with personal and laundry services among others.

Figure 2: COVID Recovery by Sector



Source: Bureau of Labor Statistics, Current Employment Statistics (CES).

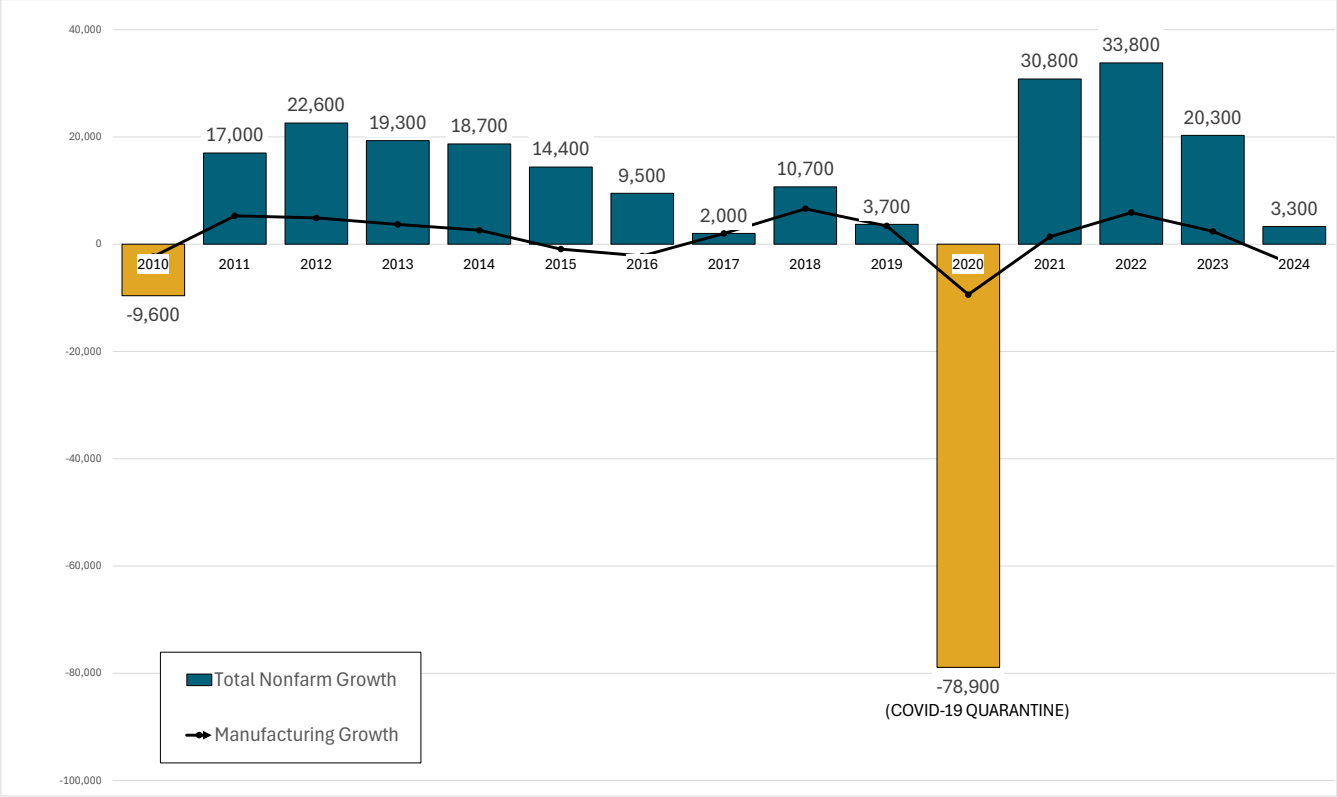
In April 2020, total nonfarm employment shed 168,400 jobs – an amount not witnessed before in the state. Almost immediately, firms began to bring back some staff and many industries learned to adapt to new business models. This was especially true within eating and drinking establishments and recreational activities, as these services are non-essential and generally involve public locations. Combined, leisure and hospitality pared 63,500 jobs from March to April in 2020. It would take 41 months for this supersector to reach pre-pandemic levels.

On the other hand, transportation and warehousing was among the first to get back to pre-pandemic levels. It took only seven months for this sector to recover all jobs lost. This was due to a rapid increase in demand for truck transportation, warehousing, and local delivery services as consumers began to rely on on-line shopping services.

Outlook

The Iowa and U.S. businesses continue to show little signs of hiring in 2025. This is due to rising uncertainty with global tariffs and trade wars and the fears of increasing input costs for producers (NBC News, 2025). For Iowa, manufacturing steers the economy. Approximately 1 in 8 jobs are in the manufacturing sector. Generally, Iowa's total nonfarm employment trends along with manufacturing.

Figure 3: Iowa Total Nonfarm and Manufacturing Sector Annual Growth (2010-2024)



Source: Bureau of Labor Statistics, Current Employment Statistics (CES).

From the chart above, one can see that when manufacturing goes negative it has a strong impact on total nonfarm employment's trend. This is due to manufacturing feeding other sectors, especially transportation and warehousing for the shipment of input and finished goods. For consumers, wages from manufacturing exceed the statewide average annual wage by 21.7 percent or $13,300. (BLS QCEW) This will continue be the most telling sector in determining Iowa's current economic climate.

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2024 Unemployment Insurance Claims and Characteristics of the Unemployed in Review

Written by Teresa Wageman

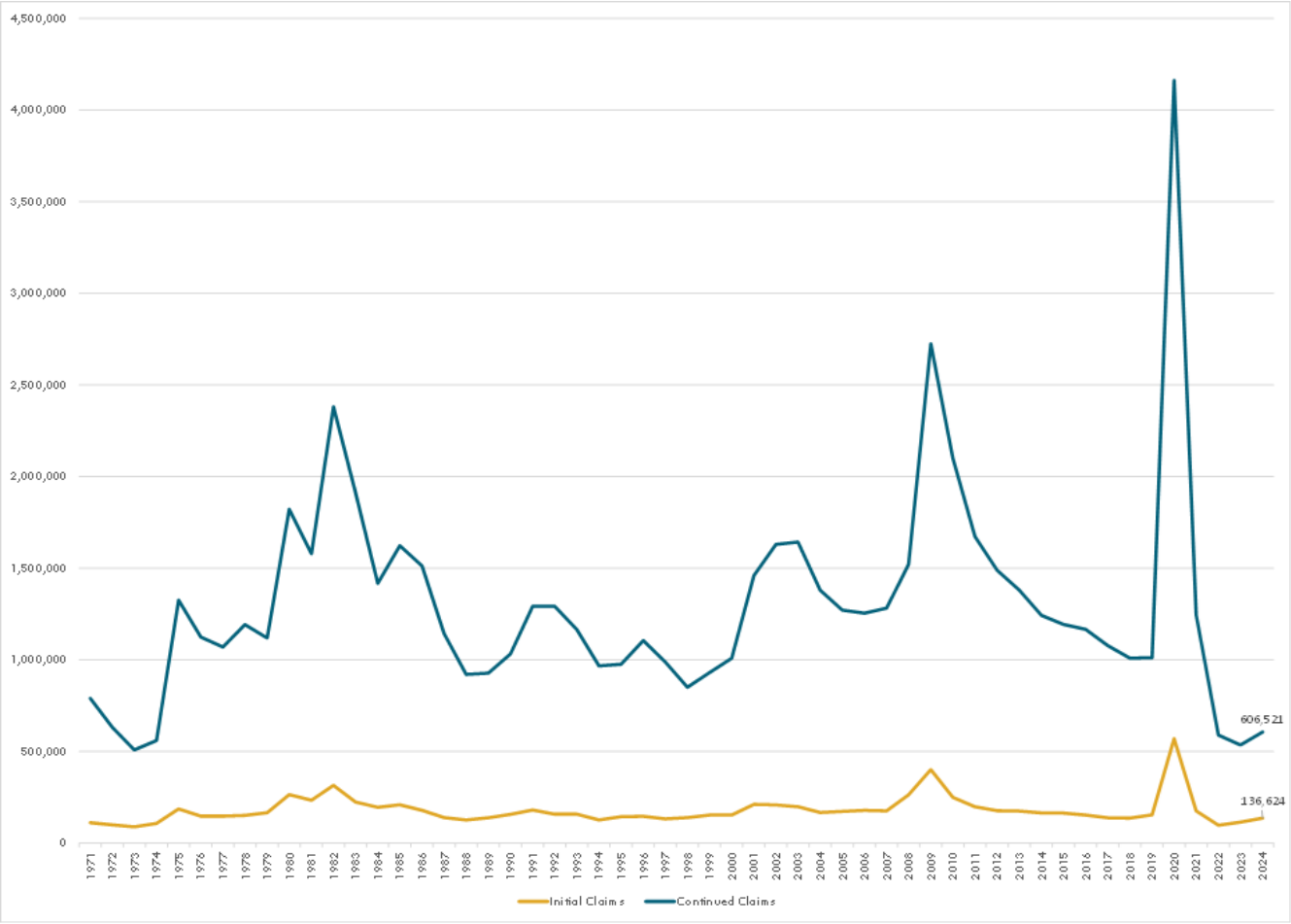
Initial and Continued Claims Trends in 2024

Initial and continued claims trended slightly higher in 2024. An **initial claim** represents a new spell of unemployment for an unemployment insurance claimant. A **continued claim** refers to ongoing weekly benefit claims by workers who previously filed an initial claim. These claims track individuals currently receiving unemployment benefits, in contrast to initial claims, which monitor new filings for benefits.

There were 136,624 initial claims in 2024, an increase from 2023 (115,270 initial claims). The lowest number of initial claims in recorded history was in 1973 (89,422). For reference, initial claims hit a high in 2020 of 570,453.

There were 606,521continued claims in 2024 an increase from 2023, which had 535,805 continued claims. The lowest number of continued claims in recorded history, again as with initial claims, was in 1973 (508,809). Continued claims hit a high again in 2020 with a 3,859,061 count.

Trends in Initial and Continued Claims, 1973-2024

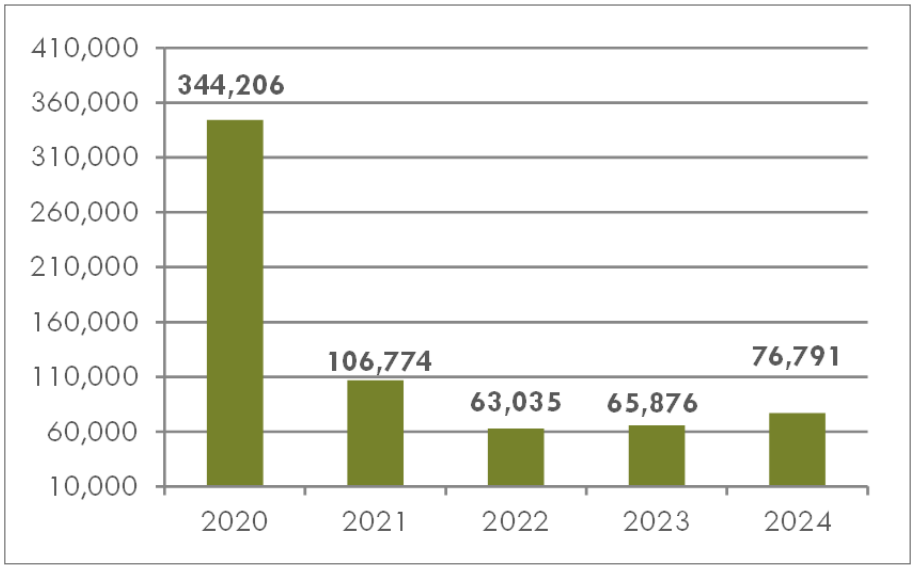


Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

The Characteristics of Unemployment Recipients In 2024

There were 76,791 unemployment benefit recipients in 2024, a slight increase from the year 2023 (65,876). Both numbers represent a historical low. These counts remain below the 2020 pandemic number of recipients (344,206), as the graph below shows. The recipient number represents the number of persons receiving at least one UI benefit payment during the year.

Recipients Over 5 Year Period

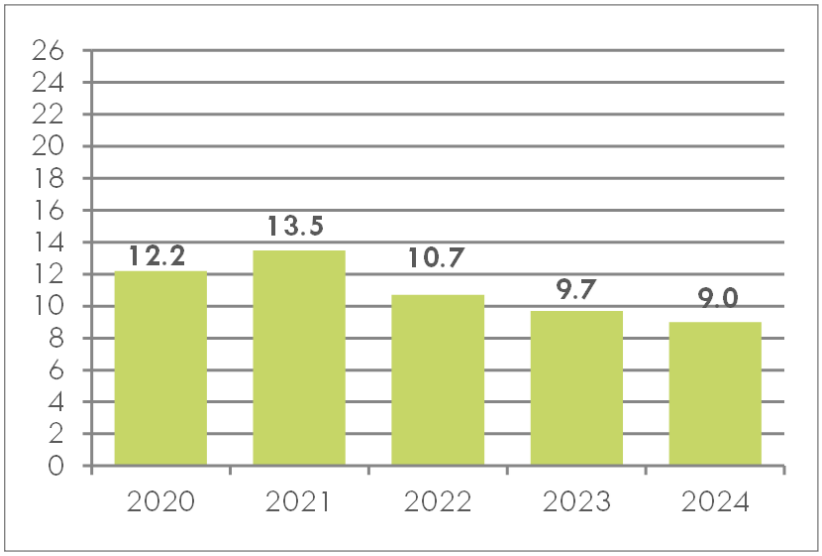


Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

The average duration of benefits also marked a significant low at 9.0 weeks for 2024. Down from 9.7 weeks in 2023 and marks the lowest level since 1967 when the average duration was 9.7 weeks. The chart below demonstrates this.

The average duration is calculated as follows: The number of weeks compensated for a twelve-month period divided by the number of first payments for the same period.

Average Duration of Benefits Paid Over the Past 5 Years



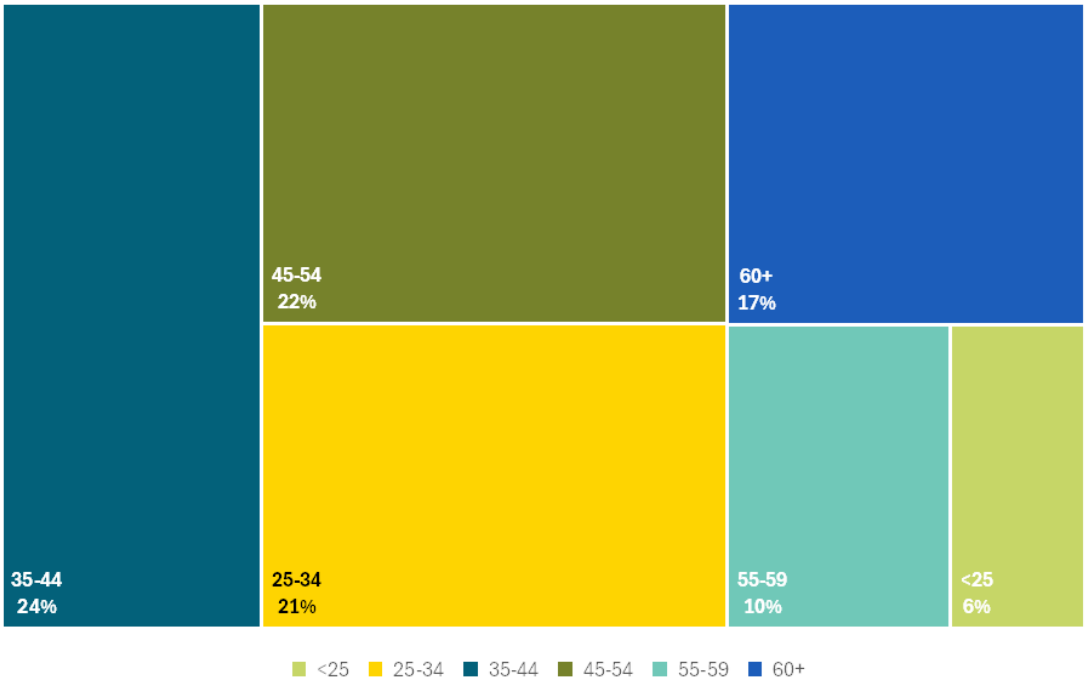
Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

Males made up the higher percentage (68%) of UI recipients in 2024 as male dominated industries had the highest number of claimants for the year. 31% were female with a no response rate of 1%. Seasonality affects the trend of this statistic as by mid-year as seasonal industries like construction see fewer claimants, then by late autumn, the seasonal layoffs begin to increase. Most recipients (24%) were between the age of 35-44 years old and 21% were between the age of 23-34 and 45-54 years old.

The higher percentage of recipients (71%) were White while 13% were Hispanic or Latino, making up the highest percentage of recipients in 2024. Black or African American made up10% of recipients.

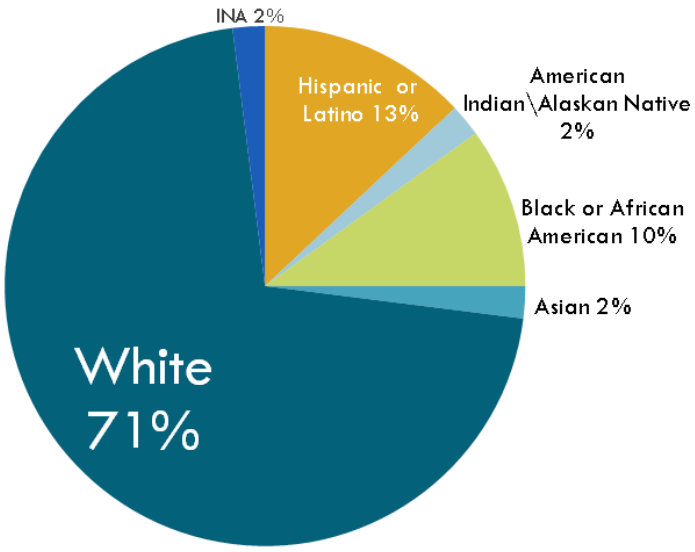
The charts on the next page show summaries of recipients by age groups and by race and ethnical groupings.

Breakdown of Recipients by Age



Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

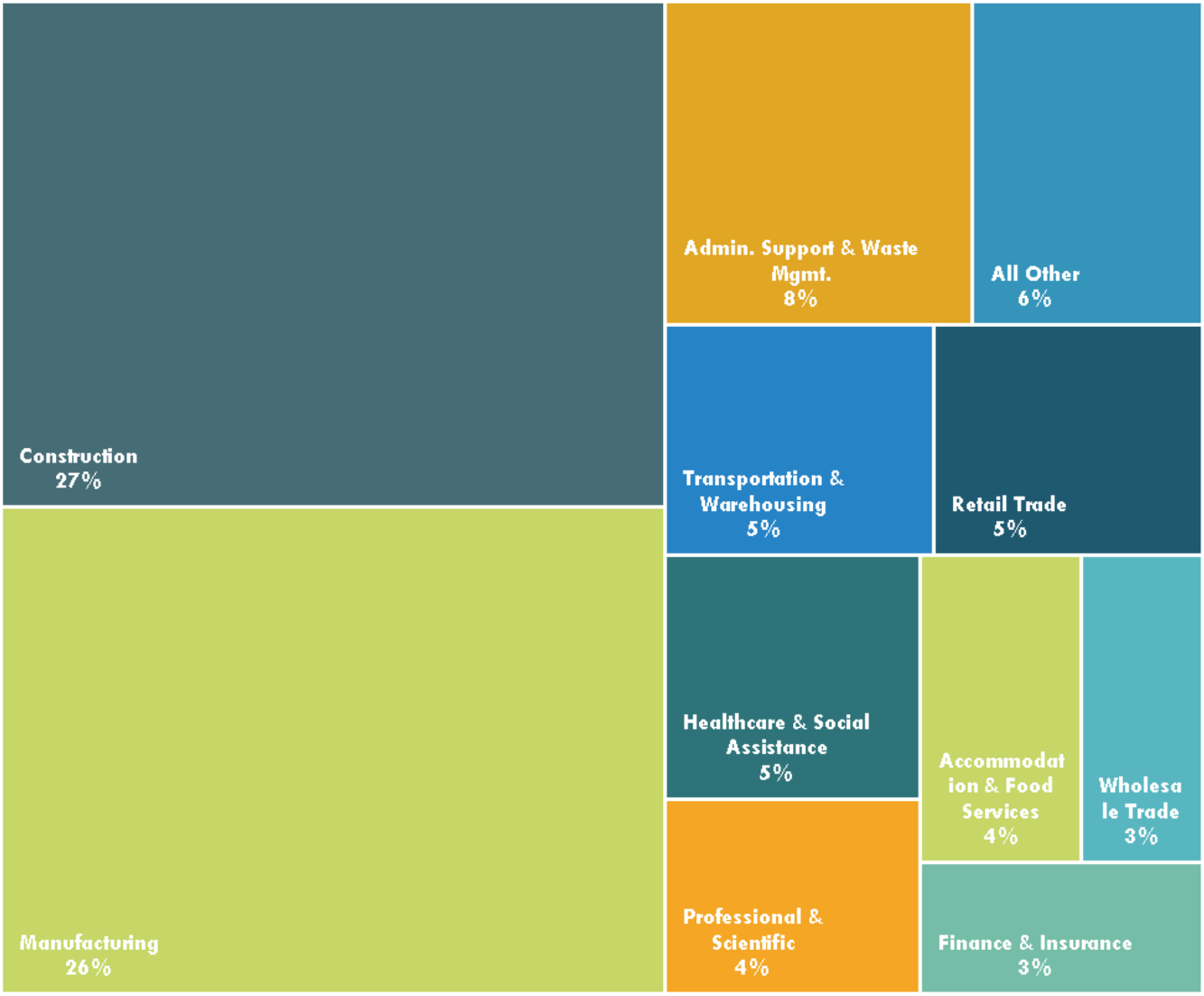
Claimant Breakdown by Race/Ethnicity



Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

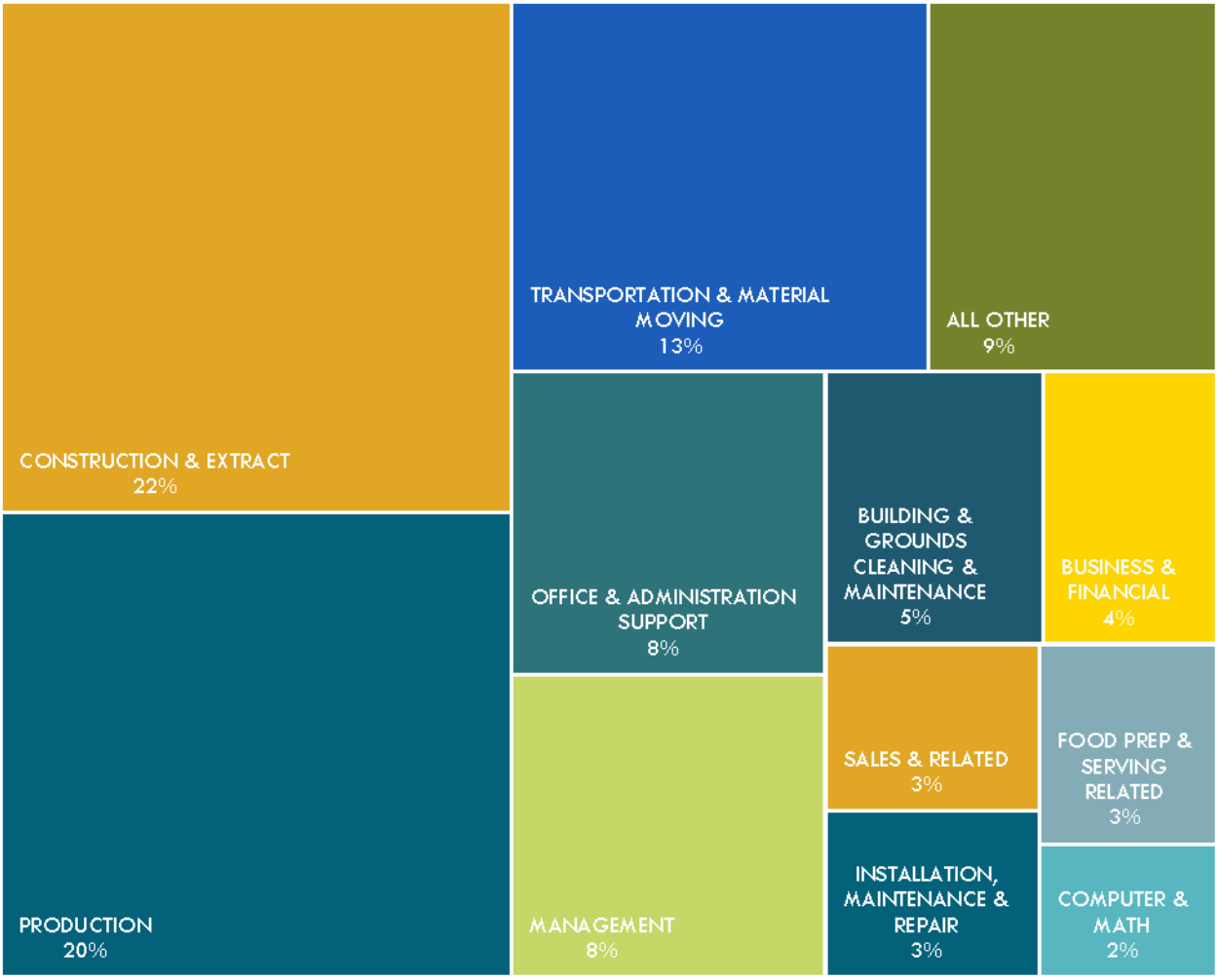
Male dominated industries and occupation sectors made up the highest percentage of claimants in 2024. Construction (27%) and manufacturing (26%) top the industry list. Construction and extract (22%) and Production (20%) top the occupation list. Again, seasonality affects these sector counts with temporary seasonal layoffs in industries like construction due to weather restrictions during the winter months and temporary layoffs in manufacturing over holiday weeks. The following charts breakdown claimants by industry and occupation statistics.

Percentage of Claimants by Industry 2024



Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

Percentage of Claimants by Occupation 2024



Source: Iowa Unemployment Insurance Statistics, Iowa Workforce Development

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Source of Unemployment Insurance Claims data: *ETA-5159 Claims and Payment Activities Report.*

Source of Duration data: *ETA-5159 Claims and Payment Activities Report.*

Source of Characteristics data: *ETA-203 Distribution of Characteristics of the Insured Unemployed Report.*

Iowa Industry Projections Overview, 2024-2026

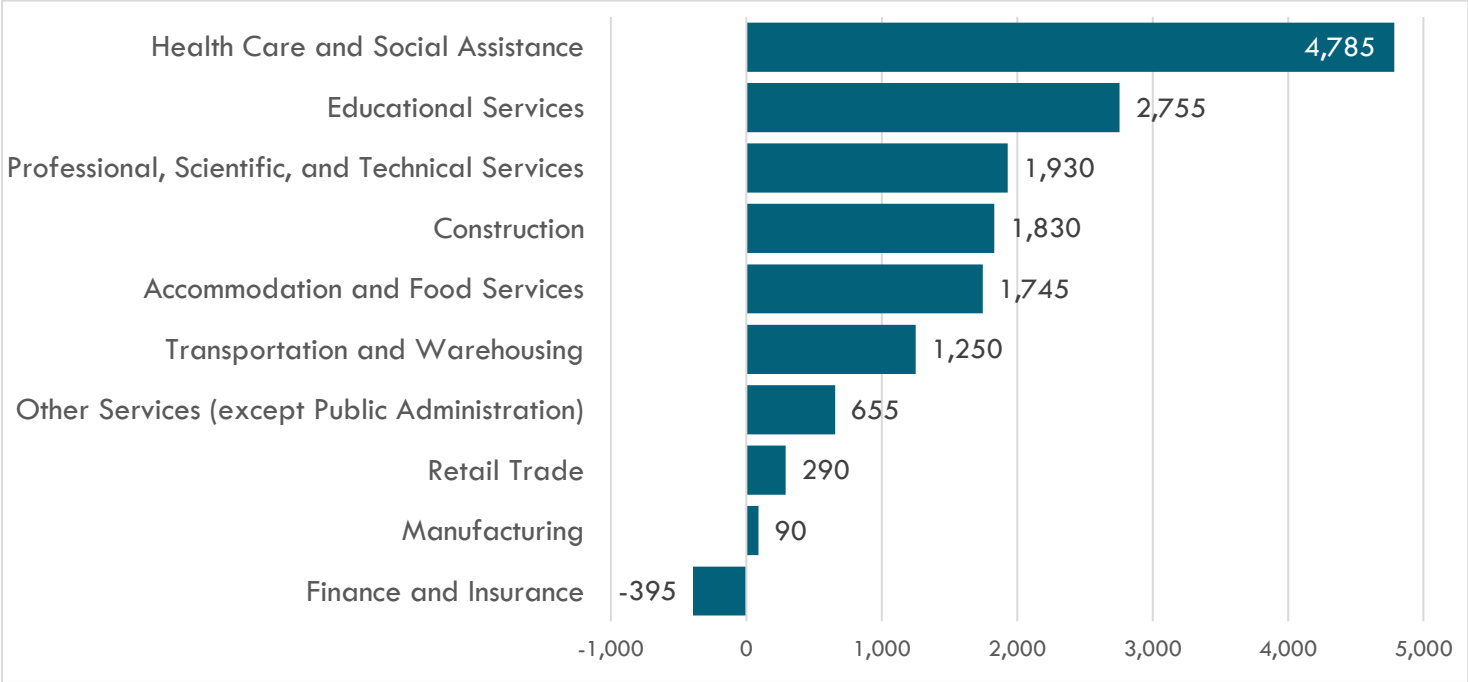
Written by Chap Deit

Industry Employment in the Next Two Years

Industry employment in Iowa is projected to add 18,555 nonfarm jobs from 2024-2026. Industry employment will increase to 1,795,340. This is 1.0 percent higher than the current 1,776,785 employment level. The 2024-2026 projections growth rate is modest compared to the prior short-term projection. It is 1.0 percentage points lower than the 2022-2024 industry projections and reflects the continued normalization of the labor market.

Figure 1, below, provides a breakdown of projected employment growth (or loss) by major industry sectors.

Figure 1: Projected Growth by Sector (Top Ten), 2024-2026



Source: Industry Projections 2024-2026, Research & Analysis Bureau, Iowa Workforce Development, workforce.iowa.gov/iproj/data

As can be seen in Figure 1, Healthcare and social assistance sectors are projected to add the most jobs in the next two years, driven by an increase in the number of aging populations. Pressure for the health care sector to increase efficiency and cut costs means this industry may move away from acute care settings, such as hospitals, towards alternative sites and community based-care settings. Increases in community care programs will result in higher demand for direct care occupations.

The Education Service is expected to add 2,755 jobs in the next two years. This sector includes both state and local public education as well as private schools and other providers of education. Initiatives to improve education at kindergarten and elementary levels and to ensure access for more children will increase the overall demand for education services. This demand for educational services will continue to grow as the number of high school graduates increases and apprenticeships expand. Additionally, as larger numbers of older workers continue to postpone retirement and successfully up-skill and retool to adapt to technology in their fields, educational services will continue to add jobs. In sum, educational services will benefit from a growing need for workers upskilling and reskilling, and from a greater digital economy.

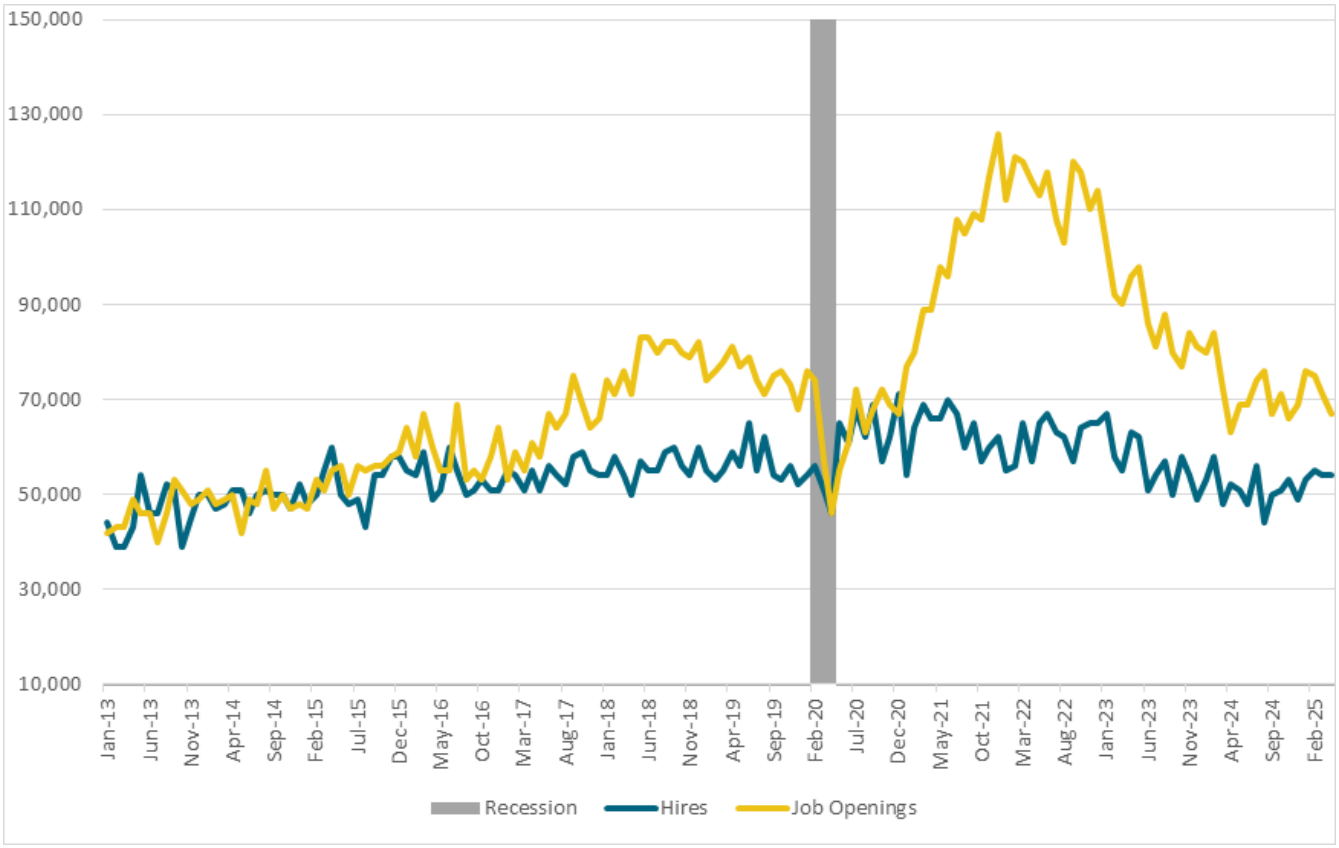
Solid jobs gains are expected from professional and business services, along with transportation and warehousing. The demand in professional and business services is driven by new businesses and companies that need to leverage external sources without commitment to hire new employees and for the need to adapt and harness information technology to drive efficiency. This industry sector leads the broader economy in terms of changes and is expected to experience solid growth over the projections period as the broader U.S. economy continues to grow into a digital economy.

Finance and insurance sectors are projected to lose jobs mostly due to pressure from high interest rates. Econometric models suggest that higher interest rates have high influence on economic activity. Interest rates, particularly high rates, are highly influential to the housing market and other large purchases. The overall expected reduction in consumption and investment will result in slower economic growth for the interest rate-sensitive industry sectors and will impact labor market.

Labor Market Dynamic in Iowa

The Bureau of Labor Statistics Job Openings and Labor Turnover Survey (JOLTS) estimates shows that labor demand is still holding strong in Iowa. Figure 2 shows the job openings and hiring levels for Iowa since 2013; and illustrates that there is still a higher number of job openings compared with hiring levels. The number of job openings has trended down since March of 2022, but the overall number of job openings is still elevated compared to hiring levels.

Figure 2: Iowa Job Openings and Hiring Level, Seasonally Adjusted

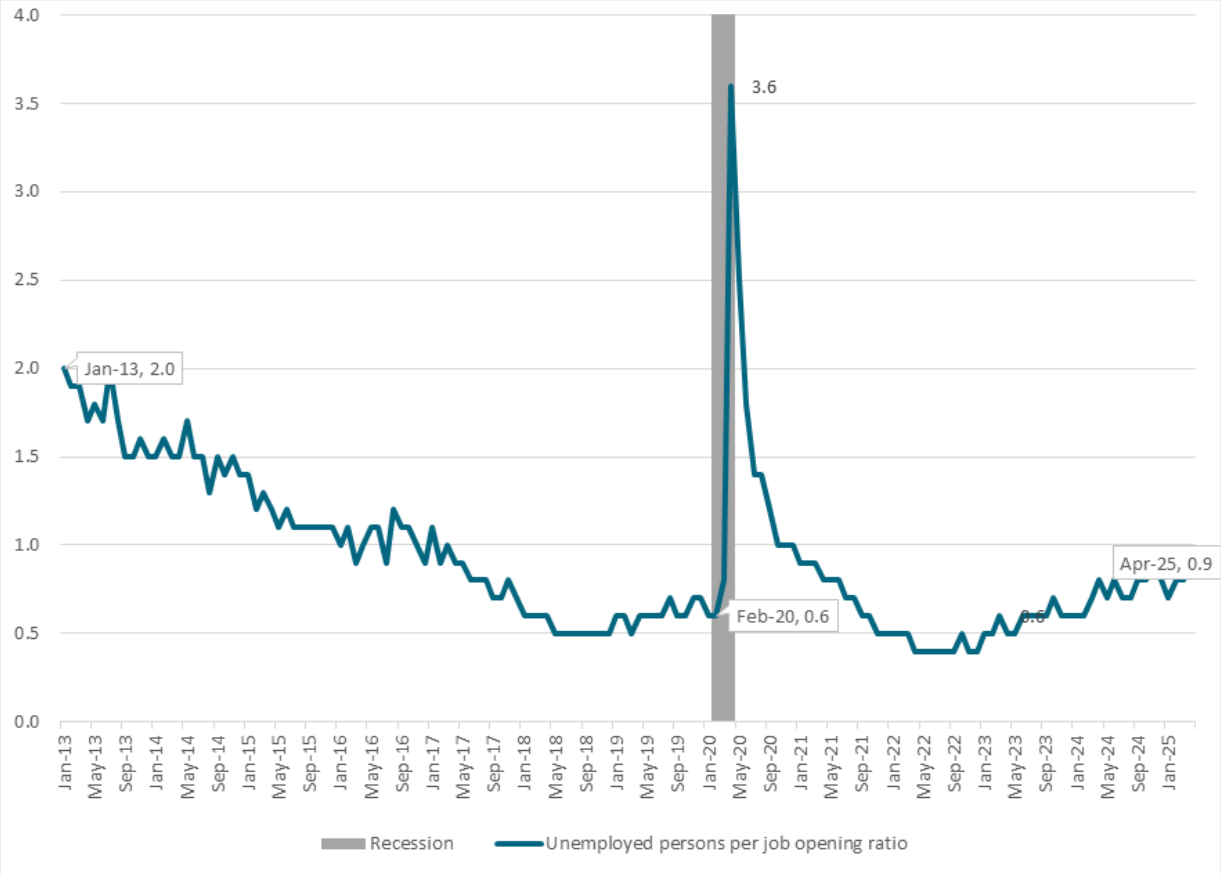


Source: Job Openings and Labor Turnover Survey, U.S. Census Bureau

A different way to assess the labor market dynamic is to look at the number of job openings per unemployed person. This statistic captures the dynamic of the labor market conditions: Job opening levels capture the labor demand, while the number of unemployed persons captures the supply side of the equation. A ratio of 1.0 suggests that a job is available for each unemployed person, and a lower ratio indicates a tight labor market.

Figure 3 is a graph of the monthly ratio of job openings per unemployed persons since 2013. The graph shows that the ratio of unemployed per job opening for Iowa stood at 2.0 in January 2013; and indicated that more people were looking for jobs. The ratio of unemployed per job opening started to decline shortly thereafter and trended downward to 0.6 by January of 2020, showing that Iowa experienced a tight labor market since 2017. During the peak of the COVID-19 induced recession of 2020, the ratio of unemployed per job openings spiked to 3.6 for Iowa, showing the impact of lockdowns caused by the pandemic. The monthly ratio of unemployed per job opening still hovers near 0.9 as of April 2025, which suggests that the Iowa labor market is equilibrating, and the labor market is continuing its return to pre-pandemic conditions. Hence, the imbalance between labor demand and supply has mostly dissipated.

Figure 3: Iowa Number of Unemployed Persons Per Job Opening Ratio, Seasonally Adjusted



Source: Job Openings and Labor Turnover Survey, U.S. Census Bureau

Summary

Iowa Short-Term industry projections data show that labor market is continuing its return to pre-pandemic conditions. Despite greater macroeconomic headwinds, there is still a higher number of job openings compared with the hiring levels. Industry projections are expected to add 18,555 nonfarm jobs, which reflects the continues normalization of the labor market.

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Labor Force and Occupational Analysis Bureau, Iowa Workforce Development.
https://www.iowalmi.gov/industry-projections

Inflation and the Labor Market, Powell, November 2023:
https://www.federalreserve.gov/monetarypolicy/openmarket.htm

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Bureau of Labor Statistics (BLS), U.S. department of Labor. https://data.bls.gov/PDQWeb/jt

Personal Consumption Expenditures price index, June,2024:
https://www.bea.gov/data/personal-consumption-expenditures-price-index

Leisure & Hospitality in Iowa

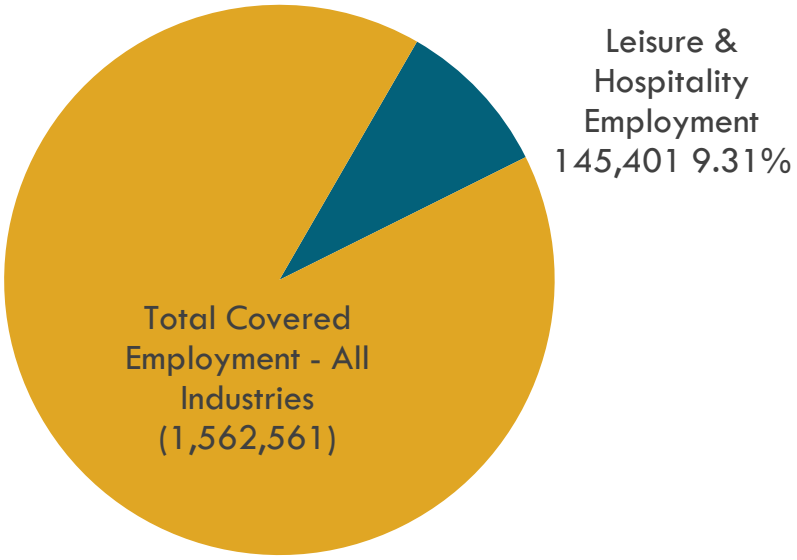
Written by Dennis Schwartz

The Leisure & Hospitality super-sector includes employment in establishments such as hotels, restaurants, live entertainment venues, and drinking places, to name a few. The super-sector is comprised of two sectors:

- The Arts, Entertainment, and Recreation sector includes a wide range of establishments that operate facilities or provide services to meet varied cultural, entertainment, and recreational interests of their patrons. This sector comprises (1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.
- The Accommodation and Food Services sector comprises establishments providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption. The sector includes both accommodation and food services establishments because the two activities are often combined at the same establishment. Excluded from this sector are civic and social organizations; amusement and recreation parks; theaters; and other recreation or entertainment facilities providing food and beverage services.

Employment in the Leisure and Hospitality super-sector represented 9.3 percent of Iowa's total covered employment in 2024 (Figure 1).

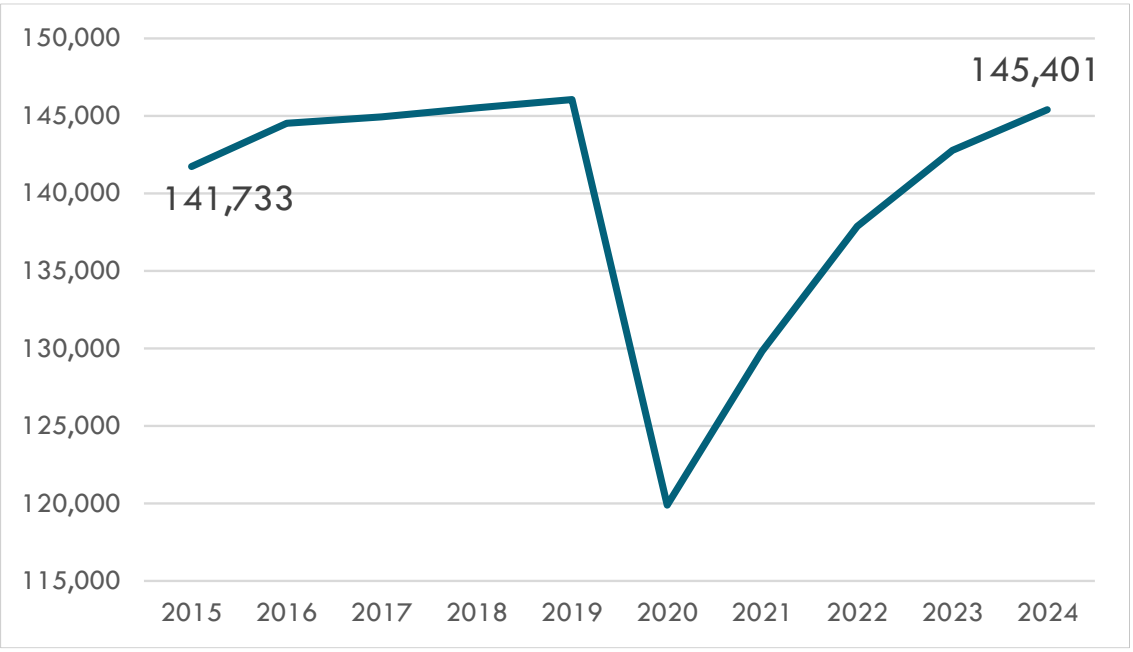
Figure 1: Leisure & Hospitality Employment vs Total Covered Employment



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) 2024

Establishments in Leisure & Hospitality were among the more negatively affected by the Covid-19 pandemic and overall, employment levels in these establishments have made a nearly-full recovery from the losses experienced during that period. Currently, employment is just 0.5 percent below the sector's peak employment, achieved in 2019 (Figure2). Employment in Food Services and Drinking Places has seen gains each year since 2021 and is at an all-time high.

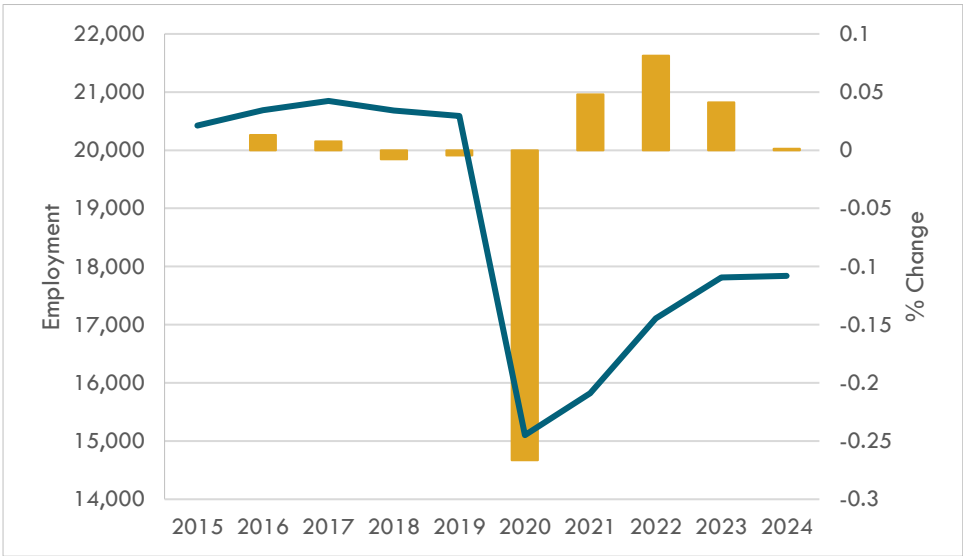
Figure 2: Leisure & Hospitality Employment



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

However, employment within the Accommodation and Food Services sector, specifically accommodations, has struggled to achieve its' pre-pandemic employment levels in spite of having gained jobs each year beginning with 2021. The employment level currently remains down 13.4 percent from the 2019 level and down 14.4 percent from the peak employment of 20,848 achieved in 2017 with slowing gains in 2024, adding just 23 jobs from the previous year (Figure 3). It is however encouraging that employment will grow 16.4 percent by 2032 (latest long-term projections available) according to Iowa Workforce Development.

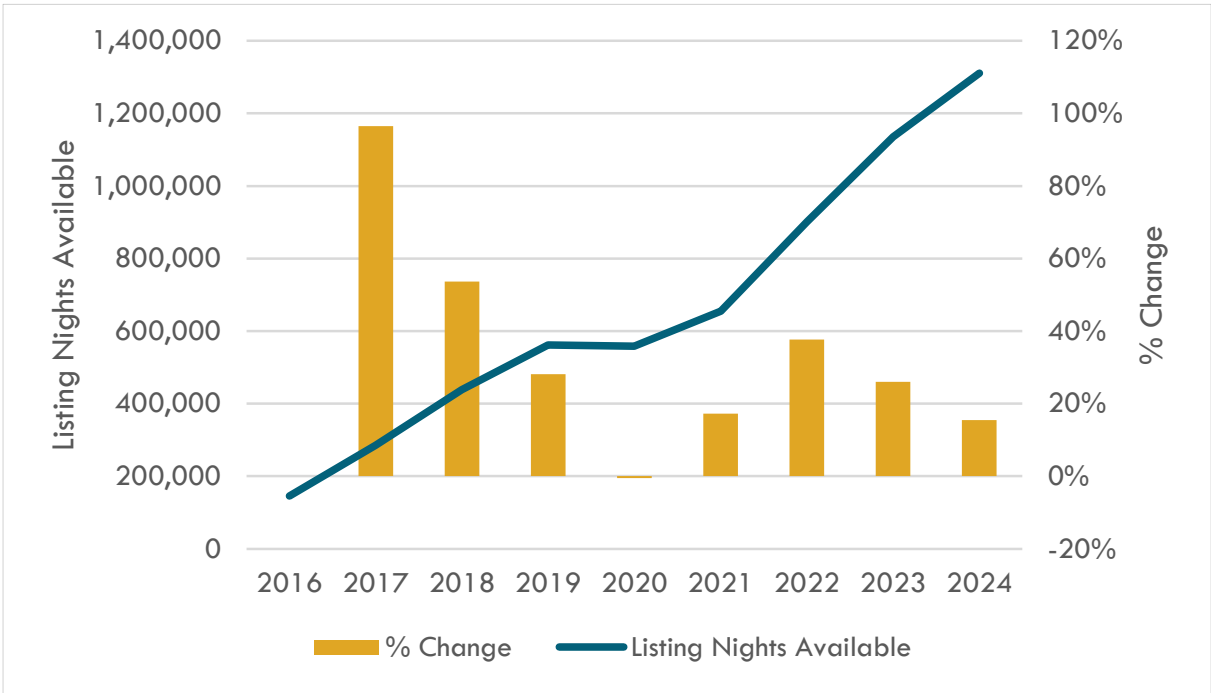
Figure 3: Accommodations Employment



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

Within the Accommodations sub-sector there is one particular emerging industry of note, short-term rentals. Short-term rentals are typically categorized as private properties that are rented out as accommodations to guests for limited periods of time. With the exception of 2020, this industry has seen gains in the "number of listing nights available" each year since 2017 with more than 1.3 million available nights listed in 2024 (Figure 4).

Figure 4: National Short-Term Rentals



Source: AirDNA

2024-2026 Iowa Occupational Group Outlook and Historical GDP Z-Score Analysis

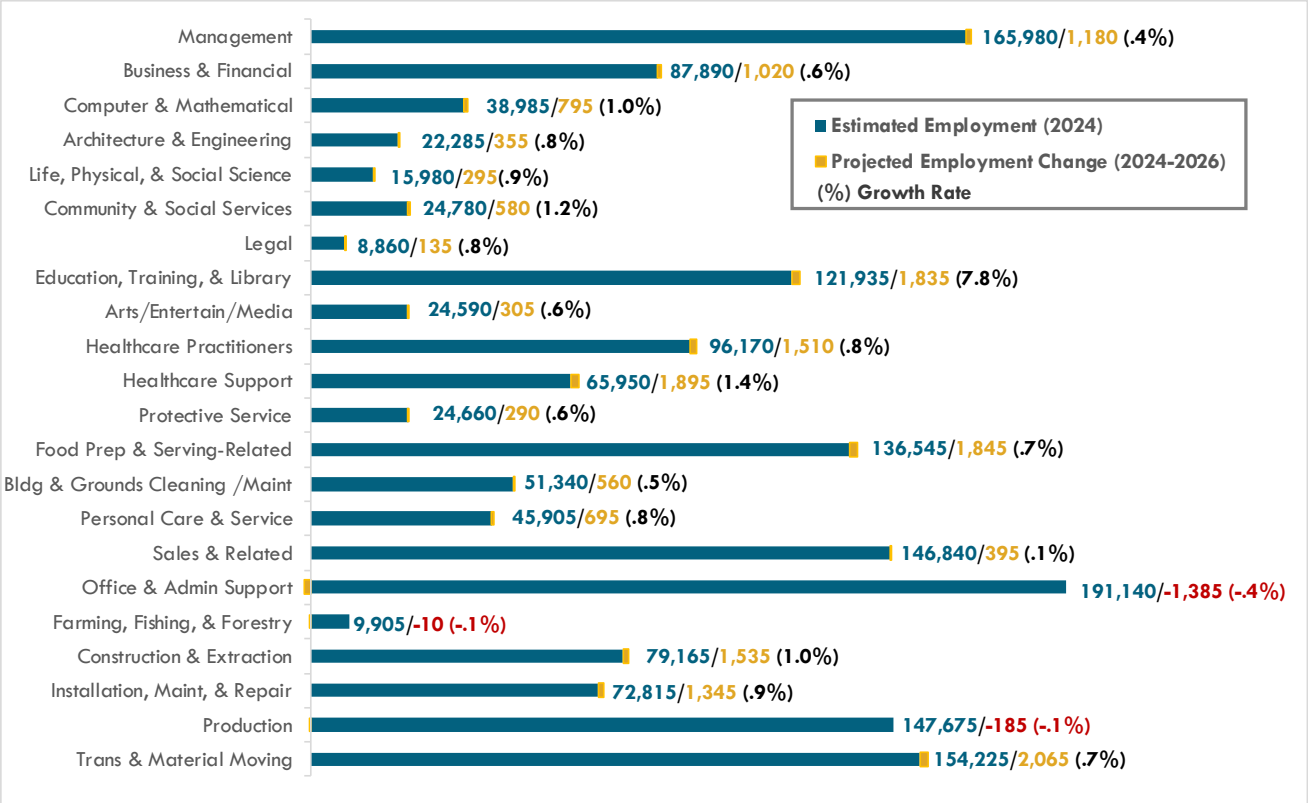
Written by Brent Paulson

2024-2026 Occupational Group Outlook

Iowa's total occupational employment projects annual increases of .5 percent between 2024 and 2026, resulting in 8,520 new jobs. The projection marks an increase from the .3 percent projected growth with 5,180 new jobs derived from the 2023-2025 projection cycle and indicates a more historical in nature outlook. Obstacles to greater employment growth are most prevalent within industries heavily dependent on the national economy and trade policies. In Iowa, these would primarily include agriculture and manufacturing due to tariff, inflation, & interest rate uncertainty. As a result, employers find themselves in the unenviable position of conducting strategic planning under several differing economic forecast models anticipating and/or reacting to economic headwinds.

Figure 1 presents occupational group estimates and projected job growth openings for 2024 to 2026 that largely follow historical trends. STEM and service-providing jobs are depicted outpacing occupations considered non-STEM and/or goods producing. Major occupational groups expected to meet or exceed the state .5% two-year annual growth rate include Business/Financial, Computer/Mathematical, Architecture/Engineering, Life/Physical/Social Science, Community/Social Services, Legal, Education, Arts/Entertainment/Media, Healthcare, Protective Service, Food Prep, Building/Grounds Maintenance, Personal Care, Construction, Installation/Maintenance/Repair, and Transportation/Material Moving.

Figure 1: 2024-2026 Iowa Occupational Group Estimates, Projections, and Growth Percent



Source: Iowa Short-Term Projections, Labor Market Information Division, Iowa Workforce Development

2002-2022 Iowa Historical Occupational Group Estimates

For many employers and policy makers past occupational group employment data can be very useful in economic decision-making. Understanding a state or region's employment composition, for example, helps identify growth patterns as well as any perceived strengths and weaknesses. Figure 2 takes a historical look at Iowa's occupational group employment estimates from 2002-2022.

Upon inspection, Iowa's occupational group estimates show steady growth during the 2002-2022 period with the total all combined growth rate set at 9.3%. The top ten occupational group growth rates include Computer & Mathematical (79.7%), Healthcare Support (63.9%), Business & Financial (53.4%), Farming & Related (43.5%), Life/Physical/Social Science (39.8%), Transportation & Material Moving (38.1%), Healthcare Practitioner (36.0%), Education (24.7%), Architecture & Engineering (16.4%), and Construction & Extraction (14.3%).

Several occupational groups experienced downturns following economic disruptions (i.e., recessions of 2001, 2008, & 2020) exacerbating already prevalent declining growth trends. As a result, reclaiming previous employment levels has been challenging. Five such occupational groups declining over the 2002-2022 period include Office & Admin Support (-18.5%), Personal Care (-13.5%), Production (-9.9%), Sales & Related (-6.6%), and Legal (-3.9%).

Figure 2: 2002-2022 Iowa Historical Occupational Group Estimates by Number and Percent*

	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022	Growth Rate (%), 2002-2022
Total, All	1,680,865	1,693,395	1,741,697	1,762,260	1,717,020	1,758,205	1,795,100	1,821,755	1,833,700	1,757,895	1,837,690	9.3
Management	169,635	164,560	161,565	161,565	155,660	161,915	164,320	169,610	174,065	180,120	190,425	12.3
Business & Financial	59,755	64,475	68,401	69,430	69,835	76,000	77,025	77,955	74,670	78,230	91,640	53.4
Computer & Mathematical	23,595	28,040	28,533	30,365	28,995	33,470	33,550	34,860	39,520	41,030	42,395	79.7
Architecture & Engineering	19,020	14,880	18,067	18,115	17,940	18,715	19,925	20,415	22,620	21,920	22,140	16.4
Life, Physical, & Social Science	11,070	12,035	13,042	14,135	11,655	12,490	12,830	13,455	14,075	13,745	15,480	39.8
Community & Social Service	23,230	19,785	24,728	24,980	24,865	25,495	31,495	29,435	28,060	24,295	24,440	5.2
Legal	9,205	10,340	8,545	8,710	8,475	8,250	8,055	8,835	9,595	9,025	8,845	-3.9
Education, Training, & Library	99,250	102,345	103,689	108,195	109,520	115,965	113,595	122,035	126,085	123,695	123,765	24.7
Arts/Design/Entertainment/Sports/Media	25,695	25,170	28,167	28,790	26,525	26,560	26,770	26,445	26,790	24,430	26,445	2.9
Healthcare Practitioners	70,915	77,510	79,116	81,310	81,850	84,995	86,030	90,600	92,220	87,080	96,475	36.0
Healthcare Support	39,680	43,985	46,244	48,930	47,955	49,160	50,140	48,875	48,720	63,835	65,045	63.9
Protective Service	22,195	20,095	22,488	22,950	21,640	22,335	22,265	22,925	23,705	23,255	24,500	10.4
Food Preparation & Serving Related	122,855	131,850	131,252	133,730	131,865	132,020	134,480	140,400	137,615	120,945	127,120	3.5
Building & Grounds Cleaning/Maintenance	54,180	56,265	56,956	58,965	58,600	59,645	58,465	58,865	59,945	53,235	57,985	7.0
Personal Care	53,520	48,595	53,483	55,110	53,410	53,010	55,530	56,030	59,095	42,130	46,295	-13.5
Sales & Related	176,000	165,300	179,034	182,310	178,595	177,320	178,350	173,015	173,030	159,770	164,410	-6.6
Office & Administrative Support	251,810	247,110	244,336	243,955	243,880	246,530	249,885	245,295	241,605	209,485	205,320	-18.5
Farming, Fishing, & Forestry	13,850	12,090	12,321	13,455	14,405	15,395	18,860	21,150	19,300	21,245	19,880	43.5
Construction & Extraction	75,235	82,925	84,837	81,600	74,650	75,710	80,275	83,865	81,380	80,910	85,995	14.3
Installation, Maintenance, & Repair	66,680	62,435	67,321	69,420	66,265	68,585	70,155	73,175	75,360	73,610	74,515	11.8
Production	168,185	172,830	173,132	171,740	158,740	161,460	167,720	166,380	161,930	144,560	151,535	-9.9
Transportation & Material Moving	125,300	130,775	136,440	134,490	131,700	133,170	135,375	138,130	144,315	161,350	173,050	38.1

Source: Iowa Workforce Development, Labor Market Information Division; Data derived from annually based long-term projection analysis and not quarterly based short-term (*2024 short-term estimates excluded in analysis due to their quarterly based year collection methods)

Z-Score Analysis of Iowa's GDP Growth

Closer examination of the data can often involve statistical analysis involving normal distributions set to standard form. By utilizing numerical measures of central tendency and variability to describe the general nature of a data set, a more precise description is made of the quantitative location of a measurement to the rest of the data. As a result, z-scores are a popular statistical measurement of relative standing that can be used in this case for the comparison of state and regional economic growth rates. As the total area under a standard normal curve is "1", z-scores are defined by always having a "0" mean, possessing a unit standard deviation, and expressed in terms of standard units or standard scores. Such an expression makes it possible to compare distributions.

Gross Domestic Product, or GDP, is a popular economic indicator used as a standard measure of the total value of all goods and services produced in an area during a certain period. In this analysis, statistical measurements of the U.S. Bureau of Economic Analysis' (BEA) year-to-year indexed GDP growth values (rather than raw numbers for greater comparability) of an area were calculated to determine variability and standard deviations and subsequently compared and ranked according to z-score determination. In essence, GDP growth rates were converted to z-squares.

The numerical value of an area's year-to-year z-score reflects the relative standing of the measurement. In interpreting z-scores, a large z-score implies that the measurement is larger than almost all other measurements, while a large negative z-score indicates that the measurement is smaller than almost every other measurement (If a z-score is "0" or near "0", the measurement is located in the midsection of the sample or population.). Approximately 68% of measurements will have a z-score between -1 and 1, 95% will have a z-score between -2 and 2, and nearly all will have a z-score between -3 and 3.

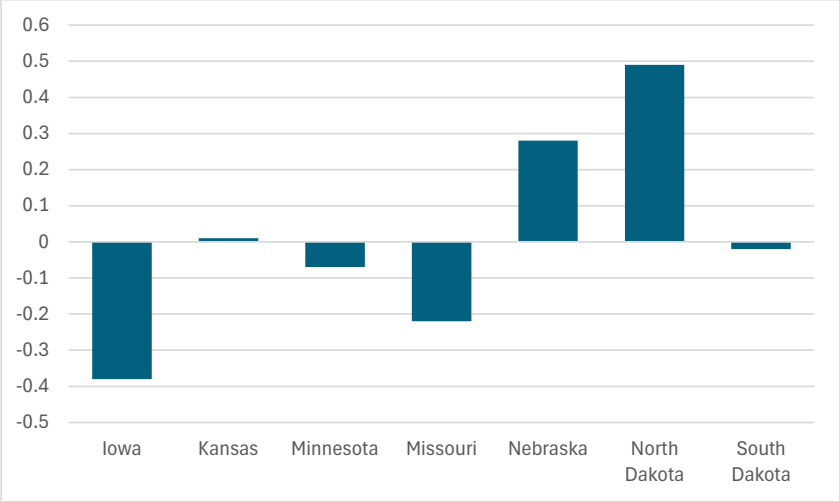
In this analysis, the mean ("0") reflects the average of all states comprising the Plains region including Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota (as identified by BEA). Throughout 2005-2024 Iowa experienced three periods above (overperforming) the regional mean (2005-2006, 2014-2015 and 2020-2021) and several below (underperforming) the mean. As Figure 3 illustrates, Iowa has fallen below the mean over 60% of the time with a z-score average of -.37 during this period in relation to GDP indexed growth. This translates to Iowa on average being .37 standard deviations below the regional mean ("0") but within the -1 and 1 range (as are approximately 68% of other measurements).

Figure 3: 2005-2024 Iowa Year-to-Year Z-Score Analysis of GDP Indexed Growth Rates

Source: Iowa Workforce Development, Labor Market Information Division

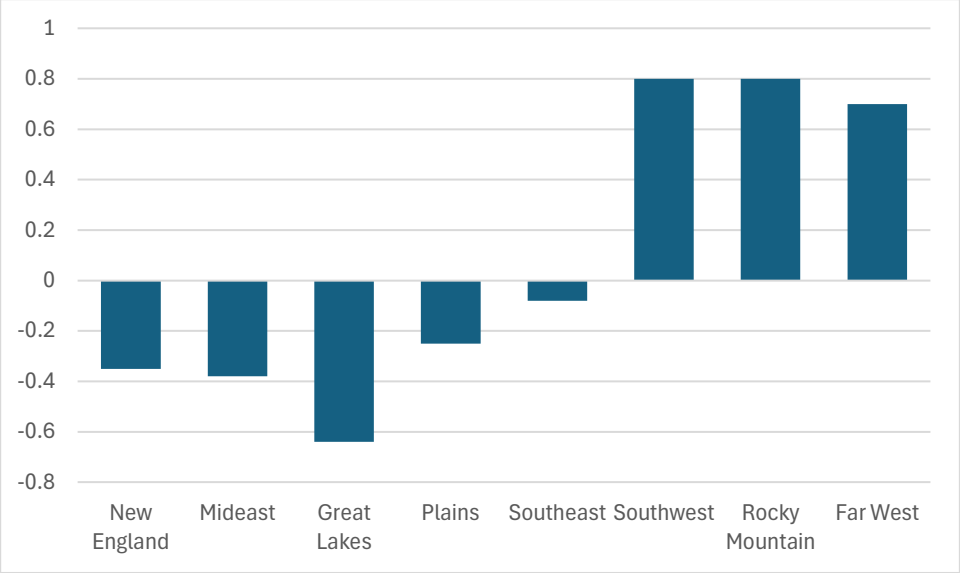
Comparisons to other Plains states further reveal Iowa's economic position. A look at Figure 4, on the next page, indicates that all states within the Plains region exceed Iowa's 2005-2024 average -.37 z-score (with "0" set as the regional mean). As Figure 2 previously shown, an insufficient amount of quality goods and services producing jobs have been created to offset significant occupational declines in the Office & Admin Support, Personal Care, Production, and Sales & Related occupational groups. Similarly, Figure 5 compares the nation's regions (with "0" set as the national mean) and the Plains region registered a -.28 z-score (or .28 standard deviations below the national mean, or "0"). High GDP growth regions include the Rocky Mountain, Southwest, and Far West regions.

Figure 4 : 2005-2024 Plains State's Average Z-Score Analysis of GDP Growth Rates



Source: Iowa Workforce Development, Labor Market Information Division

Figure 5 : 2005-2024 National Region's Average Z-Score Analysis of GDP Growth Rates



Source: Iowa Workforce Development, Labor Market Information Division

Explanations vary widely as to high growth vs. low growth areas but an aging, slower growth population state such as Iowa facing such challenges must adapt to be competitive. Greater growth in population, employers, and training can lead to greater growth in opportunities.

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The Effects of Remote Work on Labor Force Participation Rates in Rural and Urban Iowa Counties

Written by Samuel Queen

Introduction

COVID-19 brought about major shocks in the labor market and work environment. One such shock was the drastic change from primarily working at an employer location to either a hybrid or fully remote work setting. Much work has already been done to test the relationship between working from home and labor productivity, job satisfaction, and quits rate. In 2024, the BLS investigated the impacts of remote work on total factor productivity (TFP) across major US industries and found that TFP growth was positively associated with the rise in shares of remote workers, all else equal (Pabilonia-Redmond, 2024).

This research article will focus on uncovering potential associations between working from home and labor force participation rates. A subset of this work will further investigate whether remote work has a different impact on rural or urban counties. The universe for this work will be Iowa, specifically counties in Iowa from the years 2021 to 2024. The guiding question for this research is: "Has remote work affected labor force participation rates in Iowa?". And if remote work has an effect, is there a measurable difference in rural and urban counties?

Studying this relationship is important as Iowa policy makers keep track of rural vitality, and migration patterns within the state. Remote capable jobs could theoretically decouple primary residences from employment centers, altering local labor markets. Lastly, labor market shocks and trends are felt differently across space, leading to different outcomes in rural or urban settings.

Data Sources and Methodology

Our efforts will be focused on modeling the Iowa labor markets and attempting to capture potential relationships within them. The data generating process is centered around Census population estimates, local area unemployment statistics (LAUS) labor force estimates for Iowa counties, and the IWD Laborshed surveys. All data sources cover the years 2021 to 2024. This timeframe was chosen to account for the introduction of our variable of interest in the Laborshed survey.

The focus of this study is on measuring the relationship between working from home and labor force participation rates. To generate the "remote work/working from home" variable, we turn to the Laborshed survey. The Laborshed survey conducted by Iowa Workforce Development, in partnership with the Iowa Economic Development Authority, is a survey of Iowa residents between the ages of 18–64. This survey collects data related to participants' workforce characteristics. Such characteristics include current employment status, educational attainment, gender, and most importantly for this research, primary employment location. Surveys collected from 2021 to 2024 were aggregated and summarized at the county level; key variables are represented as the share of that variable per county. For example, we calculated the share of responses that workers primarily work from home, at their employer's location, or customer job site for each county in each year. These aggregation, summation, and percentage calculations were completed for the following variables:

- Primary work location
- Gender
- SOC group
- Industry Classification
- Educational Attainment

This list will serve as the main set of control variables to more accurately reflect the nuances contained within Iowa labor markets.

Next, we need to generate the dependent variable, labor force participation rates (LFPR). To do this, we need timely estimates for the denominator in the equation for LFPR.

$$LFPR = \frac{Labor\ Force\ Estimates}{Population\ Estimates}$$

This research will incorporate a hybrid approach to generate the yearly population estimates. The Census ACS 5-year population estimates, and the Census Population Estimates Program (PEP), combined with the compound annual growth rate (CAGR) formula, are employed to create county population estimates.

$$CAGR = \left(\frac{Ending\ Population}{Starting\ Population}^{\frac{1}{number\ of\ years}} - 1\right) * 100$$

Utilizing this formula combined with the annual Census PEP estimates for each Iowa county, we generated a growth rate estimate for each county. Then we apply this growth rate estimate to the Census ACS 5-year estimates for Iowa county populations to get an accurate measure of the adult working population for each county in Iowa in each year for the given time frame.

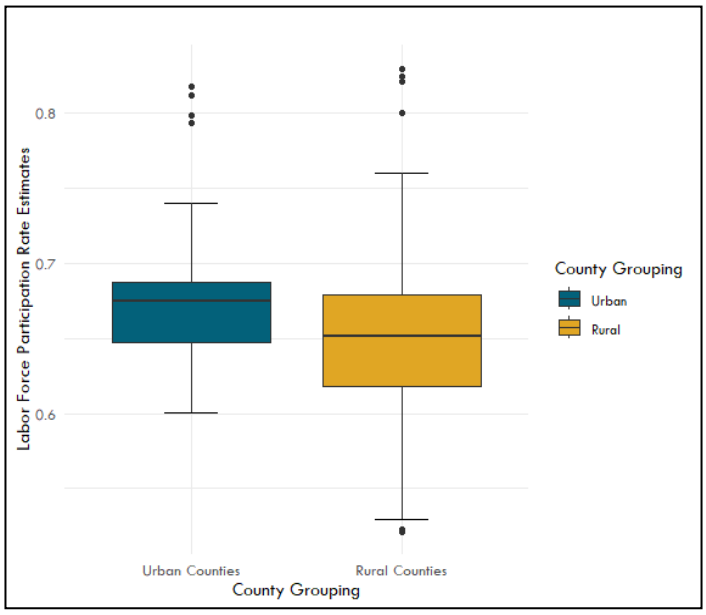
The reason this combined data source hybrid approach was chosen is to account for differences in each data source and a lack of timely data collection. LAUS data gives labor force counts by year (the numerator) but does not provide population estimates (the denominator). Census ACS data provides accurate civilian 16+ age population estimates, but not all counties are available for a given year. Census PEP data provides yearly county estimates but does not account for 16+ age breakouts. So, by using the growth rates generated from Census PEP data and applying those growth rates to Census ACS 5-year population estimates, we created annual working age (16+) population estimates per county. Once those estimates are finalized, we apply the LFPR equation to create annual LFPR estimates, and this will serve as the dependent variable for our analysis.

The final piece of the puzzle comes via identifying which counties in Iowa are rural and which are considered urban. This split grouping is a key component for analysis as well. The USDA Economic Research Service (ERS) provides Rural-Urban Continuum Codes (RUCC), applying a set of criteria to each county in the US to determine their status on the rural to urban spectrum. While these codes provide more than just "rural" or "urban" classifications (there are subsets within those two groups), for the purposes of this study, we will label counties as either rural or urban. The most recent update to RUCC was in 2023, those codes are applied to the counties present in our analysis as a constant term. Meaning that if a county is classified as rural in 2023, it is classified as rural for the entire time-period, the same logic applies to urban counties as well.

Exploratory Data Analysis

The focus of this analysis is centered around rural versus urban county groups within the state of Iowa. To perform a proper analysis, we first visualize changes between and within these groups to help identify key differences and trends for each group. To start, we can chart the differences between labor force participation rates (LFPR) by rural and urban county groupings (Figure 1, on the next page). Urban counties have on average, a larger LFPR compared to their rural counterpart and have less variation overall. This is to be expected due to sampling issues along with general population and economics trends. There is a clear and distinct difference which will guide the continued analysis of these two groups.

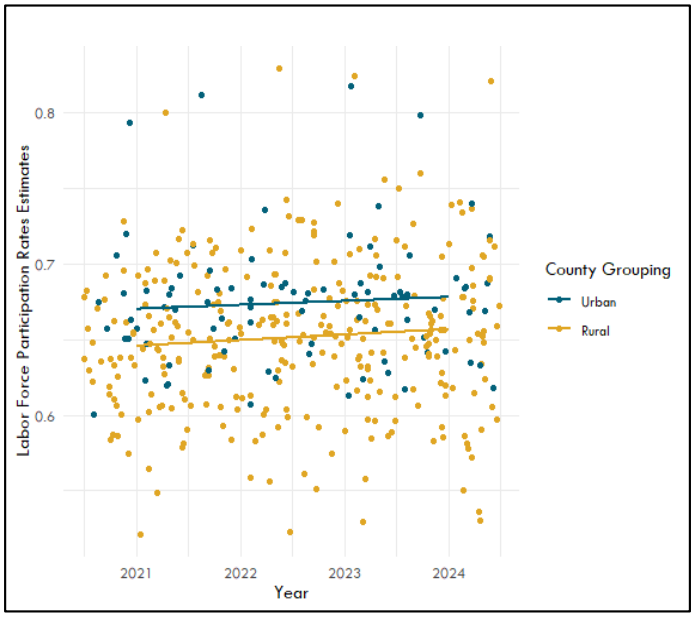
Figure 1: Labor Force Participation Rates by County Grouping



Now knowing there are visual differences, we can test to see if those differences between grouped means are significant. This analysis is done via Welch's t-test or an unequal variances t-test, a widely accepted statistical tool where (in this case) we test the null hypothesis that the two population means (rural and urban counties) are equal. The data is distributed normally and contains unequal variances, meeting the main assumptions for the test (Bobbit, 2019). After analysis, we find that the difference between "Rural Counties Average Labor Force Participation Rate" and "Urban Counties Average Labor Force Participation Rate" (mean of x = 0.65, mean of y = 0.67) suggests that the difference is negative, statistically significant, and medium (difference = -0.02, 95% CI [-0.03, -0.01], t(163.27) = -4.32, p < .001; Cohen's d = -0.68, 95% CI [-0.99,-0.36]).

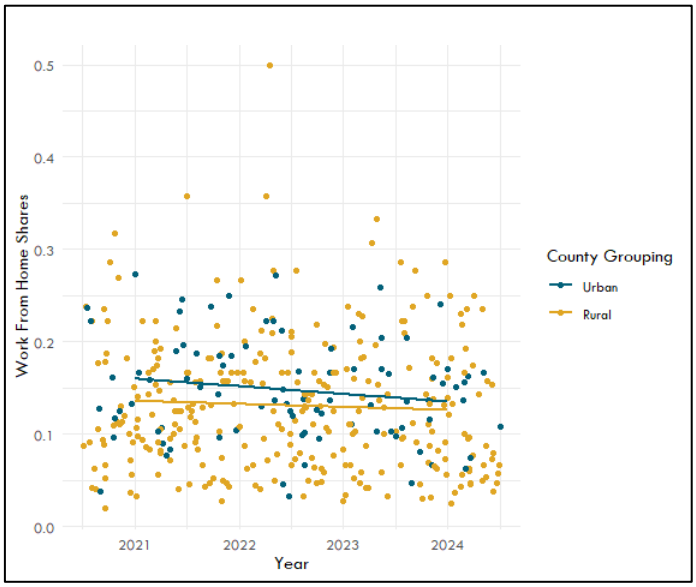
Because of the panel structure of the dataset, it is important to visualize and interpret the relationship of key variables over time as well. In Figure 2, we see LFPR estimates for each county (colored by rural or urban grouping) displayed over time. We see a slightly positive and linear trend from 2021 to 2024.

Figure 2: Labor Force Participation Rates Over Time



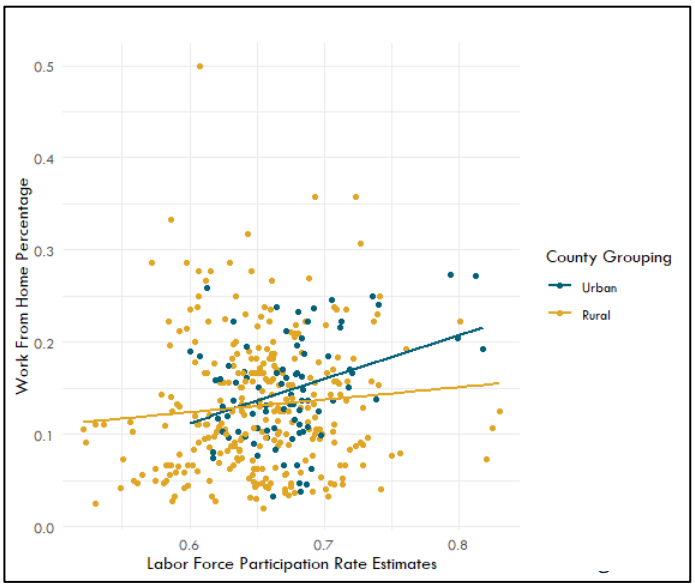
In Figure 3, we see the first introduction of our main variable of interest, "working from home". From 2021 to 2024, for both county groups, we saw a slightly negative, linear trend in the shares of workers working from home by county. Rural counties see little change over time while urban counties have a noticeably steeper decrease over the same span of years. Both groups show a negative trend, however.

Figure 3: Work from Home Shares Over Time



Lastly, we need to visualize the general relationship between the share of the population that works from home and the LFPR estimate by county. Figure 4 shows the relationship between our two main variables. We see from the visualization that while both urban and rural counties show a positive correlation, urban counties have a more positive and sharper linear relationship between LFPR and working from home shares, than rural counties.

Figure 4: Work from Home by Labor Force Participation Rates by County



To test this relationship and verify what we can see visually, we employ a Spearman's rank correlation test between our variables. Spearman's rank was chosen over the traditional Pearson's correlation due to the more rigorous assumptions needed for Pearson's correlation. Spearman's rank does not assume any specific distribution, is less sensitive to outliers, and can handle potential non-linear associations (Frost, 2021).

Three tests will be conducted: a general test between work-from-home and LFPR estimates, a test for urban counties specifically, and a test for rural counties.

The overall Spearman's rank correlation rho between LFPR estimates and working from home shares is positive, statistically significant, and small (rho = 0.15, S = 7.94e+06, p = 0.004). The Spearman's rank correlation rho between rural county LFPR estimates and rural county working from home shares is positive, statistically not significant, and small (rho = 0.11, S = 3.80e+06, p = 0.056). Lastly, the Spearman's rank correlation rho between urban county LFPR estimates and urban county working from home shares is positive, statistically significant, and medium (rho = 0.27, S = 79665.77, p = 0.010). The reported effect sizes are based on Funder's 2019 recommendations.

Table 1: Spearman's Rank Correlation by Test Group

Test Group	Spearman's rank coefficient	p-Value
Overall	rho = 0.15	0.004
Rural Counties	rho = 0.11	0.056
Urban Counties	rho = 0.27	0.010

The results of the above tests quantify and confirm our visualizations (Table 1). There exists a slight correlation between working-from-home and LFPR estimates. However, within that correlation there again exists a difference between urban and rural counties. Of the two, urban counties are the driving force behind this correlation, evidenced specifically by the second and third correlation tests conducted that show a statistically not significant relationship in rural counties and a statistically significant relationship in urban counties.

Regression Framework and Analysis

Panel data analysis requires an additional level of classification beyond a classical linear regression approach. Due to the structure of the data itself, we must account for groups of observations and those same groups of observations over time. If proper treatment is not implemented, concerns of heteroskedasticity within the error term can arise and throw the regression results into question. There are three main model choices for panel data: Pooled OLS, Random Effects, and Fixed Effects.

There are two main tests to determine the efficiency of the model choices listed above. The Breusch-Pagan (BP) Lagrange Multiplier Test helps us choose between a Pooled OLS regression and a random-effects regression (Breusch-Pagan, 1980). The null hypothesis of the BP test assumes that the random effects in the dataset are not significant and can be excluded from the model without worry of information loss. The alternative hypothesis suggests that the random effects are significant and need to be included. After conducting this test, we find that we reject the null hypothesis as the BP test indicates the random effects within the dataset are significant (p-value < 2.2e-16); rejecting the use of a Pooled OLS regression.

The Hausman specification test is used to compare the consistency of estimators in a statistical model, primarily to determine whether the random effects or fixed effects model is more consistent and efficient (Hausman, 1978). The main idea behind the test is that if the random effects model is correct, there should not be a significant difference between the fixed effect and the random effects estimator. In a hypothesis testing framework, the null hypothesis assumes that the estimators are not significantly different, while the alternative suggests that the random effects model is inconsistent. After testing, we find that we cannot reject the null hypothesis (p-value = 0.4301) and confirm the random effects framework will be an efficient and consistent model specification.

$$y_{it} = \boldsymbol{x}_{it}\boldsymbol{\beta}_i + \alpha + (\mu_i + \epsilon_{it})$$

The above equation is the mathematical representation of our random effects model choice. Specifically, we are incorporating both unit observations (i = Iowa counties) and time-period observations (t = year). In a more functional form, we can describe the model as follows:

- $Y_{i,t}$ represents the dependent variable (labor force participation rates)
- $X_{i,t}$ represents the independent variable(s) (working from home, rural county indicator, industry type, SOC grouping, demographic characteristics, etc.)
- $B_{i,t}$ represents the coefficients associated with the previously listed independent variables
- $\alpha_{i,t}$ represents a constant term that captures the mean of all unit-specific effects (does not vary with time and takes the place of the traditional intercept term)
- μ_i represents the variance introduced by the unit specific effect for a given unit i
- $\varepsilon_{i,t}$ represents the idiosyncratic error from all other sources for a given unit i and time-period t

To start, we need to establish a baseline model, serving as the foundation of our analysis. This is done by running a regression where:

$$LFPR_{i,t} = \text{Work from Home Share}_{i,t} + \text{Rural County Indicator}_{i,t} + \text{error}_{i,t}$$

The results of this regression are displayed in Table 2 below.

Table 2: Baseline Results of Regression Model

Term	Estimate	Std. Error	Z Statistic	p-Value
Intercept	0.674	0.0089	75.95	0.000 ****
Work from Home	0.002	0.0105	0.155	0.877
Rural County Indicator	-0.023	0.0104	-2.18	0.0298 *

*significance codes: 0 '****', 0.001 '***', 0.01 '**', 0.05 '*', 0.1 '*'*

We find that the working from home variable is not statistically significant with a large p-value (0.877) and very small estimates that we are not confident are different from zero. The interpretation of the working from home coefficient is that a 1% increase in the share of people working from home (across all counties and time periods) is associated with a 0.2% increase in LFPR, on average. Similarly, the rural county indicator variable is statistically significant (p value of 0.0298) and shows that rural counties (where the indicator variable=1) have on average, a 2.23% lower LFPR estimate when compared to the urban group. In terms of model specification, the adjusted R-squared value is 0.123, suffice to say there is still work to be done. Lastly, it is important to note that the standard errors of the model have been clustered to give more robust standard error estimates.

Moving on to a more expansive version of the model, we can add in control variables to account for the previously mentioned low R-squared value. The control variables of choice are based mainly on the "Statewide Telework Profile 2024". The control variables chosen are gender, SOC groups, industry classifications, education, and median income (all represented as percentage shares for each county). As mentioned earlier, the standard errors for this model have been clustered at the group level. The results of the statistically significant variables in this regression are presented in Table 3, on the next page.

Table 3: Results of Regression Model Incorporating Defined Statistically Significant Variables

Term	Estimate	Std. Error	Z Statistic	p-Value
Intercept	0.658	0.010	64.97	0.000 ****
Work from Home	0.004	0.016	0.22	0.826
Rural County Indicator	-0.019	0.010	-1.82	0.070 *
Professional/Paraprofessional/ Technical Services Occupations	0.031	0.015	2.08	0.039 **
Healthcare & Social Services	-0.030	0.013	-2.25	0.025 **

*significance codes: 0 '*****', 0.001 '****', 0.01 '***', 0.05 '**', 0.1 '*'*

This model gives us slightly different coefficients for our variables of interest. The same interpretation can be applied to this output as well. A 1% increase in the shares of Working from Home is associated with a 0.4% increase in LFPR estimates, on average, across counties and time periods. Similarly, when compared to the urban group, rural counties see a -1.9% difference in LFPR estimates on average. Looking now into model diagnostics, the adjusted R-squared value for this specific model is 0.843, a large increase from our previous version. Most of the variation in LFPR estimates is due to the differences between individuals (90.6%), and the rest is explained through idiosyncratic error (9.4%). The theta values (ranging from 0.69 to 0.84, mean = 0.81) for the model suggest an emphasis towards within-individual variation (meaning the model behaves like a fixed -effects model). It seems that this specific model does well in capturing potential relationships in labor force estimates within the Iowa labor markets.

Our last model of interest is a variation on our initial baseline regression, specifically vis a vie an interaction term. To properly see the association between working from home and LFPR estimates in each county type (rural and urban), we need to add in an interaction term to the working from home variable. The model now looks like this:

$$LFPR_{i,t} = (\text{Work from Home Share} * \text{Rural County Indicator})_{i,t} + \text{Rural County Indicator}_{i,t} + error_{i,t}$$

Table 4: Results of Regression Model After Incorporating an Interaction Term

Term	Estimate	Std. Error	Z Statistic	p-Value
Intercept	0.677	0.0088	76.58	0.000 ****
Work from Home	0.002	0.0169	0.105	0.916
Rural County Indicator	-0.023	0.0107	-2.12	0.035 *
Work from Home : Rural County Interaction	-0.00009	0.0206	-0.004	0.997

Here we see very similar estimates for both the working from home and the rural county indicator variable. However, the interaction term is where our focus lies. The estimate is effectively zero with an incredibly low z statistic (and correspondingly high p-value). The interaction term should be interpreted as the association between a 1% increase in rural counties working from home shares and the corresponding LFPR estimates, on average. In this instance, there is effectively no change in LFPR estimates (-0.009%) when working from home in rural counties increases by 1%.

Results and Discussion

There are two main takeaways from the regression analysis conducted. Firstly, we cannot reject the null hypothesis that the interaction between rural counties and working from home has a statistically significant impact on LFPR estimates. From the interaction model laid out in the previous section we see that the coefficient is essentially zero and we cannot say that there is a statistically significant difference from zero.

Practically speaking, the results of this regression analysis show that working from home in rural counties does not have a measurable impact on LFPR estimates in said counties. From an economic perspective, it is hard to support the notion that working from home is an effective tool to boost labor force participation in rural counties.

Furthermore, what could happen is that while workers are able to work from home and not make the commute to work, many of them may already live in urban counties (seen in population trends in Iowa), so the benefit that is being reaped is found mainly in urban counties, with a residual impact on rural workers. We must also consider that the main industries and jobs present in rural counties may not be capable of supporting remote work, while the industries and job types found in urban counties can. There are also infrastructure concerns as well, one limitation that rural counties have compared to urban counties is a lack of comprehensive high speed internet connection. Without reliable internet services, working from home is completely out of the question. This is also a potential point of emphasis in future research, adding internet coverage may act as an effective control or even an instrumental variable for modeling purposes.

The second main takeaway is that this research uncovered a statistically significant difference between rural and urban labor force estimates. In each model, the rural county indicator variable presented a statistically significant relationship to labor force participation rates on average. While the estimates themselves changed slightly with the addition of control variables and an interaction term, in each model the association was statistically significant, albeit a small association. It is recommended that more work should be done to further quantify this relationship and potentially hash out a causal impact as to why there are differences in LFPR estimates in rural and urban counties.

While the model performed well and uncovered an interesting relationship, there are still improvements that could be made to generate more insights. This research was focused mainly on labor market variables and did not incorporate other factors. Potentially including variables to account for housing costs, quality of life, environmental variables, educational access, and other sociological and economic considerations may bring a more holistic approach to the topic.

Conclusion

Going forward, there are other relationships that can be investigated that may provide additional insights. An example of this could be studying how remote work impacts homemakers and currently retired people. These two groups of potential labor sources are often overlooked in most labor market analyses. One could also research how remote work is connected to lower commute time/costs, and if that drives LFPR in rural counties. Another connection could be with the rise of remote work that there are more flexible options for childcare, which allows for less monthly spending. Lastly, there are potential correlations to remote work and health outcomes. If workers are spending at least some working days at home, they are lowering their exposure rates to contagious diseases. Many such connections exist. With that said, remote work is here to stay, and it is wise to continue research into the potential outcomes and impacts of these new models of working, whether they are hybrid, fully remote, or otherwise.

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Ghost Jobs: The Hiring Mirage Reshaping the Labor Market

Written by Kusum Adhikari

Introduction

The modern job market appears vibrant, with thousands of postings flooding online platforms every day. Yet many job seekers quickly discover that not all these opportunities are real. They spend hours tailoring resumes and crafting cover letters only to be met with silence. Increasingly, the culprit is not just competition, but the rise of ghost jobs: listings that exist without genuine intent to hire. These phantom postings waste candidates' time, distort labor market signals, and complicate policy analysis.

Ghost jobs are not scams designed to steal personal information. Many are created and maintained by legitimate companies for strategic, operational, or sometimes, unintentional reasons (CBS News, 2025). They may confuse applicants, inflate digital job board statistics, and erode trust in the hiring process. For job seekers, they create false hope, waste effort, and harbor disillusionment toward the job market. For economists, they distort our understanding of labor dynamics. And for employers, they represent a controversial but increasingly common practice in the modern hiring landscape. Understanding the driving forces, consequences, and emerging solutions is essential for job seekers, employers, analysts, and policymakers alike.

What Are Ghost Jobs?

Ghost jobs are postings for roles that do not currently exist, are already filled, or are not intended to be filled in the near term. The concept is not entirely new—employers have long advertised internal-candidate roles or kept "evergreen" listings open for recurring positions. What is new is the scale and persistence. In recent employer surveys, large shares of hiring managers acknowledge posting roles without immediate hiring plans and allowing inactive postings to linger (Resume Builder, 2024). Other reasons for ghost postings may include:

- Expired postings left online due to oversight.
- "Evergreen roles" kept open to collect resumes for future use and maintain backup candidate pools.
- Listings used to signal growth, stability, or competitiveness.

A 2024 ResumeBuilder survey found that 40 percent of employers admitted posting jobs with no immediate intent to hire, with nearly a third of listings left active despite inactivity (Dennison, 2025).

Why Ghost Jobs Exists

At first glance, ghost jobs may seem like a new phenomenon, but they are more of an evolution of old practices. Companies have long posted roles with an internal candidate already in mind or maintained "evergreen" listings to collect resumes for future needs, but this practice has expanded and with motivations ranging from strategic to unintentional:

- Talent Pipeline Building: Employers may use ghost listings to stockpile resumes, even when no position is open (Harvard Resource Solutions, 2025).
- Image Management: Public ghost job postings may be used in an effort to signal growth and stability to investors, customers, and even employees.
- Employee Motivation: Ghost postings may be used to suggest replaceability in the hopes of increasing current staff productivity.

- Operational Flexibility: Ghost jobs may be used as placeholders by firms should an irresistible candidate appear.
- Cost Management: Employers may delay actual hiring to reduce payroll costs (Clarify Capital, 2025).
- Administrative Oversight: Sometimes postings simply linger because no one removes them (The Muse, 2025).
- Automation: ATS or AI-driven recruiting platforms now automatically recycle job ads, keeping expired roles alive indefinitely (Clarify Capital, 2025).

The practice spans job levels from entry-level to executive and cuts across industries. Pockets of higher prevalence tend to appear in technology, construction, and manufacturing sectors where hiring is cyclical, skill-specific, or project-driven.

How to Spot and Avoid Ghost Jobs

Recognizing ghost jobs is increasingly essential for applicants hoping to conserve time and energy. Warning signs include:

- Vague descriptions with generic responsibilities and minimal detail.
- Missing or outdated posting dates, suggesting the ad may no longer be active.
- Absence from company websites, even if listed on external job boards.
- Recycled postings that appear repeatedly without change.
- Radio silence after applying, with no acknowledgment or updates (DAVRON, 2025).

To reduce wasted effort, job seekers should cross-check listings directly on company sites, focus on recently posted roles, and leverage personal networks to verify opportunities. Proactive outreach to recruiters can also clarify whether a role is truly active (Dennison, 2025).

From Ghost Jobs to Labor Market Reality

Ghost jobs do more than frustrate individuals; they distort perceptions of the broader economy. Digital job board data can suggest an inflated demand for workers, thus misleading analysts and policymakers. This is where the Job Openings and Labor Turnover Survey (JOLTS) becomes critical.

Unlike commercial platforms, JOLTS counts only positions that truly exist, with available work and active external recruitment. In theory, this shields official labor statistics from ghost job contamination. Yet in practice, ghost postings still affect market sentiment, candidate behavior, and corporate reputation.

JOLTS Data and Why It Matters

The Bureau of Labor Statistics' JOLTS program provides official data on job openings, hires, and separations. JOLTS is designed to reduce ghost-job contamination. JOLTS counts only positions that:

1. Exist with work available,
2. Are expected to start within 30 days, and
3. Are actively recruiting external candidates.

These criteria remove a large share of phantom/ghost postings that persist on commercial boards, yet ambiguities remain, especially when companies maintain "evergreen" roles that technically meet the criteria without real hiring intent.

Additionally, the JOLTS survey depends on employer self-reporting, which introduces some distortion. That is why economists regularly cross-validate JOLTS with unemployment, participation, hires, wages, and private surveys. When JOLTS and corroborating indicators move in tandem, analysts can be confident in the signal. When digital vacancy counts diverge wildly from JOLTS, ghost postings, scraping artifacts, or definitional differences are likely culprits.

Trend Analysis: Openings, Hires, and Key Metrics

Understanding ghost jobs requires examining the gap between job postings and actual hires.

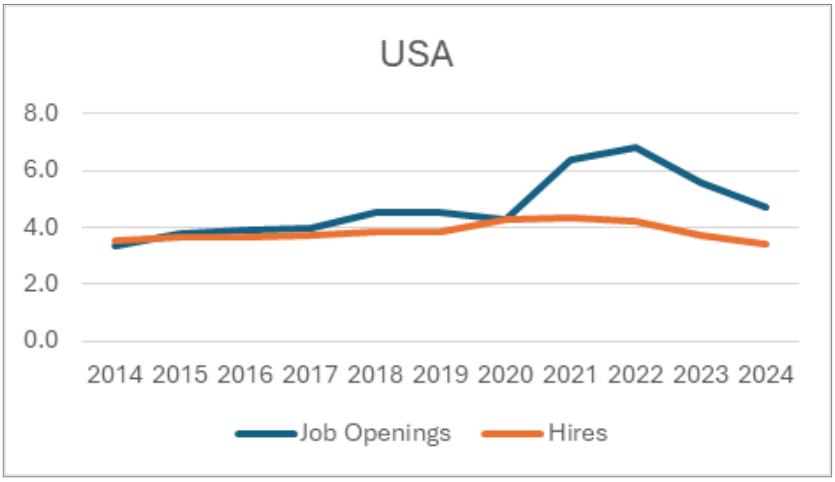
- Job Openings measure demand, unfilled positions with work available.
- Hires record the actual onboarding of employees.

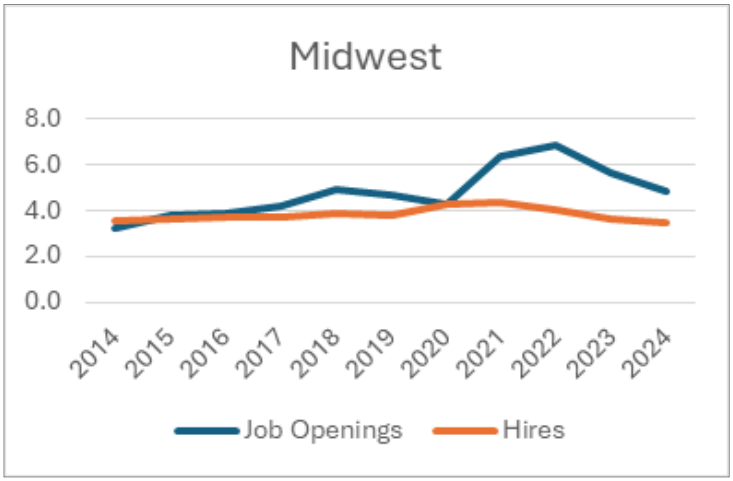
The difference between the two reveals whether employers are successfully converting labor demand into real employment. The JOLTS data in this article use rate values which normalize indicator values versus the sum of employment to standardize the data and allow for easier comparison (BLS, 2025).

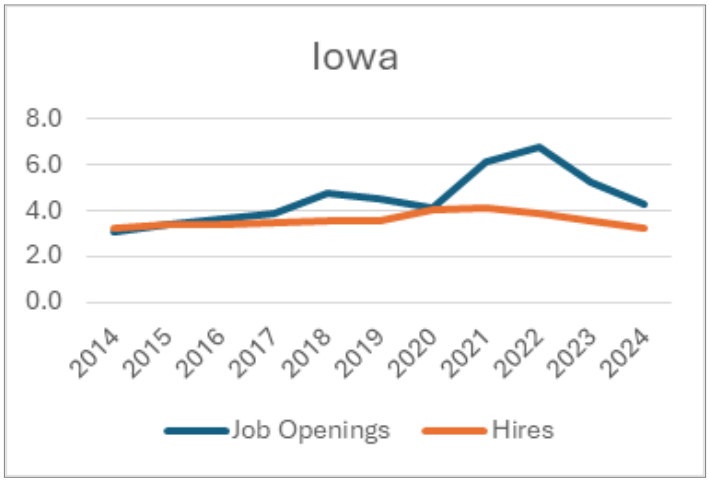
Openings vs. Hires:

When openings consistently outpace hires it signals recruitment struggles, skill mismatches, or slow onboarding. Balanced or reversed ratios suggest "looser" labor markets.

Figure 1: Trend analysis of Job Openings and Hires from 2014-2024
For the Nation, Midwest Region, and State of Iowa







Source: U.S. Bureau of Labor Statistics (BLS), JOLTS Program

a) Job Openings
   - From 2014 to 2024, job openings consistently increased, peaking at 6.8 percent in 2022 and then decreasing to 4.7 percent in 2024 nationwide.
   - The Midwest region and Iowa follows a similar trend, with highest increases, especially in 2022, before a slight decline in 2023 and 2024.

b) Hires
   - Hires were generally lower than job openings, with consistent growth until 2021 (peaking around 4.3 percent), followed by a decline to 3.4 percent in 2024.
   - Midwest and Iowa also show hires following a similar trajectory but not matching job openings in terms of growth.

The gap between job openings and hires has widened nationwide, particularly from 2020 onward. The most significant growth in job openings occurred between 2020 and 2022, while hires have stagnated or slightly declined in recent years. The data does suggest the presence of ghost job openings, as job openings consistently exceed hires, particularly after 2020. This indicates that while many jobs are available, the actual filling of these positions does not keep pace, pointing to possible inefficiencies or disconnects in the hiring process.

Estimated Ghost Openings:

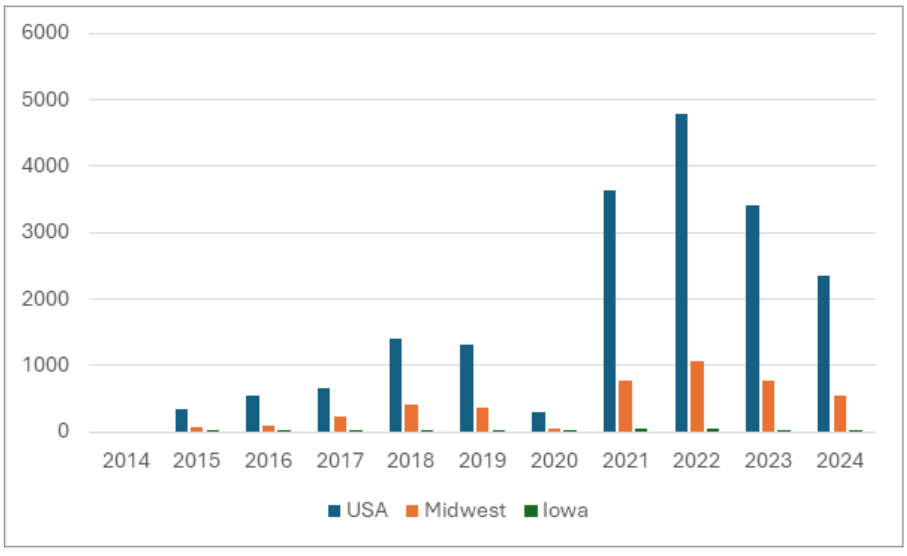
A common way to estimate ghost job openings is by subtracting the number of hires from the number of job openings.

Estimated Ghost Openings = Number of job openings – Number of hires

This approach helps analysts assess how many vacancies remain unfilled in the labor market. However, it is important to recognize that commercial job boards often inflate these figures compared to JOLTS. The gap between job openings and hires shows how many positions are actively sought by employers versus the number of roles filled. Large positive gaps typically indicate a tight labor market with recruitment challenges, skill shortages, or slower hiring processes. Over time, persistent differences can also highlight inefficiencies in sourcing, screening, or onboarding workers (Congressional Research Service, 2025).

The chart below illustrates this estimation trend year over year.

Figure 2: Estimated Ghost Openings by Area



Source: U.S. Bureau of Labor Statistics (BLS), JOLTS Program

- **USA:** In 2014, there was a slight negative difference (-139.1), where the number of hires slightly exceeded job openings, suggesting that hires were slightly more than expected or job openings were underreported. Since many vacancies were filled through internal hiring or employee referrals, fewer external candidates were considered for open positions.

- **Midwest**: In 2014, the difference was negative (-46.6), meaning that there were slightly more hires than job openings. After 2014, the difference became positive, with the largest difference in 2022 (1,071.3), showing that job openings significantly exceeded hires. In 2024, the difference decreased but remained high at 534.3.

- **Iowa:** 2014 started with a negative difference (-0.8), meaning there were slightly more hires than job openings in Iowa. From 2015 to 2024, the difference became consistently positive, with a notable peak in 2022 (52.7). This indicates that the number of job openings exceeded the number of hires. The difference began to decrease after 2022, reaching 20.6 in 2024, but it remained positive, showing that job openings are still exceeding hires, although at a smaller margin compared to the peak.

Widening Gap Between Job Openings and Hires:

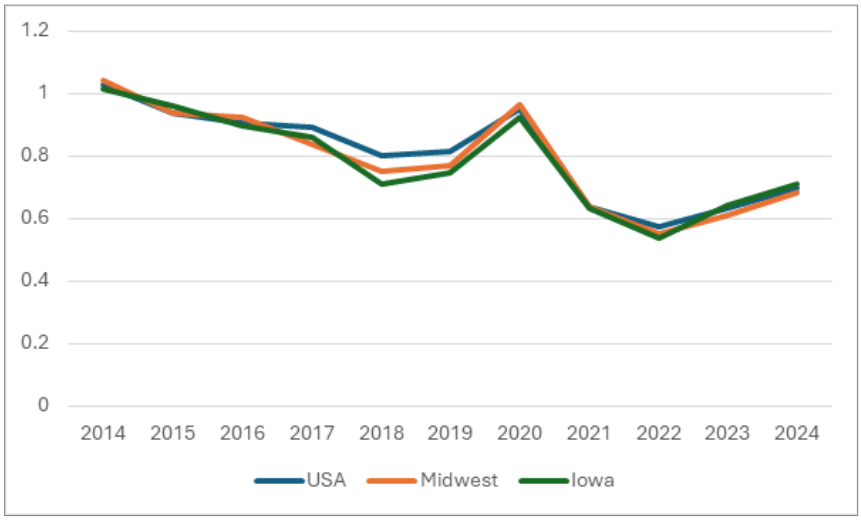
Over time, the difference between job openings and hires has grown, as seen across the USA, Midwest, and Iowa. This shows that while the number of available positions is increasing, fewer people are hired to fill those positions.

BLS Methodology: The BLS tracks job openings as positions employers are actively seeking to fill, but a job opening can be a long-term vacancy or an opening that remains posted without hiring for months. This widening gap can therefore signal jobs that remain unfilled, even though they are still counted as "open."

Vacancy Yield (Hires per Job Opening):

A critical tool here is the vacancy yield ratio (hires per job opening):
Vacancy Yield = Number of hires / Number of job openings
A ratio above 1 suggests rapid filling of roles or multiple hires per posting; a ratio below 1 signals difficulty in recruitment or longer vacancies (BLS, 2018). Ghost jobs muddy this picture, as phantom postings can inflate openings without corresponding hires, reducing observed efficiency.

Figure 3: Hires per Job Opening by Area



Source: U.S. Bureau of Labor Statistics (BLS), JOLTS Program

- **USA:** In 2014, the ratio was 1.03, meaning there were slightly more hires than job openings, suggesting a relatively balanced situation. From 2015 onward, the ratio declined steadily, reaching 0.57 in 2022, indicating that for every job opening, fewer hires were being made. This suggests a growing disconnect between available jobs and the actual hiring process. By 2024, the ratio is 0.69, showing an improvement compared to 2022, but still far from 1, indicating that a significant number of job openings remain unfilled. The consistent increase in job openings, coupled with the steady decline in hires per job opening, is a key indicator of ghost job openings.

- **Midwest**: The ratio started at 1.04 in 2014, indicating a slightly higher number of hires than job openings. The ratio steadily declined over the years, with 2022 seeing the lowest at 0.55, showing that only about half of the job openings were filled. By 2024, the ratio increased to 0.68, showing some improvement but still indicating many jobs remain unfilled.

- **Iowa:** 2014 started with a ratio of 1.02, meaning hires were slightly greater than job openings. From 2015 onwards, the ratio began to decline. By 2018, it was already down to 0.71, showing that fewer hires were being made compared to the number of job openings. The ratio hit its lowest point in 2022 at 0.54, suggesting that less than half of the job openings were being filled. 2023 and 2024 showed some improvement with ratios of 0.64 and 0.71, respectively, but the ratio remained below 1, indicating a continued imbalance where fewer hires were made than the number of job openings.

The gap between job openings and hires, along with the steadily decreasing hires per job opening ratio, points to a growing trend of ghost job openings from 2015 onwards. This suggests that while companies are posting more jobs, they are not actively filling them, either due to inefficiencies in the hiring process, unrealistic job requirements, or positions being posted for non-hiring purposes.

Declining Hires per Job Opening Ratio:

The hires per job opening ratio has steadily declined, especially after 2020, indicating that while job openings are increasing, fewer of them are being filled relative to the postings.

BLS Methodology: The BLS considers openings based on employer surveys but doesn't always differentiate between positions that are urgently needed versus those that are posted for show, are filled intermittently, or left open due to recruitment difficulties.

When the hires per job opening ratio falls (below 1), it suggests that fewer hires are being made per job opening. This might point to job postings that are not actively being filled — a key characteristic of ghost job openings.

Current Conditions Snapshot

Despite headwinds from elevated interest rates and recent bouts of inflation, layoffs remain historically low and overall unemployment is stable, all signs of job security for many currently employed workers. At the same time, hiring has cooled from the breakneck pace of 2021 in the wake of the COVID quarantine. Since mid-2024, hiring rates have hovered closer to post-Great Recession norms, making it harder for new entrants and recently laid-off workers to secure roles.

The mismatch amplifies job-seeker frustration. Many candidates report submitting hundreds of applications with few callbacks, experiencing employer "ghosting," and receiving generic rejections despite relevant qualifications. Recent graduates face tougher odds than the broader workforce, underscoring the importance of reading labor-market signals carefully—and of filtering out phantom demand.

Economic and Policy Signals

At a macro level, persistent openings exceeding hires are typically associated with economic expansion, tighter labor markets, and upward pressure on wages and benefits. Conversely, narrowing gaps tend to coincide with slowdowns or heightened layoff risk. Ghost jobs blur these signals when analysts lean heavily on digital vacancy counts without validation.

Sectoral composition and regional structure shape the picture. Tech-oriented regions in the West and South often report higher vacancy yields, reflecting dynamic demand for specialized skills. Manufacturing-heavy regions in parts of the Midwest can be more cyclical, with hires trailing openings during downturns. Service-dense coastal metros display mixed patterns depending on local housing costs, commuting frictions, and industry composition.

Implications and Effects for Labor Market Analysis

Ghost jobs ripple through the hiring ecosystem in multiple ways:

1. For Job Seekers: They waste time, fuel false hope, and undermine trust.
2. For Employers: Reputations can suffer. When real roles eventually open, top talent may hesitate to apply to companies notorious for ghost postings.
3. For Analysts: Online vacancy data has become less reliable. Ghost jobs lower calculated hires-per-opening ratios, erode trust in statistics, and distort wage or shortage signals.
4. For Policymakers: Misinterpreted labor tightness can lead to misguided interventions or misallocated resources. (The Interview Guys, 2025)

Mitigating the Problem

Change is underway. Legislative proposals like the Truth in Job Advertising and Accountability Act (TJAAA) would require employers to disclose intent, remove stale postings, and report outcomes (Dennison, 2025). States including California, New Jersey, and Kentucky are experimenting with transparency rules (Congressional Research Service, 2025).

Meanwhile, platforms are adapting. LinkedIn and Greenhouse now pilot "verified job" badges, while emerging ethical recruiting networks push for standardized best practices.

On an individual level, job seekers can reduce wasted effort by networking, applying selectively, and using platforms known for verifying postings (Dennison, 2025). Employers, for their part, should balance strategic flexibility with transparency, recognizing that credibility in hiring is itself a competitive advantage.

Conclusion

Ghost jobs illustrate the growing disconnect between digital hiring practices and real labor demand. For candidates, they mean wasted effort, dashed expectations, and lower trust. For analysts and policymakers, they blur signals that guide training investments, wage forecasts, and regional planning. They frustrate individuals, complicate data analysis, and challenge institutional trust. Yet with awareness, regulation, and technology, stakeholders can mitigate their impact.

Ultimately, the fight against ghost jobs is about more than protecting applicants from wasted effort. It is about restoring integrity to the hiring process and ensuring that labor market signals reflect reality.

By bringing transparency to recruitment, employers, platforms, and policymakers can rebuild trust and create a job market where posted opportunities are genuine pathways—not mirages on a screen.

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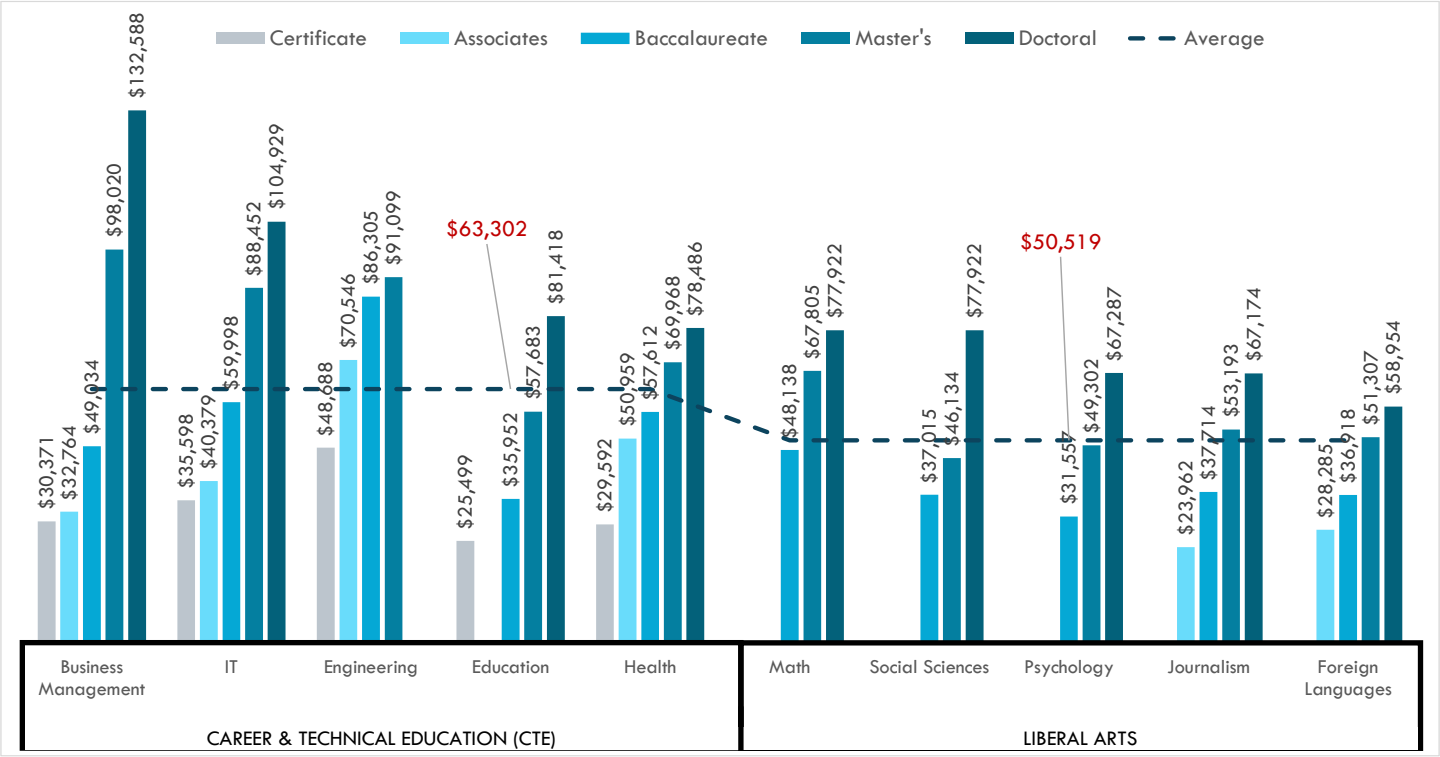
Post-Secondary Employment Outcomes

Written by Ananda Subramanian

Post-Secondary Employment Outcomes (PSEO) data, created by the U.S. Census Bureau, provide earnings for graduates of community colleges and universities in Iowa. Prospective students, alumni and institutions have the opportunity to analyze earnings by CIP programs allowing students to set expectations, alumni to negotiate future salaries, and institutions to better prepare their students for future careers.

Education-Income Ladder

Figure 1: Median Earnings - First Year After Graduation by Degree Level
Top 5 Disciplines by Career & Technical Education (CTE) and Liberal Arts



Source: U.S. Census Bureau, Center for Economic Studies, LEHD: https://lehd.ces.census.gov/applications/pseo

The chart presents median earnings for the top five two-digit CIP (Classification of Instructional Programs) codes, grouped into Career and Technical Education (CTE) and Liberal Arts programs. The bars illustrate the progression of educational attainment, beginning with certificates and associate degrees typically earned at 15 community colleges and extending up to doctoral degrees awarded by 3 regent universities in Iowa.

A consistent trend emerges: higher levels of education are strongly associated with higher earnings. For instance, a student who completes a certificate or associate degree at a community college secures an initial foothold in the labor market. By transferring to a four-year institution, that same student can build on prior credentials, achieving improved educational outcomes and capturing significant wage premiums.

[1]The data include graduates from cohorts spanning 2001 through 2021.

[2]Median earnings are total annual earnings for graduates from all jobs (from State Unemployment Insurance wage record), adjusted to 2022 dollars using Consumer Price Index for all Urban Consumers (CPI-U). To be included, a graduate must have earned more than the equivalent of working full time (35 hours per week for 50 weeks) at the federal minimum wage, and must have must have three or more quarters of non-zero earnings.

This trajectory reflects a well-documented body of research on human capital, which highlights the substantial returns to education and the value of continued learning. From a workforce development perspective, these findings provide actionable insights for individuals, institutions, and policymakers working to align educational investments with labor market demand.

Stackable credentials, particularly within community colleges, play a critical role in this process. For example, a student may begin with a Nurse Aide certificate and later advance to an Associate Degree in Nursing, qualifying as a registered nurse. Similar pathways exist in welding, IT support, construction trades etc. These stackable models mirror the "earnings ladders" visible in the chart, where each successive credential unlocks access to higher-paying and higher-responsibility roles. At the same time, certificates and diplomas can meet immediate regional workforce needs while leaving the option open for students to pursue advanced credentials later. Work-based learning opportunities—such as apprenticeships, internships, and clinical experiences—further accelerate these transitions by providing hands-on experience that employers value alongside formal education.

CTE programs generally yield higher earnings than Liberal Arts programs at comparable degree levels (as the chart shows). This is largely because graduates in CTE and STEM-related fields are trained in specialized, high-demand technical roles that directly meet industry needs. In Iowa, the top five employing industries include healthcare, manufacturing, retail trade, education, and accommodation/food services. Within these sectors, common occupations range from healthcare support and management roles to sales, teaching, material moving, and food preparation. Filling these positions requires a balanced mix of STEM and Liberal Arts graduates, spanning both short-term credentials and advanced degrees. Aligning program capacity with industry demand is therefore essential to improving wage outcomes for students.

PSEO database also shows the proportion of share of graduates in different industries. The table below shows the top 5 industries the graduates entered immediately after graduating from a community college or a regent university.

Table 1: Share of Graduates by Credential and Industry One Year After Graduating

	Certificate	Associates	Baccalaureate	Masters	Doctoral
Manufacturing	12%	10%	10%	12%	5%
Retail Trade	9%	13%	8%	3%	7%
Professional/Scientific	2%	4%	12%	11%	21%
Health	43%	32%	12%	17%	23%
Education	4%	5%	14%	31%	28%

Source: U.S. Census Bureau, Center for Economic Studies, LEHD: https://lehd.ces.census.gov/applications/pseo

The darker-shaded cells indicate fields with a higher concentration of graduates one year after graduation. At the sub-baccalaureate level, the Health sector is by far the most prominent, accounting for 43 percent of certificate holders and 32 percent of associate degree holders. This reflects strong labor market demand for technicians, nurses, and allied health professionals who are able to transition quickly into the workforce.

At the other end of the educational attainment spectrum, the Education sector emerges as the leading destination for graduate degree holders, drawing 31 percent of master's graduates and 28 percent of doctoral graduates. This concentration underscores the advanced credential requirements for occupations such as teachers, administrators, and faculty members.

The Professional, Scientific, and Technical Services industry shows a different pattern, attracting a disproportionately large share of doctoral graduates (21 percent).

These positions are typically filled by research scientists, analysts, and engineers working in R&D-intensive fields that require specialized expertise.

By contrast, the Retail Trade and Manufacturing sectors primarily absorb graduates with sub-baccalaureate credentials. In Retail, employment is concentrated in roles such as cashiers, sales associates, and stock clerks—positions that typically require limited formal education. Manufacturing displays a similar trend, with assemblers, fabricators, operations workers, and material movers representing common roles. While these occupations demand technical skills and training, they rarely require advanced degrees.

Taken together, these patterns illustrate how educational attainment aligns with labor market segmentation. Some industries—such as health, education, and professional/scientific services—place a premium on advanced credentials, while others, such as retail and manufacturing, rely more heavily on workforce readiness and technical proficiency.

Conclusion

The article highlights the earning power of different pathways across Career and Technical Education versus Liberal Arts. For students seeking a potential career, PSEO data can act as a "career menu" where the cost of education and potential return can be weighed side by side. CTE pathways—particularly in IT, engineering, health, and business—offer strong wages at relatively early levels of attainment, while Liberal Arts pathways tend to require advanced study to achieve competitive earnings. For policymakers and educators, the data underscores the importance of aligning curriculum with labor market demand while ensuring students are informed about the long-term financial implications of their choices.

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