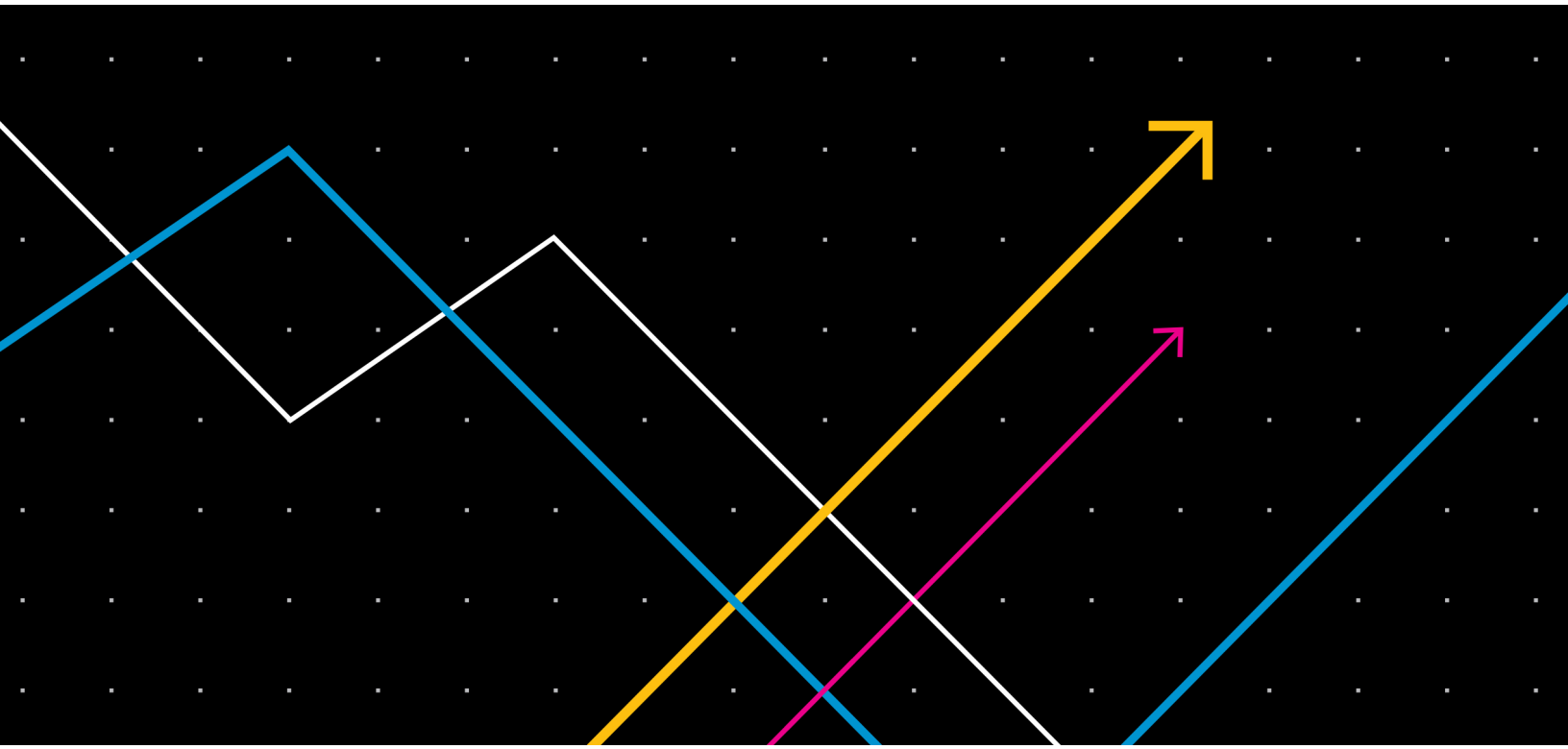

RESEARCH REPORT

Job Quality and Race and Gender Equity

Understanding the Link between Job Quality and Occupational Crowding

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Executive Summary

Job quality is important for worker well-being (Congdon et al. 2020). However, all occupations are not equal in quality, and quality employment is distributed unevenly by race and gender. This study uses occupational crowding methodology to better understand how this occurs and who is impacted. We conducted a review of major definitions of job quality across multiple fields to develop an organizing framework of the main elements of job quality. The main categories we identified were pay, hours, scheduling, benefits, job security, working conditions, on-the-job training, advancement, and worker voice. We then identified these job quality indicators in 108 occupations and developed a combined job-quality score. The average job-quality score was 5.8 out of a total possible score of 11 across the occupations, the most frequent total scores were 7 or 8, and few occupations were very below average.

We then looked at occupational crowding—how people are over-, under-, or proportionally represented in roles taking educational requirements and educational attainment into account—for Black women, Black men, Latinx women, Latinx men, white women, and white men. We found that as job-quality scores increase—indicating higher-quality roles—a significant decrease is found in the representation of Black women, Black men, Latinx women, Latinx men, and White women as compared with White men. In contrast, higher quality roles tend to have a higher concentration of White men. We found the same results when examining wages. We also looked at other indicators separately, disaggregated by occupations with high and low benchmark ratings.

This research sheds light on the importance of improving job quality across multiple dimensions to reduce occupational disparities by race and gender. For more detailed analysis, researchers and policymakers need better data to measure job quality in occupations at more disaggregated levels. There is also a need for better data on different aspects of job quality linked to occupations, such as retirement benefits. Survey questions could also focus on workers' preferences and needs in job quality by race and gender. The findings also potentially reinforce the importance of ensuring all groups have equitable access to the roles for which they are qualified (Hamilton and Dixon 2022).

Job Quality and Race and Gender Equity

Job Quality Literature and Equity

Black, Latinx, and female workers are impacted differently when it comes to job quality, including wages (Henry and Frederickson 2014; PayScale 2020; Holder 2020), benefits like health insurance, life insurance, and paid leave (Kristal, Cohen, and Navot 2018). Nearly one-third of Black women work in "bad jobs"—jobs that have low pay—which is higher than any other race and gender group, and they are also likeliest to be disappointed with the quality of their jobs (Rothwell and Crabtree 2019).[1]

Several factors may lead to these disparities. Structural barriers to economic mobility include transportation and housing, and the issues of employee work-arrangement structures and nonstandard work among workers remain prevalent. Yang and colleagues (2020) find that workers of color, particularly Black workers, are more frequently in nonstandard work arrangements with greater instability and less access to typical markers of high-quality jobs. A long history of hiring discrimination biased against people of color also exists (Quillian et al. 2017), which affects not only whether people are hired but also their compensation upon hire, and Black women face a "double wage penalty," meaning they have less wages based on both gender and race.[2] Relatedly, discrimination in internal promotion and mobility prevent workers of color from accessing better jobs within an organization after hiring (Collins 1997; Wilson and Roscigno 2016). Occupational crowding reflects the discriminatory crowding out of higher-paying or generally better-quality jobs for workers of color even when they are qualified (Bergmann 1994; Hamilton 2013). Finally, a decline in worker voice through organized labor and collective bargaining may be related to these disparities because it relates to overall income inequality (Bivens et al. 2017).

Occupational Crowding

Conventional explanations for the overrepresentation of workers of color and women in lower-paying roles include a lack of human capital—if these groups could obtain the same education as their white or male counterparts, wage and employment gaps would narrow (Kaufman and Hotchkiss 2006). The occupational crowding theory, in contrast, was developed by economist Barbara Bergmann, who hypothesized that employers discriminate against Black workers. The theory held that Black people are excluded from high-paying, desirable occupations and are relegated to low-paying roles, even when they are qualified for higher paying positions (Bergmann 1974). This distribution creates a crowding effect of Black workers into low-paying occupations.

How Occupational Crowding Is Different from Occupational Segregation

Despite being used interchangeably at times, *occupational crowding* and *occupational segregation* differ. *Occupational crowding* looks at the overrepresentation and underrepresentation of a group (i.e., women, Black people) in an occupation or labor force sector, given the group's educational attainment and expected level of representation in that occupation (Bergmann 1994; Hamilton, 2013). *Occupational segregation* generally measures the unequal distribution of groups across jobs in racialized patterns irrespective of education (Sullivan et al. 2019).

Literature on Occupational Crowding

Since the introduction of Bergmann's occupational crowding model, researchers have used the model to determine patterns in the US economy. Most of these studies are based on the level or wage of the occupation. For instance, Black women are overrepresented or "crowded" into the role of nursing aide, a relatively low-paying occupation (Gibson et al. 1998). In a 2010–11 study focused on gender, researcher find that 88 percent of workers in health care support were women and 79 percent were in the personal care service category (Holder 2018). In "white collar" occupations, Black men and women are largely excluded from private sector managerial occupations and sales and professional occupations and an overrepresentation in public administration occupations exists (Gibson et al. 1998). Hamilton (2006) found that Black men were underrepresented in management occupations, and "crowded out" of 92 of 167 management occupations. Hamilton also found that Black men were overrepresented in the

lowest-paid occupations (such as sales with an average annual wage of $34,110 and service with an average wage of $24,361). Even within these lower-paying occupations, average wages were higher for the sales and service occupations in which Black workers were underrepresented. In contrast with management roles, Black workers are overrepresented in sales and office occupations, service occupations, and production, transportation, and material moving occupations (Hamilton and Darity 2012; Holder 2018).

Latinx women and men are crowded into the food industry—a sector with comparatively lower wages and higher risk of on-the-job injury—and this was heightened for Latinx women and men who were not citizens (Hamilton et al. 2021). In the wake of the COVID-19 pandemic, some roles were "essential," such as health care and agriculture work. Black women, Latinx men, and Latinx women were more likely to be crowded into roles considered "essential" compared with white men and received lower wages when in those roles (Hamilton et al. 2021). Further, regardless of whether roles were considered essential, Black women, Black men, Latinx women, Latinx men, and white women were crowded into roles with higher physical proximity to others as compared with white men—and therefore at risk of more disease exposure—and paid lower wages when in those roles (Hamilton et al. 2021).

In this study, we expand on this literature by using dimensions of job quality beyond wages and disease exposure. We use combined indices of pay, hours, scheduling, benefits, job security, working conditions, training, advancement, and voice.

Methodology

Job-Quality Score Methodology

We identified eleven key indicators from publicly accessible data to represent job quality related to occupational crowding and combined these indicators into one dataset. To understand pay, hours and scheduling, nonwage benefits, job security, working conditions, training and advancement, and worker voice, we used the following variables laid out in table 1 to create one overall job-quality score.

TABLE 1

Job-Quality Variables to Create an Overall Job-Quality Score

Domain	Variable	Source
Pay	Median annual wage	Occupational Employment and Wage Statistics (OEWS)
Hours/Scheduling/Benefits	Percent of workers working 40 hours a week	Occupational Requirements Survey (ORS)
	Percent of workers working a regular schedule (as opposed to irregular or seasonal)	Occupational Requirements Survey (ORS)
	Percent of workers who take up health insurance coverage	American Community Survey (ACS)
	Percent of workers offered a retirement or pension plan	Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC)
Job security	Projected change in total employment from 2021–31	Bureau of Labor Statistics (BLS) Employment Projections
	Unemployment rate in 2022	Current Population Survey (CPS)
Working Conditions	Rate of injury/illness per 100 workers	BLS Survey of Occupational Injuries and Illnesses (SOII)
Training/ Advancement	Mean days of OJT required	Occupational Requirements Survey (ORS)
Voice	Percent of workers covered by a union	Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC)
	Level of autonomy	O*NET OnLine

Source: Researcher's list of sources used in this report.

To understand how these variables differed by occupation, we looked at occupations at the four-digit Standard Occupational Classification (SOC) code level. SOC codes can be viewed at the two-, four-, or six-digit level, with increasing levels of detail in classification. We chose the four-digit level because it had the best balance of precise detail as well as accessible data. We found 108 occupations with sufficient data for this analysis.[3] [4]

To compare job quality among occupations, we used the values for all the above variables to create a job-quality score. If an occupation's value for a variable was better than average for all occupations aggregated, the occupation received one point; if the occupation's value was worse than average, the occupation received zero points.[5] We then calculated a score, which is the total number of elements for which an occupation had a better-than-average value. By this process, we interpret a higher total score as a better overall job. Limitations to this methodology can be found in the discussion section.

Occupational Crowding Methodology

We examined occupational crowding in each of those 108 occupations among six race and gender groups aged 25 to 64: Black women, Black men, Latinx women, Latinx men, white women, and white men. See the appendix for demographic information about these groups, including age, household status, immigration status, and educational attainment.

Occupational crowding measures the degree to which a group is over-, under-, or proportionally represented in an occupation considering their educational attainment and the educational requirement for the role (see box 1). We use the methodology developed by Gibson and colleagues (e.g., Hamilton 2006 and Hamilton and Darity 2012).[6]

Using data from the American Community Survey (ACS), we identify education requirements based on the universe of all employed and unemployed workers in each occupation in the 20th and 80th percentiles of education. To understand occupational crowding, we divide the actual share of each race gender group in each occupation buy their expected to share to find a crowding score.

In determining crowding by occupation, we used the methodology described in Hamilton and colleagues (2021) and compared Black men, Latinx women, Latinx men, and white women to white men. When analyzing crowding for white men, we examined their sorting in comparison to everyone in the economy (see King's "access model" as cited in Hamilton et al. 2021).

BOX 1

Occupational Crowding Definitions

Occupational crowding measures the degree to which a group is over-, under-, or proportionally represented in an occupation considering their educational attainment and the educational requirement for the role.

- **Educational requirements:** We use all employed and unemployed workers in each occupation in the 20th and 80th percentiles of education of those currently in roles. For instance, for drafters, engineering technicians, and mapping technicians, the 20th percentile is a high school degree or high school equivalency and the 80th percentile is a bachelor's degree. Those who are considered qualified then, have education that ranges between those levels.
- **Proportional representation:** Occupations where the expected number of the relevant group does not exceed nor is less than 10 percent (between .9 to 1.1).
- **Underrepresentation ("crowded out"):** Occupations with less than 10 percent of the expected number of the relevant group (crowding score of less than .9).
- **Overrepresentation ("crowded in"):** Occupations composed of more than 10 percent of the expected number of the group (crowding score of more than 1.1)

Findings

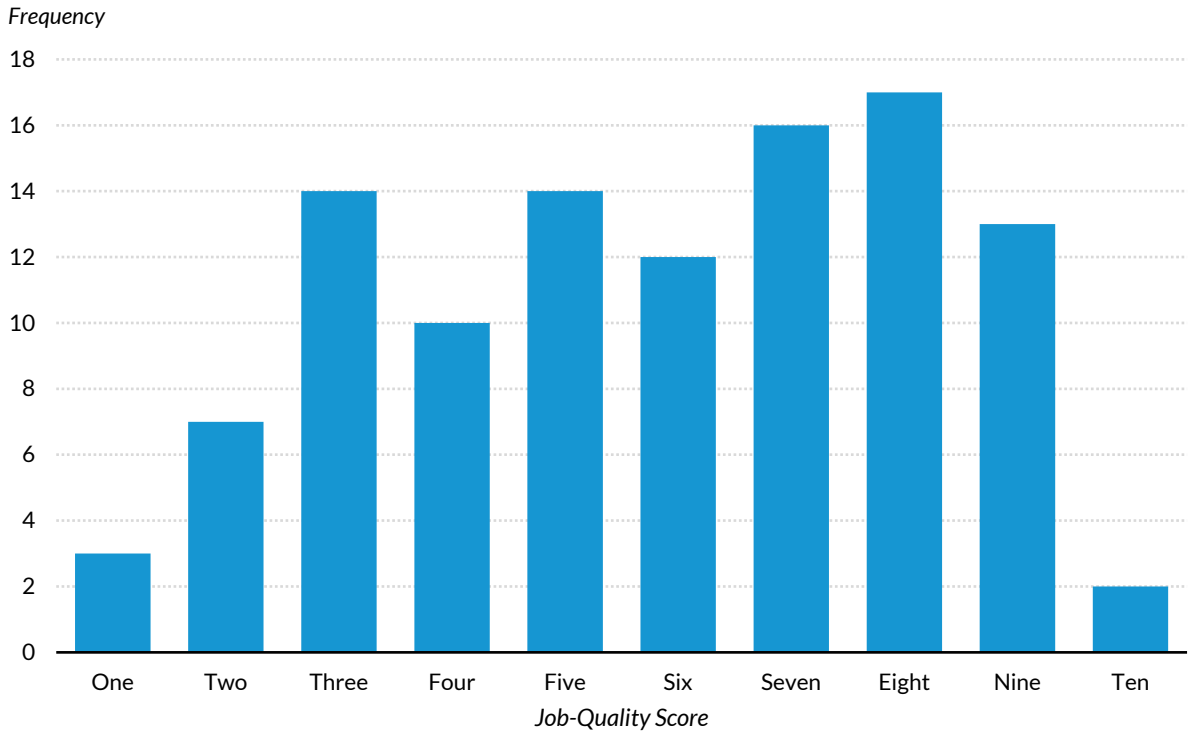
Job-Quality Scores and Occupations

The 108 occupations we examined represented all 22 major occupation groups, with the largest share comprising production occupations (11 occupations or 10.2 percent, with examples that included food production workers and supervisors of production workers). The next most common occupation group was office and administrative support occupations (10 occupations or 9.3 percent of all occupations, with examples including financial clerks and supervisors of office and administrative support workers). The occupation groups that were less common and included only two occupations each were as follows: computer and mathematical occupations, community and social service occupations, and legal occupations. See the appendix for a full list of the occupations.

Variation exists among different occupations in their total job-quality scores. With eleven elements of job quality that an occupation could receive a point for (i.e., the variables listed in table 1), occupations ranged in total scores from one to 10. The average score was 5.8 and the most frequent total scores were seven or eight out of eleven, and few were very below average. Figure 1 shows the distribution of total job-quality scores among the SOC occupations.

FIGURE 1

Frequency of Job-Quality Scores



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Source: Authors' tabulation of data. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS).

The variation in total job-quality scores by occupation is somewhat intuitive based on the reputation of different occupations for having better or worse pay. For example, with a score of ten out of eleven points are occupations like all other business operations specialists, which are top-level managerial positions, and occupational health and safety specialists (see box 2 for more examples of occupations and rankings). Similarly, lawyers and judges, as well as physical scientists, had a total job-quality score of nine. On the lower end of the spectrum were occupations like food preparation workers, retail sales workers, and agricultural workers (all earning a score of one), and grounds maintenance workers, animal care workers, and entertainment attendants (all earning a score of two).

BOX 2

Examples of Occupations with Higher and Lower Job-Quality Scores

The overall job-quality scores were based on eleven indicators and ranged from 1 to 10, with an average score of 5.8.

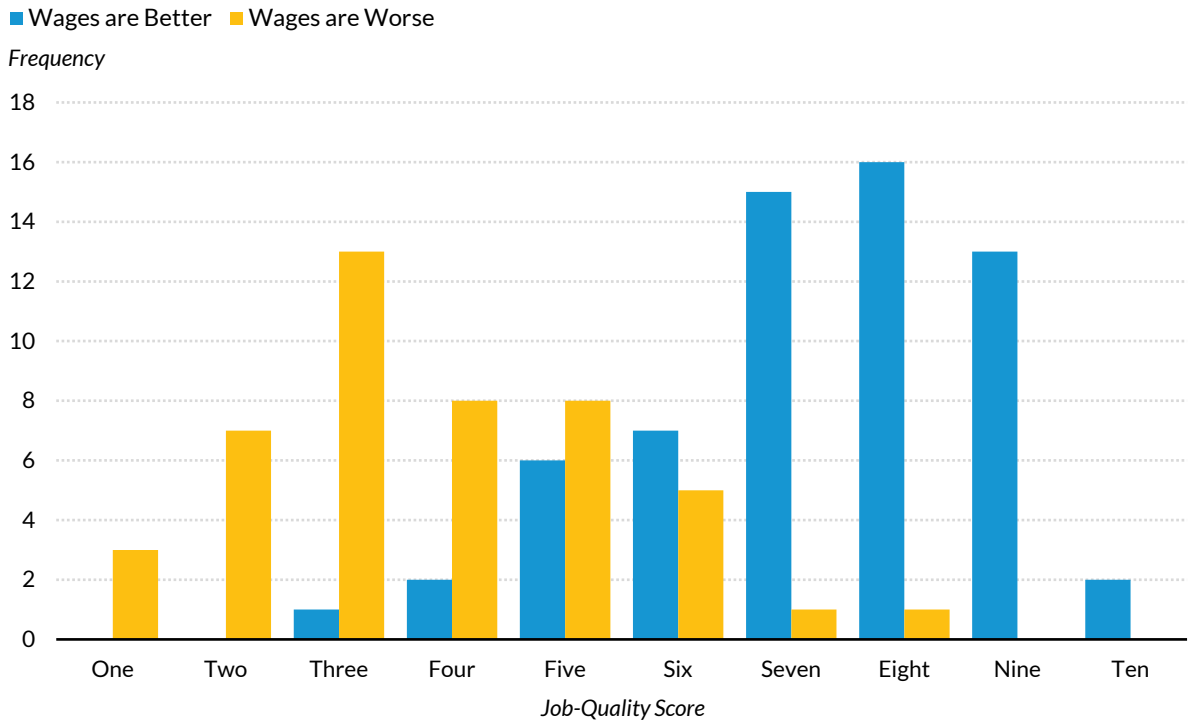
- Examples of occupations with the lowest job-quality scores:
  - Other food preparation and serving related workers (job-quality score of 1)
  - Retail sales workers, and agricultural workers (job-quality score of 1)
  - Other personal care and service workers (job-quality score of 1)
  - Animal care and service workers (job-quality score of 2)
  - Helpers, construction trades (job-quality score of 3)
  - Food processing workers (job-quality score of 3)
  - Building cleaning and pest control workers (job-quality score of 4)
  - Supervisors of building and grounds cleaning and maintenance workers (job-quality score of 4)
- Examples of occupations with the highest job-quality scores:
  - All other business operations specialists (job-quality score of 10)
  - Occupational health and safety specialists and technicians (job-quality score of 10)
  - Law enforcement workers (job-quality score of 9)
  - Firefighting and prevention workers (job-quality score of 9)
  - Lawyers, Judges, and related workers (job-quality score of 9)
  - Social scientists and related workers (job-quality score of 9)
  - Plant and system operators (job-quality score of 8)

Some of the overall variation can be explained by the fact that total job-quality scores varied greatly by the level of pay. We also separated the occupations into a low-pay group—those with median annual wages below the average, and a high-pay group—those with median annual wages above the average. Figure 2 shows the frequency of each job-quality score among low-pay occupations, as well as the frequency of job-quality scores among high-pay occupations. These graphs indicate that although some overlap in total scores exists, more low job-quality scores comprise low-pay occupations than

high-pay occupations. This aligns with previous research that has shown that elements of job quality tend to be bundled together, with higher-pay occupations also being better occupations more broadly (Scott and Katz 2021).

FIGURE 2

Frequency of Job-Quality Scores among High and Low-Pay Occupations



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Source: Authors' tabulation of data. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)
Notes: Occupations were classified as "low pay" because the median wages were at or below the average across all 108occupations. Occupations were classified as "high pay" because the median wages were above the average across all 108 occupations.

A handful of occupations have an overall job-quality score that is higher than the average of 5.8 but is considered low wage. These include the following:

- Assemblers and fabricators (job-quality score of 8)
- Material recording, scheduling, dispatching, and distributing workers (job-quality score of 7)

- Baggage porters, bellhops, and concierges (job-quality score of 6)
- Other office and administrative support workers (job-quality score of 6)
- Printing workers (job-quality score of 6)
- Other production workers (job-quality score of 6)
- All other production workers (job-quality score of 6)

Occupational Crowding Findings

We assessed the occupational overrepresentation and underrepresentation for each race and gender group. As noted earlier, all groups were compared with white men, and white men were compared with the economy.

Table 2 shows the share of occupations in which each group were under- or overrepresented. Overall, findings mirror the literature described earlier (e.g., Hamilton 2006; Hamilton et al. 2021). Black women, Black men, Latinx women, Latinx men, and white women tended to be overrepresented in more occupations with lower wages than where they were underrepresented, while the reverse was true for white men. In addition, where Black women, Black men, Latinx women, Latinx men, and white women *were* in occupations where they were not highly represented in the data, they received a smaller share of average wages.

A summary of these findings can be found below:

- **Black women**
  - » Black women were underrepresented (crowded out) in 59 percent (frequency of 60) of occupations when sufficient data existed. The most common occupations Black women were crowded out of, by major occupation group, included production occupations (8 occupations), transportation and material moving occupations (7), and management occupations (5). In these occupations, average wages were $66,533 but where Black women were in these positions, they earned just 70 cents on the dollar compared with white men.
  - » Black women were overrepresented (crowded in) in 35 percent of the occupations (36 occupations) and the most common, by major occupation group, were office and administrative support occupations (9 occupations) and personal care and service occupations (5 occupations). Average wages were much lower where Black women were overrepresented as compared with where they were underrepresented

($39,952 compared with $66,553). Black women earned 80 cents on the dollar compared with white men.

- **Black men**
  - » Black men were underrepresented (crowded out) in 55 percent of the occupations (59 occupations). The most common occupations in which Black men were crowded out, by major occupation group, included production occupations (7 occupations) and construction and extraction occupations (6 occupations). In these occupations, average wages were $68,525 but Black men earned 79 cents on the dollar compared with white men.
  - » Black men were overrepresented in 37 percent of occupations (40 occupations), with the most common examples including office and administrative support occupations (7 occupations) and transportation and material moving occupations (5 occupations). As with Black women, average occupational wages were lower here than where Black men were crowded out ($39,074 compared with $68,525). Black men earned 80 cents on the dollar compared with white men.
- **Latinx women**
  - » Latinx women were underrepresented (crowded out) in 55 percent of the occupations (57 occupations). The most common occupations in which Latinx women were crowded out, by major occupation group, included production occupations (7 occupations), construction and extraction occupations (6 occupations), transportation and material moving occupations (5 occupations), and management occupations (5 occupations). In these occupations, average wages were $65,665 but Latinx women earned the least—just 65 cents on the dollar compared with white men.
  - » Latinx women were crowded into 34 percent of the occupations (37 occupations), and the most common were in the major category of office and administrative support occupations (9 occupations). Average wages were much lower where Latinx women were overrepresented as compared with where they were underrepresented ($39,910 compared with $65,665).
- **Latinx men**
  - » Latinx men were underrepresented (crowded out) in 36 percent of the occupations (39 occupations). The most common occupations in which Latinx men were crowded out, by major occupation group, included production occupations (5 occupations) and management occupations (5 occupations). In these occupations, average wages were somewhat higher than that of other groups at $74,363 but Latinx men earned 84 cents on the dollar compared with white men.
  - » Latinx men were crowded into 35 percent of occupations (38 occupations), a similar rate to where they were underrepresented and proportional. The most common

example was office and administrative support occupations (5 occupations). Average wages were much lower in occupations where Latinx men were crowded in, at just $35,511 compared with $74,363.

- **White women**
  - White women were underrepresented (crowded out) in 54 percent of the occupations (58 occupations). The most common occupations in which white women were crowded out, by major occupation group, included production occupations (9 occupations), transportation and material moving occupations (8 occupations), and construction and extraction occupations (7 occupations). In these occupations, average wages were $59,894, but white women earned 70 cents on the dollar compared with white men.
  - White women were overrepresented in 32 percent of occupations (35 occupations), and as with Black women, Latinx women, and Latinx men, the most common example was office and administrative support occupations (8 occupations). Average occupational wages were lower in occupations where white women were overrepresented though the average wage was higher than other groups at $43,991.
- **White men**
  - White men were underrepresented (crowded out) in 35 percent of the 108 occupations (38 occupations) as compared with the entire economy. The most common occupations in which white men were crowded out, by major occupation group, included office and administrative support occupations (9 occupations), and personal care and service occupations (5 occupations). Average wages were the lowest where white men were represented compared with other groups ($39,700), but white men earned above average wages (130 percent) when they were employed in these occupations.
  - White men were overrepresented in half of the occupations (54) and the most frequent examples were transportation and material moving occupations, production occupations, and construction and extraction occupations (7 occupations). Unlike other groups, wages were higher on average in occupations where white men were overrepresented than where they were underrepresented ($63,530 compared with $39,700). White men were the only group to earn above average wages (110 percent).

TABLE 2

Occupational Crowding in 108 Occupations

	Black women	Black men	Latinx women	Latinx men	White women	White men
Underrepresented occupations						
Percent of occupations underrepresented	58.8	54.6	54.8	36.1	53.7	35.2
Number of occupations	60	59	57	39	58	38
Average wages in occupations	$66,533	$68,525	$65,665	$74,363	$59,894	$39,700
Share of average wages worker receives	0.70	0.79	0.65	0.84	0.79	1.3
Overrepresented occupations						
Percent of occupations overrepresented	33.3	37.0	34.3	35.2	32.4	50.0
Number of occupations	36	40	37	38	35	54
Average wages in occupations	$39,952	$39,074	$39,910	$35,511	$43,931	$63,530
Share of average wages worker receives	0.80	0.86	0.77	0.90	0.90	1.1

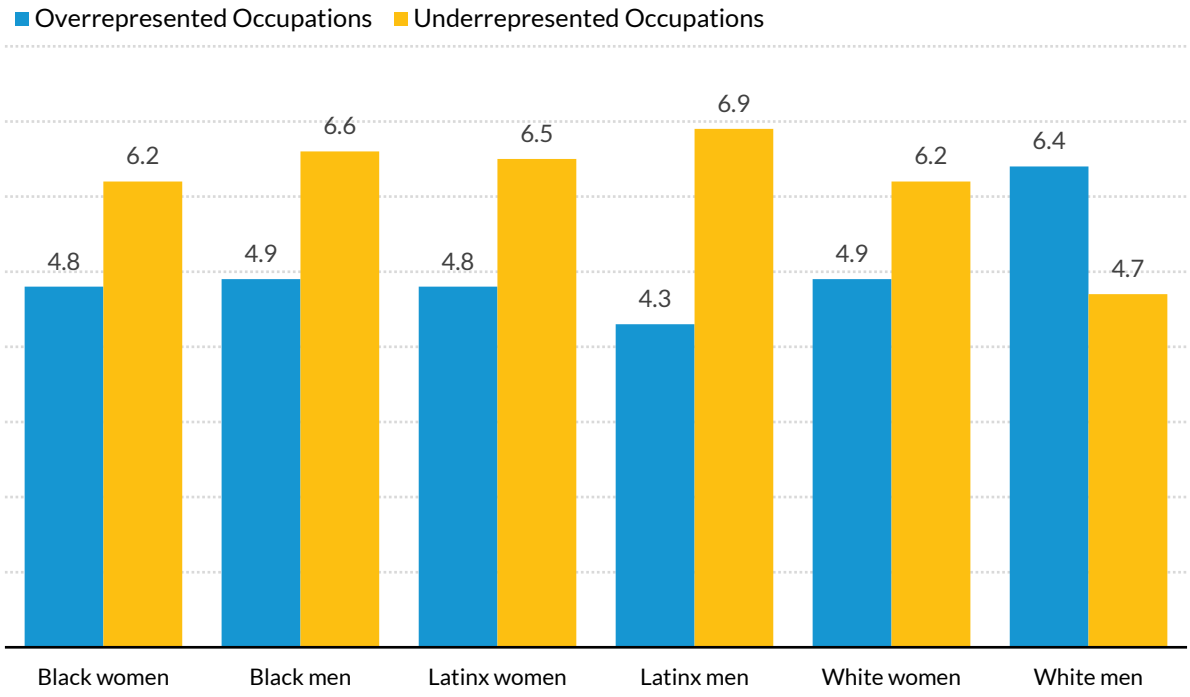
Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023.
Notes: There was also proportional representation (not depicted here), representing the remaining share of the 108 occupations. Average wages in occupations are from the ACS and reflect all workers in the economy aged 25-64. There were six occupations with insufficient observations to report data on Black women and Latinx women as compared with white men.

Occupational Crowding and Job Quality

We assessed the occupational overrepresentation and underrepresentation for each race and gender group using the average crowding score (a higher score indicates overrepresentation of each group) and job-quality score—which considers all 11 indicators (see figure 3 for these results and table 1 for the list of variables). Only white men have better job quality in occupations where they are overrepresented as compared with where they are underrepresented. Among occupations for which groups are overrepresented (crowd score greater than 1.1), the average job-quality score is the highest for white men as compared with the economy (6.4), over two points higher than other groups as compared with white men (4.8 for Black women, 4.9 for Black men, 4.8 for Latinx women, 4.3 for Latinx men, and 4.9 for white women). The trend was reversed when it comes to underrepresentation: average job-quality scores were 6.2 for Black women, 6.6 for Black men, 6.5 for Latinx women, 6.9 for Latinx men, 6.2 for white women, and 4.7 for white men (figure 3).

FIGURE 3

Average Job-Quality Scores in Occupations for Which Groups are Under- or Overrepresented



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Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS).

We also observed the direction and magnitude of the relationship between crowding scores and the total job-quality score using simple linear regression (table 3 and see the appendix for more details). As job-quality scores increase—indicating higher quality roles—crowding scores significantly decrease for Black women, Black men, Latinx women, Latinx men, and white women as compared with white men. In contrast higher quality roles tend to have a higher concentration of white men.

TABLE 3

Relationship between Crowding and Job-Quality Score

Group	Direction of relationship
Black Women	-**
Black Men	-**
Latinx Women	-***
Latinx Men	-***
White Women	-*
White Men	+***

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy. There were six occupations with insufficient observations to report data on Black women and Latinx women as compared with white men.

We also examined the relationship between the representation of each group and each indicator. First, the direction of the relationship between the wage indicator (median wages) and occupational crowding scores mirrored that of the total job-quality scores (table 4). As job-quality scores increased, crowding scores significantly decreased for Black women, Black men, Latinx women, Latinx men, and white women as compared with white men, while the reverse was true for white men. In other words, higher-paying roles tend to have higher concentrations of white men and lower concentrations of other groups. This finding mirrors other research on occupational crowding and wages (e.g., Hamilton and Darity 2012; Hamilton 2006).

TABLE 4

Relationship between Crowding and Wages

Group	Median annual wages, direction of relationship
Black Women	-**
Black Men	-**
Latinx Women	-***
Latinx Men	-***
White Women	-*

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy. There were six occupations with insufficient observations to report data on Black women and Latinx women as compared with white men.

Aside from the overall job-quality score, we looked at other indicators as each may have a different level of importance for an employee's overall experiences (e.g., Wiswall and Zafar 2018; Scott and Katz 2021). However, as noted earlier, higher-paying occupations tend to have higher job-quality scores. We examined the relationship among other indicators and crowding separated by pay. We examined hours, scheduling, health insurance, retirement, projected employment, unemployment, working conditions, and autonomy in 62 higher-paying occupations with a wage measure of one ("better than average") and did the same for the 46 lower paying occupations with a wage benchmark of zero ("same or worse than average").

Findings are summarized below (see the appendix for tables of results):

- **40 hours per week:** There were no significant findings disaggregated by wages.
- **Regular schedule:** Occupations that had a regular schedule tended to have a (significant) underrepresentation of Black women, Latinx women, and white women in both high and low paying occupations. Black men were underrepresented in higher-paying occupations with more regular schedules. For white men, a more regular schedule was significantly associated with overrepresentation, regardless of wages.
- **Health insurance take-up**: The decision to take-up health insurance could be influenced by other factors which we cannot ascertain here. A positive relationship existed between crowding and health insurance take-up for Black women and Black men, with significance in higher-paying roles. For Latinx women and white women, the relationship was negative in

lower-paying roles but positive (and significant) in higher-paying ones. There was a negative and significant relationship between health insurance take-up and the representation of white men, but only in better paying occupations.

- **Retirement plan offered:** A positive relationship existed between the rates at which occupations offered retirement coverage and crowding for Black women, Black men, Latinx women, and white women, but this association was only significant for Black women in higher-paying roles. For Latinx men, occupations that offered retirement coverage tended to have lower concentrations of Latinx men, significantly so in higher paying roles.
- **Projected employment:** We did not observe significance for any of the relationships between projected employment and crowding scores disaggregated by wages.
- **Unemployment:** Occupations with *better* unemployment rates (meaning unemployment rates in occupations were lower than average), were associated with more Black women, Black men, Latinx women, and white women, with significant relationships for Black women, Latinx women, and white women in higher-paying roles and Black men in worse paying roles.
- **Working conditions:** Occupations where illness or injury rates were lower had significantly higher concentrations of Black women and white women in lower-paying roles, and lower concentrations of white men. In contrast, roles with more injuries tended to have an underrepresentation of Latinx men, and this finding was significant in higher-paying occupations.
- **Training and advancement:** No significant findings existed disaggregated by wage levels in occupations.
- **Union coverage:** In terms of worker voice, no significant relationships existed between crowding and union coverage in occupations.
- **Autonomy:** An inverse relationship existed between crowding and autonomy for Latinx men in both low- and higher paying roles.

BOX 3

Occupational Crowding, Job Quality, and Disability Status

We examined occupational crowding among Black women, Black men, Latinx women, Latinx men, and white women with and without a disability to understand the compounding barriers these groups may face. Notably there were not enough data on members of certain race, gender, and disability groups in occupations to examine crowding in all occupations. See the note below table 5 for more details.

Black women, Black men, Latinx women, Latinx men, and white women—with and without a disability—are underrepresented in occupations with higher job-quality scores compared with occupations for which they are overrepresented. Latinx men with a disability (average job-quality score of 7.2 out of 10), followed by Black men with a disability (job-quality score of 6.9), are especially underrepresented in "better" occupations (table 5). Black women, Black men, Latinx women, Latinx men, and white women—with and without a disability—tend to be more underrepresented in occupations with higher health insurance take-up rates compared with those for which they were overrepresented. We also note that the average injury rates are especially higher (indicating worse quality) for Black men with a disability where they are overrepresented. Latinx men without a disability are the worst off in terms of average injury rates in roles where they are crowded in, followed by Latinx men with a disability.

TABLE 5

Average Job Quality Job-Quality Score, Health Insurance Take-Up, and Injury Rate for Disability Status Groups Are Underrepresented and Overrepresented

	Underrepresented Occupations			Overrepresented Occupations		
	Average overall job-quality score	Average injury rate	Average health insurance take-up	Average overall job-quality score	Average injury rate	Average health insurance take-up
Black women						
With disability	6.4	0.79	75.1%	4.4	0.78	63.2%
Without disability	6.5	0.78	74.0%	4.8	0.80	66.3%
Black men						
With disability	6.9	0.69	75.9%	4.5	0.87	62.8%
Without disability	6.6	0.73	74.3%	4.8	0.93	66.0%
Latinx women						
With disability	6.4	0.81	74.2%	4.5	0.92	62.8%
Without disability	6.6	0.71	75.0%	4.8	0.90	65.2%
Latinx men						
With disability	7.2	0.56	77.7%	4.2	0.99	60.6%
Without disability	6.9	0.56	78.0%	4.2	1.17	59.7%
White women						
With disability	6.5	0.82	73.7%	4.8	0.75	65.8%
Without disability	6.2	0.82	72.3%	4.9	0.78	65.9%

Source: Occupational crowding and demographic data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: "Average income" is defined as average income based on all groups in the economy. "Insurance take-up" is defined as workers who take up health insurance coverage. "Injury rate" is defined as rate of injury/illness per 100 workers.
Several occupations with insufficient data to include results follow: Black women with a disability: 39 occupations; Black women without a disability: 6 occupations; Black men with a disability: 29 occupations; Latinx women with a disability: 39 occupations; Latinx women without a disability: 3 occupations; Latinx men with a disability: 23 occupations; and white women with a disability: 10 occupations.

Limitations

Some limitations to our methodology exist for understanding job quality and occupations. First, our research was done at the four-digit SOC code level, where there may still be variation by more detailed occupation in job quality as well as crowding. Had we been able to disaggregate data sources at the more detailed six-digit SOC code level, findings on job quality might be more precise. Spotty data from different sources meant that a few job quality elements had to be aggregated at an even higher level for some occupations, making them less accurate. As we noted, the average job-quality score was 5.8, and the most frequent total scores were seven or eight out of eleven, and few were very below average. This clustering around the middle may indicate a need for future research with more detailed benchmarking schemes.

The job-quality variables we used also may not give an accurate or complete picture of quality. We need more input on what workers value and more data to measure different dimensions. For example, low employer-sponsored health care take-up rates could reflect other factors, such as having other sources of health insurance from family members or a public source, such as Medicaid or the Healthcare Marketplace. The retirement variable reflects the rate at which occupations offer employer-sponsored retirement, but no information exists on the actual contribution rate. In addition, we classified more on-the-job training as reflecting high-quality jobs but more research from the perspective of workers in these occupations could shed light on whether this is a desirable characteristic for these occupations. Preferences in job quality may differ depending on an individual person or according to different demographic traits. For example, women have been shown to take lower wages in exchange for more scheduling flexibility (Wiswall and Zafar 2018). Scott and Katz (2021) find that there are important distinctions by race and gender in how survey respondents rank the importance of different elements of job quality. For example, women, Black people, and Latinx people were all more likely than white men to rank all elements as "extremely important." Moreover, women were more than twice as likely as men to value control over hours as "extremely important," and were more likely to value benefits, enjoyment, and a sense of purpose. Black and Latinx people were more than twice as likely as white people to rate advancement as "extremely important." Pay also appeared to be more important for people of color than for comparable white workers.

Relatedly, in conducting the research, we found a tradeoff between nuance and clarity of results. For example, we only assessed occupations on whether their job-quality elements were worse or better than average. However, this study awards one point for each element that is better than average, essentially counting each element as equally important to total job quality. This may discount the

perceived quality of some occupations and overstate the perceived quality of others. Nonetheless, a more complex categorization scheme makes it more difficult to understand each occupation's unique breakdown of job quality, so we opted for a simpler, but less precise methodology.

A final limitation is that many job-quality elements that previous research has identified as important are still abstract and difficult to measure, and so not captured in any available data. For example, there is little publicly available data on things like career growth opportunities and different types of leave. Because of that, our assessment of each occupation's job-quality score is missing key elements.

To understand the relationship between occupational crowding and individual elements of job quality, such as benefits, we examined each indicator separately, disaggregated by the wage score. As with the job-quality score limitations, by using four-digit occupation levels we lose some nuance, and our findings could mask variation in occupations.

Conclusion

In this study, we linked the job-quality literature to the occupational crowding literature. We use 11 indicators of job quality related to pay, hours, scheduling, benefits, job security, working conditions, training, advancement, and worker voice to create one job-quality score in 108 occupations. We then assessed the relationship between occupational crowding and job quality. Occupational crowding considers educational requirements and educational attainment of various groups. Occupational crowding takes the human capital argument out of occupational segregation—when groups are crowded out of more desirable roles, discrimination is likely at play (Bergmann 1974).

Existing research on occupational crowding has found that women and people of color are crowded out of better-paying roles. In this study, we observed that Black women, Black men, Latinx women, Latinx men, and white women tended to be underrepresented in occupations with higher total job-quality scores, while white men tend to be overrepresented. We found the same results when examining wages. We also looked at other indicators separately, disaggregated by occupations with high and low benchmark ratings.

This research sheds light on the importance of improving job quality across multiple dimensions to reduce occupational disparities by race and gender. For more detailed analysis, researchers and policymakers need better data to measure job quality in occupations at more disaggregated levels. There is also a need for better data on different aspects of job quality linked to occupations, such as retirement benefits. Survey questions could also focus on workers' preferences and needs in job quality by race and gender. The findings also potentially reinforce the importance of ensuring all groups have equitable access to the roles for which they are qualified (Hamilton and Dixon 2022).

Appendix A. Demographic Information

To understand how various race and gender groups, as well as job quality, are represented in the 108 occupations of interest, we used the ACS. We present descriptive information about these groups in tables 5 to 7.

A larger proportion of Latinx women and Latinx men are immigrants (45.9 percent and 53 percent, respectively; table 5). Most white men (61.1 percent) and white women (58 percent) are married with a spouse present, followed by Latinx men (42.6 percent), Black men (40.2 percent) and Black women (29.8 percent). Over half of Black women, Latinx women, and Latinx men have children (table A1).

TABLE A1

Demographic Information for Workers Ages 25 through 64

	Age (mean)	Immigrant (%)	Married (%)	Children (%)
Black women	42	13.7	29.8	53.9
Black men	42	15.9	40.2	38.9
Latinx women	41	45.9	46.1	61.9
Latinx men	41	53.0	52.6	52.9
White women	44	4.5	59.0	48.6
White men	44	5.0	61.1	44.9

Source: American Community Survey 2020 Year Estimates: Minneapolis, MN: IPUMS, 2023
Notes: Married" refers to individuals with a spouse present. "Immigrant" refers to individuals who fit one of the following categories: naturalized citizen, not a citizen; not a citizen, but has received first papers.

Of the groups included in this study, Black women (6.9 percent) are the most likely to have a disability, followed by Black men (6.4 percent), white men (6.3 percent), white women (5.8 percent), and Latinx men (4.8 percent; table 6). Additionally, Black women and Black men are the most likely to have multiple (two or more) disabilities (2 percent for each group; table A2).

TABLE A2

Disability Status for Workers Ages 25 through 64

	Black women (%)	Black men (%)	Latinx women (%)	Latinx men (%)	White women (%)	White men (%)
Any disability	6.9	6.4	5.3	4.8	5.8	6.3
One disability	4.9	4.4	3.9	3.5	4.3	4.7
Multiple disabilities	2.0	2.0	1.4	1.3	1.6	1.6

Source: American Community Survey 2020 Year Estimates: Minneapolis, MN: IPUMS, 2023.

Black men had an unemployment rate of 8.2 percent using 2020 data, which is the highest across groups, followed by Black women with an unemployment rate of 7 percent. White men and white women have the lowest unemployment rates, and white men earn the most across all groups, a median income of $53,933 (table A3).

White men and white women are the most likely to have some type of health insurance coverage (91 percent and 93.5 percent, respectively) and health insurance from an employer or union (75.1 percent and 76.8 percent, respectively). Latinx men are the least likely to have any type of health insurance coverage (71.8 percent) or health insurance from an employer or union (53.7 percent), followed by Latinx women (81 percent with health insurance from any source and 57.76 percent with coverage from an employer; table A3).

TABLE A3

Employment, Income, Health Insurance Coverage, and Education for Workers Ages 25 through 64

	Unemployed (%)	Wage and salary income (mean)	Health insurance, any (%)	Health insurance, employer/ union (%)	Bachelor's degree and above (%)
Black women	7.0***	$31,387***	89.3***	66.0***	31.0***
Black men	8.2***	$35,437***	84.4***	65.4***	24.1***
Latinx women	5.7***	$26,325***	81.0***	57.7***	24.3***
Latinx men	4.4***	$35,000***	71.8***	53.7***	17.0***
White women	3.6***	$39,070***	93.5***	76.8***	46.0***
White men	3.8	$53,933	91.0	75.1	39.6

Source: American Community Survey 2020 Year Estimates: Minneapolis, MN: IPUMS, 2023

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men to obtain significance levels.

Appendix B. Occupational Crowding and Job Quality Results

TABLE A4

Relationship between Crowding and Occupation-Quality Score

Group	Coefficient
Black women	-0.134**
Black men	-0.0659**
Latinx women	-0.162***
Latinx men	-0.0743***
White women	-0.0551*
White men	0.0788***

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A5

Relationship between Crowding and Wages

Group	Median annual wages coefficient
Black women	-0.134**
Black men	-0.0659**
Latinx women	-0.162***
Latinx men	-0.0743***
White women	-0.0551*

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for wages is from the Occupational Employment and Wage Statistics (OEWS).

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A6

Relationship between Crowding and Hours/Scheduling/Benefits

	40 hours per Week Benchmark (Coefficient)		Regular Schedule Benchmark (Coefficient)		Health Insurance Take-Up Benchmark (Coefficient)		Retirement Plan Offered Benchmark (Coefficient)	
Group	Wages worse	Wages better	Wages worse	Wages better	Wages worse	Wages better	Wages worse	Wages better
Black women	.271	.23	-1.35***	-.858***	0.104	.62***	0.497	0.477*
Black men	.089	.155	-.21	-.217**	0.193	.181*	0.324	0.163
Latinx women	.115	.169	-.981***	-.865***	-0.282	.578***	0.027	0.412
Latinx men	.074	.066	.075	-.05	-0.168	-.087	-0.055	-0.202**
White women	-.012	.128	-.598***	-.554***	-0.099	.408***	0.042	0.192
White men	-.051	.129	.415***	.527***	0.086	-.39***	-0.088	-0.098

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A7

Relationship between Crowding and Job Security

	Projected Employment Benchmark (Coefficient)		Unemployment Benchmark (Coefficient)	
Group	Wages worse	Wages better	Wages worse	Wages better
Black women	0.212	0.229	0.634	0.466**
Black men	0.274	-0.063	0.568*	0.121
Latinx women	0.5	0.125	0.232	0.367*
Latinx men	0.224	-0.117	0.01	-0.082
White women	0.278	0.198	0.203	0.3**
White men	-0.277	-0.142	-0.223	-0.269

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A8

Relationship between Crowding and Working Conditions

	Illness/Injury Benchmark (Coefficient)	
Group	Wages worse	Wages better
Black women	0.826**	-0.163
Black men	0.098	0.072
Latinx women	0.494	0.006
Latinx men	-0.191	-0.15**
White women	0.511***	0.115
White men	-0.335**	-0.025

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A9

Relationship between Crowding and Training/Advancement

	Mean Days of OJT Required Benchmark (Coefficient)	
Group	Wages worse	Wages better
Black women	-0.088	-0.347
Black men	-0.242	-0.101
Latinx women	-0.214	-0.468
Latinx men	-0.153	-0.009
White women	-0.123	-0.119
White men	0.141	0.142

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A10

Relationship between Crowding and Voice

	Union (Coefficient)		Autonomy (Coefficient)	
Group	**Wages worse**	**Wages better**	**Wages worse**	**Wages better**
Black women	-0.102	0.065	-0.251	-0.493
Black men	0.088	0.062	0.049	-0.151
Latinx women	-0.014	0.087	-0.5	-0.553
Latinx men	-0.007	0.041	-0.302**	-0.37***
White women	-0.131	-0.127	-0.153	-0.103
White men	0.095	0.115	0.223	0.244

Source: Occupational crowding data from American Community Survey 2020 Year Estimates. Minneapolis, MN: IPUMS, 2023. Data for job quality sources are from the following: American Community Survey (ACS), BLS Survey of Occupational Injuries and Illnesses (SOII), Bureau of Labor Statistics (BLS) Employment Projections, Current Population Survey (CPS), Current Population Survey-Annual Social and Economic Supplement (CPS-ASEC), O*NET OnLine, Occupational Employment and Wage Statistics (OEWS), Occupational Requirements Survey (ORS)

Notes: Significance levels: 0.10*, 0.05**, 0.01***. All demographic groups are compared with white men while white men are compared with everyone in the economy.

TABLE A11

Occupations and Job Quality Indicators, and Occupational Crowding Results by Race and Gender

Occupation	B W	B M	L W	L M	W W	W M	Education (20th percentile)	Education (80th percentile)	Bench mark total (out of 11)	Wages	40 hrs	Schedule	Health ins	Retire-ment	Growth	Unemploy-ment	Illness / injury	OJT	Union	Autonomy
Top executives	C O	C O	C O	C O	C O	C I	Some college	Master's/ Professional	8	Better	Same or worse	Same or worse	Better	Better	Better	Better	Better	Better	Same or worse	Better
Advertising, marketing, promotions, public relations, and sales managers	C O	C O	C O	C O	P	C I	Some college	Bachelor's	8	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
Operations specialties managers	C O	C O	C O	C O	C O	C I	Some college	Master's/ Professional	8	Better	Same or worse	Same or worse	Better	Better	Better	Better	Better	Better	Same or worse	Better
Human resources managers	C I	P	C I	C I	C I	C O	Some college	Master's/ Professional	7	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
Other management occupations	C O	C O	C O	C O	C O	C I	HS/GED	Master's/ Professional	7	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Same or worse	Better	Better	Better
All other managers	C O	C O	C O	C O	P	C I	HS/GED	Master's/ Professional	8	Better	Same or worse	Better	Better	Same or worse	Better	Better	Better	Better	Same or worse	Better
Business operations specialists	C I	C O	P	C O	P	P	Some college	Bachelor's	8	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
All other business operations specialists	C O	C O	C O	C O	P	P	Some college	Master's/ Professional	10	Better	Better	Better	Better	Better	Better	Better	Better	Better	Same or worse	Better
Financial specialists	P	C O	P	C O	P	P	Some college	Master's/ Professional	7	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
Computer occupations	C O	C O	C O	C O	C O	C I	Some college	Master's/ Professional	9	Better	Better	Same or worse	Better	Better	Better	Better	Better	Better	Same or worse	Better
Mathematical science occupations	P	P	C O	P	C O	P	Bachelor's	Master's/ Professional	8	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better

Architects, surveyors, and cartographers	CO	CO	CO	P	CO	CI	Bachelor's	Master's/ Professional	8	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
Engineers	CO	CO	CO	P	CO	CI	Bachelor's	Master's/ Professional	8	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
All other engineers	CO	CO	CO	CO	CO	CI	Some college	Master's/ Professional	8	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
Drafters, engineering technicians, and mapping technicians	CO	CO	CO	CO	CO	CI	HS/GED	Bachelor's	9	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Better	Better
Life scientists	CO	CO	CO	CO	P	P	Bachelor's	Master's/ Professional	9	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Better	Better
Physical scientists	CO	CO	CO	CO	CO	CI	Bachelor's	Master's/ Professional	9	Better	Better	Better	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better
Social scientists and related workers	P	CO	CI	P	CI	CO	Bachelor's	Master's/ Professional	8	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Better	Better	Better	Better
Life, physical, and social science technicians	CO	CO	CO	CO	CO	CI	HS/GED	Bachelor's	8	Better	Better	Better	Better	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better
Occupational health and safety specialists and technicians	CO	CO	CO	CO	CO	CI	HS/GED	Bachelor's	10	Better	Better	Better	Better	Better	Same or worse	Better	Better	Better	Better	Better
Counselors, social workers, and other community and social service specialists	CI	CI	CI	CI	CI	CO	Some college	Master's/ Professional	9	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better	Better	Better	Better
Religious workers	CO	P	CO	CO	CO	CI	Some college	Master's/ Professional	6	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse	Better	Better	Better	Same or worse	Better

Lawyers, judges, and related workers	C O	C O	C O	C O	C O	C I	Master's/ Professional	Master's/ Professional	9	Better	Better	Same or worse	Better	Better	Better	Better	Better	Better	Same or worse	Better
Legal support workers	C I	C I	C I	C I	C I	C O	Some college	Bachelor's	7	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse
Postsecondary teachers	C O	C O	C O	P	P	P	Bachelor's	Master's/ Professional	7	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better
Preschool, elementary, middle, secondary, and special education teachers	C I	C I	C I	C I	C I	C O	Bachelor's	Master's/ Professional	7	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better
Other teachers and instructors	C I	C I	C I	C I	C I	C O	Some college	Master's/ Professional	4	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse	Better
Librarians, curators, and archivists	C I	C O	C I	P	C I	C O	Some college	Master's/ Professional	8	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better	Same or worse	Better	Better
Other educational instruction and library occupations	C I	C I	C I	C I	C I	C O	HS/GED	Bachelor's	5	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Better	Better	Same or worse	Better	Better
Art and design workers	C O	C O	P	P	C I	P	Some college	Bachelor's	8	Better	Better	Better	Better	Same or worse	Same or worse	Same or worse	Better	Better	Better	Better
Entertainers and performers, sports and related workers	C O	C I	C O	P	C O	C I	Some college	Bachelor's	5	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse	Better
Media and communication workers	C O	C O	C I	P	C I	C O	Some college	Master's/ Professional	7	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better
Media and communication equipment workers	C O	C O	C O	P	C O	C I	Some college	Bachelor's	7	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better	Better	Better
Healthcare diagnosing or	C O	C O	C O	C O	C I	P	Bachelor's	Master's/ Professional	6	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better	Same or worse	Better	Same or worse	Better

treating practitioners																		
Physical/occupational therapists, nurses, and audiologists	CI	CI	CI	CI	CI	CO	Some college	Master's/ Professional	9	Better	Better	Same or worse	Better	Better	Better	Better	Same or worse	Better	Better	Better
Physicians, surgeons, and all other healthcare diagnosing or treating practitioners	CO	CO	P	P	P	P	Master's/ Professional	Master's/ Professional	5	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Better	Same or worse	Better
Health technologists and technicians	CI	CI	CI	P	CI	CO	HS/GED	Bachelor's	6	Better	Better	Same or worse	Better	Better	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse
Other healthcare practitioners and technical occupations	CI	CI	CI	CO	CI	CO	Some college	Master's/ Professional	7	Better	Same or worse	Better	Better	Better	Same or worse	Better	Same or worse	Better	Same or worse	Better
Home health and personal care aides; and nursing assistants, orderlies, and psychiatric aides	CI	CI	CI	CI	CI	CO	HS/GED	Some college	3	Same or worse	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse
Occupational therapy and physical therapist assistants and aides	CI	CI	CI	CI	CI	CO	Some college	Bachelor's	5	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better
Other healthcare support occupations	CI	CI	CI	CI	CI	CO	HS/GED	Some college	5	Same or worse	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse
Supervisors of protective service workers	CO	CO	CO	CO	CO	CI	HS/GED	Bachelor's	9	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Better	Better
Firefighting and	CO	CO	CO	CO	CO	CI	HS/GED	Bachelor's	9	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Better	Better

prevention workers																			
Law enforcement workers	CO	CI	CO	P	CO	CI	HS/GED	Bachelor's	9	Better	Same or worse	Better	Better	Better	Same or worse	Better	Better	Better	Better	Better
Other protective service workers	CI	CI	CO	CI	CO	P	HS/GED	Bachelor's	5	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better
Supervisors of food preparation and serving workers	P	CI	P	CI	P	CO	HS/GED	Some college	4	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse	Better
Cooks and food preparation workers	CI	CI	CI	CI	CI	CO	11th Grade	Some college	3	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse
Food and beverage serving workers	CI	P	CI	CI	CI	CO	HS/GED	Some college	3	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse
Other food preparation and serving related workers	CI	CI	CI	CI	CI	CO	11th Grade	Some college	1	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse
Supervisors of building and grounds cleaning and maintenance workers	CO	CO	CO	CI	CO	CI	HS/GED	Some college	4	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse
Building cleaning and pest control workers	CI	CI	CI	CI	P	CO	11th Grade	Some college	5	Same or worse	Better	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Better	Better
Grounds maintenance workers	CO	P	CO	CI	CO	CI	9th Grade	Some college	2	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse
Supervisors of personal care and service workers	CI	CI	CI	P	CI	CO	HS/GED	Bachelor's	4	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better	Better	Better

Animal care and service workers	C O	C O	C I	C I	C I	C O	HS/GED	Bachelor's	2	Same or worse	Better	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse
Entertainment attendants and related workers	C I	P	P	P	P	P	HS/GED	Bachelor's	2	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse
Funeral service workers	C O	P	C O	C O	C O	C I	Some college	Bachelor's	3	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Personal appearance workers	C I	C I	C I	C I	C I	C O	HS/GED	Some college	2	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Baggage porters, bellhops, and concierges	C I	C I	P	C I	C O	C O	HS/GED	Some college	6	Same or worse	Better	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better
Tour and travel guides	C I	C O	C O	C O	C O	C I	HS/GED	Bachelor's	2	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Other personal care and service workers	C I	C I	C I	C I	C I	C O	HS/GED	Bachelor's	2	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Supervisors of sales workers	C O	C O	C O	C O	P	C I	HS/GED	Bachelor's	4	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Better
Retail sales workers	C I	C O	C I	P	C I	C O	HS/GED	Some college	1	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse
Sales representatives, services	C O	C O	C O	C O	C O	C I	HS/GED	Bachelor's	6	Better	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse	Better
Sales representatives, wholesale and manufacturing	C O	C O	C O	C O	C O	C I	HS/GED	Bachelor's	6	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better
Other sales and related workers	C O	C O	P	C O	C I	P	HS/GED	Bachelor's	3	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Supervisors of office and administrative support workers	C I	P	C I	P	C I	C O	HS/GED	Bachelor's	7	Better	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better

Communications equipment operators	CI	CI	CI	CI	CI	CO	HS/GED	Bachelor's	4	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse
Financial clerks	CI	CI	CI	P	CI	CO	HS/GED	Bachelor's	4	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse
Information and record clerks	CI	CI	CI	CI	CI	CO	HS/GED	Bachelor's	5	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse
All other information and record clerks	CI	CI	CI	CI	CI	CO	HS/GED	Bachelor's	3	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Material recording, scheduling, dispatching, and distributing workers	P	CI	CO	P	P	P	HS/GED	Some college	7	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Better	Better
Weighers, measurers, checkers, and samplers, recordkeeping	CI	CI	CI	CI	P	CO	HS/GED	Some college	4	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse
Secretaries and administrative assistants	CI	P	CI	P	CI	CO	HS/GED	Bachelor's	5	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Same or worse
Other office and administrative support workers	CI	CI	CI	CI	CI	CO	HS/GED	Bachelor's	6	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Better	Same or worse
All other office and administrative support workers	CI	CO	CI	CO	CI	CO	HS/GED	Bachelor's	5	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Supervisors of farming, fishing, and forestry workers	CI	CO	CO	CI	CO	CI	9th Grade	Some college	3	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better

Agricultural workers	C O	C O	C I	C I	C O	C O	5-8th Grade	HS/GED	1	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse
Forest, conservation, and logging workers	C I	C O	C I	C O	C O	C I	11th Grade	Some college	3	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better
Supervisors of construction and extraction workers	C O	C O	C O	P	C O	C I	HS/GED	Some college	8	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Better	Better	Better	Better
Construction trades workers	C O	C O	C O	C I	C O	C I	10th Grade	Some college	5	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse
Electricians, insulation workers, plumbers, metal workers, and other installers and technicians	C O	C O	C O	C I	C O	C I	HS/GED	Some college	7	Better	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better	Better
All other metal workers and solar installers	C O	C O	C O	P	C O	C I	HS/GED	Some college	7	Better	Better	Better	Better	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse
Helpers, construction trades	C I	C I	C I	C I	C O	C I	10th Grade	HS/GED	3	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse
Other construction and related workers	C O	C O	C O	P	C O	C I	HS/GED	Some college	9	Better	Better	Better	Better	Better	Same or worse	Same or worse	Better	Better	Better	Better
Extraction workers	C I	C O	C O	P	C O	C I	HS/GED	Some college	5	Better	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Better
Supervisors of installation, maintenance, and repair workers	C O	C O	C O	C O	C O	C I	HS/GED	Some college	9	Better	Better	Better	Better	Better	Same or worse	Better	Better	Better	Same or worse	Better

Electrical and electronic equipment mechanics, installers, and repairers	CO	CO	CO	CO	CO	CI	HS/GED	Some college	8	Better	Better	Better	Better	Better	Same or worse	Better	Same or worse	Better	Same or worse	Better
Vehicle and mobile equipment mechanics, installers, and repairers	CO	CO	CO	P	CO	CI	HS/GED	Some college	5	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Better	Same or worse	Better
Other installation, maintenance, and repair occupations	CO	CO	CO	P	CO	CI	HS/GED	Some college	9	Better	Better	Better	Better	Better	Same or worse	Better	Same or worse	Better	Better	Better
Supervisors of production workers	CO	CO	CO	CO	CO	CI	HS/GED	Some college	7	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Better	Better	Same or worse	Better
Assemblers and fabricators	P	CI	CI	P	CO	P	HS/GED	Some college	8	Same or worse	Better	Better	Better	Better	Same or worse	Same or worse	Better	Better	Better	Better
Food processing workers	CI	CI	CI	CI	P	CO	11th Grade	Some college	3	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse
Metal workers and plastic workers	CO	CO	CO	CO	CO	CI	HS/GED	Some college	4	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Better
All other metal and plastic workers	CO	CO	CO	P	CO	CI	HS/GED	Some college	5	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse
Printing workers	CO	CO	CO	CO	CO	CI	HS/GED	Some college	6	Same or worse	Better	Better	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse	Better
Textile, apparel, and furnishings workers	CI	CI	CI	CI	CI	CO	9th Grade	Some college	2	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse
Woodworkers	CO	CO	CO	CO	CO	CI	HS/GED	Some college	3	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better	Same or worse	Same or worse
Plant and system operators	CO	CO	CO	CO	CO	CI	HS/GED	Some college	8	Better	Better	Same or worse	Better	Better	Same or worse	Same or worse	Better	Better	Better	Better

Other production occupations	CO	CO	CO	P	CO	CI	HS/GED	Some college	6	Same or worse	Better	Better	Better	Better	Same or worse	Same or worse	Same or worse	Better	Same or worse	Better
All other production workers	CO	CI	P	CI	CO	P	HS/GED	Some college	6	Same or worse	Better	Better	Better	Better	Same or worse	Same or worse	Same or worse	Better	Better	Same or worse
Supervisors of transportation and material moving workers	CO	CI	CO	P	CO	CI	HS/GED	Some college	7	Better	Better	Better	Better	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better
Air transportation workers	CO	CO	CO	CO	CO	CI	Some college	Bachelor's	6	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better
Motor vehicle operators	CO	CI	CO	CI	CO	CI	HS/GED	Some college	4	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Better
Rail transportation workers	CO	CI	CI	CO	CO	CI	HS/GED	Some college	7	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Better	Same or worse	Better	Better
Water transportation workers	CI	CO	CI	CO	CO	CI	HS/GED	Bachelor's	6	Better	Same or worse	Better	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Better	Better
Other transportation workers	CO	CI	CO	CI	CO	CI	HS/GED	Some college	3	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Better	Same or worse	Same or worse	Same or worse
Material moving workers	CO	CI	P	CI	CO	P	HS/GED	Some college	3	Same or worse	Same or worse	Better	Same or worse	Better	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse
All other material moving workers	CO	CI	CO	P	CO	CI	HS/GED	Some college	3	Same or worse	Same or worse	Better	Same or worse	Better	Same or worse	Same or worse	Same or worse	Same or worse	Same or worse	Better

Notes: BW = Black women; BM = Black men; LW = Latinx women; LM = Latinx men; WW = White women; WM = White men. CO=crowded out; CI=crowded in, P=proportional.

Notes

[1] Shakesprere et al. (2021) provide a review of the existing literature on racial disparities in the job elements. See Shakesprere, Jessica, Batia Katz, and Pamela Loprest. 2021. "Racial Equity and Job Quality: Causes Behind Racial Disparities and Possibilities to Address Them." Washington, DC: Urban Institute.

[2] Elise Gould, "Black-White Wage Gaps Are Worse Today than in 2000," *Working Economics* (blog), Economic Policy Institute, February 27, 2020, https://www.epi.org/blog/black-white-wage-gaps-are-worse-today-than-in2000/.

[3] There were 109 occupations identified but for this analysis we excluded "all other postsecondary teachers"' as we were unable to match the data to ACS at the four-digit level for crowding analyses.

[4] Some datasets we used already had data at the four-digit level, but others had data at the six-digit code level instead. To look at those at the four-digit level, we calculated an average value of each variable weighted by the total employment in each six-digit occupation. This value was then added as the value for the relevant four-digit code. There was also one dataset that only had data available at the two-digit SOC code level. For those variables, we used the two-digit value as the value for each four-digit SOC code under the two-digit umbrella.

[5] Unemployment and injury rates were two indicators where a lower score was "better."

[6] Bergmann's methodology controlled for educational attainment by analyzing occupations that only required a high school education (Bergmann 1974). In this methodology, the crowding of Black men in an occupation was determined by calculating the expected share of Black men by the share of Black men in the population without a high school education. However, by investigating beyond high school educational attainment and blue-collar occupations, Gibson and colleagues (1998) calculated the expected occupation share of Black workers based on the share of Black workers with educational credentials for that occupation. Only Black individuals with educational attainment between the 25th and 90th percentiles were considered eligible for the required occupation. Both methodologies hold that fi an occupation had a 10 percent greater share of Black workers than the expected share, Black workers were crowded into the occupation; if an occupation's share of Black workers was 10 percent lower than the expected share, the group was crowded out of that occupation; and if the occupation's share of Black workers is neither 10 percent greater nor 10 percent lower than the expected share, the group was proportionally represented in that occupation. The methodology used by Gibson and colleagues (1998) introduces a crowding index or score, where the ratio is the proportion of an occupation's share of Black workers (in the numerator) to the proportion of the occupation's working-age population that consists of Black workers with the required educational credentials for that occupation (in the denominator). Thus, a crowding index that is equal to one means the group is proportionally represented in an occupation, a crowding index less than one means the group is underrepresented in an occupation, and a crowding index greater than one means the group is overrepresented in an occupation. Most current studies use the methodology developed by Gibson and colleagues (e.g., Hamilton 2006 and Hamilton and Darity 2012).

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