Race and Jobs at High Risk to Automation

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Introduction

This data brief examines the extent to which African Americans, Latinos, Whites, and Asian Americans are employed in the 30 occupations that employ the most people in the United States that have a high probability of automation over the next 10-20 years (above 0.8 probability on a 0-0.99 scale established by an Oxford University study).[1]

KEY FINDINGS:

- Automation will have a significant effect on African American and Latino workers. Over 31 percent of Latino workers and 27 percent of African American workers are concentrated in just 30 occupations at high-risk to automation. By comparison, these 30 occupations account for 24 percent of all White workers and 20 percent of all Asian American workers.

- African American workers are overrepresented in particular jobs with a high risk of being eliminated or fundamentally changed by automation. For example, compared to White workers, African American workers are:

  - Over one-and-a-half times more likely to be cashiers, cooks, combined food preparation and serving workers (including fast food), production workers, and laborers and freight/stock/material movers; and

  - Over three times more likely to be security guards, bus drivers, and taxi drivers/chauffeurs.

The numbers below do not reflect heavy and tractor-trailer truck drivers because the automation risk of 0.79 falls just below this study's 0.80 floor. Heavy and tractor-trailer truck drivers alone account for 1.7 percent of the entire Black workforce (299,000 Black workers).

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[1] See CARL BENEDIKT FREY AND MICHAEL A. OSBORNE, THE FUTURE OF EMPLOYMENT: HOW SUSCEPTIBLE ARE JOBS TO COMPUTERIZATION? OXFORD UNIVERSITY 57-72 (2013).

Jobs at High-Risk to Automation (80-99%) that Employ the Most People, by Race

	Occupation	Total Employed	# of Blacks Employed	Automation Risk	% of Latino Workforce	% of Black Workforce	% of White Workforce	% of Asian American Workforce
1	Retail Salespersons	3,312,000	406,000	0.92	2.38%	2.26%	2.19%	1.90%
2	Cashiers	3,260,000	580,000	0.97	2.67%	3.22%	1.92%	2.54%
3	Secretaries & Administrative Assistants	2,744,000	236,000	0.81-0.98	1.28%	1.30%	1.95%	0.95%
4	Cooks	2,179,000	378,000	0.81-0.96	3.02%	2.10%	1.33%	1.13%
5	Waiters & Waitresses	2,085,000	196,000	0.94	1.72%	1.10%	1.39%	1.45%
6	Laborers & Freight, Stock, & Material Movers, Hand	1,900,000	378,000	0.85	1.76%	2.11%	1.16%	0.66%
7	Construction Laborers	1,801,000	146,000	0.88	3.24%	0.81%	1.29%	0.43%
8	Accountants & Auditors	1,777,000	151,000	0.94	0.63%	0.84%	1.17%	2.11%
9	Receptionists & Information Clerks	1,331,000	173,000	0.96	0.97%	0.96%	0.89%	0.53%
10	Grounds Maintenance Workers	1,326,000	108,000	0.95	2.26%	0.59%	0.96%	0.20%
11	Office Clerks, General	1,295,000	190,000	0.96	0.87%	1.05%	0.81%	0.97%
12	Bookkeeping, Accounting, and Auditing Clerks	1,137,000	88,000	0.98	0.54%	0.49%	0.81%	0.60%
13	Sales Representative, Wholesale and Manufacturing	1,059,000	51,000	0.85	0.45%	0.28%	0.79%	0.49%
14	Food Preparation Workers	1,000,000	149,000	0.87	1.16%	0.83%	0.62%	0.73%
15	Real Estate Brokers and Sales agents	977,000	67,000	0.86-0.97	0.39%	0.37%	0.71%	0.49%
16	Production Workers, All Others	968,000	165,000	0.92	0.85%	0.92%	0.60%	0.57%

	Occupation	Total Employed	# of Blacks Employed	Automation Risk	% of Latino Workforce	% of Black Workforce	% of White Workforce	% of Asian American Workforce
17	Security Guards & Gaming Surveillance Officers	923,000	281,000	0.84-0.95	0.64%	1.56%	0.46%	0.40%
18	Miscellaneous Assemblers & Fabricators	898,000	192,000	0.9-0.98	0.70%	0.89%	0.54%	0.70%
19	Miscellaneous Agricultural Workers	818,000	18,000	0.87	1.70%	0.12%	0.64%	0.12%
20	Inspectors, Testers, Sorters, Samplers & Weighers	734,000	94,000	0.98	0.51%	0.52%	0.47%	0.59%
21	Insurance Sales Agents	630,000	69,000	0.92	0.29%	0.38%	0.43%	0.31%
22	Industrial Truck & Tractor Operators	605,000	157,000	0.93	0.67%	0.87%	0.35%	0.15%
23	Shipping, Receiving, and Traffic Clerks	546,000	88,000	0.98	0.47%	0.49%	0.36%	0.13%
24	Taxi Drivers & Chauffeurs	500,000	143,000	0.89	0.25%	0.80%	0.21%	0.87%
25	Drivers/Sales Workers & Truck Drivers	496,000	74,000	0.98	0.42%	0.41%	0.33%	0.14%
26	Billing and posting clerks	452,000	63,000	0.96	0.28%	0.35%	0.30%	0.23%
27	Paralegals and Legal Assistants	433,000	44,000	0.94	0.28%	0.25%	0.31%	0.16%
28	Combined food Preparation and Serving Workers, including Fast Food	420,000	76,000	0.92	0.34%	0.42%	0.26%	0.15%
29	Bus Drivers	415,000	122,000	0.89	0.19%	0.68%	0.22%	0.15%
30	Operating Engineers and other Construction Equipment Operators	351,000	30,000	0.95	0.27%	0.17%	0.26%	0.01%
	TOTALS	**36,372,000**	**4,913,000**		**31.20%**	**27.32%**	**23.73%**	**19.85%**

The Opportunities and Challenges of Automation

The precise effects of automation on future labor markets are difficult to predict. It is likely, however, that in particular contexts automation will result in the following outcomes:

- **Automation will both eliminate and create jobs.** New technologies may both displace workers and generate new employment opportunities. For example, while sales from ecommerce companies like Amazon reduce the number of sales and employees at traditional retail stores, Amazon also creates new jobs by hiring workers at fulfillment centers and in other parts of its distribution network. One study found that from 2007 to 2016, the general retail sector lost 51,000 jobs while the ecommerce sector added 355,000 jobs.[2]

- **Automation will allow many workers to be more effective.** Rather than completely displace some workers, automation may allow some workers to focus more attention on particular job functions that are difficult to automate and therefore be more effective. For example, autonomous school buses may allow school bus drivers to more effectively supervise and engage children on buses.

- **Automation could increase access to opportunity.** Automation could lower costs and increase access to basic goods and services. For example, a primary obstacle to jobs and economic mobility is lack of transportation.[3] If properly deployed, autonomous vehicles could lower the cost of transportation, and allow more low-income people to access jobs.

- **Automation could fall hardest on low-income workers.** Even many who assert that automation will increase overall employment opportunities recognize that absent intervention the impact of automation could fall hardest on low-income, lower-skilled, and less-educated workers.[4] The White House Council of Economic Advisors, for example, found that "83 percent of jobs making less than $20 per hour would come under pressure from automation," compared to only "4 percent of jobs making above $40 per hour."[5]

- **African American communities face unique challenges in labor transitions**. While automation will create new types of jobs, the African American community faces a unique combination of well-documented challenges that make it particularly vulnerable in labor

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[2] See MICHAEL MANDEL, PROGRESSIVE POLICY INSTITUTE, THE CREATION OF A NEW MIDDLE CLASS? (2017) (finding that from 2007 to 2016, the general retail sector lost 51,000 jobs while the ecommerce sector added 355,000 jobs).

[3] See e.g., DANIEL G. CHATMAN, ROBERT B. NOLAND, TRANSIT SERVICE, PHYSICAL AGGLOMERATION AND PRODUCTIVITY IN US METROPOLITAN AREAS (2013).

[4] See e.g., MELANIE ARNTZ, TERRY GREGORY & ULRICH ZIERAHN, THE RISK OF AUTOMATION FOR JOBS IN OECD COUNTRIES, OECD PUBLISHING 4 (2016) ("The main conclusion from our paper is that automation and digitalisation are unlikely to destroy large numbers of jobs. However, low qualified workers are likely to bear the brunt of the adjustment costs as the automatibility of their jobs is higher compared to highly qualified workers. Therefore, the likely challenge for the future lies in coping with rising inequality and ensuring sufficient (re-) training especially for low qualified workers.").

[5] EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES, ARTIFICIAL INTELLIGENCE, AUTOMATION, AND THE ECONOMY 15 (2016).

market transitions. These challenges include: 1) an average household net worth that is one tenth that of Whites (making periods without income particularly difficult); 2) implicit bias in hiring and evaluation; 3) residential and educational segregation; 4) transportation challenges; 5) lower rates of digital readiness; and 6) and limitations in social networks.

- **Depending on strategic interventions, automation could increase or decrease racial inequality.** Recognizing that a disproportionate share of African American and Latino workers are employed in jobs that are at high risk to automation, automation could increase racial inequality. Displacement of half of the African American workers in just the 30 largest occupations at high-risk to automation without transitioning them into new employment opportunities could increase the African American unemployment rate from 7.5 percent to over 20 percent.[6] In contrast, economic disruption can, if properly harnessed, create new opportunities that address long-standing social inequities. For example, strategic interventions by policymakers that increase connections between educators and employers, equip workers in African American and Latino communities with premium skills for new job opportunities, and provide pipelines to help them secure and succeed in these positions can help reduce racial disparities. In 2018, the Joint Center's research will explore the most effective solutions.

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[6] This increased unemployment rate assumes an additional 2,456,000 unemployed African Americans looking for work.

Methodology

The sources of the racial job data are the Bureau of Labor Statistics, Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity (last modified Feb. 8, 2017) and the Bureau of Labor Statistics, Employed and experienced unemployed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity, Annual Average 2016. The source of the automation risk data is Carl Benedikt Frey and Michael A. Osborne, The Future of Employment: How Susceptible are Jobs to Computerization? September 17, 2013 (appendix p. 57-72). Frey and Osborne consider occupations with an automation probability of 70-99% to be at "high-risk," while the Joint Center took a more conservative approach and categorized occupations at 80-99% probability as "high-risk."

Frey and Osborne's automation probability is organized with a version of the Standard Occupational Classification, which has an overlapping but a slightly more detailed classification of occupations than the Bureau of Labor Statistics Current Population Survey occupations racial data. Thus, for some subcategories of occupations we have automation risk, but we have racial data only for the larger occupational category.

The Joint Center addressed this issue by applying the racial percentages of the larger occupational category to the subcategories with automation probabilities of 0.80 or higher, and omitting from the analysis the subcategories with automation probabilities of 0.79 or lower. With regard to Sales Representatives, Wholesale and Manufacturing, for example, the Current Population Survey groups together both Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products (0.85 automation risk) and Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (0.25 automation risk). Approximately 81% of those in this total grouping are the former (except technical and scientific products). Thus, we multiplied the total number of jobs in this Current Population Survey category by 0.81 to obtain the total job number for the former and exclude the latter, recognizing that the racial composition of the former might be slightly different than the latter. The same methodology was used to analyze Ground Maintenance Workers, Bus Drivers, Miscellaneous Assemblers & Fabricators, and Drivers/Sales Workers & Truck Drivers.

The Joint Center was founded in 1970 as the Black think tank (history here). Today, the Joint Center remains anchored in the Black community and collaborates closely with organizations from other communities. We focus on the future of work, the future of entrepreneurship, and the use of technology to improve quality of life in communities with significant African American populations. We also work to increase diversity among staff in Congress.

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