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Ten Facts About the State of the Economy for U.S. Workers Without College Degrees

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The most important policy to boost economic opportunity is one that focuses on shifting the occupational mix toward fewer low-wage jobs and more middle-wage ones.

KEY TAKEAWAYS

- Many low-wage jobs pay poorly not because workers in those positions lack sufficient education, but because their occupations have low productivity.
- Policymakers should consider new approaches to help non-college-educated workers—starting with policies to spur automation in the low-paying occupations that are most likely to employ them.
- Policy also should focus on expanding jobs in industries that pay non-college-educated workers comparatively well. Those are most likely to be found in high-tech industries and in the traded sectors that face global competition.

INTRODUCTION

Relatively few of the benefits of economic growth in the last decade have gone to less-educated workers. The median inflation-adjusted salary for a worker with a high-school degree who has not attended college increased by less than 1 percent from 2008 to 2017 (inching from $37,596 to $37,960). Moreover, non-college-degree workers earn just 56 percent as much as the median worker with at least a bachelor's degree.[1]

The common response to this disparity is to call for more young people to attend and finish college. But this can't be the full answer. Some people simply don't like school and academic learning. Many more, as the student-loan crisis shows, cannot afford to go to college. Moreover, having more college-educated barbers, for example, would do little to boost their incomes, as many low-wage jobs pay little, not because the workers don't have as much education, but because their occupations have low productivity.

As such, policymakers need to think about new approaches to help non-college-educated workers. It is beyond the scope of this paper to spell out such an agenda in detail, but clearly steps involve greater support for skills development and training, more universal access to health care, and a higher minimum wage must play a key role.

But even this will not be enough given the large share of jobs in the economy that are in low-productivity sectors and occupations. Indeed, nearly 30 million workers without a college degree work in industries where the average wage for non-college-educated workers is less than $25,000 per year, or $12.50 per hour.[2] Therefore, the most important policy to boost economic opportunity is one that focuses on shifting the occupational mix toward fewer low-wage jobs and more middle-wage ones.

Policymakers should start by supporting policies that spur automation in occupations that pay poorly and employ a high share of non-college-educated workers. The savings produced by automating some of these jobs increase demand in other parts of the economy. That boosts spending, thereby creating new jobs, many of them middle-wage jobs. This means supporting policies that spur more automation, such as increased funding for productivity-focused R&D and establishing an investment tax credit—or, absent that, permanent first-year expensing for capital equipment.[3]

If policymakers cannot put the pedal to the metal for automating low-wage jobs, they should at least resist the increasingly fashionable panics about technology killing jobs and oppose neo-Luddite responses like technology bans, "robot taxes," or undue regulatory restrictions.[4]

At the same time, policy should work to help expand jobs that pay non-college-educated workers reasonably well. As this brief shows, these are more likely to be found in high-tech industries where staying competitive requires discovering and developing new breakthroughs, all of which requires skilled workers, including skilled technicians. In addition, traded sectors—those industries which face global competition—are particularly important because the competition they are exposed to pushes them to become more productive, making each worker's labor more valuable. Further, traded sectors are crucial for the economy because the contraction or failure of a traded-sector firm has a multiplier effect, harming all the U.S. domestic suppliers and customers that rely on the firm. Unlike closing a barber shop, which simply redirects demand to

existing or new barber shops, losing traded-sector industries often allows foreign producers and workers to step in and meet the demand.

Against that backdrop, 10 revealing facts follow below about the industries that provide the best prospects for non-college-educated workers. They are drawn from analysis of microdata from the 2008 and 2017 editions of the Census Bureau's American Communities Survey (ACS).[5]

TEN FACTS ABOUT THE BEST INDUSTRIES FOR NON-COLLEGE-EDUCATED WORKERS

1. Software Publishers Pay the Highest Wages to Workers Without College Degrees

While the software industry employs a low percentage of workers without college degrees—16 percent compared to 56 percent for all industries—they earn an average annual salary of $84,731, which is more than 2.5 times the group's national average ($32,997) and even greater than the average wage that workers with at least a bachelor's degree receive ($76,544). This is likely due partly to the fact that some workers in the industry have strong programming skills but no college degree and partly that there is an overall shortage of software workers, regardless of their level of education.

Four other industries pay workers without degrees more than $70,000 on average, and all of them are engaged in energy production: electric and gas utilities, electric power generation and distribution, oil and gas extraction, and petroleum refining. In these industries, most workers are skilled technicians, many with two-year degrees and significant, deep work experience.

2. Workers Without Degrees Earn 58 Percent More in High-Tech Industries

High-tech industries employ a smaller share of workers with less than college degree (32 percent) compared to all industries (57 percent). While 90 percent of employees have less than a college degree in the logging industry (which has the greatest share of non-degree-educated workers), only 16 percent lack a degree in the software industry (which has the lowest share). However, the average wage for workers without a college degree in high-tech industries is $50,661—58 percent more than the non-high-tech industry average of $32,083. These are industries that rely on innovation and advanced technology, such as aerospace, biopharmaceuticals, software, and telecommunications. Moreover, the gap between innovation industries and the rest of the economy is increasing: In 2008, salaries for non-college-educated workers were 49 percent larger in high-tech industries than in non-high-tech industries. This gap underscores why national efforts to boost U.S. technological innovation are important to improving living standards for non-college educated workers. Table 1 lists the 14 high-tech industries that pay non-college workers at least 50 percent more than the national average.

Table 1: Employment and wages of workers without college degrees in 14 high-tech industries[6]

Industry	Average Wages	Percentage Above Average	Employment
Software Publishing	$84,731	157%	23,659
Computer Systems Design Services	$67,901	106%	540,990
Aerospace Manufacturing	$60,738	84%	24,320
Aircraft Manufacturing	$58,747	78%	299,098
Internet Publishing, Broadcasting, and Web Search Portals	$57,747	75%	26,741
Wired Telecommunications Carriers	$57,266	74%	285,451
Computer Manufacturing	$56,750	72%	42,078
Other Information Services	$55,288	68%	7,277
Wireless Telecommunication	$54,527	65%	140,322
Architectural and Engineering Services	$53,345	62%	385,455
Navigational, Measuring, and Control Instrument Manufacturing	$52,577	59%	107,173
Communication and Video Equipment Manufacturing	$52,405	59%	50,159
Pharmaceuticals and Medicines Manufacturing	$50,917	54%	153,261
Data Processing and Hosting Services	$49,527	50%	56,100

3. Six High-Tech Industries Employ More Non-College Workers Than Workers With At Least a Bachelor's Degree

While high-tech industries on average employ a smaller share of workers without college degrees, 6 industries, employing nearly half of the non-college-educated workers in the high-tech sector overall, each employ more non-college workers than workers with bachelor's degrees or higher and pay above the national average. As table 2 shows, these are household appliance manufacturing, electrical equipment manufacturing, commercial and service industry machinery manufacturing, wired telecommunications carriers, and medical equipment manufacturing.

Table 2: Average wages and percentage of non-college workers in select high-tech industries[7]

Industry	Percent Non-College	Average Wages of Non-College Workers
Household Appliance Manufacturing	66.5%	$35,956
Electrical Equipment Manufacturing	60.4%	$44,290
Commercial and Service Industry Machinery Manufacturing	54.1%	$48,448
Wired Telecommunications Carriers	51.4%	$57,266
Medical Equipment Manufacturing	45.3%	$43,535
Health Care Services	44.3%	$36,173

4. Workers Without Degrees Earn 38 Percent More in Traded Industries

Traded industries are industries in which a considerable share of output is sold outside the United States, such as most manufacturing, agriculture, mining, entertainment, and software. Given the comparatively intense competition in these industries, including with low-wage nations, one might think that wages for non-college-educated workers in these sectors would be lower than economy-wide wages. In fact, the average salary for non-college-educated workers in traded industries is $42,632, which is 38 percent more than in non-traded industries. And the gap between these sectors and the rest of the economy is increasing—in 2008, traded-sector salaries were 35 percent larger than non-traded salaries. This is why the United States needs a coherent and well-funded national strategy to boost U.S. global competitiveness (and thus increase sales and jobs in traded sectors) to improve living standards for non-college workers.

5. Eight of the 10 Highest Paying Non-High-Tech, Non-Traded Industries for Non-College-Educated Workers Are in Transportation, Mining, and Utilities

Industries that are neither high-tech nor traded make up 58 percent of the 259 industries in the ACS dataset, but they account for only 10 of the 30 highest-paying industries for workers without college degrees. Half of these industries are related to utilities, including the two highest non-high-tech, non-traded industries, electric and gas utilities and electric power generation and distribution (table 3).

Table 3: Ten non-high-tech, non-traded sectors with the highest average non-college-educated worker wages, and the number of non-college-educated workers in each sector[8]

Industry	Average Wages	Workers
Electric and Gas Utilities	$78,238	43,541
Electric Power Generation and Distribution	$73,339	345,614
Rail Transportation	$68,584	175,421
Pipeline Transportation	$67,873	36,588
Labor Unions	$66,806	45,722
Other Utilities	$64,208	11,826
Natural Gas Distribution	$62,086	73,665
Petroleum and Petroleum Products Wholesalers	$56,478	55,570
Metals and Minerals Wholesalers	$56,329	38,133
Non-depository Credit and Related Activities	$53,913	360,886

6. The Gap in Pay Between Workers With At Least a Bachelor's Degree and Workers Without a Degree Is 15 Percent Smaller in High-Tech, Traded Industries

Industries that are both high-tech and traded (e.g., aerospace, pharmaceuticals, and data processing) pay workers with college degrees more than either broad sector individually (high-tech or traded), for an average of $52,861. While these industries pay significantly more than others across the board, that doesn't fully explain the wages for workers without degrees. Nationally, workers with at least a bachelor's degree make 132 percent more than workers without one, but this ratio falls to 97 percent in high-tech traded industries. In other words, there is less occupational inequality in these sectors than in the economy overall. In fact, if these industries had the average education-based wage gap, workers without degrees would earn $7,867 less per year. This reinforces the critical need to establish and support a national industrial strategy, focused in large part on technology-based industries.

7. Within the High-Tech Sector, Industries With Above-Average Shares of Non-College-Educated Workers Have 2 Million of Those Workers

The 16 high-tech industries that employ more than the overall sector's average proportion of workers without a college degree (32 percent), employ 2.5 million non-college-educated workers. This accounts for 60 percent of workers without college degrees in the high-tech sector. Notably, 7 of these industries are among the 10 high-tech industries with the most workers without a college degree—health care services, aircraft manufacturing, wired telecommunications carriers, medical equipment manufacturing, and electrical equipment manufacturing, electronic component manufacturing, and motion picture and video production—all of which pay more than the national average for non-college educated workers (table 4).

Table 4: Employment, percentage of non-college workers, and average wages for non-college workers in select high-tech industries[9]

Industry	Percent Non-College	Employment	Average Wages
Household Appliance Manufacturing	67%	46,967	$35,956
Electrical Equipment Manufacturing	60%	215,241	$44,290
Commercial and Service Industry Machinery Manufacturing	54%	45,028	$48,448
Wired Telecommunications Carriers	51%	28,5451	$57,266
Sound Recording	45%	16,320	$33,956
Medical Equipment Manufacturing	45%	270,170	$43,535
Health Care Services	44%	508,796	$36,173
Motion Picture and Video	44%	212,239	$33,527
Aircraft Manufacturing	44%	299,098	$58,747
Wireless Telecommunications	44%	140,322	$54,527
Navigational, Measuring, and Control Instrument Manufacturing	39%	107,173	$52,577
Communication and Video Equipment Manufacturing	37%	50,159	$52,405
Aerospace Manufacturing	37%	24,320	$60,738
Electronic Component Manufacturing	36%	212,804	$47,583
Data Processing and Hosting Services	35%	56,100	$49,527
Business, Technical, and Trade Schools	35%	37,166	$33,427

8. Fourteen of the 20 Highest-Paying Industries for Workers Without College Degrees Employ Fewer of Those Workers Than They Did a Decade Ago

Twenty industries pay workers without college degrees an average of more than $50,000 per year, and they employ 2.9 million such workers. However, these industries employ 12 percent fewer workers without college degrees than they did in 2008, four times the national decline in the share of non-college-educated workers, with 14 in this category reducing their employment. In contrast, employment of workers with at least a bachelor's degree grew by 32 percent for these industries over this period, compared to 26 percent nationwide. Five of the six industries that increased their employment of non-college-educated workers are high-tech or traded (software publishing, oil and gas extraction, computer systems design, aircraft manufacturing, and internet publishing and broadcasting), with the only exception being pipeline transportation, as seen in table 5. Further, each of these industries had above-average wage-growth for workers without college degrees, especially software publishing, Internet publishing and broadcasting, and oil and gas extraction, which increased by 47 percent, 33 percent, and 33 percent, respectively.

Table 5: Sectors that increased employment of non-college-educated worker between 2008 and 2017, by percentage increase in employment and wages[10]

Industry	Employment Increase	Wage Increase
Internet Publishing and Broadcasting	112%	33%
Pipeline Transportation	35%	24%
Computer Systems Design	30%	24%
Aircraft Manufacturing	29%	18%
Software Publishing	13%	47%
Oil and Gas Extraction	2%	33%

9. Non-College-Educated Workers Earn More Than $63,000 in the Mining and Extraction and Utilities Sectors, Nearly Double the National Average

The two highest-paying sectors for degreeless workers are mining and extraction and utilities, offering an average of $63,574 and $63,335, respectively, which is 94 percent more than the national average. Further, these have non-college-educated worker wages 30 percent greater than any other sectors. The next-highest-paying sectors—administrative, information, and finance—offer average wages between $45,000 and $49,000.

10. The Two Largest Sectors for Workers Without Degrees, Retail and Entertainment, Pay Those Workers 36 Percent Less Than Other Sectors

The two largest employers of workers without a degree are retail trade and entertainment, and accommodation and food services, employing 27 percent of the 85 million workers without college degrees. The retail and entertainment sectors pay an average of $26,739 and $19,923, respectively—which is just 81 percent and 60 percent, respectively, of the $32,997 average in the overall economy. The average wages for workers without college degrees across each sector is shown in table 6.

Table 6: Major sectors by average wage of non-college-educated workers, and the number of non-college-educated workers in each sector[11]

Industry	Average Wages	Workers
Mining and Extraction	$63,574	431,822
Utilities	$63,335	712,412
Administration	$48,687	2,945,523
Information	$45,632	1,234,846
Finance	$45,119	4,184,610
Wholesale Trade	$44,689	2,402,106
Manufacturing	$42,260	9,853,101
Transportation	$40,475	5,118,245
Construction	$38,835	8,037,523
Professional	$34,194	7,358,685
Medical	$31,009	7,456,682
Retail	$26,739	12,134,498
Agriculture	$25,255	1,462,186
Education	$23,450	3,811,285
Other Services	$22,977	4,920,886
Entertainment, Accommodations, and Food	$19,923	11,157,886
Social Services	$18,026	1,911,484

CONCLUSION

In the face of the growing divide between the wages of those with and without college degrees, it has become even more important to provide workers without college degrees greater opportunity. As the facts here underscore, bolstering employment in the sectors that have traditionally employed the most workers without degrees cannot be the path forward, given that so many of them earn very low wages. Part of the path forward can and should come from redistributive policies such as universal health care and a higher minimum wage. But equally important is to support, or at minimum not resist industry efforts to automate jobs, especially low-wage jobs, while at the same time finding ways to expand employment in higher-wage sectors, including energy, transportation, utilities, and high-technology and traded sectors like manufacturing. Policymakers also should beef up programs and policies to help workers without college degrees transition into these higher-paid sectors.

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ENDNOTES

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