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The Robots Have Descended on Trump Country

They are leaving many 'casualties of history' in their wake.

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The growing use of work robots and the deployment of artificial intelligence have been most disruptive in just those areas of the country that provided President Trump with crucial margins of support in 2016.

In a paper that was published earlier this year, "Robots and Jobs: Evidence from U.S. Labor Markets," Daron Acemoglu and Pascual Restrepo, economists at M.I.T. and Boston University, demonstrate that the Midwest and sections of the South have far higher ratios of robots to population than other regions of the United States.

They calculate the job losses resulting from the addition of one robot in a "commuting zone." Their bottom line: "one more robot in a commuting zone reduces employment by about six workers."

These job losses are concentrated

> in blue collar occupations such as machinists, assemblers, material handlers and welders. Workers in these occupations engage in tasks that are being automated by industrial robots, so it is natural for them to experience the bulk of the displacement effect created by this technology.

The adverse effects of automation fall disproportionately on the voters who cast most of their ballots for Trump in 2016: White men, much more than women, and whites without college degrees.

Donald Trump's $1.5 trillion tax cut has increased incentives to replace workers with robots, contradicting his campaign promise to restore well-paying manufacturing jobs in the nation's heartland.

The Trump tax bill permits "U.S. corporations to expense their capital investment, through 2022. So, if a U.S. corporation buys a robot for $100 thousand, it can deduct the $100 thousand immediately to calculate its U.S. taxable income, rather than recover the $100 thousand over the life of the robot, as under prior law," Steven M. Rosenthal, a senior fellow at the Urban Institute and a specialist in tax policy, wrote me by email.

I have addressed the impact of robotics on Trump voters in previous columns, but today I want to explore these developments in greater detail as tools to gather and analyze information have improved.

One of the most striking developments in recent decades is the ongoing decline in work force participation among men, from 88.7 percent in July, 1947 to 68.7 percent in September, 2010, according to the Federal Reserve.

This drop in participation has been sharpest for men without college degrees.

In an email, David Autor, who is also an economist at M.I.T., explained the situation:

> We find that automation displaces employment and reduces labor's share of value-added in the industries in which it originates. In the case of employment, these own-industry losses are reversed by indirect gains in customer industries and induced increases in aggregate demand.

Overall, according to Autor,

> employment is growing steadily, and its growth in terms of number of jobs has not been discernibly dented by technological progress. But the sum of wage payments to workers is growing more slowly than economic value-added, so labor's share of the pie of net earnings is falling. This doesn't mean that wages are falling. It means that they are not growing in lock step with value-added.

Automation and productivity improvements, Autor wrote,

> tend to grow the economic pie in aggregate while simultaneously considerably diminishing some slices and yet expanding others' dramatically. Most new workplace technologies displace some worker tasks and entire jobs, devalue certain skills, and disrupt livelihoods. This is individually and socially costly and politically disruptive.

E.P. Thompson, author of the classic work of British history, "The Making of the English Working Class," described the brutality of economic transformation during the Industrial Revolution in Britain:

> The experience of immiseration came upon them in a hundred different forms; for the field laborer, the loss of his common rights and the vestiges of village democracy; for the artisan, the loss of his craftsman's status; for the weaver, the loss of livelihood and of independence; for the child, the loss of work and play in the home; for many groups of workers whose real earnings improved, the loss of security, leisure and the deterioration of the urban environment.

While there are parallels between conditions of workers during industrialization in England and during the deindustrialization of regions of this country now, one big difference stands out from a political vantage point: In England, workers turned sharply to the left while here they have moved sharply to the right.

Autor identified a contemporary source of discontent. He noted that even if automation creates "an opportunity for every citizen to gain in theory," that

> will almost never happen without forceful social policy and tax policy that spreads the gains and buffers the individual losses. Absent those policies (which the U.S. has little of in general, and even less so today than in earlier decades), losses will tend to be highly concentrated among displaced workers and in communities in which legacy employers are located.

The major concern for the labor market in the United States, Autor wrote,

> is not the number of jobs per se, but the decline in labor's share of value-added and, even more urgently, the steep falls in earnings among less-educated workers, which certainly have a technological origin.

Acemoglu and Restrepo worry that the robot-related dislocations in automated industries will harm, and thus inflame, the discontent of key voters, even as jobs are created elsewhere. In their January paper, "Artificial Intelligence, Automation and Work," they write:

> Last but not least, the development and adoption of productivity-enhancing AI technologies cannot be taken for granted. If we do not find a way of creating shared prosperity from the productivity gains generated by AI, there is a danger that the political reaction to these new technologies may slow down or even completely stop their adoption and development. This underscores the importance of studying the distributional implications of AI, the political economy reactions to it, and the design of new and improved institutions for creating more broadly shared gains from these new technologies.

Acemoglu and Restrepo agree with Autor that

> greater use of robots in a commuting zone is likely to generate benefits for the rest of the U.S. economy by reducing the prices of tradable goods now produced using robots and by creating shared capital gains.

But Acemoglu and Restrepo contend that even after calculating "these positive spillovers across commuting zones," there are still "uniformly negative aggregate effects."

Their calculations suggest that

> one more robot per thousand workers reduces aggregate employment-to-population ratio by about 0.2 percentage points or, equivalently, one new robot reduces employment by about 3.3 workers and wages by about 0.37 percent (as opposed to 0.37 percentage points and 0.71 percent, respectively, without trade).

An Amazon fulfillment center in Carteret, N.J. Demetrius Freeman for The New York Times

I asked Acemoglu whether these findings challenge the economic argument that technological advance is almost always beneficial. He replied:

> It does challenge the conventional wisdom to some degree. But this conventional wisdom is really up for challenge. The view that technological change always and everywhere benefits most groups is completely devoid of historical context. This isn't what has happened in history, this isn't what has happened in the early 20th century.

He cited key developments in the late 1890s and early 1990s:

> During mechanization of agriculture, we have also experienced rapid creation of new jobs and tasks in industry, both for production workers and for clerical workers. If it weren't for these other changes, many of them technological and social in nature, mechanization of agriculture would have created much more hardship (and today we tend to forget how much hardship it did create in the first place).

Acemoglu, Restrepo and Autor are not alone in exploring the economic and political consequences of robotics and artificial intelligence.

Jeffrey Sachs, a professor of economics at Columbia, has a parallel take, writing by email:

> Until now, automation (robotics, machines more generally, smart systems) has mostly replaced activities that require brawn (agriculture, mining, lifting, warehousing) repetitive physical activity (assembly line, cutting/sowing), basic data management (ledgers, various logistics), while being complementary with complex management, human judgment, highly contextual activities.

The demographic group most hindered by the rise of automation, Sachs wrote, "has been the proverbial white male with less than a college degree and living in rural and semirural areas."

Sachs believes that

> the next wave of job losses will be in basic business services (wholesale and retail trade, warehousing and transport) which will mean another hit for workers with relatively lower educational attainment.

In terms of incomes, according to Sachs, "automation (including AI) will raise overall output but lower the earnings of some or even all workers, while raising the returns to many forms of capital."

Without the adoption of redistributive tax and spending policies, he argued,

> the old, the skilled, and the rich (who will make intergenerational transfers within families to their own children) will benefit at the expense of the young, the less skilled, and the poor. All of this seems to be underway.

Jason Furman, a professor of economics at Harvard's Kennedy School who served as chairman of the Council of Economic Advisers in the Obama administration, writing with Robert Seamans, a professor of management at N.Y.U., has a broader view of the positive and negative effects of automation and artificial intelligence.

In their June 2018 paper, "A.I. and the Economy," Furman and Seamans argue that, from a theoretical perspective, innovation has four effects on labor markets.

The first is that "automation can directly displace labor in the affected sector." Second is that "automation can create new jobs in new areas." The authors note that "job losses at brick-and mortar department stores were more than made up for by new opportunities at fulfillment and call centers." The third effect is that "higher incomes increase demand for jobs throughout the economy, including in ways that are not directly linked to technology. For example, the share of workers in leisure and hospitality in the United States has steadily trended upward as household incomes have risen, enabling people to afford more restaurants and travel." And the fourth effect is that "technology may replace specific tasks rather than entire jobs — leaving substantial room for human employment in jobs that will be changed by worker's having a new tool at their disposal."

Both the upside and the downside of artificial intelligence, Furman and Seamans point out, have "the potential to dramatically change the economy," adding that

> On the one hand, the potential for increased productivity growth is welcome given the decades-long slowing in productivity growth in the United States and other advanced economies. On the other hand, the potential for AI-induced labor disruptions could potentially exacerbate existing problems in the labor force, including the decades-long decline in male labor force participation rate.

The 2017 Trump tax cut not only boosted incentives for corporations to replace workers with robots, it has also created incentives for American companies to move production overseas, even as it directed resources toward "opportunity zones" in what the Trump administration defines as "neglected and underserved communities" — incidentally providing a bounty of lucrative grants, guarantees and breaks for real estate developers.

While Trump is clearly attuned to the political power of white working class anger — in 2016 he ignited a blue-collar insurgency and mobilized white men in particular — his campaign rhetoric is also expedient. He is highly attuned to the agenda of the Republican Party he leads, not to mention the corporate establishment and its antipathy to corporate taxation. And it goes without saying that the tax cut was enormously beneficial to Trump and to his family — by conservative estimates he will personally save from $11 to $15 million annually and his estate will reap millions.

The reality for the voters who believed in Trump is not so bright. Take two counties, Alger and Ontonagon, both on Michigan's Upper Peninsula, which voted overwhelmingly for Trump in 2016 (57-37 and 60-34). Two years later, their respective unemployment rates are 8.4 and 9.4 percent, compared with the low national rate of 3.7 percent. These two counties have median household incomes of $41,270 and $35,038, far below the national median, which is $61,372.

On Monday, the Daily Mining Gazette in next door Houghton County, Mich., reported that the "opioid crisis has hit the Ontonagon County region hard" with "one of the highest opioid-related hospitalization rates in Michigan."

Andrew K. Shotwell, a local attorney, told the County Board that opioid use is increasing and that "Ontonagon in the top 10 for that in the state of Michigan." The Gazette reported that prescriptions "rose from 65.6 per 100 people in the county in 2009 to 113 in 2016, more than the number of people."

E.P. Thompson, looking at 19th century England, put the plight of similarly technologically displaced people best:

> Their crafts and traditions may have been dying. Their hostility to the new industrialism may have been backward looking. Their communitarian ideals may have been fantasies. Their insurrectionary conspiracies may have been foolhardy. But they lived through these times of acute social disturbance, and we did not. Their aspirations were valid in terms of their own experience.

Ontonagon County is at an extreme, but at the extreme, it illuminates the bleak dislocation much of Trump country has suffered.

From 2000 to 2017, the county population plummeted from 7,818 to 5,881. Young people are leaving in droves: 36.4 percent of the population is 65 or older, more than twice the national average, which is 15.6 percent. 12.6 percent of county residents are under 18, compared with 22.6 percent nationally.

Per capita retail sales, a measure of economic vitality, were $7,550 last year in the county, according to the census, compared with $13,443 nationally.

These are men and women, to quote E.P. Thompson again, who "lived through these times of acute social disturbance." If, Thompson continued, "they were casualties of history, they remain, condemned in their own lives, as casualties."

Erik Brynjolfsson and Andrew McAfee, professors at M.I.T. with a specialization in the economics of automation, are conducting a research project on "digital technologies and their impact on the earnings prospects of American workers." They report that some of the news

> is clearly bad. The median American household earns less than it did fifteen years ago, labor's share of national income peaked in the early 1980s and has been falling pretty steadily since then, long-term unemployment has emerged as a vexing problem, and start-ups are creating many fewer jobs than they used to.

Carl Benedikt Frey and Michael Osborne of the Oxford Martin Program on the Impacts of Future Technology in Britain have estimated that about 47 percent of total employment in the United States is susceptible to computerization. They note that "wages and educational attainment exhibit a strong negative relationship with an occupation's probability of computerization." In addition, Frey and Osborne write that

> high-skilled workers have moved down the occupational ladder, taking on jobs traditionally performed by low-skilled workers, pushing low-skilled workers even further down the occupational ladder and, to some extent, even out of the labor force.

In a separate study, Frey and Thor Berger, also of the Oxford Martin School, have found that "the bulk of low-skilled and low-income workers are now for the first time susceptible to computerization" adding that "workers with extraordinary social and creative skills will still remain in the work force in 2030."

Trump is convinced that he has extraordinary skills, boasting last month: "I have a gut, and my gut tells me more sometimes than anybody else's brain can ever tell me." At a moment like this, do voters want to be governed by a president who, as his first secretary of state publicly pointed out, is "undisciplined" and "doesn't like to read" — and that was after calling him a "moron" behind closed doors?

I would argue that we have been warned — the situation that obtains in the country today has to be grasped with the head as much as with the gut.

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