

# Robot takeover's costs may be more than we imagined

Industry automation cut up to 670,000 U.S. jobs between 1990 and 2007

---

The Washington Post · 10 apr 2017 · BY JEFF GUO [jeff.guo@washpost.com](mailto:jeff.guo@washpost.com)

---

Economists have long argued that automation, not trade, is responsible for the bulk of the 6 million jobs shed by the manufacturing sector over the past 25 years. Now, they have put a precise figure on some of the losses.

Industrial robots alone eliminated up to 670,000 American jobs between 1990 and 2007, according to new research from MIT's Daron Acemoglu and Boston University's Pascual Restrepo.

Many have interpreted the study as an indictment of technological change — a sign that, as one New York Times headline put it, “Robots are winning the race for American jobs.” But the bigger takeaway is that the nation has been ill-equipped to deal with the upheaval caused by automation.

The researchers estimate that half the job losses resulted from robots directly replacing workers. The rest of the jobs disappeared from elsewhere in the local community. It seems that after a factory sheds workers, that economic pain reverberates, triggering further unemployment at, say, the neighborhood grocery store or the car dealership.

The latest study suggests that for manufacturing workers, the process of adjusting to technological change has been much slower and more painful than most experts thought.

“We were looking at a span of 20 years, so in that time frame, you would expect that manufacturing workers would be able to find other employment,” Restrepo said. Instead, not only did the factory jobs vanish, but other local jobs disappeared, too. Acemoglu and Restrepo say that every industrial robot eliminated about three manufacturing positions, plus three more jobs from around town.

Experts still say trade and automation can benefit Americans overall, contributing to lower prices and creating new kinds of jobs. But this evidence draws attention to the losers — the dislocated factory workers who just can't bounce back.

The research from Acemoglu and Restrepo joins the work of David Autor, David Dorn and Gordon Hanson, who have shown that the harms of trade with China were similarly concentrated in certain communities. The laid-off manufacturing workers couldn't quickly find new jobs, so the economic pain lingered in their neighborhoods.

The United States does have a program to retrain workers who lost their jobs to overseas competition, but research shows that most of them turn to other parts of the government safety net, such as Social Security, disability benefits and Medicaid. Few of these efforts, though, seem to be doing enough for communities that have lost their manufacturing bases, where people have reduced earnings for the rest of their lives.

Perhaps that much was obvious. After all, anecdotes about the Rust Belt abound. But the new findings bolster the conclusion that these economic dislocations are not brief setbacks, but can hurt areas for an entire generation.

But how do we even know that automation is a big part of the story at all? A key bit of evidence is that, despite the massive layoffs, American manufacturers are making more stuff than ever. Factories have become vastly more productive. Many factors contributed to these changes; Acemoglu and Restrepo focused particularly on the rise of the industrial robot.

In the past, machines did automate many jobs out of existence, but new technology always created new opportunities — new kinds of desires and new kinds of jobs to fulfill them. The recent anxieties about technological change are hardly new; writing in the 1930s, economist John Maynard Keynes counseled patience, promising that any jobs lost to technology marked only a “temporary phase of maladjustment.”

The question now is what to do if the period of maladjustment lasts decades, or possibly a lifetime, as the latest evidence suggests. Some say the time is nigh for a universal basic income. Microsoft co-founder Bill Gates recently offered another provocative suggestion: Perhaps robots should pay taxes to compensate the workers that they replace.

Another lesson from history is that humans may have to become more flexible. America’s transformation from an agricultural nation to a manufacturing nation didn’t happen by accident, says Michael Chui, a partner at the McKinsey Global Institute who studies automation trends.

“For people to go from working on the farm to working in factories, we greatly increased the educational attainment of the country over that time,” he said.

Some workers have weathered the strains of automation better than others. The number of jobs in finance, for instance, has continued to climb in recent decades, despite computers taking over many tasks such as filing papers, conducting research or even executing trades. Computerization displaced some people but also created new kinds of work — jobs for programmers and people who sift through terabytes of financial data. In this case, automation amplified opportunities for people with advanced skills and talents.

Even in auto manufacturing, an industry that has been the poster child for robots displacing workers, there are signs of new opportunity. Ron Harbour, an analyst at Oliver Wyman, says many of the most automated factories these days actually require more human labor to produce a car. That’s because cars themselves have become more complex, with more complicated features.

The latest auto jobs are not the same as the old auto jobs, of course. These days, plants are seeking more robot technicians than assembly-line welders. But this illustrates the hope that someday there will be more than enough work for both humans and robots, as long as we are prepared for it to look different from what we’re used to.

“We were looking at a span of 20 years, so in that time frame, you would expect that manufacturing workers would be able to find other employment.” Pascual Restrepo, Boston University economist, on how the adjustment to automation has been slower and more painful than predicted