

RESEARCH BRIEF

The Transformation of Manufacturing and the Decline in US Employment

Based on BFI Working Paper No. 2018-20, "[The Transformation of Manufacturing and the Decline in US Employment](#)," by Kerwin Kofi Charles, professor of economics at the Harris School of Public Policy; Erik Hurst, professor of economics at the Booth School of Business; and Mariel Schwartz, UChicago Ph.D. student in economics

KEY TAKEAWAYS

- ✓ Employment rates and hours worked for prime-age men declined dramatically since 2000
- ✓ Sectoral changes in manufacturing explain much of this decline
- ✓ Prime-age workers with less education are feeling the brunt of these sectoral changes
- ✓ Negative social effects, like increased drug use, hamper a region's ability to recover

In December 2017 the unemployment rate was 4.1 percent, far below its peak of 10 percent in October 2009 in the depths of the Great Recession, and nearly equaling the 3.9 percent in December 2000. From this reading of the data, the labor market had made tremendous gains to return to its pre-crisis strength. However, those headline unemployment numbers mask a precipitous decline in employment among prime-age working men linked to the decline in manufacturing, with negative effects that extend beyond the health of labor markets to the well-being of communities and their citizens.

Between 2000 and 2017, employment rates for men aged 21 to 55 fell by 4.6 percentage points, and hours worked per year fell by over 180 hours (employment effects for women are also negative but less dramatic). These declines in employment began prior to the Great Recession while the economy was growing, and only worsened after 2007. To put this decrease in perspective, the secular (or long-term) decline in annual hours worked for prime-age men from 2000 to 2017 is as large as the cyclical decline in annual hours worked during the 1982 recession. In other words, while the economy cycled through ups and downs between 2000 and 2017, prime-age working men endured a sort of shadow downturn, a 17-year decline in employment.

Annual Hours Worked, Males 21-55, CPS



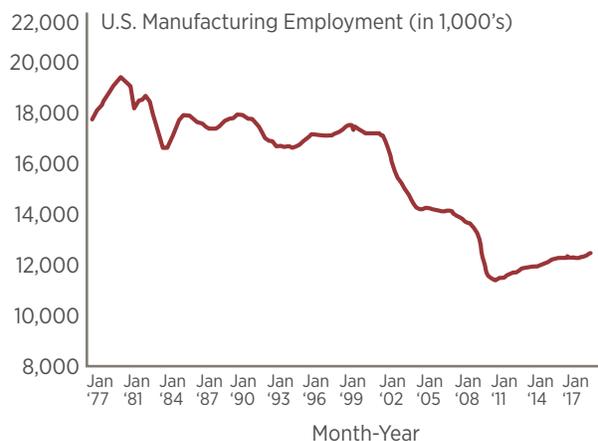
Using a variety of data sources and empirical approaches, Kerwin Kofi Charles of the Harris School of Public Policy, Erik Hurst of the Booth School of Business, and UChicago economics student Mariel Schwartz, reveal the connection between this decrease in hours worked and the decline in manufacturing. In their paper, [“The Transformation of Manufacturing and the Decline in US Employment,”](#) the authors investigate how changes in manufacturing have impacted employment rates of prime age workers, particularly in those regions where manufacturing was a major employer.

Perhaps most sobering is the authors’ conclusion that those manufacturing jobs are not coming back. The increased pace of decline in manufacturing employment since 2000—when output actually increased by about 5 percent—reveals that improvements in productivity are driving the decline in employment. Fewer workers are needed to produce more, and this won’t change. Therefore, efforts to rescue jobs through trade policy are misdirected, the authors’ show.

Beyond the labor market, the authors find further negative effects stemming from the decline in manufacturing employment. The authors’ novel research supports the emerging view that labor market conditions can impact different dimensions of health: In this case, loss of manufacturing jobs are associated with higher rates of prescription opioid abuse and overdose deaths. Further, those negative social effects can prevent the economic recovery of these regions as possible employers may be reluctant to locate where a large number of potential workers frequently fail drug tests.

Finally, the authors investigate why these sectoral changes seem so intractable. Industries have evolved for decades and workers have either moved, taken new jobs or otherwise adapted. However, many workers today in these communities seem trapped in place, opting to drop out of the workforce and otherwise make ends meet.

Monthly U.S. Manufacturing Employment 1977-2014



Aggregate Trends and Local Effects

Before exploring recent trends in manufacturing employment, it is worth reviewing why economists pay such close attention to this sector:

- **Size:** Historically, manufacturing has accounted for a large portion of US employment, including roughly 20 percent in 1980.
- **Concentration:** Manufacturing jobs are highly concentrated in particular locations, meaning that negative employment shocks have large spillovers in communities and regions.
- **Policy:** Given its size and concentrated importance, manufacturing has occupied a large role in policy debates.
- **Human capital:** Manufacturing has long provided jobs for less educated workers; for example, as of 1980, over one-third of employed men between the ages of 21 and 55 with a high school degree or less worked in the manufacturing sector.

The massive transformation of manufacturing since 2000, along with a sharp decline in work propensity among prime-age persons, are two historically significant changes to the sector. The authors train their extensive analytical tools on the question of whether and how much these two phenomena are causally related. Their work reveals that the persistent long-run decline in employment and hours for prime-age workers did not occur evenly across the US. For example, a 10-percentage-point decline in the local manufacturing share reduced local employment rates by 3.7 percentage points for prime age men and 2.7 percentage points for prime-age women.

How much of this local job loss accounts for the national decline in employment rates? Recall that aggregate employment rates for men aged 21 to 55 fell by 4.6 percentage points from 2000 to 2017 (2.8 percent for women). The

Total Manufacturing Establishments 1977-2017 (in 1,000s)



authors estimate that between one-third and one-half of this decline can be attributed to the decline in the manufacturing sector. These are initial estimates that will be refined by further analysis, the authors note, but they are large enough to reveal the causal connection between the decline in manufacturing and the drop in prime-age employment. Importantly, their results reveal an even larger effect for prime-age workers with less education.

For many workers, manufacturing jobs provide relatively high wages, and the authors show that as employment and hours fell, so did wages in affected commuting zones. The authors take this as strong evidence that their estimates of reductions in employment and hours do not primarily reflect reduced labor supply, but instead are the product of decreased labor demand.

For some, this decline in manufacturing employment means the US should engage in trade policies that reduce the impact of international competition on the demand for US-produced goods. However, the authors' analysis reveals that US manufacturers did not hire less labor because of falling demand for manufacturing output. Despite a reduction in output during the Great Recession, a 27 percent decline in manufacturing employment, and a 21 percent decline in manufacturing establishments, US total manufacturing output is 7 percent higher today than in 2000. The authors describe the adoption of production techniques that use less labor as a potential explanation for this phenomenon, noting evidence which suggests greater technology adoption and capital deepening in the sector over the past two decades.

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U.S. Quarterly Real Output Index for the Manufacturing Sector (2000Q1 = 100)



Regarding trade and its effect on manufacturing employment, considerable attention has been paid recently to the impact of China on US markets. However, the authors review estimates in the literature which suggest that import competition from China accounts for only about one-quarter of the decline in manufacturing during the 2000s. Further, the authors' analysis reveals that manufacturing employment declined substantially over the 2000s even in markets where there was essentially no manufacturing loss because of Chinese imports.

Additionally, they authors show that shocks to manufacturing that were unrelated to China or trade had very similar effects on local labor markets to any Chinese import shock. An implication of these results is that policy efforts to address the adverse labor market effects of trade will not reverse the broader trend in manufacturing employment that has significantly weakened labor market options, particularly for less educated workers.

Effect of Manufacturing Decline on Wellbeing: Evidence from Opioid-Use

Permanent loss of jobs and reductions in wages have pernicious effects beyond the financial wellbeing of workers and households and can also affect their overall health. The authors reveal that local manufacturing decline was associated with increased prescription opioid drug use and overdose deaths at the local level.

Besides providing evidence about the adverse effect of negative manufacturing shocks on worker well-being, the authors' drug results highlight how negative local labor market shocks may have interacted with factors like changes in physician prescription behavior to drive the ongoing opioid epidemic in the United States. Further, manufacturing decline resulted in more failed drug tests among workers tested by their firms. Higher rates of failed drug tests among potential workers can hamper the economic recovery of a region as existing and potential employers may have trouble filling roles.

The authors acknowledge that it is still an open question as to who, specifically, increases their drug use in affected communities—persons who lose work or family members whose income falls when breadwinners are displaced. Similarly, current data do not distinguish between increased drug use for persons intending to find a job vs. those who will not seek employment.

Why A Persistent Employment Effect?

The US economy has experienced sector declines throughout its history, and the manufacturing sector itself has, at other periods, shed large numbers of jobs. However, rarely have the negative employment rate effects of these changes been as large or persistent. Manufacturing employment differences in the 1980s, for example, had little effect on local employment rates. What is different about today? To help answer this question, the authors focus on three mediating mechanisms: transfer receipt from public and private sources, skill mismatch within the manufacturing sector, and regional migration.

Briefly, the authors find evidence that more persons in affected areas are on disability, but the effects are small and do not explain why employment rates have remained so persistently low in the wake of declining manufacturing employment. As for private transfers, one measure is evidence of altered cohabitation patterns, but the authors find no evidence for this phenomenon.

Skill mismatch provides stronger evidence the persistent effect of manufacturing decline on employment, with mismatch even occurring within the manufacturing sector. Manufacturing is becoming an increasingly skilled sector, particularly relative to other industries that have historically employed lower educated workers, such as retail and construction. For example, in the early 2000s, one in five younger workers in manufacturing had a bachelor's degree; by 2017, that rate was one in four.

CLOSING TAKEAWAY

Imposing trade barriers will not substantially increase the employment prospects of workers with lower levels of accumulated schooling.

Finally, the authors describe a striking feature among displaced workers relative to prior periods: fewer of them are willing to move across regions in search of work. A number of explanations have been posited for this phenomenon, but current research does not offer conclusive answers.

Implications

This paper contributes to ongoing debates about industrial, environmental, and trade policy—all with the aim of promoting employment in the manufacturing sector. A key issue in these debates is the cost and benefit of free trade policies. While recent research shows that import competition has played an important role in the decline of U.S. manufacturing employment during the 2000s, the authors' results suggest that imposing trade barriers will not substantially increase the employment prospects of workers with lower levels of accumulated schooling. As they reveal, the manufacturing sector is increasingly highly skilled in terms of worker education. In addition, manufacturing has become much more capital intensive since 2000.

Finally, the closed factories that accounted for much of trade-related job loss during the 2000s were likely using more labor-intensive technology. Should trade barriers be erected, any new manufacturing plants created in the US would almost surely use more capital-intensive technologies. While certain policies to support the manufacturing sector (like imposing tariffs on imports) may increase US manufacturing output, they will likely not have large effects on the employment rates of workers with lower levels of education.

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