

# The Nature of Work after the COVID Crisis: Too Few Low-Wage Jobs

David Autor and Elisabeth Reynolds



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This policy essay is an essay from the authors. As emphasized in The Hamilton Project's original strategy paper, the Project was designed in part to provide a forum for leading thinkers across the nation to put forward innovative and potentially important economic policy ideas that share the Project's broad goals of promoting economic growth, broad-based participation in growth, and economic security. The authors are invited to express their own ideas in policy papers, whether or not the Project's staff or advisory council agrees with the specific proposals. This policy paper is offered in that spirit. David Autor is a trustee and board member for the Urban Institute; codirector of the Labor Studies Program at the National Bureau of Economic Research; member of the Congressional Budget Office's Panel of Economic Advisors; and a board member of the Opportunity and Inclusive Growth Initiative of the Federal Reserve Bank of Minneapolis. The authors did not receive financial support from any firm or person with a financial or political interest in this article and Reynolds is currently not an officer, director, or board member of any organization with an interest in this article.

**BROOKINGS**

## Introduction

Prior to the onset of the COVID crisis, the industrialized world was undergoing rapid employment growth, so much so that *The Economist* magazine declared in May 2019, “Most of the rich world is enjoying a jobs boom of unprecedented scope” (*The Economist* 2019). Despite these encouraging trends, a cross-national Pew Research Center survey conducted in 2018 found that majorities of citizens in advanced and emerging economies anticipated that robots and computers would probably or definitely take over many jobs, exacerbating inequality, and making it more difficult to find work (Wike and Stokes 2018). The COVID crisis has upended these predictions, bringing to an end the longest economic expansion in U.S. history and causing a worldwide spike in unemployment. Ironically, technological advances generally, and automation specifically, had almost nothing to do with this reversal of fortune. Should we now stop worrying about technological unemployment and focus instead on conventional threats? Or are all prior bets simply off?

In our view, the answer to both questions is *no*. The current COVID crisis makes the trajectory of automation’s impact on employment more readily discernible, and what we see provides no grounds for setting aside our concerns. The COVID crisis appears poised to reshape labor markets along at least four axes: telepresence, urban de-densification, employment concentration in large firms, and general automation forcing. Although these changes will have long-run efficiency benefits, they will exacerbate economic pain in the short and medium terms for the least economically secure workers in our economy, particularly those in the rapidly growing but never-highly-paid personal services sector.

## Background

Before we try to predict the future, it would be helpful to review how we got here. In the decades immediately following World War II, from the mid-1940s to the late 1970s, rapid technological advances and well-functioning institutions in the United States delivered rising productivity and rapid, evenly distributed wage gains to the vast majority of workers. This virtuous dynamic broke down in the years from the mid 1970s to the present. Even though aggregate productivity rose by approximately 75 percent between 1973 and 2016 and average worker compensation rose by 50 percent, the distribution of gains was so skewed that the *median* worker saw less than a 20 percent increase in compensation in these decades (Stansbury and Summers 2018).

The disconnect between rising productivity and stagnating median wages during the last forty-five years underscores

that citizens have legitimate grounds for concern about the consequences of technology (broadly) and automation (specifically) for worker and citizen welfare. New and emerging technologies will surely raise aggregate economic output and boost societal wealth. But whether the typical citizen will share in these benefits is demonstrably uncertain. We have argued elsewhere that whether rising aggregate productivity translates into shared prosperity or simply rising inequality depends crucially on the operation of institutions of governance, societal investment, education, law, and public and private leadership (Autor, Mindell, and Reynolds 2019).

## COVID Crisis and Postcrisis Trajectory

Despite our concerns about the distributional consequences of advancing technologies, until the COVID crisis began, we were sanguine about the prospects for ongoing employment growth, even in the face of lackluster wage growth. In the fall of 2019 we wrote, “We anticipate that in the next two decades industrialized countries will have more job openings than workers to fill them, and that robotics and automation will play an increasingly crucial role in closing these gaps” (Autor, Mindell, and Reynolds 2019, 19). The COVID crisis has upended our confidence in that prediction—not merely because COVID has generated mass unemployment in the short term, which it has, but also because the postcrisis trajectory now worries us. In the following sections, we lay out four reasons why.

### TELEPRESENCE

The first major postcrisis transformation is so self-evident that it might escape notice. That change is telepresence. Our MIT colleague David Mindell has famously observed that telepresence is a form of automation (Mindell 2015). While Mindell originally made this remark about underwater drones (also known as unmanned submarines, which is a technology that he has pioneered), the point applies broadly. Placing people in any physically hostile environment—such as at the bottom of the sea, in Earth’s upper atmosphere, at a bomb disposal site—entails costly, energy-intensive, life-support systems that provide climate control (i.e., oxygen, temperature regulation, atmospheric pressure), water delivery, waste disposal, and so on. By obviating these needs, telepresence not only reduces costs but also typically creates better functionality: machines unencumbered by physically present operators can take on tasks that would be perilous with humans aboard.

These same lessons apply to workplaces. Though (most) work environments are not overtly hostile to human life, they are expensive, duplicative places for performing tasks that many

employees could telepresently accomplish from elsewhere, albeit with a loss of the important social aspects of work that they facilitate. Not only is providing and maintaining physical offices costly for employers, but also the need to be physically present in offices imposes substantial indirect costs on the employee. The Census Bureau estimates that U.S. workers spend on average of 27 minutes commuting to work one way, which cumulates to 225 hours per year (U.S. Census Bureau 2019; authors' calculations). Arguably, many of us who perform "knowledge work" have been so accustomed to the habit of "being there" that we failed to notice the rapid improvements in the next best alternative: *not* being there.

It seems a near certainty that, long after the COVID crisis has subsided, the share of workers who work partly or primarily from home will be substantially greater than it was precrisis. Indeed, U.S. employers project that the share of working days delivered from home will triple after the pandemic has passed (Altig et al. 2020). This projection, of course, applies primarily to the top quartile of higher-educated workers whose work is easily done remotely (Dingel and Neiman 2020), and we discuss the implications for other workers immediately below. These same considerations surely apply to business travel: much of this physical travel was once indispensable but telepresence has made it much less so, and firms will want to carefully rethink what portion is still worth paying for.<sup>1</sup> The crisis has also spurred rapid adoption of telemedicine for delivering the subset of medical services that can be performed "hands off" (Hollander and Carr 2020). Telemedicine has facilitated social distancing in the short run. In the longer run, it will reduce office time among both providers and patients.

If telepresence displaces a meaningful fraction of professional office time and business travel, the accompanying reductions in office occupancy, daily commuting trips, and business excursions will mean steep declines in demand for building cleaning, security, and maintenance services; hotel workers and restaurant staff; taxi and ride-hailing drivers; and myriad other workers who feed, transport, clothe, entertain, and shelter people when they are not in their own homes. This is significant because these services make up a large and rising share of employment among workers without postsecondary credentials; collectively, these services account for one in four U.S. jobs. In May 2019, 9.2 percent of U.S. employment was in food preparation and serving occupations, 8.5 percent in transportation, 3.0 percent in buildings and grounds cleaning and maintenance, and another 4.6 percent in protective services and in personal care and services (Bureau of Labor Statistics 2019). A substantial, long-run demand contraction in these services will mean significant job loss—or lock-in of existing COVID-induced job losses—and a sustained period of labor market adjustment.

These challenges will likely be compounded by the unfolding wave of major retail bankruptcies. In 2019 retail sales employment accounted for approximately 3.4 percent of employment. These are typically low-paid jobs, with median annual earnings of \$25,400 in 2019 (Bureau of Labor Statistics n.d.). While employment in this sector was already under grave pressure from online competition, the COVID crisis will compress into a few short months what would otherwise have unfolded over multiple years. The uptick in bankruptcies of major retail chains this spring is a signal that this transformation has already begun.

There is an irony to these observations. Many scholars, the authors included, have lamented the polarization of employment in the United States and throughout the industrialized world. As the demand for workers in middle-skilled production, clerical, and administrative support occupations has eroded in the face of automation and, in the case of production work, globalization, the U.S. labor market has increasingly resembled a barbell economy:<sup>2</sup> Professional, technical, and managerial occupations put poundage on the high-wage side of the bar, while food services, cleaning, security, entertainment, recreation, repair, and health services add mass to the low-wage side of the bar. If demand for personal and business services is permanently diminished in the post-COVID labor market, this will in effect mean that weight is sliding off the low-wage end of the bar.

Given the obvious downsides of job polarization, it is legitimate to ask, Is it possible that the pandemic-related reallocation of work out of low-wage, economically insecure personal service occupations is actually good news in disguise? The answer, unfortunately, is no. Reducing demand for non-college-educated workers in low-paid jobs will not ultimately raise demand for these same workers in middle-paid jobs. Workers who remain in these jobs may face even lower wages. Those displaced may suffer significant hardship as they seek new work, potentially in occupations where they have no experience or training. Paradoxically, having too few low-wage, economically insecure jobs is actually worse than having too many.

And then there is the challenge of recovery. At the macroeconomic level, tight labor markets—as the United States enjoyed until very recently—generate aggregate benefits: upward wage pressure for low-paid workers, rising employment-to-population rates, employers' greater willingness to hire workers with physical work limitations or checkered histories, and improved household finances that buttress consumer confidence and augment labor demand.<sup>3</sup> In the best-case scenario, the COVID recovery will feature a sharp snapback across all sectors and a return to the high-pressure labor markets of the late 2010s. Alternatively, if sectors such as hospitality, building services, and



transportation end up being permanently diminished, then current labor market slack will take additional years to work off, and the macroeconomic benefits of tight labor markets will take longer to return accordingly.<sup>4</sup>

## URBAN DE-DENSIFICATION

This brings us to our second forecast: COVID-induced changes in work patterns will alter the character of cities. If our predictions are correct about long-term reductions in office occupancy, daily commuting trips, and business travel, these changes will affect not only demand for specific job categories but also the economic structure of places. The past three decades have witnessed an urban renaissance. U.S. cities have seen steep reductions in crime, significant gains in racial and ethnic diversity, outsized increases in educational attainment, and a reversal of the tide of suburbanization that drew young, upwardly mobile families out of cities in earlier decades (Autor 2019; Autor and Fournier 2019; Berry and Glaeser 2005; Diamond 2016; Glaeser 2020). It seems plausible, though far from certain, that the post-pandemic economy will see a partial reversal of these trends. If financiers, consultants, product designers, researchers, marketing executives, and corporate heads conclude that it is no longer necessary to commute daily to crowded downtown offices, and moreover, if business travelers find that they need to appear at these locations less frequently, this may spur a decline of the economic centrality, and even the cultural vitality, of cities. Given that the primary engine of job growth, albeit not wage growth, among urban non-college-educated workers over the past several decades has been expanding employment in personal services (i.e., food service, cleaning, security, entertainment, recreation, health aides, transportation, maintenance, construction, and repair), these changes in the economic structure of urban life would again fall heavily on the employment prospects of urban low-paid workers. Following job opportunities would require costly and disruptive relocation outside of these urban areas.

We stress that reports of the death of cities have been greatly exaggerated over many decades (Gaspar and Glaeser 1998). Even as popular commentators opined that the internet has rendered the economic world effectively flat, leading indicators have pointed in the opposite direction over the past 30 years: rising urban rents, corporations relocating their headquarters to both expensive marquee locations (Los Angeles, New York, San Francisco) and mid-sized, more affordable cities (Atlanta, Austin, Des Moines, Greenville, Nashville, Provo); and the weight of U.S. GDP shifting toward a handful of superstar cities that drive a disproportionate and rising share of national and global innovation (Glaeser 2011; Hsieh and Moretti 2019). We anticipate that the COVID crisis will moderate rather than reverse these trends. And this moderation could have benefits: cities could become less hectic, more affordable, and ultimately more family friendly.

While we are uncertain about the net effects of the COVID crisis on cities, we are convinced that the pandemic will permanently alter the texture of urban life. And, if that is true, the texture of suburban life may change as well, perhaps in the opposite direction.

## EMPLOYMENT CONCENTRATION IN LARGE FIRMS

A third lasting labor market consequence of the pandemic appears far less speculative. The depth and duration of the ongoing COVID crisis appears likely to disproportionately cull the ranks of small firms, which typically lack the liquidity and preferential access to credit markets needed to survive many months of inactivity (see Walsh 2020). The ensuing wave of business closures will accelerate the current trend of rising dominance of large firms across numerous industries (Rose 2020), which will have negative consequences for workers. Because large firms tend to pay a smaller share of earnings to workers and a larger share to owners and investors, the reallocation of economic activity from small and mid-size firms to large firms will tend to reduce the share of national income paid to wages and salaries (also called labor's share) (Autor et al. 2020). This reduction will reinforce the sharp fall in labor's share of national income that has taken place in the United States since the year 2000. While a fall in labor's share does not imply any change in the size of the economic pie, it does mean a rise in inequality. Because ownership of capital is far more concentrated than ownership of labor (something that no one owns more than one of), a contraction in labor's slice of the economic pie means rising aggregate income concentration.

## AUTOMATION FORCING

A fourth and final (for the purposes of this paper) consequence of the crisis that is currently difficult to measure or quantify, but that could prove important in the future, is what one might generically call automation forcing. Spurred by social distancing requirements and stay-at-home orders that generated a severe temporary labor shortage, firms have discovered new ways to harness emerging technologies to accomplish their core tasks with less human labor—fewer workers per store, fewer security guards and more cameras, more automation in warehouses, and more machinery applied to nightly scrubbing of workplaces. In June of 2020, for example, the MIT Computer Science and Artificial Intelligence Lab launched a fleet of warehouse disinfecting robots to reduce COVID risk at Boston area food banks (Gordon 2020). Throughout the world, firms and governments have deployed aerial drones to deliver medical supplies, monitor social distancing in crowds, and scan pedestrians for potential fever (Williams 2020). In the meatpacking industry, where the novel coronavirus has sickened thousands of workers, the COVID crisis will speed the adoption of robotic automation (Motlteni 2020). Surely, there are myriad other

examples that are not yet widely known but will ultimately prove important. We also note that not all innovations are technological in the conventional sense. In interviews of small and mid-size manufacturing firms conducted by the MIT Work of the Future Task Force during the crisis, several employers reported that, rather than shut down or curtail production, they found instead that it was feasible to reconfigure their lines to be less labor-intensive without sacrificing output.<sup>5</sup>

As the danger of infection recedes and millions of displaced workers seek reemployment, the temporary labor shortage will give way to a potentially sustained period of labor surplus. Firms will not, however, entirely unlearn the labor-saving methods that they have recently developed. We can expect leaner staffing in retail stores, restaurants, auto dealerships, and meat-packing facilities, among many other places. Like the decline of retail, these developments were sure to happen over the longer run. But the crisis has pulled them forward in time, hastening both the accompanying productivity gains and the inevitable labor market adjustments. The post-crisis labor glut may blunt this force, at least temporarily: when labor is cheap and abundant, firms have less incentive to invest in automation. Yet, when the labor market tightens again, those labor-saving innovations will be waiting in the wings.

## Conclusion

We began this essay by asking whether the lessons of the COVID crisis have overturned conventional wisdom—or at least *our* wisdom—on the labor market consequences of advancing automation. Our answer is no, yes, and maybe. *No*, the COVID crisis has not made irrelevant the threat that automation poses to conventional job tasks. If anything, the crisis has simply brought the possibility of an increasingly automation-intensive future closer to the present. On the other hand, *yes*, the COVID crisis has shaken our core confidence that the U.S. labor market, caught between the demographic pincers of a swelling retiree population and a flagging fertility rate, would almost inevitably experience structurally tight labor markets for many years to come. No one foresaw that a global pandemic would spur an overnight revolution in telepresence that may upend commuting patterns and business travel, and hence dent demand in rapidly growing—though never highly paid—personal service occupations. Tight labor markets no longer appear inevitable—and certainly their return is some years off—which raises greater concerns about the trajectory of the polarized U.S. labor market.

Finally, as to whether these developments mean that the U.S. labor market will continue to deliver negligible—or perhaps

negative—earnings gains for the typical U.S. worker, we say *maybe*. On its current trajectory, the unfortunate answer is likely yes. But the weight of cross-national evidence indicates that countries have a choice about the level of economic inequality that they tolerate and the plight of the typical worker (Autor, Mindell, and Reynolds 2019). The United States has done little to advance income growth or economic security among rank-and-file workers over the past four decades. But the contemporaneous examples provided by peer nations demonstrates that this was never inevitable. The United States could have done differently, and it still can. Will it?

The institutional response in the United States to the COVID crisis has been far more sweeping and effective than almost any level-headed policy wonk would have forecast. In the space of two short weeks in March 2020 the U.S. Congress enacted a legislative response to the coronavirus—the CARES Act—that was unprecedented in its scale and scope, investing 5 percent of GDP to broaden and deepen the generosity of the U.S. unemployment insurance system, offer forgivable loans to businesses that maintained employment during the crisis, and cushion the financial dent to household by issuing large, one-time cash payments to more than 130 million taxpayers (U.S. Department of the Treasury 2020). These steps have yielded economic dividends by partially insulating U.S. households from the massive increase in unemployment and business closure wrought by the pandemic.

Thus, while the crisis has accelerated the trajectory of automation and its likely impact on jobs, the long-run consequences for rank-and-file workers remain to be determined. The United States could, of course, hope to return to its pre-COVID labor market trajectory, which would mean generating large numbers of low-paying jobs. Or, as the example of CARES demonstrates, we could use the remarkable power of public and private investment to do much better, for example by making permanent the extension of unemployment insurance to independent contractors and others who previously did not qualify; by investing to upskill those whose jobs were made redundant, ideally using those online learning tools that have performed well during the pandemic; by recalibrating federal policy to stem abusive labor practices that weaken the bargaining power of low-paid workers (e.g., compulsory noncompete agreements and binding arbitration clauses); and by harnessing the virtually interest-free lending environment to rebuild public infrastructure, stimulating employment growth in the short run and economic growth over the longer run. Will the United States take these steps? We would have said a resolute *no* three months ago. At present, we have more hope that this could be a *maybe*.

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David Autor is Ford Professor in the MIT Department of Economics, codirector of the NBER Labor Studies Program, and coleader of both the MIT Work of the Future Task Force and the JPAL Work of the Future experimental initiative. His scholarship explores the labor-market impacts of technological change and globalization on job polarization, skill demands, earnings levels and inequality, and electoral outcomes.

Autor has received numerous awards for both his scholarship—the National Science Foundation CAREER Award, an Alfred P. Sloan Foundation Fellowship, the Sherwin Rosen Prize for outstanding contributions to the field of Labor Economics, and the Andrew Carnegie Fellowship just last year—and for his teaching, including the MIT MacVicar Faculty Fellowship.

In 2017, Autor was recognized by Bloomberg as one of the 50 people who defined global business. In a 2019 article, the Economist magazine labeled him as “The academic voice of the American worker.” Later that same year, and with (at least) equal justification, he was christened “Twerpy MIT Economist” by John Oliver of Last Week Tonight in a segment on automation and employment.

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Before coming to MIT, Reynolds was the Director of the City Advisory Practice at the Initiative for a Competitive Inner City (ICIC), a non-profit founded by Professor Michael Porter focused on job and business growth in inner cities. She has been actively engaged in efforts to rebuild manufacturing capabilities in the US as a member of the MA Advanced Manufacturing Collaborative, and more recently, the MA Emergency Response Team set up in the face of COVID-19 to increase the state’s production of PPE.



## Endnotes

1. For examples of business leaders expressing these sentiments, see Cutter (2020).
2. See Goos, Manning, and Salomons (2014), Autor (2014a, 2015), and Deming (2017). For a contrasting argument on the forces reshaping employment and earnings in the United States, see Stansbury and Summers (2020).
3. On the benefits of tight labor markets, see Krueger and Solow (2002).
4. This point is developed in further detail in Barrero, Bloom, and Davis (2020). The lingering uncertainty about the path of recovery will itself slow the recovery, as pointed out by Baker et al. (2020).
5. Effective management practices should arguably be considered a “technology” that can have large direct impacts on productivity. See Bloom and Van Reenen (2006).

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## Summary

David Autor and Elisabeth Reynolds ask whether the COVID-19 pandemic has changed the conventional wisdom about automation and inequality in the United States over the past four decades. They make four projections about a rapidly-automating post-COVID-19 economy: increasing telework, urban de-densification, large-firm consolidation, and forced automation, all of which have significant, negative consequences for low-wage workers and economic inequality. On a more hopeful note, they conclude that rising inequality is not the only possible path forward, with the immense government investment of the past months suggesting the possibility of large-scale interventions to alleviate the costs of automation.

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