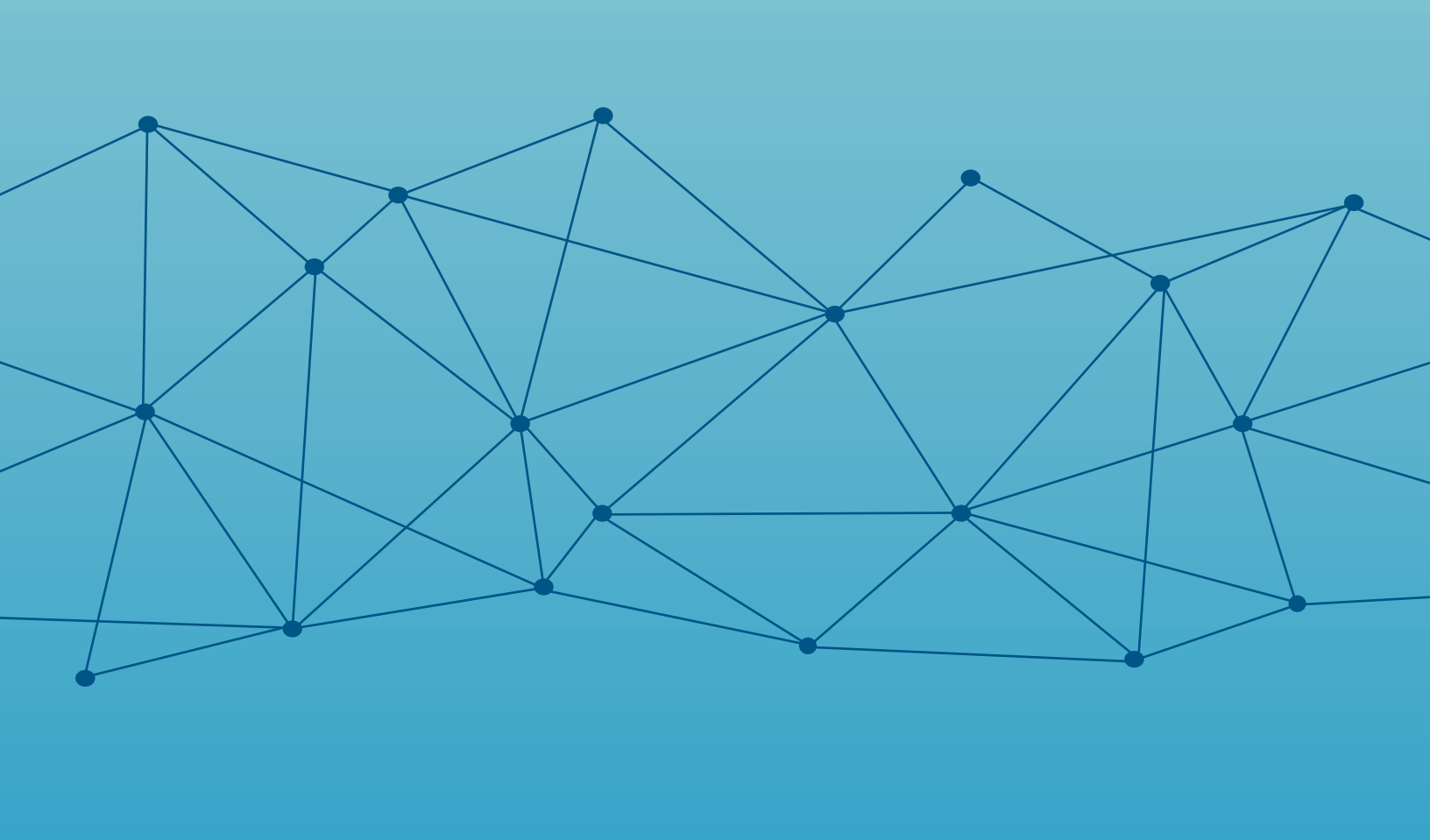


Automation and a Changing Economy

PART II: POLICIES FOR SHARED PROSPERITY



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APRIL 2019


THE ASPEN INSTITUTE
FUTURE OF
WORK
INITIATIVE



About the Future of Work Initiative

The Aspen Institute Future of Work Initiative is a nonpartisan effort to identify concrete ways to address the challenges American workers and businesses face due to the changing nature of work in the 21st century. Established in 2015, the Initiative is driven by the leadership of Honorary Co-Chairs Senator Mark R. Warner and Purdue University President and former Governor of Indiana Mitch Daniels, and Co-Chairs John Bridgeland and Bruce Reed. Executive Director Alastair Fitzpayne leads an Aspen Institute staff, based in Washington, DC.

To learn more, visit www.aspeninstitute.org/futureofwork.

Acknowledgments

The authors would like to thank the many experts who reviewed drafts of this paper and provided helpful thoughts and insights, including: Rob Atkinson of the Information Technology and Innovation Foundation; David Autor of the Massachusetts Institute of Technology; Laura Berntsen; Harin Contractor of the Joint Center for Political and Economic Studies; Maureen Conway of the Aspen Institute's Economic Opportunities Program; Jonathon Dworkin of the NewDEAL Forum; Kenan Fikri of the Economic Innovation Group; Erica Groshen of the Cornell ILR School; Andrew Hanson of the Strada Institute for the Future of Work; Jon Hiatt of the Solidarity Center & Berkeley Labor Center; Harry Holzer of Georgetown University; Louis Hyman of the Cornell ILR School; Nicole Isaac and Elizabeth Wilke of LinkedIn; Tamar Jacoby of Opportunity America; Kermit Kaleba and Andy Van Kleunen of the National Skills Coalition; Rachel Korberg and Ritse Erumi of the Ford Foundation; James Manyika, Susan Lund, Michael Chui, and Jake Silberg of the McKinsey Global Institute; Denis McDonough, Molly Elgin-Cossart, and David Marsh of the Rework America Task Force at the Markle Foundation; Genevieve Melford of the Aspen Institute's Financial Security Program; Mario Morino of Morino Ventures, LLC; Nigel Morris of QED Investors; Mark Muro of the Brookings Institution; Kristin Sharp of the Work, Workers, and Technology Initiative at New America; Rachael Stephens of the National Governors Association; Andy Stettner of the Century Foundation; Darrell West of the Brookings Institution; Portia Wu of Microsoft; and Edward Wytkind formerly of the AFL-CIO Transportation Trades Department. The authors would also like to thank the Future of Work Initiative team for their work reviewing and editing this report.

The Future of Work Initiative is grateful to the Autodesk Foundation for providing financial support for this publication. The Initiative's work is made possible through the generous philanthropic support of a range of foundations, individuals, and corporate partners.

The statements, views, and conclusions expressed in this report are solely the responsibility of the authors.

Introduction

Part I of this report, *Automation and a Changing Economy: The Case for Action*, explores how automation has impacted and will continue to impact the economic security and opportunity of the American worker.

But technology is not destiny. The impact of innovation on the American worker is mediated by policies and institutions. We can choose to create an economy that:

- » promotes technological progress;
- » prepares workers to take advantage of the opportunities technology presents;
- » supports those who are negatively impacted by automation return to stable work; and
- » shares technology's gains more broadly.

These goals are achievable with the right support, but the policy structures currently in place are inadequate.

This part of the report, *Automation and a Changing Economy: Policies for Shared Prosperity*, outlines a policy agenda for addressing these challenges and opportunities. Doing so requires an all-of-the-above approach, from targeted, specialized interventions to those with systems-level impact; from place-based policies to national-level reforms to safety net programs. The paper identifies four objectives that guide its recommendations:

Encourage Employers to Lead a Human-Centric Approach to Automation

CHALLENGE	SOLUTION
Automation changes workforce skill needs, yet employer investment in workforce development has declined.	Promote employer engagement and investment through a worker training tax credit, expansion of apprenticeships, and new sector and regional workforce partnerships.
CHALLENGE	SOLUTION
Employers are making decisions about adopting automation, but may not take into account potential impacts on workers and communities.	Encourage employers to adopt a multi-stakeholder approach to automation decisions by promoting new forms of worker voice and ownership and developing proactive strategies to identify and address impacts in advance.

Enable Workers to Access Skills Training, Good Jobs, and New Economic Opportunities

CHALLENGE

The labor market is constantly evolving, with automation contributing to changing jobs and skill needs, but supports for worker training and adult education are limited.

SOLUTION

Improve access to effective and affordable skills training and develop a culture and system of lifelong learning.

CHALLENGE

Many workers struggle to make ends meet, and while automation has the potential to improve job quality, it also may lead to more low-wage jobs and greater economic insecurity.

SOLUTION

Increase wage subsidies and the minimum wage, while creating more economic opportunities by improving labor market flexibility and promoting entrepreneurship.

Help People and Communities Recover from Displacements

CHALLENGE

Workers displaced by automation face significant economic challenges.

SOLUTION

Strengthen supports for unemployed workers through retraining, reemployment services, and Unemployment Insurance to help displaced workers transition to new jobs and careers.

CHALLENGE

Communities that are severely impacted by automation require targeted and comprehensive strategies to recover and transition.

SOLUTION

Support local economic development and improve regional competitiveness through sector-based development strategies and investment in digital infrastructure.

Understand the Impact of Automation on the Workforce

CHALLENGE

Policymakers, communities, workers, businesses, educators, and other stakeholders struggle to understand how automation is changing the economy because federal, state, and local data on the impact of technology on work is inadequate.

SOLUTION

Provide key stakeholders with better information on the impact of automation by collecting data on technological advancements, adoption rates, and workforce impacts.

These proposals offer a broad range of ideas that speak to several parts of the opportunity and challenge of automation, but they are not exhaustive. Much more will need to be considered and pursued. Some ideas are tested and proven, ready to be taken to scale. Others are still being developed, requiring experimentation and rigorous evaluation. Though each proposal can and should be considered on its own merit, many proposals—such as those to improve training access, availability, and quality—complement one another, and taken together form the contours of a comprehensive agenda for responding to the challenges and opportunities posed by automation. To be sure, there are many critical issues affecting the economic security of the American worker that deserve attention and action. This agenda should therefore be considered as an important component of the broader need for policies that create opportunity and value work in the 21st century.

This agenda focuses largely on policy solutions. These challenges, however, cannot be overcome solely by government, and certainly not by national policymakers alone. The challenge of automation requires action from federal, state, and local policymakers to employers, worker organizations, education and training providers, civil society organizations, and community leaders.

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Encourage Employers to Lead a Human-Centric Approach to Automation

Automation can be a force for expanding opportunity and improving the quality of jobs, both in the form of higher wages for more productive work and through the work itself being less menial, more engaging, more creative, and more human. But there is no guarantee the workers whose jobs are automated are the same workers who will share in the benefits, nor is there any guarantee that the distribution of benefits across regions, demographic groups, and education levels will be equitable or will improve rather than exacerbate inequalities.

How automation impacts the workforce will in part depend on decisions businesses make. Will they implement technology that replaces or augments human labor? How will businesses ensure that their workers are adequately prepared as automation changes work? If businesses implement labor-displacing technology, will they help workers transition to new jobs? As businesses adopt automating technologies to realize efficiency gains, lower costs, improve their products, and increase outputs, they should account for how these decisions may impact their workforce and the broader community, and develop strategies that put humans at the center of their decision-making process.

The following proposals would:

- » Create a worker training tax credit to encourage business investment in employees
- » Encourage employers and educational institutions to expand apprenticeships
- » Support development of industry and sector partnerships to create regional jobs and career pathways
- » Encourage employers to engage workers in automation decision-making by promoting worker voice
- » Develop pre-crisis strategies to mitigate disruption and manage workforce transition
- » Promote broad prosperity through worker ownership

1. Create a Worker Training Tax Credit to Encourage Business Investment in Employees

Employers are uniquely positioned to prepare the workforce for automation. They have the scale, the resources, and the insight into changing skill needs. There is evidence to suggest that some large employers have increased training investment in the last few years in response to the historically tight labor market and the importance of having a skilled workforce. But the available data suggest that there has been a long-term downward trend in business training investments. From 1996 to 2008, the percentage of workers receiving employer-sponsored or on-the-job training fell 42 percent and 36 percent, respectively.¹ This decline was widespread across industries, occupations, and demographic groups.²

Without intervention, business investment in workers may continue to decline. In a recent Accenture survey of 1,200 CEOs and other top executives, 74 percent said that they plan to use artificial intelligence to automate tasks in their workplace over the next three years. Yet only three percent reported planning to significantly increase investments in training over the same time period.³

In part, the decline in employer-provided training can be explained by changes in the employer-employee relationship over the past forty years. Because the benefits of training ultimately reside with the worker rather than with the business, there will always be a portion of the investment that benefits the overall economy but not the business itself. If businesses plan to retain employees over a long period, they will benefit more directly from their training investments. But as relationships between workers and businesses become less stable and short-term, businesses have a difficult time capturing the return on their training investments. The result is less investment in training even as the workforce requires greater access to skills training.⁴

Recent legislation could accelerate this trend. Businesses often have to choose between using workers or machines to accomplish a task. The 2017 Tax Cuts and Jobs Act allows businesses to immediately expense the full cost of equipment purchases—including automation technology—rather than deduct the cost of the equipment over a period of time. By reducing the after-tax cost of investing in physical capital but not providing a similar benefit for investments in human capital, the legislation may further shift business priorities away from worker training.⁵

To help workers prepare for the changing economy, federal and state policymakers should encourage employers to make greater investments in worker training through

1 Council of Economic Advisors. 2015. "Economic Report of the President." https://obamawhitehouse.archives.gov/sites/default/files/docs/cea_2015_erp_complete.pdf. More recent data on employer-provided training has been mixed. Data from the Society for Human Resource Management suggests that employer-provided tuition assistance has been falling in recent years, from 66 percent of surveyed businesses offering tuition assistance benefits in 2008 down to 53 percent in 2017. Meanwhile, data from the Association for Training & Development suggests that employer training investments have been roughly flat over the last decade. Society for Human Resource Management. 2017. "2017 Employee Benefits." <https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/pages/2017-employee-benefits.aspx>. Association for Talent Development. 2017. "2017 State of the Industry." <https://www.td.org/research-reports/2017-state-of-the-industry>.

2 Waddoups. 2016. "Did Employers in the United States Back Away from Skills Training during the Early 2000s?" *ILR Review*. <http://ilr.sagepub.com/content/69/2/405>.

3 Shook and Knickrehm. 2018. "Reworking the Revolution." Accenture. <https://www.accenture.com/us-en/company-reworking-the-revolution-future-workforce>.

4 As economist Lisa Lynch writes, "Employees who are perceived to have higher turnover rates, such as low-wage and low-skilled workers, are less likely to receive employer-provided training.. in addition, training itself may contribute to employee turnover: if new skills are of value to other employers, then firms risk having their trained employee hired away." Lynch. 2004. "Development Intermediaries and the Training of Low-Wage Workers." In *Emerging Labor Market Institutions for the Twenty-First Century*. <https://www.nber.org/chapters/c9959.pdf>.

5 Tangel and McGroarty. 2018. "Tax Incentive Puts More Robots on Factory Floors." *Wall Street Journal*. <https://www.wsj.com/articles/tax-incentive-puts-more-robots-on-factory-floors-1516962600>.

a Worker Training Tax Credit. This tax credit, which the Aspen Institute Future of Work Initiative proposed in a recent issue brief, would mirror the policy design of the popular R&D Tax Credit.⁶ Businesses would establish a base expenditure level for qualified training expenses, which would be determined by averaging the amounts spent in each of the three years prior to the current tax year.⁷ The value of the tax credit would be 20 percent of the difference between the current year qualified training expenditure and the base expenditure level. The credit would only cover training for non-highly compensated workers (less than \$120,000 per year), the standard currently used in the Internal Revenue Code.⁸ Eligible activities include employer-provided training that leads to an industry-recognized credential, or training programs authorized under the Workforce Innovation and Opportunity Act.⁹ Similarly, the Information Technology and Innovation Foundation has proposed turning the existing R&D Tax Credit into a knowledge tax credit by expanding qualified spending under the credit to include spending on worker training.¹⁰

Two bills have been introduced in the U.S. Congress that are similar to the Aspen Institute proposal. Senator Mark Warner (D-VA)—along with Senators Bob Casey (D-PA) and Debbie Stabenow (D-MI)—first introduced the Investing in American Workers Act in October 2017. In 2018, Representative Raja Krishnamoorthi (D-IL), along with Representatives Joe Crowley (D-NY) and Linda Sánchez (D-CA), introduced a companion bill in the House.¹¹

In addition, several states provide businesses with tax incentives to encourage training investments, including Connecticut, Georgia, Kentucky, Mississippi, Rhode Island, and Virginia. These incentives range between 5 percent and 50 percent of eligible training expenses.^{12 13}

6 Fitzpayne and Pollack. 2018. "Worker Training Tax Credit." Aspen Institute Future of Work Initiative. <https://www.aspeninstitute.org/publications/worker-training-tax-credit-update-august-2018/>.

7 Adjusted for inflation (CPI-U).

8 This concept is found in Section 414(q) of the federal tax code. It was set at \$120,000 in total compensation in 2018. Internal Revenue Service. "Retirement Plans: Definitions." U.S. Department of the Treasury. <https://www.irs.gov/retirement-plans/plan-participant-employee/definitions>.

9 Section 3(52) of Workforce Innovation and Opportunity Act defines an industry-recognized credential as consisting of "an industry-recognized certificate or certification, a certificate of completion of an apprenticeship, a license recognized by the State involved or Federal Government, or an associate or baccalaureate degree." Section 122(a)(2) of the Workforce Innovation and Opportunity Act defines an eligible training provider as (A) an institution of higher education that provides a program that leads to a recognized postsecondary credential; (B) an entity that carries out apprenticeship programs; or (C) another public or private provider of a program of training services, which may include joint labor-management organizations, and eligible providers of adult education and literacy activities if such activities are provided in combination with occupational skills training.

10 Atkinson. 2015. "How a knowledge tax credit could stop decline in corporate training." Information Technology and Innovation Foundation. <https://itif.org/publications/2015/03/09/how-knowledge-tax-credit-could-stop-decline-corporate-training>.

11 U.S. Senate. "S.2048 - Investing in American Workers Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/senate-bill/2048>. U.S. House of Representatives. "H.R.5516 - Investing in American Workers Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/5516>.

12 Connecticut: Credit of 5 percent of all expenses incurred for the enhancement of human capital.
Georgia: Tax credit of 50 percent of a company's direct training expenses, with up to \$500 credit per full-time employee, per training program. Maximum annual credit per employee of \$1,250.
Kentucky: Tax credit of up to 50 percent of eligible training.
Mississippi: Tax credit of 50 percent of costs for training an employee, not to exceed \$2,500 per employee per year.
Rhode Island: Tax credit of 50 percent of training expenses for all employees, capped at \$5,000 per employee.
Virginia: Tax credit of 30 percent of training costs (if through community college) or \$200 annually (if through private schooling) for employers who participate in worker retraining efforts.

13 An evaluation by Connecticut's Department of Economic and Community Development found that the credit "produces modest and positive benefits... [including] cumulative productivity gains to firms making investment in human capital." Connecticut State Department of Economic and Community Development. 2014. "An Assessment of Connecticut's Tax Credit and Abatement Programs." http://www.ct.gov/ecd/lib/ecd/decd_sb_501_sec_27_report_revised_2013_final.pdf.

2. Encourage Employers and Educational Institutions to Expand Apprenticeships

As technology changes the occupational composition of the economy and the skills necessary to perform many jobs, workers need access to programs that provide in-demand skills that lead to good jobs and careers. The most effective strategies incorporate work-based learning models—programs developed through partnerships between employers and educational institutions that pair classroom learning with on-the-job learning.

Perhaps the most well-known work-based learning model is apprenticeships. There are four elements critical to apprenticeship programs' success:

- » Local employers are involved in program development, ensuring that curricula are aligned to the needs of the labor market.
- » Workers are paid while they are in the program, reducing the opportunity cost of training and promoting completion.
- » Instruction is work-based, which is a proven way to teach workplace skills, especially for those who have difficulty with traditional classroom learning.
- » Employment is incorporated into the program, so graduates have jobs waiting for them when they are finished.

Research has shown that apprenticeships are effective in placing workers in well-paying jobs. A 2012 study found that registered apprentices earned roughly \$240,000 more over their lifetimes than similar workers who did not go through such programs. Apprenticeships are also cost effective. The benefits to society exceed the costs by nearly \$50,000.¹⁴ Close to 90 percent of apprentices are employed after completing their programs with an average starting wage of over \$50,000.¹⁵ Unfortunately, apprenticeships are relatively scarce in the U.S., representing only 0.3 percent of the labor force—far below Canada (2.2 percent), Britain (2.7 percent), Australia (3.7 percent), and Germany (3.7 percent).¹⁶

A variety of factors contribute to the small number of apprenticeships in the U.S.:

- » There are not enough businesses developing or participating in apprenticeship programs, due to cost and administrative burdens.¹⁷
- » There can be a lack of awareness of the programs among workers.¹⁸
- » Workers may fear there is social stigma associated with apprenticeship programs relative to other post-secondary education options.¹⁹
- » Compared to other developed countries, the U.S. federal government does not play an active role in promoting apprenticeships. When it is involved, it

14 Reed et al. 2012. "An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States." Mathematica Policy Research. https://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_10.pdf.

15 The White House. 2015. "President Obama's Upskill Initiative." https://obamawhitehouse.archives.gov/sites/default/files/docs/150423_upskill_report_final_3.pdf.

16 Lerman. 2014. "Expanding Apprenticeship Opportunities in the United States." Brookings Institution. <https://www.brookings.edu/research/expanding-apprenticeship-opportunities-in-the-united-states/>.

17 Ibid.

18 Roepe. 2017. "Why Apprenticeships Are Taking Off." CityLab. <https://www.citylab.com/life/2017/02/why-apprenticeships-are-taking-off/514977/>.

19 Ibid.

largely focuses on ensuring the quality of existing registered apprenticeship programs rather than on encouraging new ones.²⁰

Some states, however, are taking a more active role. According to the U.S. Department of Labor (DOL), as a way to reduce costs, 12 states offer tax credits to employers that hire apprentices, and another 12 states offer tuition support for registered apprentices.²¹ For example, in Montana, employers who hire workers through the Montana Registered Apprenticeship unit are eligible for a \$750 tax credit.²² Massachusetts now offers a tax credit for employers who sponsor apprenticeship programs equal to \$4,800, or 50 percent of wages paid to each apprentice.²³

Other states have tried to relieve administrative hurdles, as well as costs. South Carolina has adopted a comprehensive, successful approach to encouraging apprenticeships. Through a combination of tax credits, apprenticeship consultants who help businesses with the registration process, and an engaged community college system, South Carolina's apprenticeship enrollment has expanded from roughly 800 in 2007 to nearly 30,000 in 2018.²⁴

There is a bipartisan consensus that the federal government should play a more active role in increasing apprenticeships, as both the Trump and Obama administrations prioritized expanding these programs.²⁵ In Congress, four bipartisan bills have been introduced that would create federal tax credits to encourage businesses to create apprenticeship programs, create a competitive grant program, and expand registered apprenticeships to more occupations.²⁶ Importantly, expanding apprenticeships to more occupations could make the model more inclusive of currently underserved populations. For instance, women are under-represented in registered apprenticeships, accounting for just 7 percent in 2017, in part because apprenticeships are traditionally dominated by construction and building trades which disproportionately employ men.²⁷

20 Collins. 2018. "Registered Apprenticeship: Federal Role and Recent Federal Efforts." Congressional Research Service. <https://fas.org/sgp/crs/misc/R45171.pdf>.

21 Office of Apprenticeship. "Learn about Tax Credits." U.S. Department of Labor. <https://www.doleta.gov/oa/taxcredits.cfm>.

22 Office of Governor Steve Bullock. 2017. "Governor Bullock Highlights Tax Incentive for Montana Businesses to Grow and Create Jobs." <https://governor.mt.gov/Newsroom/governor-bullock-highlights-tax-incentive-for-montana-businesses-to-grow-and-create-jobs>.

23 Harpel. 2018. "New incentive program encourages apprenticeships." Smart Incentives. <https://smartincentives.org/new-incentiveprogram-encourages-apprenticeships/>.

24 Moore. 2017. "South Carolina's apprenticeship initiative cracks growth milestone as new U.S. labor secretary advocates for on-the-job training." *Post and Courier*. https://www.postandcourier.com/business/south-carolina-s-apprenticeship-initiative-cracks-growthmilestone-as-new/article_72157c86-3c05-11e7-9514-7bb6c3409ac9.html.

25 U.S. Department of Labor. 2018. "Task Force on Apprenticeship Expansion Submits Strategy to Create More Apprenticeships." <https://www.dol.gov/newsroom/releases/osec/osec20180510>.
The White House. 2016. "Fact Sheet: Investing \$90 Million through ApprenticeshipUSA to Expand Proven Pathways into the Middle Class." <https://obamawhitehouse.archives.gov/the-press-office/2016/04/21/fact-sheet-investing-90-million-through-apprenticeshipusa-expand-proven>.

26 U.S. Senate. "S.1352 - Apprenticeship and Jobs Training Act of 2017." 115th Congress. <https://www.congress.gov/bill/115th-congress/senate-bill/1352>.

U.S. House of Representatives. "H.R.3707 - Apprenticeship and Jobs Training Act of 2017." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/3707>.

U.S. Senate. "S.393 - LEAP Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/senate-bill/393>.

U.S. House of Representatives. "H.R.2399 - LEAP Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/2399>.

U.S. House of Representatives. "H.R.6425 - APPRENTICE Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/6425>.

U.S. Senate. "S.3802 - EARNs Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/senate-bill/3802>.

27 Hanks, McGrew, and Zessoules. 2018. "The Apprenticeship Wage and Participation Gap." Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2018/07/11/453321/apprenticeship-wage-participation-gap/>.

3. Support Development of Industry and Sector Partnerships to Create Regional Jobs and Career Pathways

Upskilling and reskilling the workforce requires local stakeholders to work together to identify current and future skills needs in their area or region. For example, employers need to work with education and training providers to develop coursework and training that meet relevant skill needs. Workers benefit from instruction in in-demand skills, awareness of emerging job opportunities, and guidance on which degrees and certifications to pursue based on what local employers look for when hiring.

Developing effective workforce partnerships among employers and training providers can be a heavy lift, especially for smaller employers. Sector partnerships bring together local stakeholders—employers, colleges, education and training providers, labor representatives, and workforce development experts—to address these challenges by developing education-to-employment talent pipelines. Pipelines are sensitive to local, regional, and industry-specific workforce needs, and create cross-industry standards. Research has established sector partnerships’ effectiveness in improving training programs’ participation and completion rates.²⁸ They also yield better employment and earnings outcomes for workers.²⁹ At the same time, employers gain access to qualified talent that can support growth and competitiveness. For example, the World Economic Forum found that while 95 percent of workers at risk of dislocation could theoretically transition into positions that have similar skills and higher wages, it would require reskilling investments, and only 25 percent of workers could be reskilled by their employers profitably. But if businesses formed industry and sector partnerships to reduce their fixed costs and times by 30 percent, they could profitably reskill nearly half of at-risk workers.³⁰

There are a variety of encouraging examples of successful sectoral partnerships. In 2010, a Toyota plant near Lexington, Kentucky partnered with the Bluegrass Community & Technical College to create KY FAME, a work-based learning program to provide a pipeline of manufacturing technicians. The program has since expanded across the state.³¹ Other successful sectoral partnerships include Jewish Vocational Service–Boston (JVS–Boston), Per Scholas, Wisconsin Regional Training Partnership (WRTP), and Capital IDEA.³²

The Workforce Innovation and Opportunity Act (WIOA), passed in 2014, recognized the importance of these strategies by requiring states and local workforce boards to develop sector partnerships. Yet, as the National Skills Coalition outlined in a recent report,³³ there is currently no dedicated funding to support development and implementation of these partnerships. While WIOA requires states to assist localities in creating these partnerships, the funding for doing so comes from the Governor’s Reserve fund, requiring states to balance partnership development against other discretionary

28 Hendra et al. 2016. “Encouraging Evidence on a Sector-Focused Advancement Strategy.” MDRC. <https://www.mdrc.org/publication/encouraging-evidence-sector-focused-advancement-strategy-0>.

29 Maguire et al. 2010. “Tuning In to Local Labor Markets.” Public/Private Ventures. <http://ppv.issuelab.org/resources/5101/5101.pdf>.

30 World Economic Forum. 2019. “Towards a Reskilling Revolution.” http://www3.weforum.org/docs/WEF_Towards_a_Reskilling_Revolution.pdf.

31 National Network of Business and Industry Associations. “KY FAME.” <http://nationalnetwork.org/guidebook/ky-fame/>.

32 Maguire et al. 2010. “Tuning In to Local Labor Markets.” Public/Private Ventures. <http://ppv.issuelab.org/resources/5101/5101.pdf>. Conway. 2011. “The Price of Persistence.” Aspen Institute Economic Opportunities Program. <https://www.aspeninstitute.org/publications/price-persistence-nonprofit-community-college-partnerships-manage-blend-diverse-funding-streams/>.

33 Brown. 2018. “Powerful Partners: Businesses and Community Colleges.” National Skills Coalition. <https://www.nationalskillscoalition.org/resources/publications/file/Powerful-Partners-Businesses-and-Community-Colleges.pdf>.

workforce spending priorities.³⁴ The 2008 reauthorization of the Higher Education Act authorized grants to educational institutions that partnered with employers to develop training programs for in-demand jobs, but these grants have never been funded.³⁵ The Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program provided \$1.9 billion to over 60 percent of the nation's community colleges to develop or redesign over 2,600 programs of study to align with local and regional employer needs.³⁶ However, the TAACCCT grant program ended in September, 2018, with no similar funding to take its place.

As the National Skills Coalition proposed,³⁷ state policymakers should support sector partnerships with funding, technical assistance, and program initiatives. In addition, federal policymakers should authorize and appropriate funding for competitive grants to highly effective sector partnerships.

4. Encourage Employers to Engage Workers in Automation Decision-Making by Promoting Worker Voice

While technological progress should be encouraged, there are many different paths that technology can take. A recent report from the United Nations' International Labour Organization observes, "Technology can free workers from arduous labour; from dirt, drudgery, danger and deprivation. Collaborative robots, or cobots, can reduce work-related stress and potential injuries. But technology-driven processes can also render labour superfluous, ultimately alienating workers and stunting their development."³⁸ Each could be considered "progress," but their implications for workers, families, communities, and society overall are quite different.

As businesses automate work, they must decide how their workforce needs will change, including whether and which workers might be laid off, or whether retraining and redeployment is possible. These decisions can have broad impacts, as layoffs can affect entire communities and regions. Business decisions that involve retraining and redeploying workers can leave all stakeholders better off. Layoffs cannot always be avoided, but transition planning should include as many stakeholders as possible to mitigate negative impacts and to find mutually beneficial solutions.

Including workers as stakeholders can be more profitable to businesses. For example, economists Susan Helper, Raphael Martins, and Robert Seamans found that as factories in the automotive industry increasingly rely on the use of robots, sensors, artificial intelligence (AI), and other digitally-enabled technologies (often called "Industry 4.0"),

34 U.S. House of Representatives. "H.R.803 - Workforce Innovation and Opportunity Act." 113th Congress. <https://www.congress.gov/bills/113/congress/house-bill/803>.

35 U.S. Government. "Public Law 110-315 - Higher Education Opportunity Act." 110th Congress. <https://www.govinfo.gov/content/pkg/PLAW-110publ315/pdf/PLAW-110publ315.pdf>.

36 Employment and Training Administration. "Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program." U.S. Department of Labor. <https://www.doleta.gov/taaccct/>.

37 National Skills Coalition. 2016. "Sector Partnership Policy Toolkit Summary." <https://www.nationalskillscoalition.org/state-policy/body/Sector-Partnership-Policy-Toolkit-Summary.pdf>.
Brown. 2018. "Powerful Partners: Businesses and Community Colleges." National Skills Coalition. <https://www.nationalskillscoalition.org/resources/publications/file/Powerful-Partners-Businesses-and-Community-Colleges.pdf>.

38 International Labour Organization. 2019. "Work for a brighter future." <https://www.ilo.org/global/topics/future-of-work/brighter-future/lang-en/index.htm>.

they are at risk of having their value, and thus their profits, captured by “digital entrants,” such as data analytics firms. Instead, they can choose an automation strategy that highlights their unique advantage: their physical proximity and hands-on involvement in the production process. By adopting automation methods that marry data, automation, and worker insights, they can better protect and build on their firm’s value proposition. This approach requires systematic engagement between workers and managers on the question of how to implement automation technology. Unfortunately, American factories, unlike their Japanese and German counterparts, are not set up to facilitate this sort of inclusive engagement.³⁹

Employers should explore options to give workers greater voice in technological innovation and adoption. Workers need to be part of strategizing how to ensure automation decisions are made to benefit not only shareholders, but also workers and communities. Similarly, policymakers should encourage employers to give workers greater voice. Similar to the German “codetermination” model, the Future of Work Initiative has proposed the adoption of worker-elected work councils and worker representation on corporate boards.⁴⁰ Recently, legislation was introduced in the U.S. Senate to require companies with over \$1 billion in revenue to let workers elect 40 percent of their corporate board members.⁴¹ Similarly, policymakers should explore industry-level bargaining, which would help workers across businesses in a given industry band together to collectively bargain on a wide range of issues, including how businesses deploy technology and prepare their workforces for its impacts.^{42 43}

5. Develop Pre-Crisis Strategies to Mitigate Disruption and Manage Workforce Transition

When businesses restructure, not all layoffs can be avoided. However, employers can take a more active role in mitigating the impacts of their changing employment needs, while also doing more to help workers transition in the event of displacement. Employers seeking to automate work have a responsibility to their workers and communities to do it in a way that is most beneficial and least disruptive to all stakeholders. Employers should:

- » **Plan Ahead:** Employers have a responsibility to understand the implications of automation in their business operations and need to be proactive in planning ahead. This should include anticipating changing skill needs and potential workforce disruptions, and developing strategies to address them, especially if those needs can be met by reskilling current employees. Businesses that are automating work should develop multi-year strategic plans that include

39 Helper, Martins, and Seamans. 2017. “Value Migration and Industry 4.0.” <https://www.aeaweb.org/conference/2018/preliminary/paper/H83bQK3y>.

Helper, Martins, and Seamans. 2018. “Who Profits from Industry 4.0? Theory and Evidence from the Automotive Industry.” https://faculty.weatherhead.case.edu/susan-helper/papers/helper_martins_seamans.pdf.

40 Aspen Institute Future of Work Initiative. 2017. “A Policy Agenda to Restore the Promise of Work.” January. <https://www.aspeninstitute.org/publications/a-policy-agenda-to-restore-the-promise-of-work/>.

41 Office of U.S. Senator Elizabeth Warren. 2018. “Warren Introduces Accountable Capitalism Act.” <https://www.warren.senate.gov/newsroom/press-releases/warren-introduces-accountable-capitalism-act>.

42 Madland. 2018. “Wage Boards for American Workers.” Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2018/04/09/448515/wage-boards-american-workers/>.

43 It should be noted that there is evidence that worker councils do not appear to reduce investment or innovation. Addison et al. 2007. “Do Works Councils Inhibit Investment?” *ILR Review*. <http://journals.sagepub.com/doi/abs/10.1177/001979390706000202>.

ways to address expected challenges. They need to act now to help workers remain employable when displacements or restructuring occurs.

» **Give Advance Notice:** The Worker Adjustment and Retraining Notification (WARN) Act requires businesses to notify its employees and the government at least 60 days in advance of a plant closure or mass layoff event, but businesses should aspire to do better. The more lead time workers have to plan ahead, to seek retraining, and to begin their job search, the less disruptive layoffs will be. For example, Swedish businesses provide up to six months of advance notice before any layoff. This notice is a key component of its highly successful reemployment system for displaced workers (over 85 percent of Swedish workers are reemployed within a year, compared to about half in the U.S.).^{44 45}

» **Try Work Sharing:** Work sharing is when businesses looking to cut costs forgo layoffs and instead reduce the weekly hours of multiple workers. Though more individual workers experience a reduction in hours and pay, no worker experiences full unemployment. For the business, work sharing can help retain workers they would otherwise lose, and give them greater flexibility to quickly increase hours back to full-time when demand increases. And though work sharing can be used anywhere, 27 states and the District of Columbia⁴⁶ already work with businesses to provide workers whose hours are reduced with partial unemployment benefits.⁴⁷ As work is automated, businesses should pursue work sharing as a way to smooth transitions and avoid layoffs. Federal policymakers should offer incentive grants to encourage all states to adopt work sharing programs.

» **Provide Transition Supports:** Severance packages should not be limited to highly-compensated employees. Career counseling, training vouchers, even financial assistance during unemployment can be offered by employers to laid off workers to help smooth their transition. For workers who are laid off because their roles are replaced by automation, providing an ownership stake in the business would mean the worker shares directly in the savings (see proposal #6).

EXAMPLES OF BUSINESS STRATEGIES TO MITIGATE DISRUPTION AND MANAGE WORKFORCE TRANSITION

In 2011, Nokia responded to increased global competition in the smartphone market by reducing operations, affecting 5,900 workers. Due to a combination of social responsibility, Finnish labor law, and business interest, Nokia created the Bridge Program to provide workers with seed capital, training, counseling, and other resources to help them find another job or start their own company. The results

44 OECD. 2015. "Back to Work: Sweden." *OECD Publishing*. <http://www.oecd.org/sweden/back-to-work-sweden-9789264246812-en.htm>.

45 OECD. 2016. "Back to Work: United States." *OECD Publishing*. https://www.oecd-ilibrary.org/employment/back-to-work-united-states_9789264266513-en.

46 Employment and Training Administration. 2018. "Comparison of State Unemployment Insurance Laws." U.S. Department of Labor. <https://oui.doleta.gov/unemploy/pdf/uilawcompar/2018/complete.pdf>.

47 As opposed to regular partial UI benefits, which are calculated by looking at remaining wages earned while partially unemployed, UI benefits under a work sharing program are calculated as a pro-rated share of benefits based on the reduction in weekly hours worked. The result is that workers under a work sharing program often receive far larger weekly UI benefits than they would be entitled under normal partial UI—despite work sharing costing the UI system no more than it would if a single worker were laid off.

was that 85 percent of affected workers participated in the program, 60 percent of affected workers knew their next step the day they lost their job, and workers started 1,000 new companies.⁴⁸ The Brookfield Institute reports that three years later, 57 percent of respondents were reemployed, 11 percent were studying, nine percent were working as entrepreneurs, and 90 percent rated the Bridge program as valuable.⁴⁹

To help future-proof their workforce, IBM conducts quarterly skills planning assessments, in which it researches which skills are more or less in demand, which are leading edge, and which are lagging. It uses this analysis to inform ongoing reskilling efforts that total half a billion dollars annually. IBM CEO Ginni Rometty has argued that employers should commit to ensuring their workers remain employable, even if they cannot always guarantee employment at the company.⁵⁰

Some hotels have experimented with automating check-in,⁵¹ room service,⁵² concierge services,⁵³ and more. After negotiating with the union, Marriott agreed to provide 165-day advance notice before implementing automation technologies, and to train workers whose hours are reduced as a result.⁵⁴

Policymakers should consider ways to design government supports for displaced workers that are available before a crisis, such as a mass layoff, occurs. As the Brookings Institution noted in a recent article, a key shortcoming of existing supports for displaced workers is that they tend only to be available after crisis hits.⁵⁵ Federal and state policymakers should target additional retraining and counseling supports to workers whose jobs are deemed at greatest risk of automation before disruptions occur. For instance, government could co-fund proactive retraining efforts for workers in at-risk jobs by providing their employers with larger Worker Training Tax Credits (see proposal #1), perhaps up to 50 percent.

In a proposal to create a Trade Adjustment Assistance for Technology, Andrew Stettner at the Century Foundation proposed establishing an independent commission to create an annually-updated list of occupations at risk of automation.⁵⁶ The commission, which would be staffed by experts at the Department of Labor and the National Institute for Standards and Technology, would analyze O*NET data to develop risk scores for each occupation based on their task distribution, the capability of current technologies, and

48 Sucher and Winterberg. 2015. "Nokia's Bridge Program." Harvard Business School. <https://www.hbs.edu/faculty/Pages/item.aspx?num=48539>.

49 Rivera et al. 2018. "Pathways to Inclusive Innovation: Insights for Ontario and beyond." Brookfield Institute. <https://brookfieldinstitute.ca/report/pathways-to-inclusive-innovation/>.

50 Wall Street Journal Podcasts. 2019. "IBM CEO Ginni Rometty on Reskilling Workers in the Age of AI." <https://www.wsj.com/podcasts/wsj-the-future-of-everything/ibm-ceo-ginni-rometty-on-reskilling-workers-in-the-age-of-ai/05224dc4-bcef-413b-acab-0d0e0b08409c>.

51 Jim and Jourdan. 2018. "Check-in with a smile." Reuters. <https://www.reuters.com/article/us-alibaba-marriott-intnl-facial-recogni/check-in-with-a-smile-marriott-alibaba-trial-facial-recognition-at-china-hotels-idUSKBN1K11B0>.

52 Walsh. 2018. "The Next Time You Order Room Service, It May Come by Robot." New York Times. <https://www.nytimes.com/2018/01/29/travel/the-next-time-you-order-room-service-it-may-come-by-robot.html>.

53 Bond. 2018. "Amazon teams with Marriott to put Alexa in hotels." Financial Times. <https://www.ft.com/content/84e8f960-736c-11e8-aa31-31da4279a601>.

54 Fussell. 2019. "The Quiet Ways Automation Is Remaking Service Work." The Atlantic. <https://www.theatlantic.com/technology/archive/2019/01/automation-hotel-strike-ai-jobs/579433/>.

55 Muro and Parilla. 2017. "Maladjusted: It's time to reimagine economic 'adjustment' programs." Brookings Institution. <https://www.brookings.edu/blog/the-avenue/2017/01/10/maladjusted-its-time-to-reimagine-economic-adjustment-programs/>.

56 Stettner. 2018. "Mounting a Response to Technological Unemployment." The Century Foundation. <https://tcf.org/content/report/mounting-response-technological-unemployment/>.

other factors. The list would enable quicker approvals of benefit applications when rapid job loss occurs in occupations above a minimum risk score. Such a risk score designation could similarly be used to target additional resources to businesses and communities at risk of disruption before jobs are impacted.

6. Promote Broad Prosperity Through Worker Ownership

In previous generations, productivity increases and wage increases tracked each other. However in more recent decades, labor compensation has grown far slower than productivity, a phenomenon known as the “productivity-compensation gap.”⁵⁷ A major contributing factor is that while returns to capital have grown, labor’s share of national income has declined.⁵⁸ As much as half of this decline can be attributed to automation.^{59 60}

One solution is for employers to create broader ownership opportunities for their workers, so the interests of workers, managers, and investors are aligned and compensation is more directly tied to the performance of the firm. With an ownership stake, workers may be more supportive of automation. Worker ownership is associated with greater employment stability, as well as higher firm productivity, profitability, and longevity. When combined with stronger inclusion of workers in business decision-making, it can also lead to higher job satisfaction, organizational commitment, identification, motivation, and workplace participation.^{61 62 63} Finally, worker ownership could even act as insurance against job or wage loss.⁶⁴

Many strategies for promoting worker ownership should be pursued. In its report *Toward a New Capitalism*, the Future of Work Initiative proposed expanding executive stock and profit-sharing compensation systems to all workers, making stock compensation tax free, and deferring taxes on stock options, among others.⁶⁵ Other options include further limiting the deduction for executive compensation for companies that do not offer broad-based ownership options; and, because greater work ownership can lead to less diversified financial portfolios, establishing a social insurance program to protect workers who own company stock from extreme losses.⁶⁶

57 Fleck, Glaser, and Sprague. 2011. “The compensation-productivity gap.” Bureau of Labor Statistics, U.S. Department of Labor. <https://www.bls.gov/opub/mlr/2011/01/art3full.pdf>.

58 Brill et al. 2017. “Understanding the labor productivity and compensation gap.” Bureau of Labor Statistics, U.S. Department of Labor. <https://www.bls.gov/opub/btn/volume-6/pdf/understanding-the-labor-productivity-and-compensation-gap.pdf>.

59 Abdih and Danninger. 2017. “What Explains the Decline of the U.S. Labor Share of Income?” International Monetary Fund. <https://www.imf.org/en/Publications/WP/Issues/2017/07/24/What-Explains-the-Dcline-of-the-U-S-45086>.

60 Eden and Gaggl. 2015. “On the Welfare Implications of Automation.” World Bank Group. <http://documents.worldbank.org/curated/en/273551468178456630/On-the-welfare-implications-of-automation>.

61 Freeman. 2007. “Effects of ESOP Adoption and Employee Ownership.” University of Pennsylvania. https://repository.upenn.edu/od_working_papers/2/.

62 Brill. 2012. “An Analysis of the Benefits S ESOPs Provide the U.S. Economy and Workforce.” Matrix Global Advisors. <https://community-wealth.org/content/analysis-benefits-s-esops-provide-us-economy-and-workforce>.

63 Akerlof and Kranton. 2005. “Identity and the Economics of Organizations.” *Journal of Economic Perspectives*. <https://www.aeaweb.org/articles?id=10.1257/0895330053147930>.

64 Freeman. 2015. “Who owns the robots rules the world.” IZA World of Labor. <https://wol.iza.org/articles/who-owns-the-robots-rules-the-world/long>.

65 Aspen Institute Future of Work Initiative. 2017. “Toward a New Capitalism.” <https://www.aspeninstitute.org/publications/a-policy-agenda-to-restore-the-promise-of-work/>.

66 This program could function similar to how the Pension Benefit Guarantee Corporation provides social insurance for workers who have private pension plans.

Enable Workers to Access Skills Training, Good Jobs, and New Economic Opportunities

As work is automated, some jobs or tasks will decline, others will increase, and new roles will emerge in new or existing industries. The vast majority of jobs—over 90 percent, according to research by the McKinsey Global Institute—are partially automatable.⁶⁷ As automation becomes more widespread, the task makeup of jobs will shift, often requiring workers to possess new or different skills.

These changes present challenges as well as opportunities. To keep up with the pace of change, our country must move toward a system of lifelong learning. No longer can we expect 12 years of childhood education to be sufficient to prepare a worker for the shifting demands of the labor market. Workers need access to effective and affordable skills training throughout their working lives, so they have the opportunity to learn, adapt, advance, and succeed. This approach will not only help workers avoid job displacements, but will help them take advantage of the many opportunities technology presents, potentially leading to higher wages and more meaningful work. Unfortunately, the U.S. is failing to meet this challenge as public and private sector investment in worker training has declined over the past several decades.

It is not enough to train workers and connect them to jobs, if the jobs are low-wage and lack security. Workers with in-demand skills should be able to meet their basic financial needs. New technologies have increased productivity and economic growth, but rising skill premiums, the deskilling of routine jobs, and declining returns to labor have resulted in economic gains that have not been broadly shared. Inequality has increased. Wages must rise to reverse this trend.

The following proposals would:

- » Create worker-owned lifelong learning and training accounts
- » Reform Pell grants to include short-term training programs
- » Improve training quality through community college investments and income share agreements
- » Increase transparency of training outcomes through better evaluation data
- » Expand access to high quality and cost-saving career counseling
- » Raise worker income and promote job quality through wage subsidies and the minimum wage
- » Create a more flexible labor market and promote entrepreneurship

⁶⁷ According to McKinsey Global Institute, at least 10 percent of work hours are automatable in 91 percent of jobs. Manyika et al. 2017. "Jobs Lost, Jobs Gained." McKinsey Global Institute. <https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

7. Create Worker-Owned Lifelong Learning and Training Accounts

Moving toward a system of lifelong learning is not easy. Workers face many barriers to upskilling or retraining, especially if they are already in a full-time job.⁶⁸ One key barrier is financial. Enrolling in a training program can be expensive, and despite many supports to help students save and pay for college, relatively few supports exist to help workers save and pay for short-term training programs.

Companies play a vital role in lifelong learning, but not all workers can rely on employers to help them acquire new skills. All workers should have financial and portable assistance to access education and training opportunities.

Federal or state policymakers should create worker-controlled Lifelong Learning and Training Accounts (LLTAs)—co-funded by workers, employers, and government—to help people pay for education and training opportunities over the course of their careers.

A 2018 Future of Work Initiative issue brief presents the policy details of this proposal.⁶⁹ Beginning at age 18, workers would be eligible to contribute up to \$2,000 per year into their LLTA on a pre-tax basis, which would be matched by means-tested government contributions. Lower-income workers could receive up to a 50 percent match. In addition, employers would also be eligible to contribute up to \$2,000 annually to these accounts, with contributions for low- and middle-income workers excludable from taxable income. Contributions would not be permitted once the account balance reaches \$10,000, which is enough to pay for tuition and fees for most two-year community college programs. The cap is a way to encourage workers to regularly use the funds throughout their careers. LLTA funds could be used to pay for any education and training programs that result in a recognized post-secondary credential—including industry-recognized certificates and state-regulated licenses and certifications—as well as testing and applications fees.

Senators Mark Warner (D-VA) and Chris Coons (D-DE) recently proposed the Lifelong Learning and Training Account Act, which was modeled after the Aspen Institute Future of Work Initiative proposal.⁷⁰ Senators Amy Klobuchar (D-MN) and Ben Sasse (R-NE) and Representatives Derek Kilmer (D-WA) and Glenn Thompson (R-PA) have also proposed lifelong learning account legislation.⁷¹

Lifelong learning account demonstration programs have been implemented in Maine, Washington state, Chicago, and New York City.⁷² Washington has a voluntary employee benefits program where employers agree to match their employees' contributions to a portable Lifelong Learning Account. In Massachusetts, State Senator Eric Lesser has proposed legislation to establish a similar program.⁷³

68 Conway. 2018. "Do job training programs work? Wrong question." *Fast Company*. <https://www.fastcompany.com/90204625/do-job-training-programs-work-wrong-question>.

69 Fitzpayne and Pollack. 2018. "Lifelong Learning and Training Accounts." Aspen Institute Future of Work Initiative. <https://www.aspeninstitute.org/publications/lifelong-learning-and-training-accounts-2018/>.

70 Office of U.S. Senator Mark R. Warner. 2018. "Warner & Coons to Introduce Bill to Promote Lifelong Learning & Worker Training." <https://www.warner.senate.gov/public/index.cfm/2018/11/warner-coons-to-introduce-bill-to-promote-lifelong-learning-worker-training>.

71 U.S. Senate. "S.3145 - Skills Investment Act of 2018." 115th Congress. <https://www.congress.gov/bills/115th-congress/senate-bill/3145>. U.S. House of Representatives. "H.R.6250 - Skills Investment Act of 2018." 115th Congress. <https://www.congress.gov/bills/115th-congress/house-bill/6250>.

72 The Council for Adult and Experiential Learning. 2011. "Lifelong Learning Accounts: Helping to Build a More Competitive Workforce." https://cdn2.hubspot.net/hubfs/617695/2011_LiLA%20Policy_Overview.pdf.

73 Commonwealth of Massachusetts. "SD.1155 - An Act to establish a Lifelong Learning and Training Account Program." 191st General Court. <https://malegislature.gov/Bills/191/SD1155>.

8. Reform Pell Grants to Include Short-Term Training Programs

Since the early 1970s, Pell Grants have played an important role in expanding access to post-secondary education by providing tuition assistance to low-income students and families. The program was initially designed to serve recent high school graduates entering four-year colleges prior to starting their careers. Over time, it has increasingly served older students with different educational and career goals. In the early 1980s, less than a quarter of Pell recipients were 25 or older; in 2010, this percentage was nearly half. Today, Pell Grants are the primary source of grant funds for adults seeking to enhance their workforce skills.⁷⁴ For this reason, the Pell Grant program is well-positioned to provide lifelong learning opportunities to workers of all ages throughout their careers.

Unfortunately, Pell Grants can only be used for programs that exceed 600 hours or 15 weeks of coursework (the length of a typical college semester), thus excluding many short-term skills-training and certificate programs that can help workers maintain and update their skills as the economy changes.

Policymakers should open Pell Grants to short-term programs. The proposal already enjoys bipartisan support. Sponsored by Senators Tim Kaine (D-VA) and Rob Portman (R-OH), the Jumpstart Our Businesses by Supporting Students (JOBS) Act would expand Pell Grants to include programs as short as 150 hours or 8 weeks in length, as long as the programs provide students with recognized post-secondary credentials and skills that align with regional labor market needs.⁷⁵ Additionally, both the Republican and Democratic proposals to reauthorize the Higher Education Act include provisions to expand Pell Grants to shorter-term programs of 300 hours and 150 hours, respectively.⁷⁶ The bipartisan Opportunity America, AEI, Brookings Working Class Study Group proposed expanding Pell Grants to short-term programs, among other reforms.⁷⁷

Expanding Pell Grants to short-term programs would be enhanced by supply-side investments that create jobs and skills pathways for working adults, such as dedicated funding for industry and sector partnerships (see proposal #3).

9. Improve Training Quality Through Community College Investments and Income Share Agreements

Providing workers with more access to skills training is important, but steps must also be taken to ensure that there is a sufficient supply of good quality training available.

There are 876 public community colleges across the country, and the education and training they provide is often high quality, making them well positioned to provide

74 Rethinking Pell Grants Study Group. 2013. "Rethinking Pell Grants." The College Board. <http://media.collegeboard.com/digitalServices/pdf/advocacy/policycenter/advocacy-rethinking-pell-grants-report.pdf>.

75 U.S. Senate. "S.839 - A bill to extend Federal Pell Grant eligibility of certain short-term programs." 116th Congress. <https://www.congress.gov/bill/116th-congress/senate-bill/839>

76 U.S. House of Representatives. "H.R.4508 - PROSPER Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/4508>.
U.S. House of Representatives. "H.R.6543 - Aim Higher Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/6543>.

77 Opportunity America/AEI/Brookings Working Class Study Group. 2018. "Work, Skills, Community." <https://opportunityamericaonline.org/wcg/>.

effective training programs.⁷⁸ Research has found that completing a training certificate at a public institution raises annual earnings by roughly 30 percent.⁷⁹ Similarly, an analysis of California community college programs found that their career and technical programs raised earnings by 14 percent for certificates of less than 18 units, and 45 percent for associate degrees.⁸⁰ Despite this evidence, community college funding has been sharply cut over the past two decades. Since 2001, state and local funding per full-time equivalent student has declined by 30 percent (after adjusting for inflation).⁸¹ Federal funding has risen over this time period, but not enough to fill the funding gap.

Policymakers should provide additional funding for community colleges to provide high-quality, in-demand skills training. The Aspen Economic Strategy Group has proposed increasing federal funding for community colleges to boost educational attainment, expand opportunities for mid-career skills development, and provide better career pathways for workers without college degrees. This funding should be based on (1) characteristics of the student body (with greater funding allocated to schools with greater shares of students from disadvantaged backgrounds); (2) the labor market conditions in the local community, such as the local employment rate; and (3) demonstrated improvements in student retention and completion.⁸²

In the last decade, many states have expanded support for community colleges by creating “College Promise” programs. Delaware and Tennessee were among the first states to develop these programs and over time other conservative and liberal states have followed. As of July 2018, nineteen states across the country have such programs.⁸³ Eight of these have been enacted in the last two years. Many other states, including California, Rhode Island, Washington, and Michigan are considering either adopting new programs or expanding their existing programs.⁸⁴

As of 2018, 25 states have adopted outcomes-based funding for their public higher education institutions, including seven that include post-graduation outcomes such as job placement rates.⁸⁵ Similarly, under Virginia’s New Economy Workforce Credential Grant (NEWCG), a student pays one-third of the cost and the state will pick up the remaining two-thirds (up to \$3,000) if the student completes the program and receives the credential in an in-demand field.⁸⁶

78 National Center for Education Statistics. 2018. “Degree-granting postsecondary institutions, by control and classification of institution and state or jurisdiction: 2017-18.” U.S. Department of Education. https://nces.ed.gov/ipeds/data/digest/d18/tables/dt18_317.20.asp.

79 Stevens analysis of Cellini and Turner (2018). Stevens. 2019. “What Works in Career and Technical Education (CTE)? A Review of Evidence and Suggested Policy Directions.” Aspen Institute Economic Strategy Group. <https://www.aspeninstitute.org/longform/expanding-economic-opportunity-for-more-americans/> Cellini and Turner. 2018. “Gainfully Employed? Assessing the Employment and Earnings of For-Profit College Students Using Administrative Data.” *The Journal of Human Resources*. <http://jhr.uwpress.org/content/early/2018/01/25/jhr.54.2.1016.8302R1.abstract>.

80 Stevens, Kurlaender, and Grosz. 2015. “Career Technical Education and Labor Market Outcomes.” National Bureau of Economic Research. <https://www.nber.org/papers/w21137.pdf>.

81 Aspen Institute Economic Strategy Group. 2019. “Expanding Economic Opportunity for More Americans.” <https://www.aspeninstitute.org/longform/expanding-economic-opportunity-for-more-americans/>.

82 This was originally proposed by the Aspen Economic Strategy Group in a recent report. Aspen Institute Economic Strategy Group. 2019. “Expanding Economic Opportunity for More Americans.” <https://www.aspeninstitute.org/longform/expanding-economic-opportunity-for-more-americans/>.

83 The Century Foundation defines College Promise programs as those that “provide at least free or debt-free tuition to a significant subset of students who are not chosen based primarily on merit considerations.” Mishory. 2018. “Free College: Here to Stay?” The Century Foundation. <https://tcf.org/content/report/free-college-stay/>. <https://tcf.org/content/report/future-statewide-college-promise-programs/>

84 Hart. 2019. “Newsom proposes free community college in California.” *Politico*. <https://www.politico.com/states/california/story/2019/01/04/newsom-proposes-free-community-college-in-california-771230>.

Borg. 2019. “Raimondo’s budget plan would extend free tuition to Rhode Island College.” *Providence Journal*. <https://www.providencejournal.com/news/20190117/raimondos-budget-plan-would-extend-free-tuition-to-rhode-island-college>.

Office of Governor Jay Inslee. 2019. “Inslee details plan to create a statewide free college program for Washington students.” <https://www.governor.wa.gov/news-media/inslee-details-plan-create-statewide-free-college-program-washington-students>. Hardwich. 2019. “Gov. Whitmer Touts Tuition-Free College Plan.” *WKAR*. <https://www.wkar.org/post/gov-whitmer-touts-tuition-free-college-plan>.

85 Kvaal and Bridgeland. 2018. Moneyball for Higher Education.” Results for America. <https://results4america.org/tools/moneyball-for-higher-education-how-states-can-use-data-and-evidence-to-improve-student-outcomes/>.

86 State Council of Higher Education for Virginia. “New Economy Workforce Credential Grant.” <http://www.schev.edu/index/institutional/grants/workforce-credential-grant>.

In addition, private training providers, often for-profit, can play a constructive role in the training landscape. But the effectiveness of their training is highly variable: while there are many effective private and for-profit training programs that offer innovation and flexibility, recent research has found that on average, students who attend for-profit certificate programs experience no discernable increase in earnings after graduation compared to similar students who do not attend a training program. When cost is taken into account, for-profit training programs on average make students worse off.⁸⁷

Policymakers should explore ways to improve the quality of private training by encouraging private training providers to design tuition systems based on outcomes rather than fixed prices. Some training providers have established outcome-based payment systems known as Income Share Agreements (ISAs), in which the provider will forego a portion of the tuition, and in return, the students promise to pay a percentage their future earnings back to the provider for a period of time after graduation. Greater use of ISAs would reward effective training programs and disadvantage providers of poor-quality training, while maintaining the incentive for private providers to develop innovative offerings.

EXAMPLES OF SCHOOLS USING INCOME SHARE AGREEMENTS

Holberton School in San Francisco offers a two-year training program in software engineering, while Kenzie Academy in Indianapolis offers coding and computer science courses that are coupled with on-the-job training through paid apprenticeships.⁸⁸ Lambda School, also in San Francisco, initially started as a coding bootcamp but is expanding its courses to include cybersecurity and nursing.⁸⁹ The courses are tuition-free, with students instead required to pay back a percentage of their income over time through an ISA. If they make below a certain income threshold, they are not required to make payments. Traditional higher education institutions have also adopted this model: Purdue University launched its ISA program (Back a Boiler) in 2016, while the University of Utah, Colorado Mountain College, and others have followed.⁹⁰

To encourage such programs, policymakers should provide regulatory clarity. With few regulations explicitly designed to govern the operation of ISAs, there are unanswered questions related to their tax and bankruptcy treatment, whether usury laws apply, how investors can verify ISA recipients' incomes, and how to protect people from predatory agreements. Policymakers should explicitly regulate ISAs in order to provide certainty to ISA providers and confidence to students that they will be protected from potential abuse.

87 Cellini and Turner. 2018. "Gainfully Employed? Assessing the Employment and Earnings of For-Profit College Students Using Administrative Data." *The Journal of Human Resources*. <http://jhr.uwpress.org/content/early/2018/01/25/jhr.54.2.1016.8302R1.abstract>.

88 Bailey. 2018. "Income Share Agreements Are an Innovative Way of Financing Tuition — and an Investment in the Workplace of Tomorrow." *The 74*. <https://www.the74million.org/article/bailey-income-share-agreements-are-an-innovative-way-of-financing-tuition-and-an-investment-in-the-workplace-of-tomorrow/>.

89 Johnson. 2019. "Online Coding School Lambda Raises \$30M, Looks Toward Medicine and Cybersecurity." *EdSurge*. <https://www.edsurge.com/news/2019-01-08-online-coding-school-lambda-raises-30m-looks-toward-medicine-and-cybersecurity>.

90 Johnson. 2019. "So You Want to Offer an Income-Share Agreement? Here's How 5 Colleges Are Doing It." *EdSurge*. <https://www.edsurge.com/news/2019-02-15-so-you-want-to-offer-an-income-share-agreement-here-s-how-5-colleges-are-doing-it>.

Last Congress, Senators Marco Rubio (R-FL) and Todd Young (R-IN) introduced a bill laying out a regulatory framework for ISAs, including capping the percentage of student income an investor can receive and defining the tax implications of ISAs.⁹¹ A similar bill was introduced by Representatives Luke Messer (R-IN) and Jared Polis (D-CO) in the House.⁹²

10. Increase Transparency of Training Outcomes Through Better Evaluation Data

It is often difficult to assess the quality of education and training programs because students and workers often lack standardized and verifiable information about program outcomes. Currently, the federal government, states, and accreditation agencies each use different metrics and definitions, leading to a patchwork of data. The Institute for College Access and Success (TICAS) found that job placement rates for a training program can vary dramatically depending on the entity making the calculation.⁹³ For example, a vocational nursing program in Texas had a job placement rate of 59 percent according to the state, but a 75 percent rate according to its accrediting agency.⁹⁴

State data systems can be used to help evaluate the effectiveness of training programs. The most reliable data source for post-graduation employment outcomes is workforce administrative data, usually collected from the Unemployment Insurance (UI) program's wage records. However, most states do not include enough data to analyze training programs' effectiveness, and some states do not link this employment data to educational data at all.

Policymakers should ensure that students have access to standardized and verifiable information about the training outcomes of individual programs. TICAS recently proposed that federal, state, and accreditation agencies standardize the job placement rate (the percentage of graduates in jobs relevant to their area of training) based on outcome data collected by states.⁹⁵ TICAS also proposed that the federal government publish a "threshold earnings rate," which would measure the share of graduates employed and earning above a certain amount.⁹⁶ Similarly, the bipartisan College Transparency Act would provide more information about what programs are helping students earn credentials and get good jobs.⁹⁷

In addition, state policymakers should add new data elements in state UI wage records, such as occupational title (using standardized occupational codes), hours worked,

91 U.S. Senate. "S.268 - Investing in Student Success Act of 2017." 115th Congress. <https://www.congress.gov/bill/115th-congress/senate-bill/268>.

92 U.S. House of Representatives. "H.R.3145 - ISA Act of 2017." 115th Congress. <https://www.congress.gov/bill/115th-congress/house-bill/3145>.

93 Dalal, Stein, and Thompson. 2018. "Of Metrics and Markets: Measuring Post-College Employment Success." The Institute for College Access & Success. https://ticas.org/sites/default/files/pub_files/of_metrics_markets.pdf.

94 Brightwood College. "Gainful Employment by Program." Created November 9, 2018. <https://consumerinfo.brightwood.edu/?pid=293&cid=71>.

95 Accreditation agencies are federally recognized entities that assess the quality of education institutions and programs for the purposes of determining if their students can use federal aid.

96 Dalal, Stein, and Thompson. 2018. "Of Metrics and Markets: Measuring Post-College Employment Success." The Institute for College Access & Success. https://ticas.org/sites/default/files/pub_files/of_metrics_markets.pdf.

97 U.S. Senate. "S.1121 - College Transparency Act." 115th Congress. <https://www.congress.gov/bill/115th-congress/senate-bill/1121>.

credential completion, and work site (see proposal #22).⁹⁸ Louisiana, Oregon, Washington, and Alaska currently collect additional data elements, including occupational title.⁹⁹ A 2014 BLS survey found that states that collected enhanced wage records “reported that the data were extremely helpful in estimating hourly earnings, understanding career progression from occupation to occupation, assessing the effectiveness of workforce training, and making occupational projections.”¹⁰⁰

To create training program effectiveness data, enriched UI data and other administrative data should be matched with education program data through a state longitudinal data system (SLDS). States should establish an SLDS and ensure the agency running it has a close working relationship with the state agencies that are providing administrative data. If presented in a simple and standardized format, this training effectiveness data could help students make informed decisions about which training to seek.¹⁰¹ If they are not already doing so, states should also prioritize sharing their UI data with other states and the federal government.

Thirty-five states currently link at least a portion of their education data with workforce data, and another seven states plan to link them in the future.¹⁰² California Governor Gavin Newsom recently proposed building a state longitudinal system.¹⁰³

11. Expand Access to High Quality and Cost-Saving Career Counseling

Workers whose jobs are impacted by automation can benefit from transitioning to new jobs or occupations, but identifying these transitions can be difficult without career counseling support. According to a recent analysis by the World Economic Forum and the Boston Consulting Group, it would be possible for 95 percent of workers currently holding jobs at risk of technological disruption to find other jobs in the economy that fit their skill set.¹⁰⁴ But most of these new jobs are outside the original job’s cluster of related professions, meaning that displaced workers may not be aware of them.

Career counseling and other reemployment services, such as job listings, job search assistance, and referrals to employers, can help workers transition back to work. A study commissioned by the U.S. DOL examining reemployment services in Nevada found that they represent a fast and cost-effective approach to helping displaced workers find work, and result in savings to the UI program that exceed the cost of the services.¹⁰⁵

98 The Workforce Information Advisory Council, the National Skills Coalition, and The Institute for College Access & Success have all made similar recommendations to states.

Workforce Information Advisory Council. 2018. “Recommendations to Improve the Nation’s Workforce and Labor Market Information System.” https://www.doleta.gov/wioa/wiac/docs/Second_Draft_of_the_WIAC_Final_Report.pdf.

National Skills Coalition. 2019. “Saying Yes to State Longitudinal Data Systems.” <https://www.nationalskillscoalition.org/resources/publications/saying-yes-to-state-longitudinal-data-systems-building-and-maintaining-cross-agency-relationships>.

Dalal, Stein, and Thompson. 2018. “Of Metrics and Markets: Measuring Post-College Employment Success.” The Institute for College Access & Success. https://ticas.org/sites/default/files/pub_files/of_metrics_markets.pdf.

99 Texas Workforce Commission. 2016. “Study on the Collection of Occupational Data.” <https://twc.texas.gov/files/news/2016-twc-study-collection-occupational-data.pdf>.

100 Administrative Wage Record Enhancement Study Group. 2014. “Enhancing Unemployment Insurance Wage Records.” https://www.bls.gov/advisory/bloc/enhancing-unemployment-insurance-wage-records_fy.pdf.

101 Loewenstein, Sunstein, and Golman. 2014. “Disclosure: Psychology Changes Everything.” *Annual Review of Economics*. <https://www.cmu.edu/dietrich/sds/docs/loewenstein/DisclosureChgsEverything.pdf>.

102 SHEEO. “State Postsecondary Data.” Last accessed March 7, 2019. <https://postsecondarydata.sheeo.org/data/>.

103 State of California. 2019. “2019-20 Governor’s Budget.” <http://www.ebudget.ca.gov/budget/2019-20/#/BudgetSummary>.

104 World Economic Forum. 2019. “Towards a Reskilling Revolution.” http://www3.weforum.org/docs/WEF_Towards_a_Reskilling_Revolution.pdf.

105 Michaelides et al. 2012. “Impact of the Reemployment and Eligibility Assessment (REA) Initiative in Nevada.” https://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_08_REA_Nevada_Follow_up_Report.pdf.

The national workforce system delivers career counseling and other reemployment services through the more than 2,500 American Job Centers (AJCs) across the country. Federal and state policymakers should ensure that these Centers have the necessary resources to help guide workers to new jobs and careers. The 2016 Gold Standard Program Evaluation by Mathematica Policy Research found that workers who used staff-supported services, including career counseling, experienced 17 percent higher earnings compared to workers who only accessed self-service resources.¹⁰⁶ However, federal workforce funding has been decreasing over time. Federal workforce grants to states—which form the core of the national public workforce system—have been cut by over 40 percent since 2001.¹⁰⁷

Federal and state policymakers should increase funding for AJCs, in particular to support additional career counselors. Moreover, states should train counselors to better use technology and data to improve their ability to guide workers through career transitions and find them high-quality jobs.

Colorado and Indiana have invested in improving job coaching by working with the Markle Foundation's Skillful Initiative to develop the Career Coaching Corps.¹⁰⁸ This program connects counselors from AJCs, community colleges, high schools, and nonprofit organizations in a "community of practice" to disseminate high-quality standards and best practices through a "train the trainer" approach. Participating counselors also learn to better use new technologies, such as SkillsEngine, mySkills, myFuture, edX, LinkedIn, and CSMlearn, and labor market data to help workers find training opportunities and well-paying jobs.

In addition, state policymakers should expand career counseling services in high schools, community colleges, and universities.¹⁰⁹ For example, Pathways to Prosperity provides middle and high school students with early and sustained career counseling and workplace-learning opportunities. Launched in 2012 by Jobs for the Future and the Harvard Graduate School of Education, it now operates at schools in 14 states.¹¹⁰

12. Raise Worker Income and Promote Job Quality Through Wage Subsidies and the Minimum Wage

Ensuring that workers have the right skills and training is not enough if jobs are low-paying and don't offer a path to the middle-class. For example, a college degree has long been considered an important component of economic success, and rightly so: increased educational attainment corresponds to both lower unemployment rates and higher

106 McConnell et al. 2016. "Providing Public Workforce Services to Job Seekers." Mathematica Policy Research. <https://www.mathematica-mpr.com/our-publications-and-findings/publications/providing-public-workforce-services-to-job-seekers-15-month-impact-findings-on-the-wia-adult>.

107 National Skills Coalition. 2018. "America's workforce: We can't compete if we cut." <https://www.nationalskillscoalition.org/resources/publications/file/Americas-workforce-We-cant-compete-if-we-cut-1.pdf>.

108 Bryson. 2018. "Colorado Connects Career-Seekers With Contemporary Coaches." *U.S. News & World Report*. <https://www.usnews.com/news/best-states/articles/2018-08-27/colorado-connects-career-seekers-with-contemporary-coaches>.
Skillful. 2019. "Skillful Indiana Names William D. Turner, Jr. Executive Director; Launches Skillful Governor's Coaching Corps with Indiana Governor Eric J. Holcomb." Markle Foundation. <https://www.skillful.com/press-release/indiana-governors-coaching-corps>.

109 Alden and Taylor-Kale. 2018. "The Work Ahead." Council on Foreign Relations. <https://www.cfr.org/report/the-work-ahead/report/recommendations.html>.

110 Jobs for the Future. 2019. "Pathways to Prosperity Network." <https://www.jff.org/what-we-do/impact-stories/pathways-to-prosperity-network/>.

median earnings.¹¹¹ Yet just over 40 percent of recent college graduates find themselves in jobs that do not typically require college degrees, and the share of these jobs that are categorized as “good jobs” declined from 48 percent in 2000 to 35 percent in 2018, while those in “low wage” jobs rose from 10 percent to 13 percent.¹¹²

Automation could, in fact, accelerate this trend. As detailed in Part I of this report, *Automation and a Changing Economy: The Case for Action*, technology tends to replace routine manual and cognitive tasks while increasing demand for nonroutine tasks. Over the past thirty years, this trend has resulted in a relative decline in middle-wage jobs and an increase in low-wage jobs.¹¹³

One approach to raising worker income is for the government to augment low-wage work. For decades, the Earned Income Tax Credit (EITC) has offered low-wage workers an important supplement to their earned income. In 2016, the EITC lifted 5.8 million Americans out of poverty, including 3 million children,¹¹⁴ more than any other single program aside from Social Security.¹¹⁵ Research has shown that the EITC provides a strong work incentive, leading to substantial increases in employment among single-parents,¹¹⁶ ¹¹⁷ and that for single mothers, receiving the EITC leads to higher wage growth in future years.¹¹⁸

Federal and state policymakers should consider expanding and modernizing EITC programs. This idea attracts bipartisan support. The Cost-of-Living Refund Act, introduced by Senator Sherrod Brown (D-OH) and Representatives Ro Khanna (D-CA) and Bonnie Watson Coleman (D-NJ), would roughly double the EITC for workers with children to a maximum of \$12,349, and increase the credit sixfold for childless adults to a maximum of \$3,054.¹¹⁹ Former Speaker Paul Ryan also proposed an expansion of the EITC.¹²⁰ Oren Cass, a Manhattan Institute senior fellow, has proposed a wage subsidy program that is conceptually similar to an EITC expansion.¹²¹ The bipartisan

111 Bureau of Labor Statistics. “Unemployment rates and earnings by educational attainment, 2017.” U.S. Department of Labor. Last modified March 27, 2018. <https://www.bls.gov/emp/chart-unemployment-earnings-education.htm>.

112 For the purposes of this analysis, researchers at the Federal Reserve Bank of New York define a “good job” as providing a full-time average annual wage of roughly \$45,000 or more; “recent college graduates” as those aged 22 to 27 with a bachelor’s degree or higher; and “jobs do not typically require college degrees” (which they refer to as “noncollege jobs”) as jobs in which less than 50 percent of the people working in that job indicate that at least a bachelor’s degree is necessary. Federal Reserve Bank of New York. 2018. “The Labor Market for Recent College Graduates.” Last updated February 6, 2019. https://www.newyorkfed.org/research/college-labor-market/college-labor-market_underemployment_jobtypes.html.

113 This can lead to job polarization, with a declining quantity of middle-wage occupations that consist of more routine work, and an increasing prevalence of both high-skill, high-paid and lower-skill, low-paid occupations that consist of more nonroutine work. In 1979, middle-skill occupations accounted for 60 percent of US employment. By 2007, this had fallen to 49 percent, and to 46 percent by 2012. Over the same period, both high- and low-skilled occupations saw rapid growth. Autor. 2015. “Why Are There Still So Many Jobs?” *Journal of Economic Perspectives*. <https://economics.mit.edu/files/11563>. Some studies have actually found that certain technologies depress demand for middle-wage jobs without a concomitant increase in demand for low-wage jobs, leading to downward pressure on wages for middle-income workers and low-income workers (who now have more competition for their jobs). Michaels, Natraj, and Van Reenen. 2014. “Has ICT polarized skill demand?” *Review of Economics and Statistics*. http://eprints.lse.ac.uk/46830/1/Michaels_Natraj_VanReenen_Has-ICT-polarized-skill-demand_2014.pdf.

114 Center on Budget and Policy Priorities. “Policy Basics: The Earned Income Tax Credit.” Updated April 19, 2018. <https://www.cbpp.org/research/federal-tax/policy-basics-the-earned-income-tax-credit>.

115 Fox. 2017. “The Supplemental Poverty Measure: 2016.” Census Bureau. <https://www.census.gov/content/dam/Census/library/publications/2017/demo/p60-261.pdf>.

116 Meyer and Rosenbaum. 2001. “Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers.” *The Quarterly Journal of Economics*. https://www.ssc.wisc.edu/~scholz/Teaching_742/Meyer_Rosenbaum.pdf.

117 Eissa and Liebman. 1996. “Labor Supply Response to the Earned Income Tax Credit.” *The Quarterly Journal of Economics*. <https://academic.oup.com/qje/article-abstract/111/2/605/1938452>.

118 Dahl, DeLeire, and Schwabish. 2009. “Stepping Stone or Dead End? The Effect of the EITC on Earnings Growth.” Institute for the Study of Labor. <http://ftp.iza.org/dp4146.pdf>.

119 Office of U.S. Senator Sherrod Brown. 2019. “Brown, Khanna, Watson Coleman Propose ‘Cost-Of-Living Refund’ To Help Lift Millions of Americans into Middle Class.” <https://www.brown.senate.gov/newsroom/press/release/brown-khanna-watson-coleman-propose-cost-of-living-refund-to-help-lift-millions-of-americans-into-middle-class>.

120 Goodnow. 2014. “Expanding opportunity in America.” American Enterprise Institute. <http://www.aei.org/publication/expanding-opportunity-in-america-paul-ryans-new-policy-reforms-for-reducing-poverty/>.

121 Cass. 2018. “The Case for the Wage Subsidy.” *National Review*. <https://www.nationalreview.com/2018/11/case-for-wage-subsidy-government-spending-book-excerpt/>.

Opportunity America, AEI, Brookings Working Class Study Group endorsed expanding the EITC to childless adults and to experiment with a wage subsidy pilot program.¹²²

In addition to expanding the EITC, policymakers should consider additional changes. In a recent white paper, the Economic Security Project and California Budget and Policy Center advocated for (1) expanding the definition of work to include unpaid caregiving and students; (2) making payments monthly instead of annually; and (3) expanding eligibility further into the middle class.¹²³ Elements of these modernizations can be found in the federal proposals mentioned above, as well as various state proposals, which are expected to be introduced in 2019.¹²⁴

While EITC expansion may be costly, there is evidence that it leads to less reliance on public assistance and more taxes paid. According to a recent working paper from Jacob Bastian and Maggie Jones, 87 percent of the cost of the EITC is offset by lower reliance on public assistance and greater labor force participation, which leads to higher tax revenues.¹²⁵

Additional steps can be taken to reduce the cost of an EITC expansion. For example, research from Jesse Rothstein suggests that roughly 25 percent of the EITC's benefit accrues to employers (in the form of lower wages) rather than to workers.¹²⁶ Policymakers should couple an EITC expansion with an increase in the minimum wage, which would help counteract employers' ability to keep wages artificially low, ensuring that the benefit of the expansion goes to workers while also reducing the cost to government of increasing worker take-home pay. A recent bipartisan Council on Foreign Relations task force proposed pairing an EITC expansion with an increase in the minimum wage in part as a way to limit the cost of the EITC subsidy.¹²⁷

There are other reasons to raise the minimum wage beyond its complimentary effects on EITC expansion. Recent research by economist Arindrajit Dube has found that over the long run, a 10 percent increase in the minimum wage corresponds to a 2.2 to 4.6 percent decline in the poverty rate.¹²⁸ Raising the minimum wage doesn't just raise the wages of the lowest-wage workers. As minimum wage workers receive higher pay, workers that make slightly more than the minimum wage see their wages increase in response.¹²⁹ In fact, workers who make up to 15 percent more than the new minimum wage may see their wage increase.¹³⁰

Recent research also suggests that concerns around the minimum wage and job loss may be unfounded, at least for moderate increases.¹³¹ For example, a 2019 study looked at 138 state-level minimum wage changes between 1979 and 2016 and found that increasing

122 Opportunity America/AEI/Brookings Working Class Study Group. 2018. "Work, Skills, Community." <https://opportunityamericaonline.org/wcg/>.

123 Araby et al. 2018. "Strengthening and Modernizing the California EITC to Fight Child Poverty, Inequality, and the Rising Cost of Living." Economic Security Project. <https://costoflivingrefund.org/blog/2018/12/17/strengthening-and-modernizing-the-california-eitc-to-fight-poverty-inequality-and-the-rising-cost-of-living>.

124 Economic Security Project. "Cost-of-Living Refund: State Information." <https://costoflivingrefund.org/states>.

125 Bastian and Jones. 2018. "Do EITC Expansions Pay for Themselves?" University of Chicago Working Paper. <https://drive.google.com/file/d/1GbBeeQzfGH9f9Y1u5rS55Sn3eStBWE7/view>.

126 Rothstein. 2009. "Is The EITC Equivalent to an NIT?" National Bureau of Economic Research. <https://www.nber.org/papers/w14966.pdf>.

127 Alden and Taylor-Kale. 2018. "The Work Ahead." Council on Foreign Relations. <https://www.cfr.org/report/the-work-ahead/report/recommendations.html>.

128 Dube. 2018. "Minimum Wages and the Distribution of Family Incomes." National Bureau of Economic Research. <https://www.nber.org/papers/w25240>.

129 Autor, Manning, and Smith. 2016. "The Contribution of the Minimum Wage to US Wage Inequality over Three Decades." *American Economic Journal: Applied Economics*. <https://www.aeaweb.org/articles?id=10.1257/app.20140073>.

130 Dube, Giuliano, and Leonard. 2018. "Fairness and Frictions." National Bureau of Economic Research. <https://www.nber.org/papers/w24906>.

131 Cooper. 2019. "Raising the federal minimum wage to \$15 by 2024 would lift pay for nearly 40 million workers." Economic Policy Institute. <https://www.epi.org/publication/raising-the-federal-minimum-wage-to-15-by-2024-would-lift-pay-for-nearly-40-million-workers/>.

the minimum wage did not cause any change in the overall number of low-wage jobs in the economy, though it did increase their pay.¹³² Recent economic history reinforces this conclusion: in 1968, the federal minimum wage (adjusted for inflation) was 40 percent higher than it is today, and unemployment was under 4 percent.¹³³

Finally, the health of the economy is strongly related to wages and job quality. An economy operating with a low unemployment rate for an extended period of time provides a variety of benefits to low- and middle-wage workers. As businesses must compete more vigorously for workers, they bid up wages, and these wage increases tend to be concentrated at the low end of the wage scale. A recent study found that a one percentage point drop in the unemployment rate would result in a half a percentage point increase in real wage growth for the bottom ten percent of workers.¹³⁴ In addition, while recent data on employer-provided training is incomplete, anecdotal evidence suggests that low unemployment conditions cause businesses to increase their training investments as a consequence of hiring and onboarding workers who may be only marginally attached to the labor force.¹³⁵ Policy proposals #14-16, which serve to strengthen social insurance programs for displaced workers, would also help boost the economy and lower the unemployment rate during economic downturns by serving as powerful automatic stabilizers.

Beyond EITC expansion and raising the minimum wage, Maureen Conway, Executive Director of the Aspen Institute Economic Opportunities Program, suggests a variety of other approaches to raise job quality, including (1) fair scheduling legislation to ensure that workers are given input and advance notice in setting their work schedules; (2) procurement standards that ensure the government only contracts with firms that offer a living wage and benefits to their employees; and (3) new government benefits such as paid leave.¹³⁶

13. Create a More Flexible Labor Market and Promote Entrepreneurship

In a rapidly changing economy, workers increasingly need the freedom to move between jobs, companies, occupations, and industries, and to become entrepreneurs by starting their own businesses. A dynamic and flexible labor market will help workers not only adjust to new technology, but allow them to take advantage of the new economic opportunities that technology will create. Policymakers should remove obstacles to switching jobs to encourage flexibility and entrepreneurship. In particular, policymakers should consider reforms to several legal restrictions on freedom of movement and make workplace benefits more portable.

132 Cengiz et al. 2019. "The Effect of Minimum Wages on Low-Wage Jobs." National Bureau of Economic Research. <https://www.nber.org/papers/w25434>.

133 Cooper. 2019. "Raising the federal minimum wage to \$15 by 2024 would lift pay for nearly 40 million workers." Economic Policy Institute. <https://www.epi.org/publication/raising-the-federal-minimum-wage-to-15-by-2024-would-lift-pay-for-nearly-40-million-workers/>.
Bureau of Labor Statistics. "Civilian Unemployment Rate." Retrieved from Federal Reserve Bank of St. Louis. <https://fred.stlouisfed.org/series/UNRATE/>.

134 Bivens and Zipperer. 2018. "The importance of locking in full employment for the long haul." Economic Policy Institute. <https://www.epi.org/publication/the-importance-of-locking-in-full-employment-for-the-long-haul/>.

135 LeVine. 2019. "Off the sidelines and earning \$30 an hour." Axios. <https://www.axios.com/newsletters/axios-future-6c6a4474-1098-4a4a-aaa0-a3819d6ab08c.html>.

136 Conway. 2018. "Strategies to Advance Job Quality." In *Investing in America's Workforce*. <https://www.investinwork.org/-/media/Files/volume-two/Strategies%20to%20Advance%20Job%20Quality.pdf?la=en>.

Legal Restrictions on Freedom of Movement

In recent decades, legal restrictions on whom workers can work for and what kind of work they can engage in have proliferated. These include non-compete clauses, no-poach agreements, and occupational licenses.

» **Non-compete clauses** are clauses in employment contracts that restrict workers from joining or founding rival companies for a certain period of time after leaving their jobs. These contracts were initially introduced to protect legitimate business interests, such as trade secrets and intellectual property. But the usage of these contracts has exploded in recent years. Surveys find that between 15 and 18 percent of workers are currently bound by non-competes, and 25 to 38 percent have been subject to non-competes at some point in their careers.¹³⁷

» **No-poach agreements** are agreements between employers promising not to poach each other's workers. These agreements are often used to prevent fast-food and other low-wage service employees of franchise companies from finding better jobs within the same company, but at different franchises. Nearly 60 percent of major franchises are covered by no-poach agreements.¹³⁸

» **Occupational licensing** is a form of regulation that requires workers to obtain a government approved license to perform certain types of work. Licensing is common for a wide variety of occupations, including dentistry, law, and medicine, but in the last few decades the number of occupations that require licenses has increased dramatically. The share of occupations requiring state-mandated licenses increased from 5 percent in the 1950's to 25 percent today. Adding federal and local licensing requirements, 29 percent of workers are currently licensed.¹³⁹ The common justification is to ensure quality and safety in certain products and services where market competition alone would be inadequate, but there is little empirical evidence that licensure leads to improvements in these areas.¹⁴⁰ Instead, it creates a large barrier to entering certain types of work and high startup costs for new businesses. Many covered occupations, such as massage therapy, cosmetology, and floristry, provide services that can be evaluated by consumers with little health risk.

There is a large body of evidence that these three legal restrictions on the freedom to work result in less economic dynamism and lower wages. For example, job mobility in Michigan fell by eight percent after the state began enforcing non-competes, while Hawaii experienced an 11 percent increase in technology job mobility after implementing an outright ban on non-competes in that industry.¹⁴¹ A U.S. Treasury study found that

137 Starr. 2019. "The Use, Abuse, and Enforceability of Non-Compete and No-Poach Agreements." Economic Innovation Group. <https://eig.org/noncompetesbrief>.

Krueger and Posner. 2018. "A Proposal for Protecting Low-Income Workers from Monopsony and Collusion." Brookings Institution. http://www.hamiltonproject.org/papers/a_proposal_for_protecting_low_income_workers_from_monopsony_and_collusion.

138 Krueger and Posner. 2018. "A Proposal for Protecting Low-Income Workers from Monopsony and Collusion." Brookings Institution. http://www.hamiltonproject.org/papers/a_proposal_for_protecting_low_income_workers_from_monopsony_and_collusion.

139 Kleiner and Krueger. 2013. "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market." *Journal of Labor Economics*. <http://archive.hhh.umn.edu/people/mkleiner/pdf/Final.occ.licensing.JOLE.pdf>.

140 The White House Council of Economic Advisors surveyed 12 studies of occupational licensing and found that "empirical research does not find large improvements in quality or health and safety from more stringent licensing," while the Goldwater Institute finds that "In truth, the health and safety justification rarely holds up under scrutiny."

The White House. 2015. "Occupational Licensing: A Framework for Policymakers." https://obamawhitehouse.archives.gov/sites/default/files/docs/licensing_report_final_nonembargo.pdf.
Slivinski. 2015. "Bootstraps Tangled in Red Tape." Goldwater Institute. <https://goldwaterinstitute.org/article/bootstraps-tangled-in-red-tape/>.

141 Balasubramanian et al. 2017. "Locked In? The Enforceability of Covenants Not to Compete and the Careers of High-Tech Workers." U.S. Census Bureau Center for Economic Studies Paper. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2905782.
Marx and Fleming. 2012. "Non-compete Agreements: Barriers to Entry...and Exit?" In *Innovation Policy and the Economy, Volume 12*. <https://www.nber.org/chapters/c12452.pdf>.

a state's decision to strictly enforce non-compete contracts was associated with a five percent reduction in wages for 25-year-old workers and a 10 percent reduction in wages for 50-year-old workers.¹⁴² Studies have shown that no-poach agreements have similar negative effects on worker mobility and wages.¹⁴³

Occupational licensing can also lead to lower rates of entrepreneurship among low-income workers. A 2015 study found that states that require licenses for more than half of their low-income occupations had entrepreneurship rates 11 percent lower than average, while states that require licenses for less than a third of low-income occupations had average entrepreneurship rates 11 percent higher than average.¹⁴⁴

To support a more dynamic economy, encourage entrepreneurship, and give workers the freedom to choose where to work, federal and state policymakers should prohibit non-compete clauses for low-income workers and ban no-poach agreements, including those between separate franchises with a single chain.¹⁴⁵ At the federal level, Senators Marco Rubio (R-FL) and Christopher Murphy (D-CT) have each introduced bills to restrict non-competes.¹⁴⁶ Senators Elizabeth Warren (D-MA) and Cory Booker (D-NJ) have also proposed banning no-poaching agreements.¹⁴⁷ California has a long-standing ban on the enforcement of non-competes, which some academics credit for the success of the state's tech industry.¹⁴⁸ In the last three years, four other states—Hawaii, Utah, Idaho, and Illinois—have passed laws that restrict non-compete clauses, while New Hampshire, Pennsylvania and Vermont have considered such legislation.¹⁴⁹ Similarly, a coalition of 11 state attorneys general is investigating no-poach agreements at several chains, and under threat of legal action, numerous fast food chains recently agreed to end the practice.¹⁵⁰

Similarly, federal, state, and local policymakers should review their licensure requirements to ensure that they are not unnecessarily burdensome.¹⁵¹ This is particularly important for state policymakers, as the majority of licensure requirements exist at the state level. Additionally, where licensure requirements across states differ, geographic labor mobility is seriously hindered, demanding efforts to harmonize requirements or create reciprocity rules.

142 Office of Economic Policy. 2016. "Non-compete Contracts." U.S. Department of the Treasury. <https://www.treasury.gov/resource-center/economic-policy/Documents/UST%20Non-competes%20Report.pdf>.

143 For a full review of the literature on the effects of non-compete and no-poach agreements, see: Walter. 2019. "The Freedom to Leave." Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2019/01/09/464831/the-freedom-to-leave/>.

144 Slivinski. 2015. "Bootstraps Tangled in Red Tape." Goldwater Institute. <https://goldwaterinstitute.org/article/bootstraps-tangled-in-red-tape/>.

145 Krueger and Posner. 2018. "A Proposal for Protecting Low-Income Workers from Monopsony and Collusion." Brookings Institution. http://www.hamiltonproject.org/papers/a_proposal_for_protecting_low_income_workers_from_monopsony_and_collusion.
Walter. 2019. "The Freedom to Leave." Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2019/01/09/464831/the-freedom-to-leave/>.

146 U.S. Senate. "S.124 - Freedom to Compete Act." 116th Congress. <https://www.congress.gov/bills/116/congress/senate-bill/124>.
U.S. Senate. "S.2782 - Workforce Mobility Act of 2018." 115th Congress. <https://www.congress.gov/bills/115/congress/senate-bill/2782>.

147 U.S. Senate. "S.2480 - End Employer Collusion Act." 115th Congress. <https://www.congress.gov/bills/115/congress/senate-bill/2480>.

148 Gilson. 1999. "The Legal Infrastructure of High Technology Industrial Districts." New York University Law Review. <https://law.stanford.edu/index.php?webauth-document=publication/256234/doc/slspublic/NYULawReview-74-3-Gilson.pdf>.

149 Marx. 2018. "Reforming Non-Competes to Support Workers." Brookings Institution. <https://www.brookings.edu/research/reforming-non-competes-to-support-workers/>.
Schwarz et al. 2018. "Three States May Restrict Use of Employment Noncompete Agreements." Society for Human Resource Management. <https://www.shrm.org/resourcesandtools/legal-and-compliance/state-and-local-updates/pages/states-may-restrict-use-of-employment-noncompete-agreements.aspx>.

150 Abrams. 2018. "'No Poach' Deals for Fast-Food Workers Face Scrutiny by States." New York Times. <https://www.nytimes.com/2018/07/09/business/no-poach-fast-food-wages.html/>.
Walter. 2019. "The Freedom to Leave." Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2019/01/09/464831/the-freedom-to-leave/>.

151 Aspen Institute Future of Work Initiative. 2017. "Toward a New Capitalism." <https://www.aspeninstitute.org/publications/a-policy-agenda-to-restore-the-promise-of-work/>.

Portable Benefits

Portable benefits are critical to promoting dynamism, entrepreneurship, and economic security. Portable benefits systems allow workers to control and keep benefits as they move from job to job or become self-employed. Today, most workers obtain benefits from their employer, and would lose those benefits if they switched jobs. If workers have access to benefits outside traditional employment relationships, they may be more likely to change jobs or take on entrepreneurial endeavors. This promotes labor market dynamism, which, when matched with household financial security, benefits workers, employers, and the economy more broadly.

Policymakers should develop portable benefit models that: (1) are not tied to any particular job, but rather are linked to the individual worker who can take the benefits from job to job or project to project; (2) support contributions from multiple employers or clients that are proportionate to dollars earned, jobs done, or time worked; and (3) cover all workers, including independent contractors and other non-traditional workers as well as traditional employees.

There is already movement at the national and state levels in developing portable benefits. At the federal level, Senator Mark Warner (D-VA) introduced the bipartisan Portable Benefits for Independent Workers Pilot Program Act which would establish a \$20 million grant fund to support experimentation with portable benefit models in states, localities, and non-profit organizations.¹⁵² Legislators in Washington, New Jersey, Georgia, and Massachusetts have introduced bills to either create portable benefits systems or start innovation funds to experiment with different portable benefits models.¹⁵³ New York's Black Car Fund, established in 1999 in New York City and expanded to the entire state in 2017, serves as an example of an existing portable benefits model. The Fund allows professional passenger car drivers, who are traditionally independent contractors, to access workers' compensation coverage, and more recently vision and telemedicine benefits through a mandatory passenger surcharge.¹⁵⁴ In addition, ten states have recently passed legislation creating state-facilitated retirement savings programs for private-sector workers, often called "Secure Choice" programs, to make retirement plans more portable and universally accessible.¹⁵⁵

152 U.S. Senate. "S.541 - A bill to require the Secretary of Labor to establish a pilot program for providing portable benefits to eligible workers, and for other purposes." 116th Congress. <https://www.congress.gov/bills/116th-congress/senate-bill/541>.

153 State of Washington. "HB 1601 - Creating the universal worker protections act." 66th Legislature. <https://app.leg.wa.gov/billssummary?BillNumber=1601&Initiative=false&Year=2019>.
State of New Jersey. "S67 - Establishes system for portable benefits for workers who provide services to consumers through contracting agents." 218th Legislature. https://www.njleg.state.nj.us/2018/Bills/S0500/67_11.HTM.
State of Georgia. "SB 475 - Independent Contractors; certain employment benefits; funding; administration; and eligibility; provide." 2017-2018 Regular Session. <http://www.legis.ga.gov/Legislation/en-US/display/20172018/SB/475>.
Commonwealth of Massachusetts. "SD 1100 - An Act establishing a portable benefits for independent workers innovation fund." 119st General Court. <https://malegislature.gov/Bills/191/SD1100>.

154 To learn more about the Black Car Fund, visit <http://www.nybcf.org/>.

155 These states are Oregon, Illinois, California, Connecticut, Maryland, New York, Washington, New Jersey, Vermont, Massachusetts.

Help People and Communities Recover from Displacements

For most workers, past evidence suggests that automation will continue to change how work is performed, but will not result in outright job loss. However, automation could displace a potentially large number of workers. The McKinsey Global Institute projects that by 2030 as much as a third of the workforce may be displaced by automation and need to transition to different occupations.¹⁵⁶

Displaced workers are those who lost or left jobs because their plant or company closed or moved, there was insufficient work for them to do, or their position or shift was abolished.¹⁵⁷ Displaced workers face significant challenges, tending to be unemployed for long periods before finding new jobs, and having to take lower wages upon reemployment.¹⁵⁸ On average, displaced workers who lose full-time jobs experience a 35 percent loss of earnings, largely due to unemployment or working fewer hours. Moreover, the longer they held their prior job, the greater the fall in earnings: on average, displaced workers with over 20 years of tenure experience 10 percent greater earnings loss than workers with one to three years of tenure.¹⁵⁹ Based on this data, workers who find their skills in less demand or even obsolete as a result of automation will, therefore, need greater assistance to transition to new jobs more quickly.

Regions and communities whose industries experience disruptions from automation can face a host of serious economic and social challenges that extend beyond those individuals and families whose jobs are lost. Plant closures and widespread displacements in one industry can spill over to adjacent ones, leading to declines in industries such as retail, service, and hospitality. Employment, wages, and home values can fall, and social problems, including poverty, crime, and drug addiction can increase. This is typified by the kind of rapid decline seen in the manufacturing, steel, and coal industries in the latter 20th and early 21st century and the persistent struggles of the communities that relied on them. Place-based and sector-based policies, if designed well, can support transition and economic development effectively in those areas where significant automation disruption occurs.^{160 161}

A recent OECD report found that through a combination of income support, reemployment services, and other policies, other countries have been able to help

156 Manyika et al. 2017. "Jobs Lost, Jobs Gained." McKinsey Global Institute. <https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

157 Bureau of Labor Statistics. 2018. "Worker Displacement: 2015-17." U.S. Department of Labor. <https://www.bls.gov/news.release/disp.nr0.htm>.

158 Jacobson, LaLonde, and Sullivan. 2011. "Policies to Reduce High-Tenured Displaced Workers' Earnings Losses Through Retraining." Brookings Institution. http://www.hamiltonproject.org/papers/policies_to_reduce_high-tenured_displaced_workers_earnings_losses_thro.
Lachowska, Mas, and Woodbury. 2018. "Sources of Displaced Workers' Long-Term Earnings Losses." National Bureau of Economic Research. <http://www.nber.org/papers/w24217>.

159 Farber. 2017. "Employment, Hours, and Earnings Consequences of Job Loss." *Journal of Labor Economics*. <https://www.journals.uchicago.edu/doi/10.1086/692353>.

160 The Hamilton Project. 2018. "Place-Based Policies for Shared Economic Growth." http://www.hamiltonproject.org/papers/place_based_policies_for_shared_economic_growth.

161 Groshen et al reviews the existing literature and concludes that "some types of well-designed policies can be effective, while other policies do not appear to be. Policies that subsidize businesses based solely on their location are hard to defend based on the research record. Place-based policies used in a more discretionary fashion seem to work better, perhaps because policymakers can target subsidies where they will do the most good and also hold recipients accountable. And place-based policies that generate public goods such as infrastructure and knowledge appear beneficial, perhaps because these goods are underprovided by the private sector."
Groshen et al. 2018. "Preparing U.S. Workers and Employers for an Autonomous Vehicle Future." *Securing America's Future Energy*. <https://aworkforce.secureenergy.org/wp-content/uploads/2018/06/Groshen-et-al-Report-June-2018-1.pdf>.

displaced workers adjust and find new jobs more effectively than in the U.S.¹⁶² It partly attributes this discrepancy to a lack of funding. The U.S. invests far less on programs that are aimed at helping displaced workers find work than many other developed countries, spending just 0.11 percent of GDP on these programs, which is half the share it spent in 1985. In contrast, Canada spends 0.24 percent of GDP on similar programs, Germany spends 0.63 percent, and France spends 1.01 percent.¹⁶³ The OECD report also notes that while programs such as UI and TAA are important, many displaced workers are not covered by these programs.

In addition to inadequate adjustment assistance, policymakers have generally avoided place-based initiatives, aside from the relatively small programs stewarded by the Economic Development Administration and a handful of federal regional development programs (Tennessee Valley Authority, Denali Regional Commission, Delta Regional Authority, Appalachian Regional Commission). New research on persistent and growing regional economic divides suggests reconsidering a more place-based approach to economic development.¹⁶⁴

The following proposals would:

- » Support displaced workers who retrain for in-demand fields
- » Provide wage insurance to older workers
- » Help displaced workers meet the costs associated with finding a new job
- » Modernize Unemployment Insurance to improve coverage and sustainability
- » Reduce stigma associated with career transitions
- » Improve efforts to support local economies and promote regional competitiveness

The first three proposals in this section, training benefits, wage insurance, and job search allowances (policy proposals #14, #15, and #16), are targeted to displaced workers. Criteria for eligibility should generally mirror that of the existing WIOA Dislocated Worker Program, though the process for determining eligibility would need to be carefully designed (for more detail on the eligibility criteria and process for these benefits, see Appendix).

14. Support Displaced Workers Who Retrain for In-Demand Fields

Finding the time and financial resources to enroll in a training program can be difficult, especially for the unemployed. Tuition and fees for community college and vocational training programs can be expensive, particularly for workers facing financial constraints. Lifelong Learning and Training Accounts (see proposal #7) are designed to help address this issue over the course of a worker's career. However, workers who become displaced

162 OECD. 2016. "Back to Work: United States." *OECD Publishing*. https://www.oecd-ilibrary.org/employment/back-to-work-united-states_9789264266513-en.

163 OECD. "Active Labour Market Policies: Connecting People with Jobs." <http://www.oecd.org/employment/activation.htm>.

164 The Hamilton Project. 2018. "Place-Based Policies for Shared Economic Growth." http://www.hamiltonproject.org/papers/place_based_policies_for_shared_economic_growth.
Austin, Glaeser, and Summers. 2018. "Saving the heartland." *Brookings Papers on Economic Activity*. <https://www.brookings.edu/bpea-articles/saving-the-heartland-place-based-policies-in-21st-century-america/>.
Economic Innovation Group. 2018. "From Great Recession to Great Reshuffling." <https://eig.org/dci>.

have a much more acute need for immediate retraining and financial support that requires additional assistance.

Displaced workers can also face non-financial barriers to retraining, such as child or elderly care, transportation, and time constraints. For example, research has shown that individuals raising preschool-age children have half as much time available for academics, sleeping, eating, and leisure activities compared to their childless peers.¹⁶⁵ Engaging in training is also a significant opportunity cost if doing so in lieu of returning to work, and if displaced workers need to take low-paying jobs just to pay bills, they will have little time to engage in training.¹⁶⁶ This can be particularly challenging because while some retraining programs are short, others can require up to two years of coursework. And though unemployed workers can receive UI benefits while in training programs to offset the opportunity cost of not working, longer programs will often exceed the maximum length of UI benefits (generally 26 weeks). For these reasons, some of the most successful training programs, such as Capital IDEA in Central Texas, provide intensive wrap-around services to give students time to devote to training.¹⁶⁷ Access to affordable childcare, in particular, is critical to student-parents succeeding in postsecondary programs.¹⁶⁸

Federal or state policymakers should provide displaced workers with training benefits that include vouchers and stipends. Vouchers should be worth up to \$10,000, enough to cover tuition and fees for most two-year community college and vocational training programs, to be used for training programs that prepare the worker for high-growth, high-demand occupations as determined by workforce boards. Stipends would be paid weekly, for up to two years, while workers are enrolled in qualified training programs. They would help pay basic living expenses and additional costs associated with attending training, such as child care and transportation. The stipend would be an amount equal to a portion of the worker's pre-displacement wages consistent with the state's UI wage-replacement rate plus an additional \$150 per week.¹⁶⁹

The Obama Administration proposed creating a Universal Displaced Worker program that provided training vouchers of up to \$8,000 over two years for training in high-growth, high-demand occupations.¹⁷⁰ Representative Tim Ryan (D-OH) recently

165 Ascend at the Aspen Institute. 2018. "Accelerating Postsecondary Success for Parents." <https://ascend.aspeninstitute.org/resources/postsecondary-education-and-students-who-are-parents-a-2gen-approach-for-policymakers/>.

166 Conway. 2018. "Do job training programs work? Wrong question." *Fast Company*. <https://www.fastcompany.com/90204625/do-job-training-programs-work-wrong-question>.

167 Conway. 2011. "The Price of Persistence." Aspen Institute Economic Opportunities Program. <https://www.aspeninstitute.org/publications/price-persistence-nonprofit-community-college-partnerships-manage-blend-diverse-funding-streams/>.

168 Ascend at the Aspen Institute. 2018. "Accelerating Postsecondary Success for Parents." <https://ascend.aspeninstitute.org/resources/postsecondary-education-and-students-who-are-parents-a-2gen-approach-for-policymakers/>.

169 While enrolled in training, the worker would continue to receive any Unemployment Insurance benefits to which they are eligible, as well as the additional \$150 per week. Once the worker's Unemployment Insurance benefits are exhausted—either because they have received the maximum number of weeks of benefits (typically 26) or because the worker was ineligible to receive Unemployment Insurance—this program would begin paying stipend benefits of an equal amount up to a total combined maximum of maximum of 104 weeks between unemployment benefits and training stipend benefits. The \$150 of additional benefits is set at a level that is meant to help cover the costs of additional expenses incurred by attending training. Though this benefit is not intended to cover full costs in all cases, it is intended to be of a magnitude similar to costs that might be incurred—particularly for child care and transportation. Child care can be quite expensive, with national averages totaling as high as \$8600-\$8700 annually (\$165-\$176 per week) according to Child Care Aware. However, it is possible that averages overestimate the true cost of child care for most families due to particularly high spending among higher-income families. For instance, one estimate from Chris Herbst at Arizona State University suggests median weekly child care expenditures among those working or in school in 2011 were lower, \$103.56 per week. Child Care Aware of America. 2017. "Parents and the High Cost of Child Care." http://usa.childcareaware.org/wp-content/uploads/2017/12/2017_CCA_High_Cost_Report_FINAL.pdf. Herbst. 2015. "The Rising Cost of Child Care in the United States." Institute for the Study of Labor. <http://ftp.iza.org/dp9072.pdf>. In its 2017 estimates of student budgets based on surveys and data from NCES and IPEDS, the College Board found that students at public, two-year, commuter institutions budgeted on average \$1780 per year (\$34 per week) for transportation costs. In the Supplemental Poverty Measure, median weekly work-related expenses including transportation totaled \$47.17 in 2014. The College Board. 2017. "Trends in College Pricing 2017." https://trends.collegeboard.org/sites/default/files/2017-trends-in-college-pricing_0.pdf. Mohanty, Edwards, and Fox. 2017. "Measuring the Cost of Employment." Census Bureau, U.S. Department of Commerce. https://cps.ipums.org/cps/resources/other_docs/SEHSD-WP2017-43.pdf.

170 The White House. 2012. "White House Announces Details on President's Plan to Provide Americans with Job Training and Employment Services." <https://obamawhitehouse.archives.gov/the-press-office/2012/03/12/white-house-announces-details-president-s-plan-provide-americans-job-tra>.

introduced legislation that would offer a \$8,000 voucher to all workers to pay for a short-term training program that teaches high-demand skills.¹⁷¹ Senators Joe Donnelly (D-IN), Kirsten Gillibrand (D-NY), Gary Peters (D-MI), and Debbie Stabenow (D-MI) introduced legislation that would provide training vouchers and income stipends to workers displaced by automation.¹⁷²

15. Provide Wage Insurance to Older Workers

When displaced workers find new jobs, they are often paid less than what they previously earned. This is particularly true for older and long-tenured workers who transition from a more senior position to a more junior or entry-level position in a different occupation. As noted earlier, long-tenured workers who lose their jobs can experience significant earnings losses.¹⁷³

To address this problem, federal and state policymakers should create a wage insurance program for displaced workers over 50 years old who become displaced and subsequently find new jobs at lower pay, in which they earn less than \$50,000 per year. A wage insurance program would provide short-term subsidies to offset a portion of the difference in earnings, up to \$10,000 over two years. It provides an incentive to return to work more quickly by reducing wage losses associated with taking a new lower-paying job. Wage insurance is similar to the EITC in that they are both wage subsidies that increase earnings for workers. Expanding the EITC (see proposal #12) would also induce displaced workers back into the labor market, while wage insurance would provide an additional incentive for those that face a decline in their earnings.

This proposal follows the same structure as the wage insurance program within Trade Adjustment Assistance (TAA), though that program is limited to workers who have lost their jobs due to trade. Many, including the Obama administration, the Council on Foreign Relations, Third Way, the Brookings Institute, and the American Enterprise Institute have called for creating a similar program for a broader set of workers than TAA covers.¹⁷⁴

Additionally, while wage insurance programs are often designed for workers in traditional employment relationships, policymakers should include independent contractors. In a paper published by the Aspen Institute Future of Work Initiative, Felicia Wong and Susan R. Holmberg of the Roosevelt Institute explored how wage insurance could be applied to displaced workers who transition from traditional employment into independent contractor work.¹⁷⁵

171 Office of U.S. Representative Tim Ryan. 2019. "Congressman Tim Ryan Introduces the WORKER Act." <https://timryan.house.gov/media/press-releases/congressman-tim-ryan-introduces-worker-act-0>

172 U.S. Senate. "S.2982 - TAA for Automation Act of 2018." 115th Congress. <https://www.congress.gov/bills/115th-congress/senate-bill/2982>.

173 Farber. 2017. "Employment, Hours, and Earnings Consequences of Job Loss." *Journal of Labor Economics*. <https://www.journals.uchicago.edu/doi/10.1086/692353>.

174 Zients and Furman. 2016. "New Reforms to Strengthen Support for Unemployed Workers." The White House. <https://obamawhitehouse.archives.gov/blog/2016/01/16/new-reforms-strengthen-support-unemployed-workers>.

Alden and Taylor-Kale. 2018. "The Work Ahead." Council on Foreign Relations. <https://www.cfr.org/report/the-work-ahead/report/recommendations.html>.

Horwitz, Minogue, and Brown. 2018. "Unemployment to Reemployment." Third Way. <https://www.thirdway.org/report/unemployment-to-reemployment-an-idea-to-modernize-the-safety-net-for-the-digital-age>.

Kletzer and Rosen. 2006. "Reforming Unemployment Insurance for the Twenty-First Century Workforce." Brookings Institution. <https://www.brookings.edu/research/reforming-unemployment-insurance-for-the-twenty-first-century-workforce/>.

Litan. 2015. "Wage insurance: A potentially bipartisan way to help the middle class." Brookings Institution. <https://www.brookings.edu/research/wage-insurance-a-potentially-bipartisan-way-to-help-the-middle-class/>.

175 Holmberg and Wong. 2016. "Wage Insurance in an Era of Non-Traditional Work." Aspen Institute Future of Work Initiative. <https://www.aspeninstitute.org/publications/wage-insurance-era-non-traditional-work/>.

16. Help Displaced Workers Meet the Costs Associated with Finding a New Job

If automation disrupts a local economy some workers may only be able to find new work by moving to a different region. Unfortunately, the cost of traveling to and from other regions to find employment or interview for new jobs, let alone the high cost of moving, can stand as a significant barrier.

Geographic mobility has declined in recent years. Americans are moving less than ever before, with the lowest rate on record in 2017.¹⁷⁶ And in the U.S., lower-skilled, less-educated workers are the least geographically mobile.¹⁷⁷ This is particularly concerning because there is substantial evidence that location has a strong influence on upward mobility, which suggests that moving can increase economic opportunity.¹⁷⁸ Research has also shown that, historically, regions experiencing disruption tend to see unemployment fall back to normal levels primarily through workers moving away to find work, rather than through new job creation.¹⁷⁹ But as geographic mobility has declined, increasingly workers are dropping out of the labor force entirely instead of moving, leading to lower labor force participation rates.¹⁸⁰

Beyond the upfront cost of moving, other key barriers to labor mobility include housing and transportation costs. For workers in distressed regions, employment prospects within their region may be limited, but the cost of living and of housing in particular in higher growth regions can pose significant barriers. To improve labor mobility, federal and state policymakers should develop proposals to increase affordable housing in high-growth, high-cost regions, expand public transportation and reduce commuting costs, and create relocation grants. Though specific affordable housing and transportation policies are beyond the scope of this paper, relocation and job search assistance are important components of a suite of supports for displaced workers.

Relocation grants could be modeled after the program within TAA, which includes a \$1,250 job search benefit and covers up to 90 percent of relocation costs up to \$1,250. Similar to a recent proposal from Third Way, this proposal would create a single job search and relocation benefit up to \$5,000.¹⁸¹ This benefit would only be available to displaced workers who cannot find work in their commuting zone for an extended period of time. And to ensure that disrupted communities are not negatively impacted by a loss of workers, this proposal should be paired with the proposal to improve regional competitiveness and entrepreneurship (see proposal #19).

Providing financial assistance for dislocated workers who wish to relocate has bipartisan support. Eli Lehrer and Lori Sanders published a *National Affairs* article proposing mobility grants for unemployed workers who move for a new job, by allowing workers to cash out future unemployment benefits in a discounted lump sum.¹⁸² Abigail

176 U.S. Census Bureau. 2018. "CPS Historical Migration/Geographic Mobility Tables." U.S. Department of Commerce. <https://www.census.gov/data/tables/time-series/demo/geographic-mobility/historic.html>.

177 Malamud and Wozniak. 2010. "The Impact of College Education on Geographic Mobility." National Bureau of Economic Research. <http://www.nber.org/papers/w16463>.
Wozniak. 2010. "Are College Graduates More Responsive to Distant Labor Market Opportunities?" *The Journal of Human Resources*. <http://jhr.uwpress.org/content/45/4/944>.

178 Chetty et al. 2014. "Where is the Land of Opportunity?" *Quarterly Journal of Economics*. <https://academic.oup.com/qje/article/129/4/1553/1853754>.

179 Katz and Blanchard. 1992. "Regional Evolutions." Brookings Papers on Economic Activity. <https://www.brookings.edu/bpea-articles/regional-evolutions/>.

180 Foote, Grosz, and Stevens. 2015. "How workers exit the labour market after local economic downturns." Centre for Economic Policy Research. <https://voxeu.org/article/mass-layoffs-and-local-labour-market-exit>.

181 Horwitz, Minogue, and Brown. 2018. "Unemployment to Reemployment." Third Way. <https://www.thirdway.org/report/unemployment-to-reemployment-an-idea-to-modernize-the-safety-net-for-the-digital-age>.

182 Lehrer and Sanders. 2014. "Moving to Work." *National Affairs*. <https://www.nationalaffairs.com/publications/detail/moving-to-work>.

Wozniak, writing for The Washington Center for Equitable Growth, proposed piloting a relocation voucher program for younger workers, funded by borrowing forward on their UI benefits.¹⁸³

In 2014, Representatives Tony Cardenas (D-CA) and Mick Mulvaney (R-SC) introduced the American Worker Mobility Act to authorize DOL to provide lump sum relocation vouchers to the long-term unemployed who need to move from an area of high unemployment to an area of low unemployment to start new jobs.¹⁸⁴ AEI economist Michael Strain also suggested such a proposal in a recent piece in *National Affairs*.¹⁸⁵

17. Modernize Unemployment Insurance to Improve Coverage and Sustainability

Unemployment Insurance (UI) coverage has eroded over the past half century, with less than 30 percent of currently unemployed workers receiving benefits.¹⁸⁶ With more workers facing potential job loss and disruption due to automation, policymakers should reform UI to improve coverage and expand access.

The UI program also faces critical funding challenges. In the Great Recession, most states exhausted their trust funds and had to borrow from the federal government in order to meet benefit obligations. In the aftermath, many states reduced their benefit levels permanently to pay back debts. If large numbers of workers lose their jobs to automation, policymakers will need to find a more permanent financing solution to ensure that the program can meet this challenge.

The Aspen Institute Future of Work Initiative, the Century Foundation, and the Center for American Progress, the Georgetown Center on Opportunity and Inequality and the National Employment Law Project have all proposed ideas on how to expand and strengthen UI coverage.¹⁸⁷ Among these proposals are ideas to:

- » expand eligibility by making more part-time, seasonal, and intermittent workers eligible for coverage;
- » create Self Employment Assistance programs in more states to enable unemployed workers to receive benefits while starting a business;
- » improve benefits by increasing and standardizing benefit formulas and extending maximum weeks of benefits; and,
- » ensure trust fund solvency by increasing the Federal Unemployment Tax Act (FUTA) tax rate or the wage base.

183 Wozniak. 2016. "Labor Mobility: Guidance for the Next Administration." Washington Center for Equitable Growth. <https://equitable-growth.org/labor-mobility-guidance-for-the-next-administration/>.

184 Roll Call. 2014. "Improving Worker Mobility Will Help Fix the Economy." http://www.rollcall.com/news/improving_worker_mobility_will_help_fix_the_economy_commentary-230859-1.html.

185 Strain. 2014. "A Jobs Agenda for the Right." *National Affairs*. <https://www.nationalaffairs.com/publications/detail/a-jobs-agenda-for-the-right>.

186 Average reciprocity rate—the share of unemployed workers receiving UI benefits—was 28 percent in 2018 based on data through November. Employment and Training Administration. "Unemployment Insurance Chartbook." U.S. Department of Labor. <https://ows.doleta.gov/unemploy/chartbook.asp>.

187 McKay, Pollack, and Fitzpayne. 2018. "Modernizing Unemployment Insurance for the Changing Nature of Work." Aspen Institute Future of Work Initiative. <https://www.aspeninstitute.org/publications/modernizing-unemployment-insurance/>. Stettner, Cassidy, and Wentworth. 2016. "A New Safety Net for An Era of Unstable Earnings." The Century Foundation. <https://tcf.org/content/report/new-safety-net-for-an-era-of-unstable-earnings/>. West et al. 2016. "Strengthening Unemployment Protections in America." Center for American Progress. <https://www.americanprogress.org/issues/poverty/reports/2016/06/16/138492/strengthening-unemployment-protections-in-america/>.

Similarly, Third Way has proposed replacing UI with a new system called Reemployment Insurance. This proposal would extend many of TAA's benefits to non-trade displaced workers, including additional income support (extending UI benefits beyond the standard 26 weeks), wage insurance, training vouchers for certified short-term programs, job search and relocation stipends, and bonuses if workers find new jobs before their income support expires.¹⁸⁸

Because UI is administered at the state level, most of these ideas must be pursued by state policymakers. Federal policymakers could require states to adopt certain reforms, provide incentive grants to encourage adoption, or withhold FUTA tax reimbursements for states that do not adopt reforms.

18. Reduce Stigma Associated with Career Transitions

Mid-life career shifts can be difficult given how personally and emotionally significant work is to one's identity. This can be particularly difficult if the types of occupations that become available are seen as not fitting the worker's gender, cultural, or social profile.

Many middle class jobs that have declined the most over the past several decades are predominantly male, while many that have grown are more heavily female.¹⁸⁹ For instance, nursing has been one of the fastest growing middle class occupations since 1980,¹⁹⁰ and is projected to remain one of the fastest growing occupations over the next decade.¹⁹¹ While nursing still has a heavy gender imbalance, the share of male nurses has risen significantly in recent decades. Men accounted for just 2 percent of registered nurses in 1960, and today account for 11 percent.¹⁹² This disparity may deter men from pursuing a career change to nursing.

Many of the jobs that are at greatest risk of automation today also have large gender imbalances. For instance, women are more likely than men to be employed as cashiers, office clerks, secretaries, and administrative assistants—jobs that are at high risk of automation. Many jobs traditionally held by men are at risk too. Driving occupations are predominantly male—women account for just 6.2 percent of truck drivers¹⁹³—and a recent report estimates that as many as 1.3 to 2.3 million American drivers could lose their jobs to autonomous vehicle technology over the next 30 years.¹⁹⁴

To help workers make transitions from declining fields into growing fields, one strategy is to reduce the cultural stigma associated with certain occupations. A recent study found that between 9 and 22 percent of the increase in the share of men in nursing since 1960 can be attributed to changing gender attitudes.¹⁹⁵

188 Horwitz, Minogue, and Brown. 2018. "Unemployment to Reemployment." Third Way. <https://www.thirdway.org/report/unemployment-to-reemployment-an-idea-to-modernize-the-safety-net-for-the-digital-age>.

189 Aisch and Gebeloff. 2015. "The Changing Nature of Middle-Class Jobs." *New York Times*. <https://www.nytimes.com/interactive/2015/02/23/business/economy/the-changing-nature-of-middle-class-jobs.html>.

190 Ibid.

191 Bureau of Labor Statistics. "Registered Nurses." Occupational Outlook Handbook. U.S. Department of Labor. <https://www.bls.gov/ooh/healthcare/registered-nurses.htm>.

192 Bureau of Labor Statistics. "Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity." U.S. Department of Labor. <https://www.bls.gov/cps/cpsaat11.htm>.

193 Ibid.

194 Groshen et al. 2018. "Preparing U.S. Workers and Employers for an Autonomous Vehicle Future." *Securing America's Future Energy*. <https://avworkforce.secureenergy.org/wp-content/uploads/2018/06/Groshen-et-al-Report-June-2018-1.pdf>.

195 Munnich and Wozniak. 2017. "What explains the rising share of U.S. men in registered nursing?" Washington Center for Equitable Growth. <https://equitablegrowth.org/working-papers/rising-share-men-nursing/>.

Public education campaigns are an important tool to reduce stigma. Lessons can be learned from previous campaigns about the most effective strategies. For instance, in 2002, the Oregon Center for Nursing launched its “Are You Man Enough To Be a Nurse?” campaign to attract more men into the field. It distributed posters to high schools and colleges across the state depicting traditionally masculine figures as nurses.¹⁹⁶ The campaign proved popular among recruiters, and was adopted by several other states as well. However, some research suggests that overly-emphasizing masculinity in such advertisements can have the opposite effect, creating perceptions of a role incongruity.¹⁹⁷ More recent campaigns to increase the share of men in nursing have focused less specifically on gender and more on the rewards of nursing careers, such as good pay and job security.¹⁹⁸

In addition, renaming job titles could help change stigma or gendered stereotypes. For instance, in 2016, the U.S. Marine Corps announced removal of “man” from 19 job titles—“basic infantryman” became “basic infantry marine”—to make them more gender neutral.¹⁹⁹

19. Improve Efforts to Support Local Economies and Promote Regional Competitiveness

Despite a long history of economic convergence across regions within the U.S., when struggling regions would catch up to prosperous ones over time, this trend has reversed in more recent decades. For most of the 20th century, per capita incomes in poorer regions would grow more quickly than incomes in richer regions, reducing regional inequality. Over the past half-century, incomes in more prosperous regions have pulled away.²⁰⁰ Regional economic disparities, which are now quite large, could become more pronounced as a result of automation. Automation has the potential to impact some regional economies more than others due to differences in their industrial and occupational makeups, and many of the regions at greatest risk of disruption are also struggling today. When regions face economic disruptions and job loss, declining business dynamism, reduced demand, and low labor force participation rates can contribute to stagnant economic growth and reduced competitiveness.

For impacted regions to take advantage of new economic opportunities, they need the ability to compete and grow. Policymakers should expand place-based policies for economic development to support struggling regional or local economies, with a focus on strategies that create and leverage resources that can be shared across employers and regions. As outlined below, these strategies should include investments in modern infrastructure, promotion of industry- and sector-based public-private partnerships, and targeting of support to mid-sized cities that can serve as hubs to support surrounding regions. These strategies can help struggling regions take advantage of clustering effects.

196 Oregon Center for Nursing. “Nursing Posters.” <https://oregoncenterfornursing.org/nursing-posters/>.

197 Clow, Ricciardelli, and Bartfay. 2015. “Are You Man Enough to be a Nurse?” *Sex Roles*. <https://link.springer.com/article/10.1007/s11199-014-0418-0>.

198 Miller and Fremson. 2018. “‘Forget About the Stigma’: Male Nurses Explain Why Nursing Is a Job of the Future for Men.” *New York Times*. <https://www.nytimes.com/interactive/2018/01/04/upshot/male-nurses.html>.

199 U.S. Marine Corps. 2016. “Military Occupational Specialty Renaming.” <https://www.marines.mil/News/Messages/Messages-Display/Article/898051/military-occupational-specialty-renaming/>.

200 Nunn, Parsons, and Shambaugh. 2018. “The Geography of Prosperity.” Brookings Institution. <https://www.brookings.edu/research/the-geography-of-prosperity/>.

Infrastructure investments, such as improving rural broadband and pursuing universal high-speed wireless connectivity, are key to improving the competitiveness of local economies and businesses, and supporting entrepreneurship and workforce participation. Connectivity allows for local businesses to access and compete for customers at a national and even global scale. Chattanooga, Tennessee, made significant investments in rolling out ultra high-speed internet, and consequently has experienced a tech boom with billions of dollars in new investment, new jobs, and new entrepreneurship opportunities.²⁰¹ For workers, these investments can also enable greater access to new tech-enabled entrepreneurial work opportunities, such as those in the gig economy. Infrastructure projects also directly create near-term mid-skill job opportunities within a community that can provide a bridge for displaced workers. Policymakers at all levels of government should seek to ensure infrastructure spending is targeted at giving workers and businesses access to the digital infrastructure they need to participate and compete in the evolving economy.

Sector-based strategies for local economic development are particularly promising for promoting competitive industries and enabling new business starts and early-stage growth. Business incubators, “makerspaces,” and co-working strategies where space, tools, and resources are shared across startup businesses offer low-cost ways to support small businesses, improve access to capital across firms, and promote the cross-pollination of talent and ideas that spurs innovation. The Century Foundation has proposed several ideas for promoting these strategies as a way to revitalize manufacturing communities disrupted by automation and global trade.²⁰²

Policymakers should also develop the business ecosystems necessary for growth through regional sector-based talent pipelines (see proposal #3), supply chains, and access to capital to improve competitiveness. The Economic Development Administration’s (EDA) Investing in Manufacturing Communities Partnership (MCIP),²⁰³ the National Institute of Standards and Technology’s (NIST) Manufacturing Extension Partnership (MEP),²⁰⁴ and the National Network for Manufacturing Innovation (NNMI)²⁰⁵ offer successful models, where federal grants support development of public-private partnerships focused on improving competitiveness of groups of small manufacturing employers.

Rather than trying to revitalize every small town across the country individually, development efforts should target mid-sized “growth poles”—hubs that promote growth in adjacent, smaller communities—as proposed by the Information Technology and Innovation Foundation (ITIF)²⁰⁶ and endorsed by experts at the Brookings Institution.²⁰⁷ All of these efforts would benefit from increased support for local and regional economic development; federal funding for non-disaster related regional

201 Reardon. 2015. “How blazing Internet speeds helped Chattanooga shed its smokestack past.” CNET. <https://www.cnet.com/news/how-blazing-internet-speeds-helped-chattanooga-shed-its-smokestack-past/>.

Rushe. 2014. “Chattanooga’s Gig: how one city’s super-fast internet is driving a tech boom.” The Guardian. <https://www.theguardian.com/world/2014/aug/30/chattanooga-gig-high-speed-internet-tech-boom>.

202 Yudken, Croft, and Stettner. 2017. “Revitalizing America’s Manufacturing Communities.” The Century Foundation. <https://tcf.org/content/report/revitalizing-americas-manufacturing-communities/>.

203 Novello. 2018. “Revitalize American Manufacturing by Nurturing the Industrial Commons.” The Century Foundation. <https://tcf.org/content/commentary/revitalize-american-manufacturing-nurturing-industrial-commons/>.

204 Maxim and Muro. 2018. “Manufacturing growth—in the Heartland and for America.” Brookings Institution. <https://www.brookings.edu/blog/the-avenue/2018/12/05/manufacturing-growth-in-the-heartland-and-for-america/>.

205 Manufacturing USA. 2018. “2017 Annual Report.” <https://nvlpubs.nist.gov/nistpubs/ams/NIST.AMS.600-3.pdf>.

206 Atkinson. 2018. “How to Reform Worker-Training and Adjustment Policies for an Era of Technological Change.” Information Technology and Innovation Foundation. <https://itif.org/publications/2018/02/20/technological-innovation-employment-and-workforce-adjustment-policies>.

207 Hendrickson, Muro, and Galston. 2018. “Countering the geography of discontent.” Brookings Institution. <https://www.brookings.edu/research/countering-the-geography-of-discontent-strategies-for-left-behind-places/>.

and community development has declined from 0.35 percent of GDP in 1978 to an estimated 0.037 percent of GDP in 2018.²⁰⁸

Policymakers should also encourage entrepreneurship. A recent study from the Economic Innovation Group found that from 1992 through 2014, new businesses accounted for all average annual net job growth, with older firms losing jobs on average every year.²⁰⁹ However, not only have new business starts been declining in the U.S. overall over the past several decades, they have also concentrated in a small number of high growth metropolitan areas, contributing to rising regional inequality.²¹⁰ By limiting non-competes, banning no-poach agreements, reviewing occupational licensing, and promoting portable benefits (see proposal #12), policymakers can help struggling communities and regions.

208 Author's estimates based on OMB historical tables accessed February 2019, comparing annual GDP to budget authority for budget subfunctions 451 (Community development) and 452 (Area and regional development).

Office of Management and Budget. "Historical Tables." The White House. <https://www.whitehouse.gov/omb/historical-tables/>.

209 Economic Innovation Group. 2017. "Dynamism in Retreat." <https://eig.org/dynamism>.

210 Ibid.

Understand the Impact of Automation on the Workforce

Preparing for the impact of automation requires good data. Workers need accurate and timely information on how industries and occupations are changing, which skills are in demand, where skills mismatches exist, and where to find new job opportunities. Education and training providers, in collaboration with employers, need data to better design effective training programs. And government and community leaders need data to design responsive, high quality training programs and support systems for people and communities impacted by automation's effects.

To date, government has done little to study or track technological trends and their impact on work. Private sector studies, on the other hand, have produced a wide range of results, projecting that automation will displace anywhere from 9 to 47 percent of all U.S. workers over varying periods of time. Even if there were consensus, there is considerable uncertainty over whether and how these projections can be used to inform decision-making, including how to make this information actionable to workers and local communities.

The following proposals would:

- » Create new metrics for tracking technological progress and automation
- » Improve occupational projections to better account for automation
- » Develop better data on how local and regional labor markets are changing

20. Create New Metrics for Tracking Technological Progress and Automation

The labor market is continually changing as a result of new technologies, yet the metrics used to understand the state of the economy, such as the unemployment rate and productivity growth, do not provide clear or consistent insights into the impact that technology and subsequent work organization trends have on the workforce. To develop strategies to address the growing use automation, policymakers need better mechanisms to track its labor market impacts.

A first step is for federal data agencies to develop new metrics and data to track technology's progression, with a particular eye toward assessing capabilities that could automate work. This work should be led by the Bureau of Labor Statistics (BLS) and the National Institute for Standards and Technology (NIST). Consultation with leading academic and private sector experts is also critical.

These agencies should create three new data metrics. In 2015, the National Academy of Sciences (NAS) convened the Committee on Information Technology, Automation, and the U.S. Workforce, co-chaired by Erik Brynjolfsson of MIT and Tom Mitchell of Carnegie

Mellon University, to study the relationship between emerging technologies and the workforce, and to propose an agenda for future research that could inform policymakers and other key stakeholders.²¹¹ The committee's recommendations included developing new indices, similar to the Consumer Price Index (CPI), to assess various aspects of technological progress and its potential workforce impacts, including:

- » **Technology Progress Index:** This index would summarize the current state of technology and its impact on the economy and work, and would track progress over time. The index could incorporate tracking of computational hardware (Moore's Law), data storage costs and speed, and high-speed internet connectivity rates. A generalized index would provide a better picture of the rate and trajectory of technological progress, and when and how advances contribute to productivity growth.
- » **Organizational Change and Technology Diffusion Index:** This index would measure the rate that businesses are adopting technology by comparing the productivity of frontier firms with median firms. The index would also track start-up firms and patenting trends to provide a picture of where new firms and conventions are being developed.
- » **Indices of Advancements in Specific Technologies:** Given that some emerging technologies are known to have high potential for disrupting work, indices are needed to track advances in individual technologies. For example, an AI Progress Index could track advances in speech recognition, computer vision, robotic dexterity, Turing Test results, and other capabilities with high automating potential.²¹²

The Committee also proposed combining these new quantitative indices with forward-looking modeling of technological progress and its impacts to forecast potential economic and workforce disruptions. Stanford University's AI100 project, a 100-year study of artificial intelligence, has built on the National Academies' work by beginning a long-term tracking of these and other indicators.

Federal and state policymakers should pursue studies to better understand how these technology trends might impact work. Representative Darren Soto (D-FL) and a bipartisan group of cosponsors have introduced the "AI Jobs Act," which would direct the DOL to study artificial intelligence and its potential impact on the workforce.²¹³ Studies have also assessed the automation potential of jobs in North Carolina,²¹⁴ Indianapolis,²¹⁵ and Phoenix²¹⁶ drawing on data and methodologies pioneered by researchers in recent years. The methodologies will require further development, but represent opportunities for future research as the data available improves and the discipline matures.²¹⁷

211 National Academies of Sciences, Engineering, and Medicine. 2017. "Information Technology and the U.S. Workforce." The National Academies Press. <https://www.nap.edu/catalog/24649/information-technology-and-the-us-workforce-where-are-we-and>.

212 The Turing Test tests whether an entity is human or machine. In other words, as Turing Test results improve, it means that machines are becoming more indistinguishable from humans.

213 U.S. House of Representatives. "H.R.827 - AI JOBS Act of 2019." 116th Congress. <https://www.congress.gov/bills/116/congress/house-bills/827>.

214 Institute for Emerging Issues. 2016. "FutureWork Disruption Index for North Carolina." North Carolina State University. <https://iei.ncsu.edu/wp-content/uploads/2015/12/IEI-FutureWork-Disruption-Index-for-NC-July-1.pdf>.

215 Kinder. 2018. "Automation Potential for Jobs in Indianapolis." New America. <https://www.newamerica.org/work-workers-technology/reports/automation-potential-jobs-indianapolis/>.

216 Kinder. 2018. "Automation Potential for Jobs in Phoenix." New America. <https://www.newamerica.org/work-workers-technology/reports/automation-potential-jobs-phoenix/>.

217 For instance, these studies have generally adopted the data and methodologies used by Oxford professors Frey and Osborne as a starting point—in part because, among the research done to categorize jobs based on levels of automatability, the data on detailed categorization is more readily available and public from this research. Other methodologies have since been developed that have refined upon this approach and could prove informative at a local scale, but for which the underlying data may not be readily available for use by other researchers.

21. Improve Occupational Projections to Better Account for Automation

The Bureau of Labor Statistics' (BLS) biennial Occupational Outlook Handbook (OOH) brings together data and analysis from across states and industries to provide a picture of the current and emerging labor market. The OOH details the duties, training, education, pay, and employment trends for hundreds of occupations, including projections of expected job growth over the coming decade. These projections can help workers choose which careers to pursue, training and education providers develop new or expand existing programs, businesses anticipate labor needs, and policymakers determine which programs may be needed to adjust to the evolving labor market.

These projections are developed in large part by combining recent employment growth trends with demographic data to project changes in labor supply and demand within a particular occupation over time. They also adjust overall growth projections to take into account changes in how businesses organize themselves, use labor, and automate certain functions.²¹⁸

But this approach may fail to fully anticipate the impact of automation for three reasons. First, the BLS methodology incorporates forward-looking projections of technological change, but it is largely based on historical trends, which may not effectively account for technologies that have yet to produce labor market impacts but which we expect may soon lead to significant change. Second, these projections only estimate the quantity of jobs within specific occupations in ten years, but provide little information on how the composition of tasks and skill needs within those jobs may change.²¹⁹ And third, projecting automation's impact on the labor market is highly sensitive to the assumed rate of technological adoption, so a single estimate of job quantity fails to convey what can be a very wide range of potential outcomes.

Recent reports by researchers at the McKinsey Global Institute,²²⁰ OECD,²²¹ and others have attempted to address this challenge by focusing on tasks as the unit of analysis rather than jobs or occupations. Using data from O*NET and other sources, these researchers break down existing jobs into discrete tasks, compare these tasks with the capabilities of current and emerging technologies, and project forward the task makeup and skill needs of future jobs. This task-based approach may provide more accurate projections of how automation will impact occupations, as well as provide information on how automation will change the requisite tasks and skills these jobs will require.

Federal policymakers should direct BLS to build on the methodologies used by these researchers, and incorporate this task analysis into its occupational projections. It should include alternative scenarios based on different rates of adoption of new technologies rather than a single number. For example, McKinsey Global Institute publishes three

218 Bureau of Labor Statistics. "Employment Projections Methodology." U.S. Department of Labor. <https://www.bls.gov/emp/documentation/projections-methods.htm>.

219 For example, medical assistants are projected to be one of the fastest growing occupations over the next 10 years and workers can use the BLS Occupational Outlook Handbook to learn about the skills and training needed today to become a medical assistant. But the skills needed in 10 years could look very different from those needed today: for instance, recent research from the Brookings Institution's Metropolitan Policy Program found that medical assistants had one of the largest increases in its share of digital skills among 545 occupations from 2002 to 2016 (a digital score of 63.7, up from 35.1).
Bureau of Labor Statistics. "How to Become a Medical Assistant." Occupational Outlook Handbook. U.S. Department of Labor. <https://www.bls.gov/ooh/healthcare/medical-assistants.htm#tab-4>.
Muro et al. 2017. "Digitalization and the American workforce." Brookings Institution. <https://www.brookings.edu/research/digitalization-and-the-american-workforce/>.

220 Manyika et al. 2017. "Jobs Lost, Jobs Gained." McKinsey Global Institute. <https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

221 Nedelkoska and Quintini. 2018. "Automation, skills use and training." OECD Social, Employment and Migration Working Papers. https://www.oecd-ilibrary.org/employment/automation-skills-use-and-training_2e2f4eea-en.

scenarios based on different rates of adoption: slow, midpoint, and rapid automation.²²² Representative Bill Foster (D-IL) has proposed that BLS develop plans to reform their occupational projections and publish multiple scenarios in consultation with industries that are driving rapid technological change.²²³ In the same vein, the aforementioned “AI Jobs Act” would authorize DOL to analyze how artificial intelligence is expected to impact the labor market.²²⁴

22. Develop Better Data on How Local and Regional Labor Markets Are Changing

Labor market data help workers, students, employers, workforce investment boards, and state agencies make informed decisions. Detailed data on local and regional economies is often nonexistent or inaccessible. Better data would benefit local, state and national stakeholders by improving understanding of how economic forces like automation are affecting local and regional economies.

State governments can be particularly important actors, both in collecting and using better data. Colorado, for instance, has worked with the Markle Foundation’s Skillful Initiative (in partnership with Microsoft and LinkedIn) to develop a more effective and transparent skills-based labor market, including with better tracking of skill needs and workforce capacities. By working with employers and educational institutions to make skills a common language and currency for job postings and education and training programs, the state hopes to make it easier for workers to show what skills they have, learn what skills employers are looking for, learn which programs will help them acquire those skills, and better match with jobs. Last February, 20 Governors helped launch the Skillful State Network in an effort to scale the model.²²⁵ But achieving that level of transparency—and linking the theory up with actual hiring decisions in practice—can be quite difficult without the underlying data and information on skill needs and gaps.

The Workforce Information Advisory Council (WIAC), which advises the U.S. Secretary of Labor on how to improve national and state workforce information systems, has published a draft report recommending specific actions to help all stakeholders better prepare for a changing economy.²²⁶ The following proposals are inspired by their recommendations:

» **Enrich state UI wage records:** States should include additional data elements in UI wage records, such as occupational title (using standardized occupational codes), hours worked, and work sites, to provide a more accurate picture of career pathways. DOL should work with states to establish strategies and processes to promote the enhancement of wage records, and provide one-time resources to upgrade states’ data collection systems

222 Manyika et al. 2017. “Jobs Lost, Jobs Gained.” McKinsey Global Institute. <https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

223 Amendment No. 139
U.S. House of Representatives. “H.Amdt.401 to H.R.3354.” 115th Congress. <https://www.congress.gov/amendment/115th-congress/house-amendment/401>.

224 Office of U.S. Congressman Darren Soto. 2018. “Rep. Soto Introduces Bipartisan ‘AI Jobs Act of 2018.’” <https://soto.house.gov/media/press-releases/rep-soto-introduces-bipartisan-ai-jobs-act-2018>.

225 Markle Foundation. 2018. “Colorado Governor John Hickenlooper, the Markle Foundation, and 20 States Launch the Skillful State Network; Introduce Skillful State Playbook.” <https://www.markle.org/about-markle/media-release/skillful-state-network>.

226 Workforce Information Advisory Council. 2018. “Recommendations to Improve the Nation’s Workforce and Labor Market Information System.” https://www.doleta.gov/wioa/wiac/docs/Second_Draft_of_the_WIAC_Final_Report.pdf.

and train employers on them. Louisiana, Oregon, Washington, and Alaska currently collect additional data elements, such as hours and occupational title.²²⁷

» **Increase funding for state labor market information systems:** The federal government provides funds to state agencies to produce, disseminate, and analyze state and local labor force statistics, including the identification of “in-demand occupations and industries,” but these funds have been cut by 45 percent since 2002.²²⁸ In accordance with the WIAC recommendations, federal policymakers should double the amount of funding for state agencies. In addition, state policymakers should invest more heavily in their own labor market information systems.

Though unlocking and enriching existing public datasets and creating new datasets and metrics are important long-term policy goals, much of these efforts could take years to develop. This is particularly concerning given existing labor market frictions that are leaving millions of Americans out of employment while open jobs sit unfilled. Though the official unemployment rate is quite low, and the number of job openings in the U.S. reached an all-time high of 7.3 million at the end of 2018,²²⁹ the employment to population ratio remains well below its pre-recession level.²³⁰

Many private sector entities have rich proprietary datasets which could provide a complement to public data. Companies such as LinkedIn, BurningGlass, Monster, and others track workers and their skills, companies and their job openings, schools and their programming, wage rates and more. Though these data may be narrower in scope than public administrative data, they do offer the possibility of answering timely labor market questions that available public data currently cannot. For instance, LinkedIn’s Economic Graph²³¹ tracks city-level skills shortages and surpluses by measuring the skills that appear in job postings on their site, the share of LinkedIn members in that city who have that skill listed in their profiles, and hiring rates of workers with and without that skill.

This presents an important opportunity for public-private partnership. Federal and state policymakers should explore partnerships with private data companies to develop current-state analyses and future looking projections, and these businesses should share their knowledge and expertise to inform development and use of new public data efforts.

227 Texas Workforce Commission. 2016. “Study on the Collection of Occupational Data.” <https://twc.texas.gov/files/news/2016-twc-study-collection-occupational-data.pdf>.

228 Workforce Information Advisory Council. 2018. “Recommendations to Improve the Nation’s Workforce and Labor Market Information System.” https://www.doleta.gov/wioa/wiac/docs/Second_Draft_of_the_WIAC_Final_Report.pdf.

229 Bureau of Labor Statistics. “Job Openings and Labor Turnover – December 2018.” U.S. Department of Labor. <https://www.bls.gov/news.release/jolts.nr0.htm>.

230 Bureau of Labor Statistics. “Civilian Unemployment Rate.” Retrieved from Federal Reserve Bank of St. Louis. <https://fred.stlouisfed.org/series/EMRATIO>.

231 LinkedIn Economic Graph. 2019. “LinkedIn Workforce Report | United States | February 2019.” <https://economicgraph.linkedin.com/resources/linkedin-workforce-report-february-2019>.

Appendix

Eligibility for displaced worker benefits

This report proposes three new benefits to help workers weather displacement and help them transition back to work: a training voucher and stipend, wage insurance, and a job search allowance (proposals #14, #15, and #16). These would be costly benefits, so policymakers should carefully consider: (1) the criteria that workers must meet to be eligible for displaced worker benefits; and (2) the eligibility process, and specifically which part of government determines each worker's eligibility.

The eligibility criteria for the existing WIOA Dislocated Worker Program is a good model for determining eligibility for the three proposed benefits: workers must have been laid off, have shown labor force attachment, and are unlikely to return to their previous industry or occupation (see below for the full statutory criteria). This criterion is relatively subjective and gives local service providers discretion in determining which recipients to prioritize.

However, applying this approach to the three benefits proposed in this report could be problematic if these benefits were designed as federal entitlement programs. This would present a principal-agent problem: local service providers would have little incentive to be judicious in their application of the eligibility criteria if the federal government funds the benefits, possibly leading to a poorly targeted program.

This problem could be avoided if the funding were provided through state formula grants (which is how WIOA is funded)—that is, each state is provided a fixed amount of federal funds for the year, and offers benefits to workers on a first-come-first-served basis. But funding these three proposed displaced worker benefits with state formula grants would entail significant downsides. First, the funding would be subject to the appropriations process, which has historically undervalued employment and training services. For example, WIOA Title I state grants—which form the core of the national public workforce system—have been cut by over 40 percent since 2001, and it is currently underfunded by \$367 million relative to the funding levels at which the program was authorized.²³² Second, while the need would be countercyclical—that is, as the economy falls, more workers would be eligible—the funding would likely not follow a counter-cyclical pattern, leading to a lack of funding at the exact moment that workers need these benefits the most.

Structuring these benefits as federal entitlements would resolve these issues, but it would require either more objective criteria (such as the criteria used by the UI system), a decision-making process located at the federal level (or at the state level with strict federal oversight), or a combination of the above. Another option would be to adopt a hybrid approach: the benefits for workers who qualify using a strictly objective criteria would be funded through uncapped (i.e. mandatory) federal funds, while the benefits for workers who only qualify using the more generous subjective criteria would be funded from capped federal formula grants to the states.

232 National Skills Coalition. 2018. "America's workforce: We can't compete if we cut." <https://www.nationalskillscoalition.org/resources/publications/file/Americas-workforce-We-cant-compete-if-we-cut-1.pdf>.
Committee on Education and the Workforce Democrats. 2018. "If Republicans Were Serious About Investing in Training, They Would Invest in Our Current Workforce Development System." <https://democrats-edworkforce.house.gov/download/-farm-bill-v-wioa-investments-fact-sheet>.

In addition, to ensure adequate utilization (TAA, for example, has a low utilization rate) the federal government should create a pre-certification process to proactively identify regional occupations that are at risk of disruption to make it easier for workers to apply for benefits. This approach has been proposed by a handful of policy experts, most recently Andy Stettner of the Century Foundation.²³³

Existing WIOA Dislocated Worker Program eligibility

A worker is eligible for the WIOA Dislocated Worker Program if he or she experiences general displacement; displacement due to closure of a facility or substantial layoff; self-employment displacement; or unpaid domestic work displacement (WIOA sec. 3(15)).²³⁴

General displacement

- 1) Has been terminated or laid off, or who has received a notice of termination or layoff, from employment, including separation notice from active military service (under other than dishonorable conditions); and
- 2) Is unlikely to return to a previous industry or occupation; and
- 3) (I) Is eligible for or has exhausted entitlement to unemployment compensation; or
(II) Has been employed for a duration sufficient to demonstrate, to the appropriate entity at a one-stop center referred to in section 121(e), attachment to the workforce, but is not eligible for unemployment compensation due to insufficient earnings or having performed services for an employer that were not covered under a State unemployment compensation law.

Displacement due to closure of a facility or substantial layoff

- 1) Has been terminated or laid off, or has received a notice of termination or layoff, from employment as a result of any permanent closure of, or any substantial layoff at, a plant, facility, military installation or enterprise; or
- 2) Is employed at a facility at which the employer has made a general announcement that such facility will close within 180 days.

Self-employment displacement

- 1) Was self-employed (including employment as a farmer, a rancher, or a fisherman); and
- 2) Is unemployed as a result of:
 - a) General economic conditions in the community in which the individual resides; or
 - b) Natural disasters.

²³³ Stettner. 2018. "Mounting a Response to Technological Unemployment." The Century Foundation. <https://tcf.org/content/report/mounting-response-technological-unemployment/>.

²³⁴ Employment and Training Administration. 2017. "Attachment III: Key Terms and Definitions." Training and Employment Guidance Letter No. 19-16. U.S. Department of Labor. https://wdr.doleta.gov/directives/corr_doc.cfm?DOCN=3851.

Unpaid domestic work displacement

- 1) An individual who has been providing unpaid services to family members in the home and who:
 - a) Has been depending on the income of another family member but is no longer supported by that income; or
 - b) Is the dependent spouse of a member of the Armed Forces on active duty and whose family income is significantly reduced because of a deployment, a call or order to active duty, a permanent change of station, or the service-connected death or disability of the member; and
 - c) Is unemployed or underemployed and is experiencing difficulty in obtaining or upgrading employment.

Bibliography

Abdih, Yasser, and Stephan Danninger. 2017. "What Explains the Decline of the U.S. Labor Share of Income? An Analysis of State and Industry Level Data." International Monetary Fund. July. <https://www.imf.org/en/Publications/WP/Issues/2017/07/24/What-Explains-the-Dcline-of-the-U-S-45086>.

Abrams, Rachel. 2018. "'No Poach' Deals for Fast-Food Workers Face Scrutiny by States." *New York Times*. July 9. <https://www.nytimes.com/2018/07/09/business/no-poach-fast-food-wages.html/>.

Addison, John, Thorsten Schank, Claus Schnabel, and Joachim Wagner. 2007. "Do Works Councils Inhibit Investment?" *ILR Review* 60, no. 2 (January): 187–203. <http://journals.sagepub.com/doi/abs/10.1177/001979390706000202>.

Administrative Wage Record Enhancement Study Group. 2014. "Enhancing Unemployment Insurance Wage Records: Potential Benefits, Barriers, and Opportunities." Prepared for the Workforce Information Council, U.S. Department of Labor. September. https://www.bls.gov/advisory/bloc/enhancing-unemployment-insurance-wage-records_fy.pdf.

Aisch, Gregor, and Robert Gebeloff. 2015. "The Changing Nature of Middle-Class Jobs." *New York Times*. February 22. <https://www.nytimes.com/interactive/2015/02/23/business/economy/the-changing-nature-of-middle-class-jobs.html>.

Akerlof, George, and Rachel Kranton. 2005. "Identity and the Economics of Organizations." *Journal of Economic Perspectives* 19, no. 1 (Winter): 9–32. <https://www.aeaweb.org/articles?id=10.1257/0895330053147930>.

Alden, Edward, and Laura Taylor-Kale. 2018. "The Work Ahead: Machines, Skills, and U.S. Leadership in the Twenty-First Century." Council on Foreign Relations. April. <https://www.cfr.org/report/the-work-ahead/report/recommendations.html>.

Araby, Jim, Chris Hoene, Josh Fryday, Natalie Foster, Solana Rice, and Tim Silard. 2018. "Strengthening and Modernizing the California EITC to Fight Child Poverty, Inequality, and the Rising Cost of Living." Economic Security Project. December. <https://costoflivingrefund.org/blog/2018/12/17/strengthening-and-modernizing-the-california-eitc-to-fight-poverty-inequality-and-the-rising-cost-of-living>.

Ascend at the Aspen Institute. 2018. "Accelerating Postsecondary Success for Parents: Leveraging the Two-Generation Approach in Policy." November. <https://ascend.aspeninstitute.org/resources/postsecondary-education-and-students-who-are-parents-a-2gen-approach-for-policy-makers/>.

Aspen Institute Economic Strategy Group. 2019. "Expanding Economic Opportunity for More Americans." February. <https://www.aspeninstitute.org/longform/expanding-economic-opportunity-for-more-americans/>.

Aspen Institute Future of Work Initiative. 2017. "Toward a New Capitalism: A Policy Agenda to Restore the Promise of Work." January. <https://www.aspeninstitute.org/publications/a-policy-agenda-to-restore-the-promise-of-work/>.

Association for Talent Development. 2017. "2017 State of the Industry." December. <https://www.td.org/research-reports/2017-state-of-the-industry>.

Atkinson, Robert. 2015. "How a knowledge tax credit could stop decline in corporate training." Information Technology and Innovation Foundation. March. <https://itif.org/publications/2015/03/09/how-knowledge-tax-credit-could-stop-decline-corporate-training>.

Atkinson, Robert. 2018. "How to Reform Worker-Training and Adjustment Policies for an Era of Technological Change." Information Technology and Innovation Foundation. February. <https://itif.org/publications/2018/02/20/technological-innovation-employment-and-workforce-adjustment-policies>.

Austin, Benjamin, Edward Glaeser, and Lawrence Summers. 2018. "Saving the heartland: Place-based policies in 21st Century America." Brookings Papers on Economic Activity. March. <https://www.brookings.edu/bpea-articles/saving-the-heartland-place-based-policies-in-21st-century-america/>.

Autor, David. 2015. "Why Are There Still So Many Jobs? The History and Future of Workplace Automation." *Journal of Economic Perspectives* 29, no. 3 (Summer): 3–30. <https://economics.mit.edu/files/11563>.

Autor, David, Alan Manning, and Christopher Smith. 2016. "The Contribution of the Minimum Wage to US Wage Inequality over Three Decades: A Reassessment." *American Economic Journal: Applied Economics* 8, no. 1 (January): 58–99. <https://www.aeaweb.org/articles?id=10.1257/app.20140073>.

Balasubramanian, Natarajan, Jin Woo Chang, Mariko Sakakibara, Jagadeesh Sivadasan, and Evan Starr. 2017. "Locked In? The Enforceability of Covenants Not to Compete and the Careers of High-Tech Workers." U.S. Census Bureau Center for Economic Studies Paper. January. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2905782.

Bailey, John. 2018. "Income Share Agreements Are an Innovative Way of Financing Tuition — and an Investment in the Workplace of Tomorrow." *The 74*. October 29. <https://www.the74million.org/article/bailey-income-share-agreements-are-an-innovative-way-of-financing-tuition-and-an-investment-in-the-workplace-of-tomorrow/>.

Bastian, Jacob, and Maggie Jones. 2018. "Do EITC Expansions Pay for Themselves? Effects on Tax Revenue and Public Assistance Spending." University of Chicago Working Paper. December 19. <https://drive.google.com/file/d/1GbBeeQzfGH9fF9Y1u5rS55Sn3eStBWE7/view>.

Bivens, Josh, and Ben Zipperer. 2018. "The importance of locking in full employment for the long haul." Economic Policy Institute. August. <https://www.epi.org/publication/the-importance-of-locking-in-full-employment-for-the-long-haul/>.

Bond, Shannon. 2018. "Amazon teams with Marriott to put Alexa in hotels." *Financial Times*. June 19. <https://www.ft.com/content/84e8f960-736c-11e8-aa31-31da4279a601>.

Brill, Alex. 2012. "An Analysis of the Benefits S ESOPs Provide the U.S. Economy and Workforce." Matrix Global Advisors. July. <https://community-wealth.org/content/analysis-benefits-s-esops-provide-us-economy-and-workforce>.

Brill, Michael, Corey Holman, Chris Morris, Ronjoy Raichoudhary, and Noah Yosif. 2017. "Understanding the labor productivity and compensation gap." *Beyond the Numbers* 6, no. 6 (June). Bureau of Labor Statistics, U.S. Department of Labor. <https://www.bls.gov/opub/btn/volume-6/pdf/understanding-the-labor-productivity-and-compensation-gap.pdf>.

Brown, Katie. 2018. "Powerful Partners: Businesses and Community Colleges." National Skills Coalition. July. <https://www.nationalskillscoalition.org/resources/publications/file/Powerful-Partners-Businesses-and-Community-Colleges.pdf>.

Bryson, Donna. 2018. "Colorado Connects Career-Seekers With Contemporary Coaches." *U.S. News & World Report*. August 27. <https://www.usnews.com/news/best-states/articles/2018-08-27/colorado-connects-career-seekers-with-contemporary-coaches>.

Cass, Oren. 2018. "The Case for the Wage Subsidy." *National Review*. November 16. <https://www.nationalreview.com/2018/11/case-for-wage-subsidy-government-spending-book-excerpt/>.

Cellini, Stephanie Riegg, and Nicholas Turner. 2018. "Gainfully Employed? Assessing the Employment and Earnings of For-Profit College Students Using Administrative Data." *The Journal of Human Resources*. January. <http://jhr.uwpress.org/content/early/2018/01/25/jhr.54.2.1016.8302R1.abstract>.

Cengiz, Doruk, Arindrajit Dube, Attila Lindner, Ben Zipperer. 2019. "The Effect of Minimum Wages on Low-Wage Jobs: Evidence from the United States Using a Bunching Estimator." Working Paper 25434, National Bureau of Economic Research. January. <https://www.nber.org/papers/w25434>.

Center on Budget and Policy Priorities. "Policy Basics: The Earned Income Tax Credit." Updated April 19, 2018. <https://www.cbpp.org/research/federal-tax/policy-basics-the-earned-income-tax-credit>.

Chetty, Raj, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez. 2014. "Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States." *Quarterly Journal of Economics* 129, no. 4 (June): 1553-1623. <https://academic.oup.com/qje/article/129/4/1553/1853754>.

Child Care Aware of America. 2017. "Parents and the High Cost of Child Care: 2017." http://usa.childcareaware.org/wp-content/uploads/2017/12/2017_CCA_High_Cost_Report_FINAL.pdf.

Clow, Kimberley, Rose Ricciardelli, and Wally Bartfay. 2015. "Are You Man Enough to be a Nurse? The Impact of Ambivalent Sexism and Role Congruity on Perceptions of Men and Women in Nursing Advertisements." *Sex Roles* 72 (April): 363-376. <https://link.springer.com/article/10.1007/s11199-014-0418-0>.

The College Board. 2017. "Trends in College Pricing 2017." https://trends.collegeboard.org/sites/default/files/2017-trends-in-college-pricing_0.pdf.

Collins, Benjamin. 2018. Registered Apprenticeship: Federal Role and Recent Federal Efforts." Congressional Research Service. April. <https://fas.org/sgp/crs/misc/R45171.pdf>.

Committee on Education and the Workforce Democrats. 2018. "If Republicans Were Serious About Investing in Training, They Would Invest in Our Current Workforce Development System." May. <https://democrats-edworkforce.house.gov/download/-farm-bill-v-wioa-investments-fact-sheet>.

Connecticut State Department of Economic and Community Development. 2014. "An Assessment of Connecticut's Tax Credit and Abatement Programs." September. http://www.ct.gov/ecd/lib/ecd/decd_sb_501_sec_27_report_revised_2013_final.pdf.

Conway, Maureen. 2011. "The Price of Persistence: How Nonprofit - Community College Partnerships Manage And Blend Diverse Funding Streams." Aspen Institute Economic Opportunities Program. February. <https://www.aspeninstitute.org/publications/price-persistence-nonprofit-community-college-partnerships-manage-blend-diverse-funding-streams/>.

Conway, Maureen. 2018. "Do job training programs work? Wrong question." *Fast Company*. July 19. <https://www.fastcompany.com/90204625/do-job-training-programs-work-wrong-question>.

Conway, Maureen. 2018. "Strategies to Advance Job Quality." In *Investing in America's Workforce: Improving Outcomes for Workers and Employers*, edited by Stuart Andreason, Todd Greene, Heath Prince, and Carl E. Van Horn. <https://www.investinwork.org/-/media/Files/volume-two/Strategies%20to%20Advance%20Job%20Quality.pdf?la=en>.

Cooper, David. 2019. "Raising the federal minimum wage to \$15 by 2024 would lift pay for nearly 40 million workers." Economic Policy Institute. February. <https://www.epi.org/publication/raising-the-federal-minimum-wage-to-15-by-2024-would-lift-pay-for-nearly-40-million-workers/>.

Cottingham, Marci. 2014. "Recruiting Men, Constructing Manhood: How Health Care Organizations Mobilize Masculinities as Nursing Recruitment Strategy." *Gender & Society* 28, no. 1 (February): 133-156. <http://journals.sagepub.com/doi/abs/10.1177/0891243213509005>.

The Council for Adult and Experiential Learning. 2011. "Lifelong Learning Accounts: Helping to Build a More Competitive Workforce." https://cdn2.hubspot.net/hubfs/617695/2011_LiLA%20Policy_Overview.pdf.

Council of Economic Advisors. 2015. "Economic Report of the President." February. https://obamawhitehouse.archives.gov/sites/default/files/docs/cea_2015_erp_complete.pdf.

Dahl, Molly, Thomas DeLeire, and Jonathan Schwabish. 2009. "Stepping Stone or Dead End? The Effect of the EITC on Earnings Growth." IZA Discussion Paper 4146, Institute for the Study of Labor. April. <http://ftp.iza.org/dp4146.pdf>.

Dalal, Neha, Beth Stein, and Jessica Thompson. 2018. "Of Metrics and Markets: Measuring Post-College Employment Success." The Institute for College Access & Success. December. https://ticas.org/sites/default/files/pub_files/of_metrics_markets.pdf.

Dube, Arindrajit. 2018. "Minimum Wages and the Distribution of Family Incomes." Working Paper 25240, National Bureau of Economic Research. November. <https://www.nber.org/papers/w25240>.

Dube, Arindrajit, Laura Giuliano, and Jonathan Leonard. 2018. "Fairness and Frictions: The Impact of Unequal Raises on Quit Behavior." Working Paper 24906, National Bureau of Economic Research. August. <https://www.nber.org/papers/w24906>.

Economic Innovation Group. 2017. "Dynamism in Retreat: Consequences for Regions, Markets, and Workers." February. <https://eig.org/dynamism>.

Economic Innovation Group. 2018. "From Great Recession to Great Reshuffling: Findings from the 2018 Distressed Communities Index." October. <https://eig.org/dci>.

The Economist. 2017. "Equipping people to stay ahead of technological change." January 14. <https://www.economist.com/leaders/2017/01/14/equipping-people-to-stay-ahead-of-technological-change>.

Eden, Maya, and Paul Gaggl. 2015. "On the Welfare Implications of Automation." Policy Research Working Paper 7487, Macroeconomics and Growth Team, Development Research Group, World Bank Group. <http://documents.worldbank.org/curated/en/273551468178456630/On-the-welfare-implications-of-automation>.

Eissa, Nada, and Jeffrey B. Liebman. 1996. "Labor Supply Response to the Earned Income Tax Credit." *The Quarterly Journal of Economics* 111, no. 2 (May): 605–637. <https://academic.oup.com/qje/article-abstract/111/2/605/1938452>.

Elevate Virginia. 2018. "2018-2019 Virginia Demand Occupations List." <http://www.elevatevirginia.org/wp-content/uploads/2018/07/2018-2019-Virginia-Demand-Occupations-List-FINAL.pdf>.

Employment and Training Administration. 2017. "Attachment III: Key Terms and Definitions." Training and Employment Guidance Letter No. 19-16. U.S. Department of Labor. https://wdr.doleta.gov/directives/corr_doc.cfm?DOCN=3851.

Employment and Training Administration. 2018. "Comparison of State Unemployment Insurance Laws." U.S. Department of Labor. <https://oui.doleta.gov/unemploy/pdf/uilawcompar/2018/complete.pdf>.

Employment and Training Administration. "Trade Adjustment Assistance Community College and Career Training (TAACCT) Grant Program." U.S. Department of Labor. <https://www.doleta.gov/taacct/>.

Employment and Training Administration. "Unemployment Insurance Chartbook." U.S. Department of Labor. Accessed November 2018. <https://ows.doleta.gov/unemploy/chartbook.asp>.

Executive Office of the President. 2016. "Artificial Intelligence, Automation, and the Economy." December. <https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF>.

Farber, Henry S. 2017. "Employment, Hours, and Earnings Consequences of Job Loss: US Evidence from the Displaced Workers Survey." *Journal of Labor Economics* 35, no. S1 (July): S235–S272. <https://www.journals.uchicago.edu/doi/10.1086/692353>.

Fitzpayne, Alastair, and Ethan Pollack. 2018. "Lifelong Learning and Training Accounts: Helping Workers Adapt and Succeed in a Changing Economy." Aspen Institute Future of Work Initiative. May. <https://www.aspeninstitute.org/publications/lifelong-learning-and-training-accounts-2018/>.

Fitzpayne, Alastair, and Ethan Pollack. 2018. "Worker Training Tax Credit: Promoting Employer Investments in the Workforce." Aspen Institute Future of Work Initiative. August. <https://www.aspeninstitute.org/publications/worker-training-tax-credit-update-august-2018/>.

Fleck, Susan, John Glaser, and Shawn Sprague. 2011. "The compensation-productivity gap: a visual essay." *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor. January. <https://www.bls.gov/opub/mlr/2011/01/art3full.pdf>.

Foote, Andrew, Michel Grosz, and Ann Stevens. 2015. "How workers exit the labour market after local economic downturns." *VoxEU*, Centre for Economic Policy Research. November. <https://voxeu.org/article/mass-layoffs-and-local-labour-market-exit>.

Fox, Liana. 2017. "The Supplemental Poverty Measure: 2016." Census Bureau, U.S. Department of Commerce. September. <https://www.census.gov/content/dam/Census/library/publications/2017/demo/p60-261.pdf>.

Freeman, Richard. 2015. "Who owns the robots rules the world." *IZA World of Labor*. May. <https://wol.iza.org/articles/who-owns-the-robots-rules-the-world/long>.

Freeman, Steven. 2007. "Effects of ESOP Adoption and Employee Ownership: Thirty Years of Research and Experience." *Organizational Dynamics Working Paper*, University of Pennsylvania. January. https://repository.upenn.edu/od_working_papers/2/.

Fussell, Sidney. 2019. "The Quiet Ways Automation Is Remaking Service Work." *The Atlantic*. January 11. <https://www.theatlantic.com/technology/archive/2019/01/automation-hotel-strike-ai-jobs/579433/>.

Ganong, Peter, and Daniel Shoag. 2017. "Why Has Regional Income Convergence in the U.S. Declined?" *Journal of Urban Economics* 102 (November): 76–90. January. <https://scholar.harvard.edu/shoag/publications/why-has-regional-income-convergence-usdeclined>.

Gilson, Ronald. 1999. "The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete." *New York University Law Review* 74, no. 3 (June): 575–629. <https://law.stanford.edu/index.php?webauth-document=publication/256234/doc/slspublic/NYULawReview-74-3-Gilson.pdf>.

Goodnow, Natalie. 2014. "Expanding opportunity in America: Paul Ryan's new policy reforms for reducing poverty." American Enterprise Institute. July. <http://www.aei.org/publication/expanding-opportunity-in-america-paul-ryans-new-policy-reforms-for-reducing-poverty/>.

Groschen, Erica, Susan Helper, John Paul MacDuffie, and Charles Carson. 2018. "Preparing U.S. Workers and Employers for an Autonomous Vehicle Future." *Securing America's Future Energy (SAFE)*. June. <https://aworkforce.secureenergy.org/wp-content/uploads/2018/06/Groschen-et-al-Report-June-2018-1.pdf>.

The Hamilton Project. 2018. "Place-Based Policies for Shared Economic Growth." Edited by Jay Shambaugh and Ryan Nunn. Brookings Institution. September. http://www.hamiltonproject.org/papers/place_based_policies_for_shared_economic_growth.

Hanks, Angela, Annie McGrew, and Daniella Zessoules. 2018. "The Apprenticeship Wage and Participation Gap." Center for American Progress. July. <https://www.americanprogress.org/issues/economy/reports/2018/07/11/453321/apprenticeship-wage-participation-gap/>.

Hardwich, Reginald. 2019. "Gov. Whitmer Touts Tuition-Free College Plan." *WKAR*. February 12. <https://www.wkar.org/post/gov-whitmer-touts-tuition-free-college-plan>.

Harpel, Ellen. 2018. "New incentive program encourages apprenticeships." *Smart Incentives*. September. <https://smartincentives.org/new-incentiveprogram-encourages-apprenticeships/>.

Hawksworth, John, Richard Berriman, and Saloni Goel. 2018. "Will robots really steal our jobs? An international analysis of the potential long term impact of automation." *PricewaterhouseCoopers*. https://www.pwc.com/hu/hu/kiadvanyok/assets/pdf/impact_of_automation_on_jobs.pdf.

Helper, Susan, Raphael Martins, and Robert Seamans. 2017. "Value Migration and Industry 4.0: Theory, Field Evidence, and Propositions." December. <https://www.aeaweb.org/conference/2018/preliminary/paper/H83bQK3y>.

Helper, Susan, Raphael Martins, and Robert Seamans. 2018. "Who Profits from Industry 4.0? Theory and Evidence from the Automotive Industry." https://faculty.weatherhead.case.edu/susan-helper/papers/helper_martins_seamans.pdf.

Hendra, Richard, David H. Greenberg, Gayle Hamilton, Ari Oppenheim, Alexandra Pennington, Kelsey Schaberg, and Betsy L. Tessler. 2016. "Encouraging Evidence on a Sector-Focused Advancement Strategy." MDRC. August. <https://www.mdrc.org/publication/encouraging-evidence-sector-focused-advancement-strategy-0>.

Hendrickson, Clara, Mark Muro, and William Galston. 2018. "Countering the geography of discontent: Strategies for left-behind places." Brookings Institution. November. <https://www.brookings.edu/research/countering-the-geography-of-discontent-strategies-for-left-behind-places/>.

Herbst, Chris. 2015. "The Rising Cost of Child Care in the United States: A Reassessment of the Evidence." IZA Discussion Paper 9072, Institute for the Study of Labor. May. <http://ftp.iza.org/dp9072.pdf>.

Holder, Sarah. 2018. "Why Marriott Workers Are Striking." CityLab. October 19. <https://www.citylab.com/equity/2018/10/why-marriott-workers-are-striking/572923/>.

Hollister, Matissa N., and Kristin E. Smith. 2014. "Unmasking the Conflicting Trends in Job Tenure by Gender in the United States, 1983–2008." *American Sociological Review* 79, no. 1, 159–181. <http://journals.sagepub.com/doi/abs/10.1177/0003122413514584>.

Holmberg, Susan, and Felicia Wong. 2016. "Wage Insurance in an Era of Non-Traditional Work." Aspen Institute Future of Work Initiative. August. <https://www.aspeninstitute.org/publications/wage-insurance-era-non-traditional-work/>.

Horwitz, Gabe, Rachel Minogue, and David Brown. 2018. "Unemployment to Reemployment: An Idea to Modernize the Safety Net for the Digital Age." Third Way. September. <https://www.thirdway.org/report/unemployment-to-reemployment-an-idea-to-modernize-the-safety-net-for-the-digital-age>.

Institute for Emerging Issues. 2016. "FutureWork Disruption Index for North Carolina." North Carolina State University. February. <https://iei.ncsu.edu/wp-content/uploads/2015/12/IEI-FutureWork-Disruption-Index-for-NC-July-1.pdf>.

International Labour Organization. 2019. "Work for a brighter future: Global Commission on the Future of Work." January. <https://www.ilo.org/global/topics/future-of-work/brighter-future/lang-en/index.htm>.

Jacobson, Louis, Robert LaLonde, and Daniel Sullivan. 2011. "Policies to Reduce High-Tenured Displaced Workers' Earnings Losses Through Retraining." The Hamilton Project, Brookings Institution. http://www.hamiltonproject.org/papers/policies_to_reduce_high-tenured_displaced_workers_earnings_losses_thro.

Jim, Clare, and Adam Jourdan. 2018. "Check-in with a smile: Marriott, Alibaba trial facial recognition at China hotels." Reuters. July 11. <https://www.reuters.com/article/us-alibaba-marriott-intnl-facial-recogni/check-in-with-a-smile-marriott-alibaba-trial-facial-recognition-at-china-hotels-idUSKBN1K11B0>.

Jobs for the Future. 2019. "Pathways to Prosperity Network." <https://www.jff.org/what-we-do/impact-stories/pathways-to-prosperity-network/>.

Johnson, Sydney. 2019. "Online Coding School Lambda Raises \$30M, Looks Toward Medicine and Cybersecurity." *EdSurge*. January 8. <https://www.edsurge.com/news/2019-01-08-online-coding-school-lambda-raises-30m-looks-toward-medicine-and-cybersecurity>.

Johnson, Sydney. 2019. "So You Want to Offer an Income-Share Agreement? Here's How 5 Colleges Are Doing It." *EdSurge*. February 15. <https://www.edsurge.com/news/2019-02-15-so-you-want-to-offer-an-income-share-agreement-here-s-how-5-colleges-are-doing-it>.

Katz, Lawrence, and Olivier Jean Blanchard. 1992. "Regional Evolutions." Brookings Papers on Economic Activity. <https://www.brookings.edu/bpea-articles/regional-evolutions/>.

Kinder, Molly. 2018. "Automation Potential for Jobs in Indianapolis." *New America*. May. <https://www.newamerica.org/work-workers-technology/reports/automation-potential-jobs-indianapolis/>.

Kinder, Molly. 2018. "Automation Potential for Jobs in Phoenix: An Economic Analysis of the Phoenix Metropolitan Area." *New America*. April. <https://www.newamerica.org/work-workers-technology/reports/automation-potential-jobs-phoenix/>.

Kleiner, Morris, and Alan Krueger. 2013. "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market." *Journal of Labor Economics* 31, no. 2 (April): S173–S202. University of Chicago Press. <http://archive.hhh.umn.edu/people/mkleiner/pdf/Final.occ.licensing.JOLE.pdf>.

Kletzer, Lori, and Howard Rosen. 2006. "Reforming Unemployment Insurance for the Twenty-First Century Workforce." The Hamilton Project, Brookings Institution. September. <https://www.brookings.edu/research/reforming-unemployment-insurance-for-the-twenty-first-century-workforce/>.

Krueger, Alan, and Eric Posner. 2018. "A Proposal for Protecting Low-Income Workers from Monopsony and Collusion." The Hamilton Project, Brookings Institution. February. http://www.hamiltonproject.org/papers/a_proposal_for_protecting_low-income_workers_from_monopsony_and_collusion.

Kvaal, James, and John Bridgeland. 2018. Moneyball for Higher Education: How States Can Use Data and Evidence to Improve Student Outcomes." Results for America. January. <https://results4america.org/tools/moneyball-for-higher-education-how-states-can-use-data-and-evidence-to-improve-student-outcomes/>.

Lachowska, Marta, Alexandre Mas, and Stephen Woodbury. 2018. "Sources of Displaced Workers' Long-Term Earnings Losses." Working Paper 24217, National Bureau of Economic Research. January. <http://www.nber.org/papers/w24217>.

Lehrer, Eli, and Lori Sanders. 2014. "Moving to Work." *National Affairs*. Winter. <https://www.nationalaffairs.com/publications/detail/moving-to-work>.

Lerman, Robert. 2014. "Expanding Apprenticeship Opportunities in the United States." The Hamilton Project, Brookings Institution. June. <https://www.brookings.edu/research/expanding-apprenticeship-opportunities-in-the-united-states/>.

LeVine, Steve. 2019. "Off the sidelines and earning \$30 an hour." *Axios*. January 15. <https://www.axios.com/newsletters/axios-future-6c6a4474-1098-4a4a-aaa0-a3819d6ab08c.html>.

LinkedIn Economic Graph. 2019. "LinkedIn Workforce Report | United States | February 2019." February. <https://economicgraph.linkedin.com/resources/linkedin-workforce-report-february-2019>.

Litan, Robert. 2015. "Wage insurance: A potentially bipartisan way to help the middle class." Brookings Institution. February. <https://www.brookings.edu/research/wage-insurance-a-potentially-bipartisan-way-to-help-the-middle-class/>.

Loewenstein, George, Cass R. Sunstein, and Russell Golman. 2014. "Disclosure: Psychology Changes Everything." *Annual Review of Economics* 6 (August): 391-419. <https://www.cmu.edu/dietrich/sds/docs/loewenstein/DisclosureChgsEverything.pdf>.

Lowrey, Annie. 2016. "2016: A Year Defined by America's Diverging Economies." *The Atlantic*. December 30. <https://www.theatlantic.com/business/archive/2016/12/2016-diverging-economies/511838/>.

Lynch, Lisa M. 2004. "Development Intermediaries and the Training of Low-Wage Workers." In *Emerging Labor Market Institutions for the Twenty-First Century*, edited by Richard B. Freeman, Joni Hersch, and Lawrence Mishel. University of Chicago Press. December. <https://www.nber.org/chapters/c9959.pdf>.

Madland, David. 2018. "Wage Boards for American Workers: Industry-Level Collective Bargaining for All Workers." Center for American Progress. April. <https://www.americanprogress.org/issues/economy/reports/2018/04/09/448515/wage-boards-american-workers/>.

Maguire, Sheila, Joshua Freely, Carol Clymer, Maureen Conway, and Deena Schwartz. 2010. "Tuning In to Local Labor Markets." Public/Private Ventures. <http://ppv.issuelab.org/resources/5101/5101.pdf>.

Malamud, Ofer, and Abigail K. Wozniak. 2010. "The Impact of College Education on Geographic Mobility: Identifying Education Using Multiple Components of Vietnam Draft Risk." Working Paper 16463, National Bureau of Economic Research. October. <http://www.nber.org/papers/w16463>.

Manyika, James, Susan Lund, Michael Chui, Jacques Bughin, Jonathan Woetzel, Parul Batra, Ryan Ko, and Saurabh Sanghvi. 2017. "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation." McKinsey Global Institute. December. <https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-the-future-of-work-will-mean-for-jobs-skills-and-wages>.

Markle Foundation. 2018. "Colorado Governor John Hickenlooper, the Markle Foundation, and 20 States Launch the Skillful State Network; Introduce Skillful State Playbook." February. <https://www.markle.org/about-markle/media-release/skillful-state-network>.

Marr, Chuck, Chye-ching Huang, Arloc Sherman, and Brandon Debot. 2015. "ETC and Child Tax Credit Promote Work, Reduce Poverty, and Support Children's Development, Research Finds." Center on Budget and Policy Priorities. October. <http://www.cbpp.org/research/federal-tax/etlc-and-child-tax-credit-promote-work-reduce-poverty-and-support-childrens>.

Marx, Matt. 2018. "Reforming Non-Competes to Support Workers." The Hamilton Project, Brookings Institution. February. <https://www.brookings.edu/research/reforming-non-competes-to-support-workers/>.

Marx, Matt, and Lee Fleming. 2012. "Non-compete Agreements: Barriers to Entry...and Exit?" In *Innovation Policy and the Economy*, Volume 12, edited by Josh Lerner and Scott Stern, 39-64. University of Chicago Press. April. <https://www.nber.org/chapters/c12452.pdf>.

Maxim, Robert, and Mark Muro. 2018. "Manufacturing growth—in the Heartland and for America." Brookings Institution. December. <https://www.brookings.edu/blog/the-avenue/2018/12/05/manufacturing-growth-in-the-heartland-and-for-america/>.

McConnell, Sheena, Kenneth Fortson, Dana Rotz, Peter Schochet, Paul Burkander, Linda Rosenberg, Annalisa Matri, and Ronadl D'Amico. 2016. "Providing Public Workforce Services to Job Seekers: 15-Month Impact Findings on the WIA Adult and Dislocated Worker Programs." Mathematica Policy Research. May. <https://www.mathematica-mpr.com/our-publications-and-findings/publications/providing-public-workforce-services-to-job-seekers-15-month-impact-findings-on-the-wia-adult>.

McKay, Conor, Ethan Pollack, and Alastair Fitzpayne. 2018. "Modernizing Unemployment Insurance for the Changing Nature of Work." Aspen Institute Future of Work Initiative. January. <https://www.aspeninstitute.org/publications/modernizing-unemployment-insurance/>.

Meyer, Bruce D., and Dan T. Rosenbaum. 2001. "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers." *The Quarterly Journal of Economics* 116, No. 3 (August): 1063-1114. https://www.ssc.wisc.edu/~scholz/Teaching_742/Meyer_Rosenbaum.pdf.

Michaelides, Marios, Eileen Poe-Yamagata, Jacob Benus, and Dharmendra Tirumalasetti. 2012. "Impact of the Reemployment and Eligibility Assessment (REA) Initiative in Nevada." January. https://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_08_REA_Nevada_Follow_up_Report.pdf.

Michaels, Guy, Ashwini Natraj, and John Van Reenen. 2014. "Has ICT polarized skill demand? Evidence from eleven countries over 25 years." *Review of Economics and Statistics* 96, no. 1: 60-77. http://eprints.lse.ac.uk/46830/1/Michaels_Natraj_VanReenen_Has-ICT-polarized-skill-demand_2014.pdf.

Miller, Claire Cain, and Ruth Fremson. 2018. "'Forget About the Stigma': Male Nurses Explain Why Nursing Is a Job of the Future for Men." *New York Times*. January 4. <https://www.nytimes.com/interactive/2018/01/04/upshot/male-nurses.html>.

Mohanty, Abinash, Ashley Edwards, and Liana Fox. 2017. "Measuring the Cost of Employment: Work-Related Expenses in the Supplemental Poverty Measure." Census Bureau, U.S. Department of Commerce. November. https://cps.ipums.org/cps/resources/other_docs/SEHSD-WP2017-43.pdf.

Moore, Thad. 2017. "South Carolina's apprenticeship initiative cracks growth milestone as new U.S. labor secretary advocates for on-the-job training." *Post and Courier*. May 18. https://www.postandcourier.com/business/south-carolina-s-apprenticeship-initiative-cracks-growthmilestone-as-new/article_72157c86-3c05-11e7-9514-7bb6c3409ac9.html.

Munnich, Elizabeth, and Abigail Wozniak. 2017. "What explains the rising share of U.S. men in registered nursing?" Washington Center for Equitable Growth. October. <https://equitablegrowth.org/working-papers/rising-share-men-nursing/>.

Muro, Mark, and Joseph Parilla. 2017. "Maladjusted: It's time to reimagine economic 'adjustment' programs." Brookings Institution. January. <https://www.brookings.edu/blog/the-avenue/2017/01/10/maladjusted-its-time-to-reimagine-economic-adjustment-programs/>.

Muro, Mark, Robert Maxim, and Jacob Whiton. 2019. "Automation and Artificial Intelligence: How machines are affecting people and places." Brookings Institution. January. <https://www.brookings.edu/research/automation-and-artificial-intelligence-how-machines-affect-people-and-places/>.

Muro, Mark, Sifan Liu, Jacob Whiton, and Siddharth Kulkarni. 2017. "Digitalization and the American workforce." Brookings Institution. November. <https://www.brookings.edu/research/digitalization-and-the-american-workforce/>.

National Academies of Sciences, Engineering, and Medicine. 2017. "Information Technology and the U.S. Workforce: Where Are We and Where Do We Go from Here?" The National Academies Press. <https://www.nap.edu/catalog/24649/information-technology-and-the-us-workforce-where-are-we-and>.

National Center for Education Statistics. 2018. "Characteristics of Degree-Granting Postsecondary Institutions." U.S. Department of Education. May. https://nces.ed.gov/programs/coe/indicator_csa.asp.

National Network of Business and Industry Associations. "KY FAME: Building Kentucky's 21st Century Skilled Manufacturing Workforce Through a Unique Employer-Educator Partnership." <http://nationalnetwork.org/guidebook/ky-fame/>.

National Skills Coalition. 2016. "Sector Partnership Policy Toolkit Summary." October. <https://www.nationalskillscoalition.org/state-policy/body/Sector-Partnership-Policy-Toolkit-Summary.pdf>.

National Skills Coalition. 2018. "America's workforce: We can't compete if we cut." August. <https://www.nationalskillscoalition.org/resources/publications/file/Americas-workforce-We-cant-compete-if-we-cut-1.pdf>.

National Skills Coalition. 2019. "Saying Yes to State Longitudinal Data Systems: Building and Maintaining Cross Agency Relationships." January. <https://www.nationalskillscoalition.org/resources/publications/saying-yes-to-state-longitudinal-data-systems-building-and-maintaining-cross-agency-relationships>.

Nedelkoska, Ljubica, and Glenda Quintini. 2018. "Automation, skills use and training." OECD Social, Employment and Migration Working Papers. March. https://www.oecd-ilibrary.org/employment/automation-skills-use-and-training_2e2f4eea-en.

Novello, Amanda. 2018. "Revitalize American Manufacturing by Nurturing the Industrial Commons." The Century Foundation. April. <https://tcf.org/content/commentary/revitalize-american-manufacturing-nurturing-industrial-commons/>.

Nunn, Ryan, Jana Parsons, and Jay Shambaugh. 2018. "The Geography of Prosperity." The Hamilton Project, Brookings Institution. September. <https://www.brookings.edu/research/the-geography-of-prosperity/>.

OECD. 2015. "Back to Work: Sweden: Improving the Re-employment Prospects of Displaced Workers." OECD Publishing. December. <http://www.oecd.org/sweden/back-to-work-sweden-9789264246812-en.htm>.

OECD. 2016. "Back to Work: United States: Improving the Re-employment Prospects of Displaced Workers." OECD Publishing. December. https://www.oecd-ilibrary.org/employment/back-to-work-united-states_9789264266513-en.

Office of Economic Policy. 2016. "Non-compete Contracts: Economic Effects and Policy Implications." U.S. Department of the Treasury. March. <https://www.treasury.gov/resource-center/economic-policy/Documents/UST%20Non-competes%20Report.pdf>.

Office of Governor Jay Inslee. 2019. "Inslee details plan to create a statewide free college program for Washington students." January 11. <https://www.governor.wa.gov/news-media/inslee-details-plan-create-statewide-free-college-program-washington-students>.

Office of Governor Steve Bullock. 2017. "Governor Bullock Highlights Tax Incentive for Montana Businesses to Grow and Create Jobs." June 1. <https://governor.mt.gov/Newsroom/governor-bullock-highlights-tax-incentive-for-montana-businesses-to-grow-and-create-jobs>.

Office of U.S. Congressman Darren Soto. 2018. "Rep. Soto Introduces Bipartisan 'AI Jobs Act of 2018.'" January 19. <https://soto.house.gov/media/press-releases/rep-soto-introduces-bipartisan-ai-jobs-act-2018>.

Office of U.S. Senator Elizabeth Warren. 2018. "Warren Introduces Accountable Capitalism Act." August 15. <https://www.warren.senate.gov/newsroom/press-releases/warren-introduces-accountable-capitalism-act>.

Office of U.S. Senator Mark R. Warner. 2018. "Warner & Coons to Introduce Bill to Promote Lifelong Learning & Worker Training." November 16. <https://www.warner.senate.gov/public/index.cfm/2018/11/warner-coons-to-introduce-bill-to-promote-lifelong-learning-worker-training>.

Office of U.S. Senator Sherrod Brown. 2019. "Brown, Khanna, Watson Coleman Propose 'Cost-Of-Living Refund' To Help Lift Millions of Americans into Middle Class." February 13. <https://www.brown.senate.gov/newsroom/press/release/brown-khanna-watson-coleman-propose-cost-of-living-refund-to-help-lift-millions-of-americans-into-middle-class>.

Opportunity America/AEI/Brookings Working Class Study Group. 2018. "Work, Skills, Community: Restoring opportunity for the working class." November. <https://opportunityamericaonline.org/wcg/>.

Pingel, Sarah. 2018. "Income Share Agreements: An Old Idea Made New, But Necessity to Protect Students Remains." *EdNote*, Education Commission of the States. November. <https://ednote.ecs.org/income-share-agreements-an-old-idea-made-new-but-necessity-to-protect-students-remains/>.

Reardon, Marguerite. 2015. "How blazing Internet speeds helped Chattanooga shed its smokestack past." *CNET*. August 20. <https://www.cnet.com/news/how-blazing-internet-speeds-helped-chattanooga-shed-its-smokestack-past/>.

Reed, Debbie, Albert Yung-Hsu Liu, Rebecca Kleinman, Annalisa Matri, Davin Reed, Samina Sattar, and Jessica Ziegler. 2012. "An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States." Mathematica Policy Research. July. https://wdr.doleta.gov/research/FullText_Documents/ETAOP_2012_10.pdf.

Rethinking Pell Grants Study Group. 2013. "Rethinking Pell Grants." The College Board. April. <http://media.collegeboard.com/digitalServices/pdf/advocacy/policycenter/advocacy-rethinking-pell-grants-report.pdf>.

Rivera, Diana, Sarah Villeneuve, Amos Zehavi, and Dan Breznitz. 2018. "Pathways to Inclusive Innovation: Insights for Ontario and beyond." Brookfield Institute. June. <https://brookfieldinstitute.ca/report/pathways-to-inclusive-innovation/>.

Roepe, Lisa Rabasca. 2017. "Why Apprenticeships Are Taking Off." *CityLab*. February 1. <https://www.citylab.com/life/2017/02/why-apprenticeships-are-taking-off/514977/>.

Roll Call. 2014. "Improving Worker Mobility Will Help Fix the Economy." February. http://www.rollcall.com/news/improving_worker_mobility_will_help_fix_the_economy_commentary-230859-1.html.

Rothstein, Jesse. 2009. "Is The EITC Equivalent to an NIT? Conditional Cash Transfers and Tax Incidence." Working Paper 14966, National Bureau of Economic Research. May. <https://www.nber.org/papers/w14966.pdf>.

Rushe, Dominic. 2014. "Chattanooga's Gig: how one city's super-fast internet is driving a tech boom." *The Guardian*. August 30. <https://www.theguardian.com/world/2014/aug/30/chattanooga-gig-high-speed-internet-tech-boom>.

Schwarz, Daniel, Martha Van Oot, Erik Winton, and Colin Thakkar. 2018. "Three States May Restrict Use of Employment Noncompete Agreements." Society for Human Resource Management. January. <https://www.shrm.org/resourcesandtools/legal-and-compliance/state-and-local-updates/pages/states-may-restrict-use-of-employment-noncompete-agreements.aspx>.

Shook, Elyn, and Mark Knickrehm. 2018. "Reworking the Revolution." Accenture. January. <https://www.accenture.com/us-en/company-reworking-the-revolution-future-workforce>.

Skillful. 2019. "Skillful Indiana Names William D. Turner, Jr. Executive Director; Launches Skillful Governor's Coaching Corps with Indiana Governor Eric J. Holcomb." Markle Foundation. January. <https://www.skillful.com/press-release/indiana-governors-coaching-corps>.

Slivinski, Stephen. 2015. "Bootstraps Tangled in Red Tape: How State Occupational Licensing Hinders Low-Income Entrepreneurship." Goldwater Institute. February. <https://goldwaterinstitute.org/article/bootstraps-tangled-in-red-tape/>.

Society for Human Resource Management. 2017. "2017 Employee Benefits: Remaining Competitive in a Challenging Talent Marketplace." June. <https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/pages/2017-employee-benefits.aspx>.

Starr, Evan. 2019. "The Use, Abuse, and Enforceability of Non-Compete and No-Poach Agreements." Economic Innovation Group. February. <https://eig.org/noncompetesbrief>.

Stettner, Andrew. 2018. "Mounting a Response to Technological Unemployment." The Century Foundation. April. <https://tcf.org/content/report/mounting-response-technological-unemployment/>.

Stettner, Andrew, Michael Cassidy, and George Wentworth. 2016. "A New Safety Net for An Era of Unstable Earnings." The Century Foundation. December. <https://tcf.org/content/report/new-safety-net-for-an-era-of-unstable-earnings/>.

Stevens, Ann Huff, Michal Kurlaender, and Michel Grosz. 2015. "Career Technical Education and Labor Market Outcomes: Evidence from California Community Colleges." Working Paper 21137, National Bureau of Economic Research. April. <https://www.nber.org/papers/w21137.pdf>.

Strain, Michael. 2014. "A Jobs Agenda for the Right." *National Affairs*. Winter. <https://www.nationalaffairs.com/publications/detail/a-jobs-agenda-for-the-right>.

Sucher, Sandra, and Susan Winterberg. 2015. "Nokia's Bridge Program: Outcome and Results (B)." Harvard Business School Supplement 315-003. February. <https://www.hbs.edu/faculty/Pages/item.aspx?num=48539>.

Tangel, Andrew, and Patrick McGroarty. 2018. "Tax Incentive Puts More Robots on Factory Floors." *Wall Street Journal*. January 26. <https://www.wsj.com/articles/tax-incentive-puts-more-robots-on-factory-floors-1516962600>.

Texas Workforce Commission. 2016. "Report to the Sunset Advisory Commission: Study on the Collection of Occupational Data." <https://twc.texas.gov/files/news/2016-twc-study-collection-occupational-data.pdf>.

U.S. Department of Labor. 2018. "Task Force on Apprenticeship Expansion Submits Strategy to Create More Apprenticeships." May 10. <https://www.dol.gov/newsroom/releases/osec/osec20180510>.

U.S. Marine Corps. 2016. "Military Occupational Specialty Renaming." Signed June 30, 2016. <https://www.marines.mil/News/Messages/Messages-Display/Article/898051/military-occupational-specialty-renaming/>.

Waddoups, C. Jeffrey. 2016. "Did Employers in the United States Back Away from Skills Training during the Early 2000s?" *ILR Review* 69, no. 2 (March): 405-434. <http://ilr.sagepub.com/content/69/2/405>.

Wall Street Journal Podcasts. 2019. "IBM CEO Ginni Rometty on Reskilling Workers in the Age of AI." February 27. <https://www.wsj.com/podcasts/wsj-the-future-of-everything/ibm-ceo-ginni-rometty-on-reskilling-workers-in-the-age-of-ai/05224dc4-bcef-413b-acab-0d0e0b08409c>.

Walsh, Nora. 2018. "The Next Time You Order Room Service, It May Come by Robot." *New York Times*. January 29. <https://www.nytimes.com/2018/01/29/travel/the-next-time-you-order-room-service-it-may-come-by-robot.html>.

The White House. 2015. "Occupational Licensing: A Framework for Policymakers." July. https://obamawhitehouse.archives.gov/sites/default/files/docs/licensing_report_final_nonembargo.pdf.

Walter, Karla. 2019. "The Freedom to Leave: Curbing Noncompete Agreements to Protect Workers and Support Entrepreneurship." Center for American Progress. January. <https://www.americanprogress.org/issues/economy/reports/2019/01/09/464831/the-freedom-to-leave/>.

West, Rachel, Indivar Dutta-Gupta, Kali Grant, Melissa Boteach, Claire McKenna, and Judy Conti. 2016. "Strengthening Unemployment Protections in America." Center for American Progress. June. <https://www.americanprogress.org/issues/poverty/reports/2016/06/16/138492/strengthening-unemployment-protections-in-america/>.

The White House. 2015. "President Obama's Upskill Initiative." April. https://obamawhitehouse.archives.gov/sites/default/files/docs/150423_upskill_report_final_3.pdf.

The White House. 2016. "Fact Sheet: Investing \$90 Million through ApprenticeshipUSA to Expand Proven Pathways into the Middle Class." April. <https://obamawhitehouse.archives.gov/the-press-office/2016/04/21/fact-sheet-investing-90-million-through-apprenticeshipusa-expand-proven>.

Workforce Information Advisory Council. 2018. "Recommendations to Improve the Nation's Workforce and Labor Market Information System." Submitted to Secretary Acosta, U.S. Department of Labor. January. https://www.doleta.gov/wioa/wiac/docs/Second_Draft_of_the_WIAC_Final_Report.pdf.

World Economic Forum. 2018. "Towards a Reskilling Revolution: A Future of Jobs for All." January. http://www3.weforum.org/docs/WEF_FOW_Reskilling_Revolution.pdf.

World Economic Forum. 2019. "Towards a Reskilling Revolution: Industry-Led Action for the Future of Work." January. http://www3.weforum.org/docs/WEF_Towards_a_Reskilling_Revolution.pdf.

Wozniak, Abigail. 2010. "Are College Graduates More Responsive to Distant Labor Market Opportunities?" *The Journal of Human Resources* 45, no. 4 (Fall): 944-970. University of Wisconsin Press. <http://jhr.uwpress.org/content/45/4/944>.

Wozniak, Abigail. 2016. "Labor Mobility: Guidance for the Next Administration." Washington Center for Equitable Growth. October. <https://equitablegrowth.org/labor-mobility-guidance-for-the-next-administration/>.

Yudken, Joel, Thomas Croft, and Andrew Stettner. 2017. "Revitalizing America's Manufacturing Communities." The Century Foundation. October. <https://tcf.org/content/report/revitalizing-americas-manufacturing-communities/>.

Zients, Jeffrey, and Jason Furman. 2016. "New Reforms to Strengthen Support for Unemployed Workers." The White House. January. <https://obamawhitehouse.archives.gov/blog/2016/01/16/new-reforms-strengthen-support-unemployed-workers>.



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