MIT work OF THE FUTURE

Building Better Jobs in an Age of Intelligent Machines

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Co-Chair, MIT Task Force on the Work of the Future

MIT Sloan Latin America Office (MSLAO) Webinar
December 18, 2020

MIT Task Force on the Work of the Future

The MIT Task Force on the Work of the Future launched by MIT President Reif in 2018

1. How are emerging technologies changing the nature of human work and the skills required?

2. How we can design and leverage technological innovations for the benefit of everyone in society?

workofthefuture.mit.edu
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The Task Force comprised

~20 faculty members from across all five schools
~20 graduate students
~34 person Advisory Board and Research Advisory Board

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The Work of the Future:

Building Better Jobs in an Age of Intelligent Machines

2020

The New York Times

Don't Fear the Robots, and Other Lessons From a Study of the Digital Economy

A task force assembled by M.I.T. examined how technology has changed, and will change, the work force.

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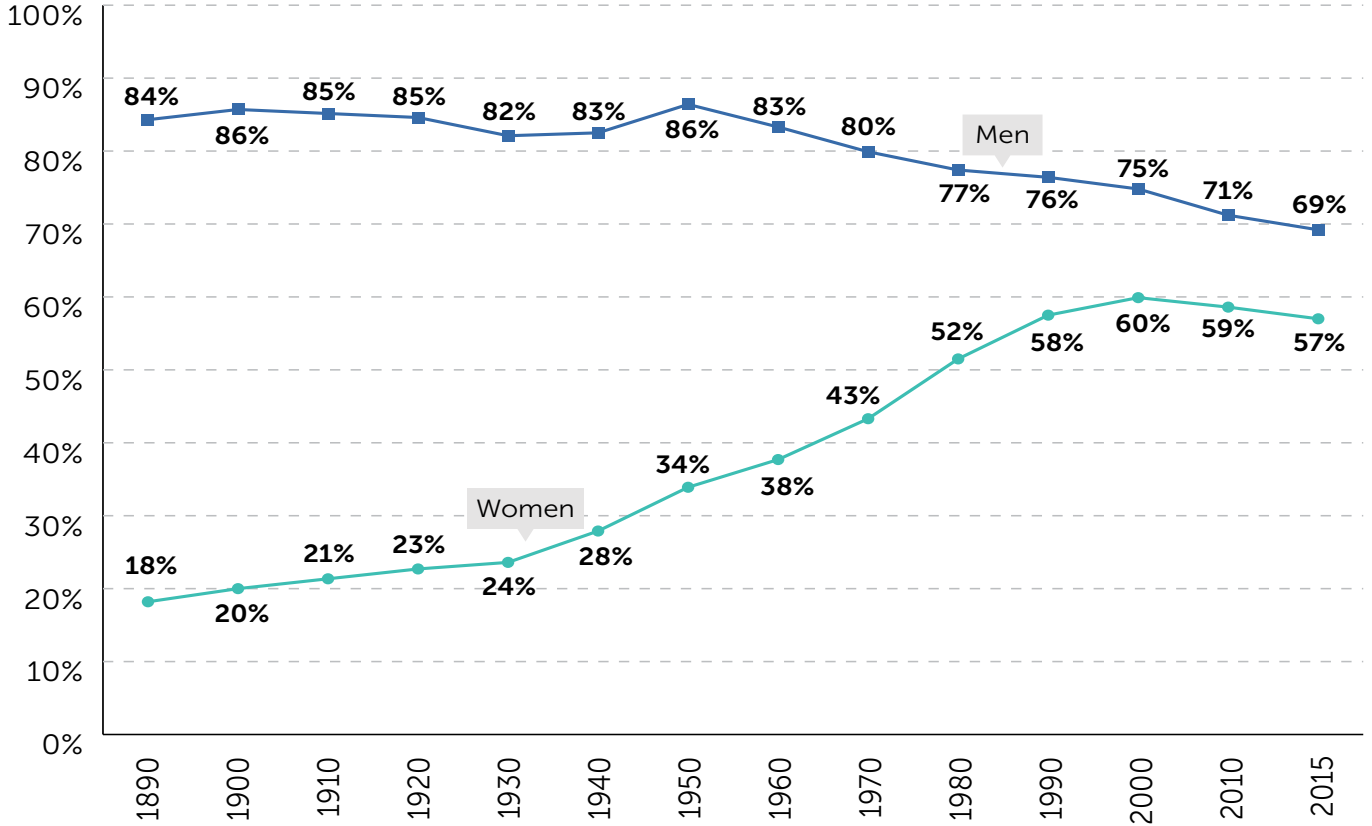
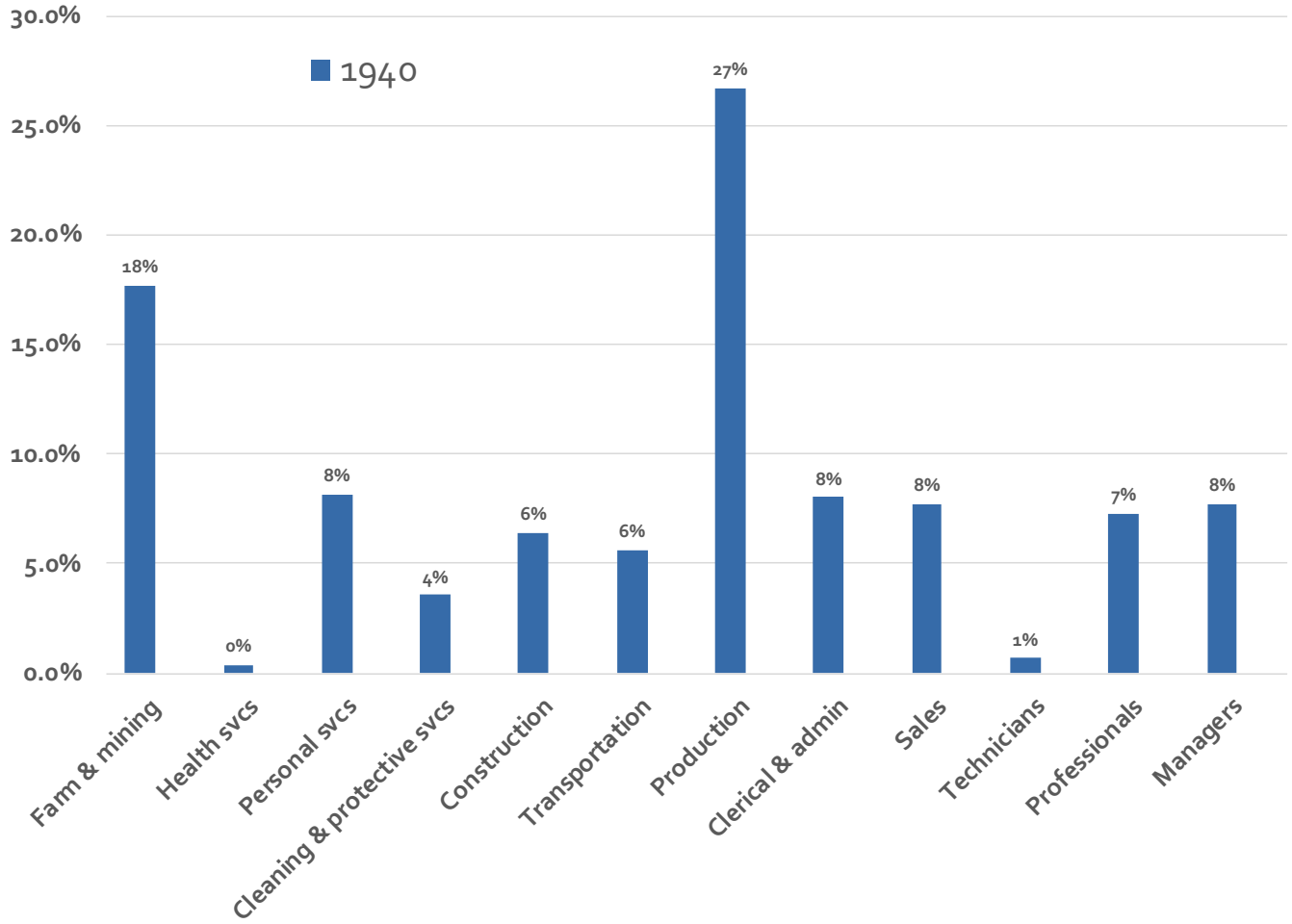
I. Economic Context

After a Century of Automation, Why Are There Still So Many Jobs?

Employment to Population Ratio of U.S. Adults, 1890 - 2015

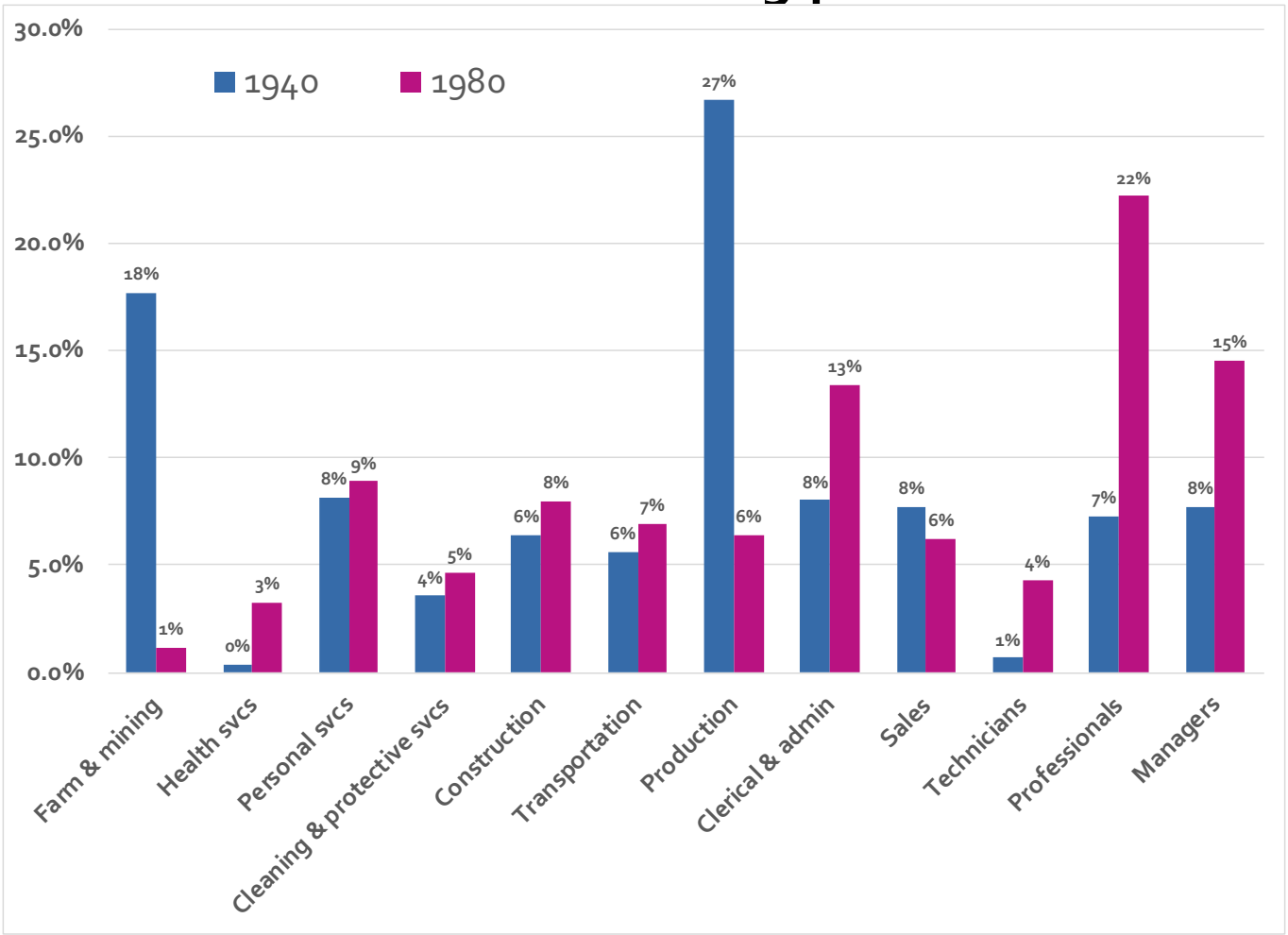


Distribution of Jobs in 1940



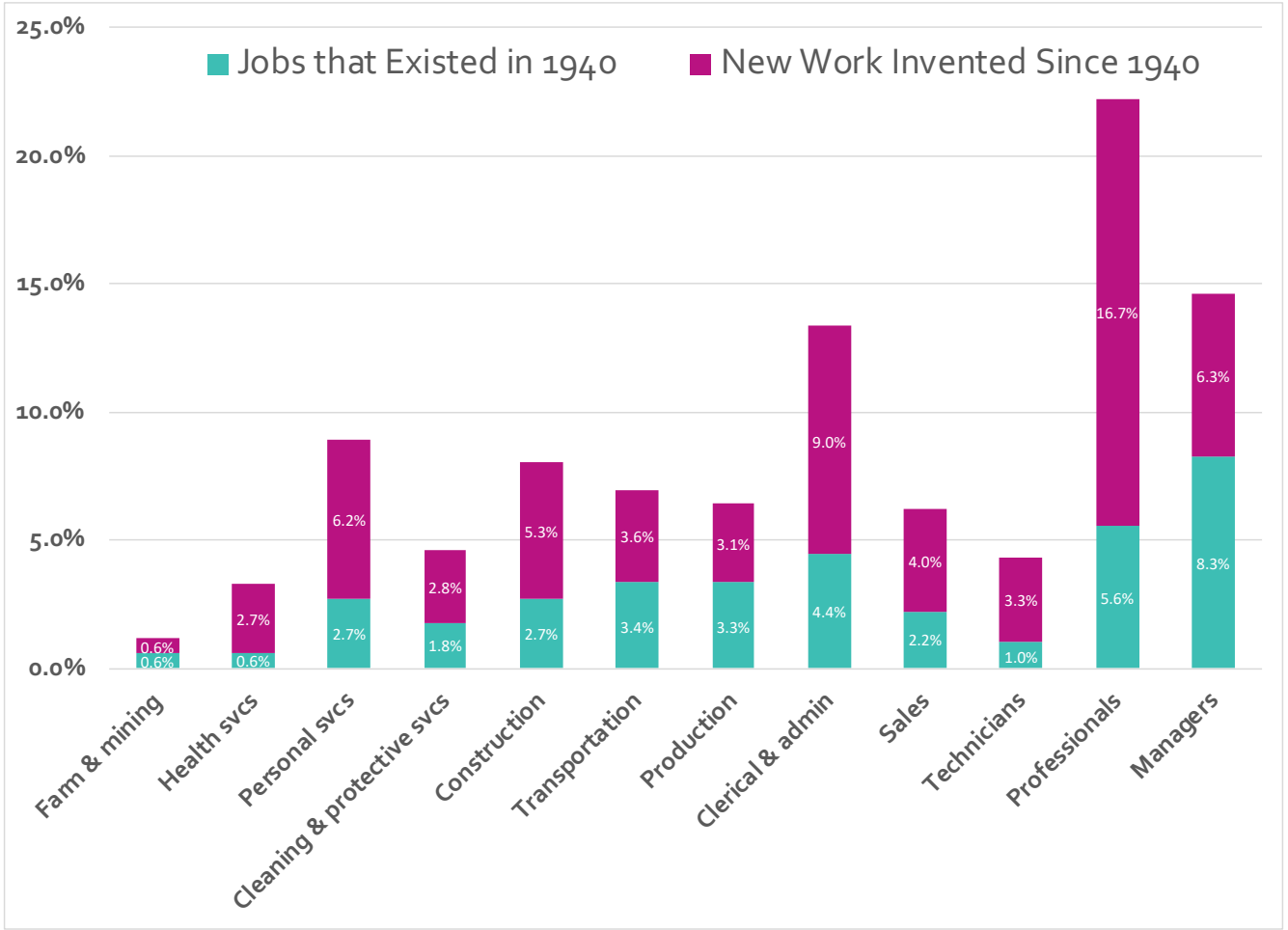
Autor, Salomons, and Seegmiller 2020

Distribution of Jobs in 1940 and 2018



Autor, Salomons, and Seegmiller 2020

More Than 2/3rds of 2018 Jobs Had Not Yet Been Invented in 1940



Autor, Salomons, and Seegmiller 2020

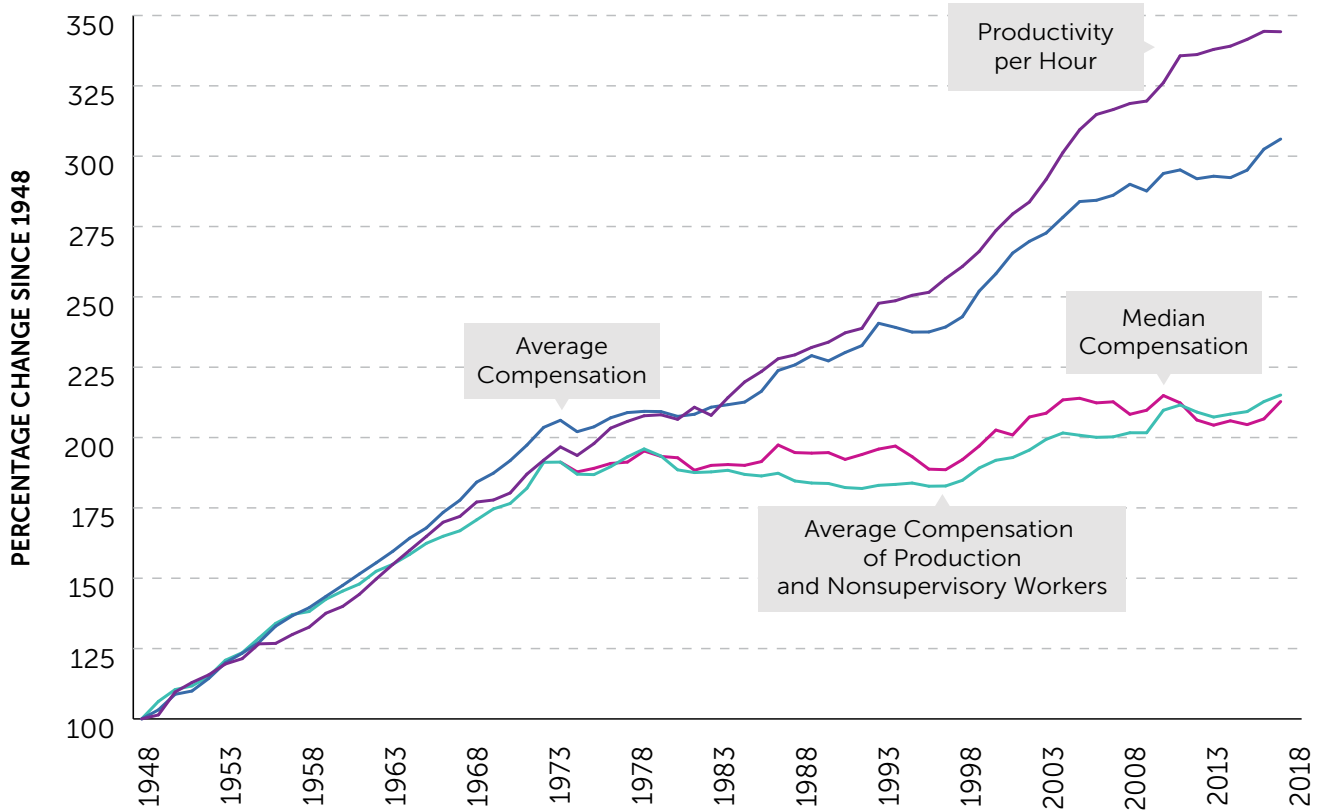
Examples of New Occupations Added to the U.S. Census Between 1920 and 2018

YEAR	EXAMPLE TITLES ADDED
1940	Automatic welding machine operator
1950	Airplane designer
1960	Textile chemist
1970	Engineer computer application
1980	Controller, remotely piloted vehicle
1990	Certified medical technician
2000	Artificial intelligence specialist
2010	Wind turbine technician
2018	Pediatric vascular surgeon

Source: Autor, Salomons, and Seegmiller, 2020

The U.S. Has Gotten Much More Productive since 1975, but Most Workers Have Benefited Little

U.S. Productivity and Compensation Growth, 1948 – 2018

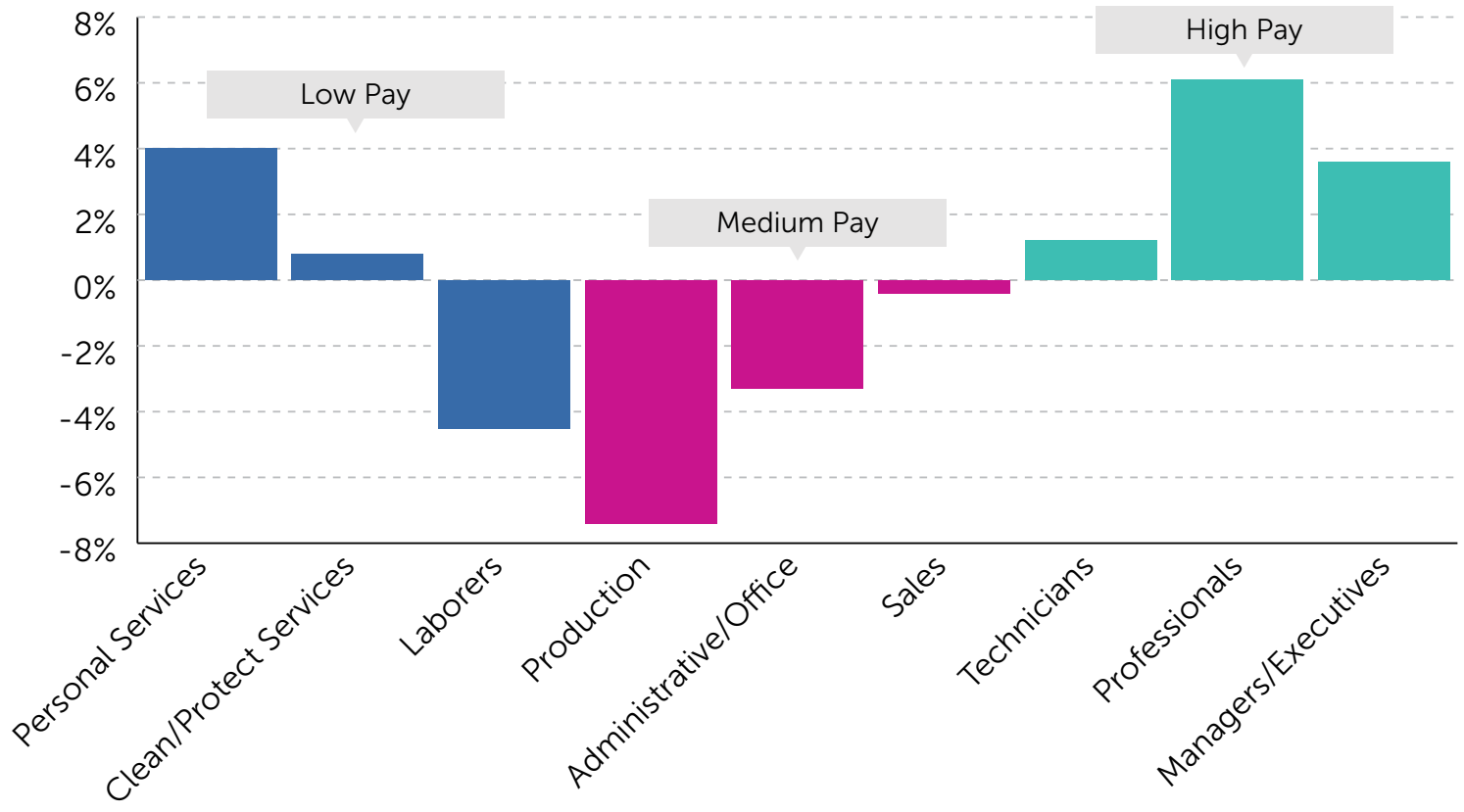


What Are the Causes?

1. **Technology**: Digitalization of work made highly-educated workers more productive, made less-educated workers easier to replace with machinery

The U.S. Occupational Structure has 'Polarized', 1980 – 2015

Changes in Employment in Low, Medium, & High Paying Occupations



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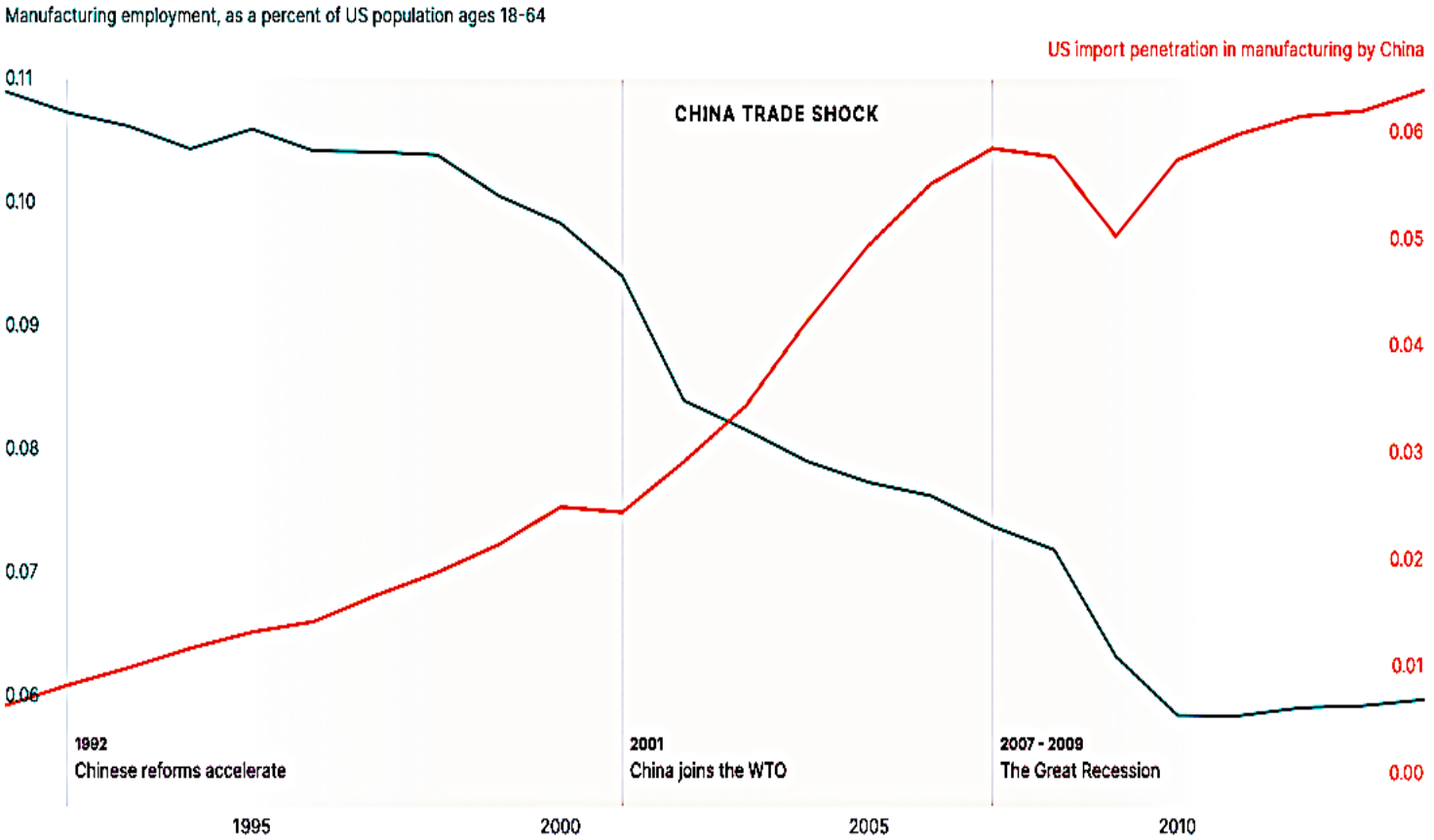
2. **Globalization**: Trade has been a huge positive for world welfare but has placed pressure on manufacturing jobs and manufacturing-intensive communities

U.S. Manufacturing Employment Dropped Sharply After China Joined the World Trade Organization in 2001



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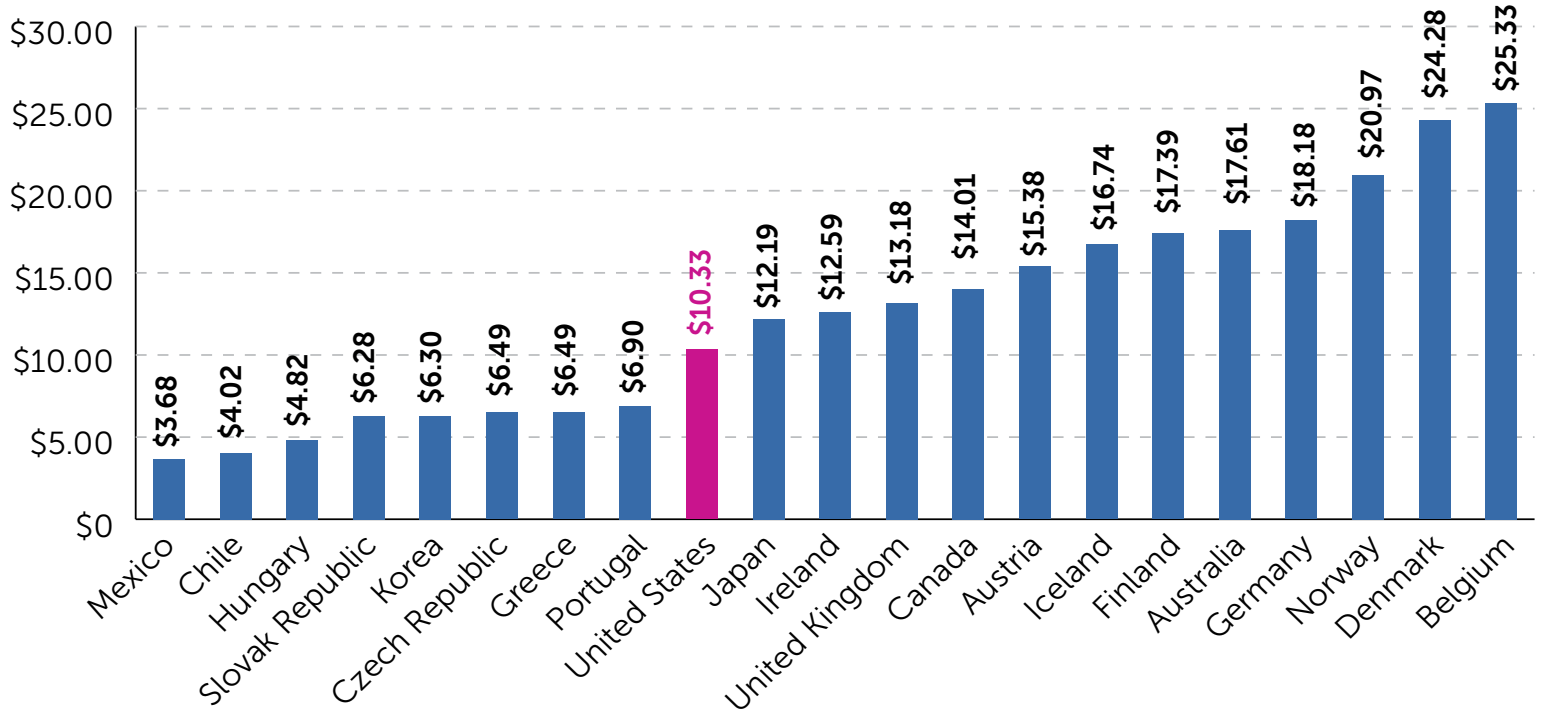
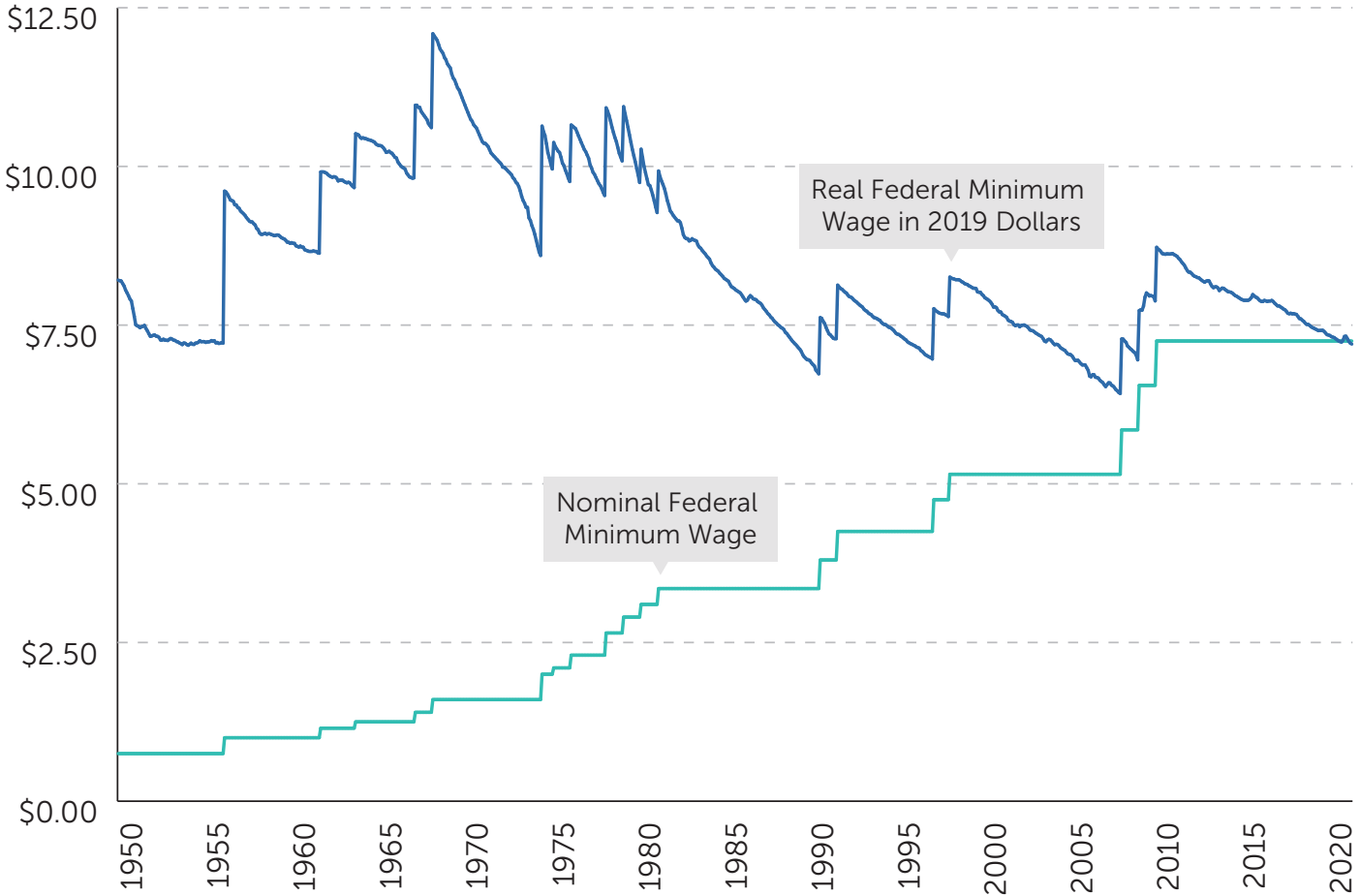
3. **Institutions**: Weakened labor unions, historically low minimum wage, and outdated employment regulations have harmed rank and file workers

Less-Educated Workers in the U.S. Receive Lower Pay Than in Other Industrialized Countries

Purchasing Power-Adjusted Hourly Earnings of Low-Education Workers in 2015

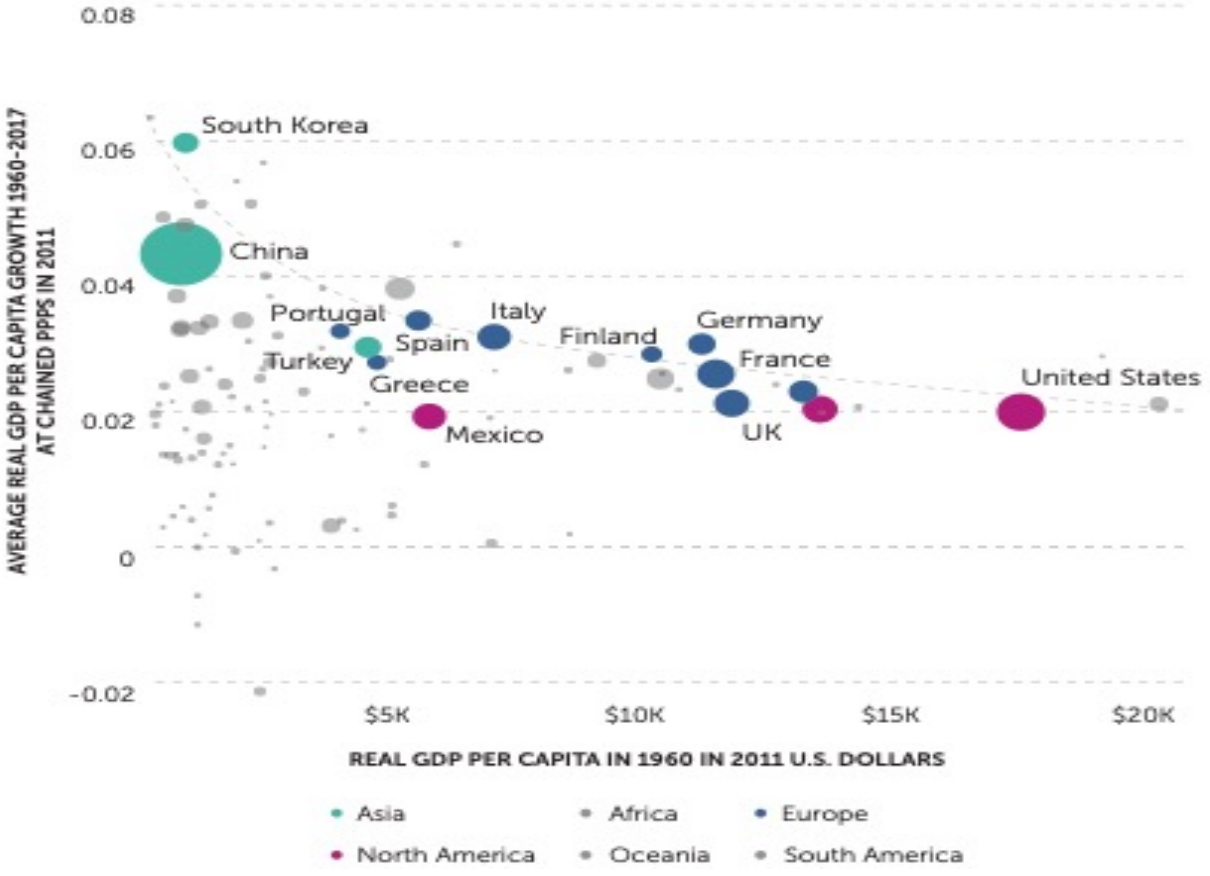


Real U.S. Federal Minimum Wage Has Fallen to Near Irrelevance



High Inequality and Low Taxes Do Not Predict Faster Growth

Average GDP Growth Rate 1960 – 2011 vs. GDP per Capita in 1960



Sources: Feenstra et al. (2015): Penn World Tables 9.1, Population (Gapminder, HYDE (2016) & UN (2019))

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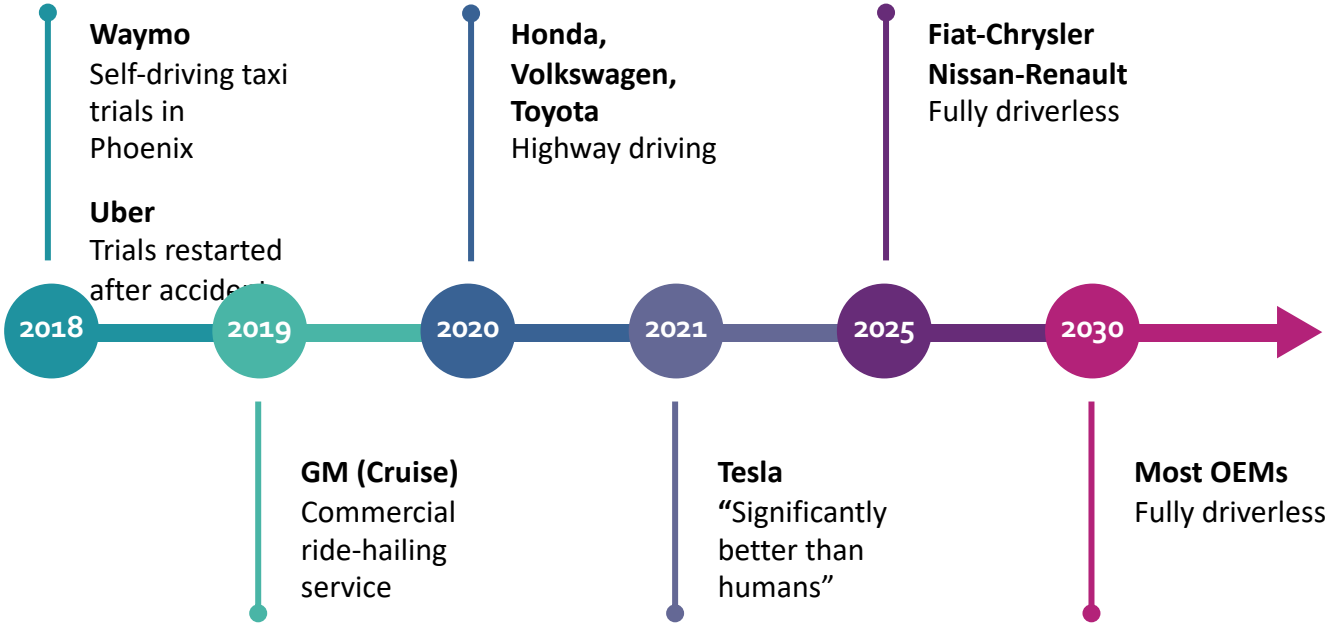
II. Technological Context

The Momentous Impacts of Technological Change are Unfolding Gradually

Autonomous Vehicles: Significant Uncertainty Related to AV technology



The Washington Post

The Switch

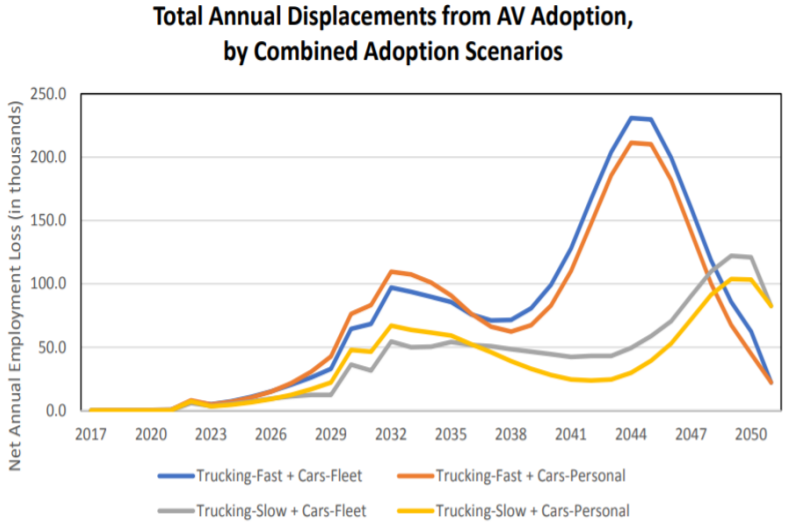
Shaken by hype, self-driving leaders adopt new strategy: Shutting up

OCTOBER 18, 2018

Three former executives at Google, Tesla and Uber who once raced to be the first to develop self-driving cars have adopted a new strategy: Slow down. And shut up.

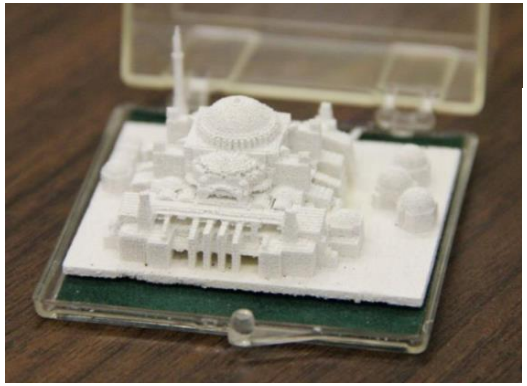
AVs Estimated to Displace 1.3 – 2.3m U.S. Workers

- Biggest shocks at least 20 years out, size similar to recent China trade shock
- Regional disparities – esp. hard on South
- Potential increase in workers' commuting range—OR increased congestion, collapse of public transit

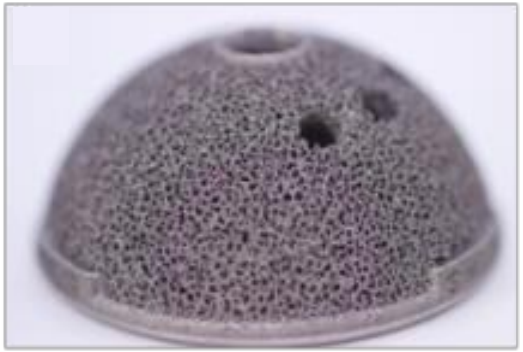


MIT Work of the Future **Preparing U.S. Workers and Employers for an Autonomous Vehicle Future (Helper et al. 2018)**

Additive Manufacturing has Transformative Potential



MIT Dome



Metal Hip Implant

Aircraft Fuel Nozzle

Faucet

Orthodontic Retainer

The Momentous Impacts of Technological Change are Unfolding Gradually

1. Autonomous vehicles
2. Industrial robotics
3. Intelligent supply chains
4. Additive manufacturing
5. Artificial intelligence

The Momentous Impacts of Technological Change are Unfolding Gradually

1. The largest labor-market effects of technology we're seeing still stem from maturing Information Technologies – Internet, mobile computing, E-commerce, electronic health records (EHR)

2. Artificial Intelligence and robotic applications take years (sometimes decades) to develop and deploy, especially into safety- and production-critical applications

3. We can see glimpses of the future today. It will take time to fully distribute. This time window offers opportunity

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III. The Work of the Future

Institutional Innovation
Must Complement Technological Innovation

1. Invest and innovate in skills and training

2. Ensure productivity gains translate into better quality jobs

3. Expand and shape innovation

The Work of the Future is Ours to Invent

1. There is a palpable fear of the future – a consequence of divergence between innovation and labor market opportunity
2. If we deploy new technologies into existing labor systems, we will get the same problematic results
3. We should reject false tradeoffs between economic growth and strong labor markets
4. The majority of today's jobs had yet to be invented a century ago. The job of the present is to build the work of the future