

# AI and Robots: The Impact on Employment, Wages, and Inequality

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April 2021

# Outline

- The state of work and workers
- Nature of jobs affected by AI and robots
- Arguments for and against the prediction of looming job losses and declining wages from technological change (TC)
- Causes of employment and wage stagnation and growth of inequality
- Role of government in improving labor market outcomes

# The state of work and workers

- The growth of inequality since the mid 1970s
- Wages for those with some college or less have declined in real terms since 1979. For college educated, wage have stagnated since 2000.
- Although official unemployment rates appear low, the measures obscure a variety of phenomena:
  - Declines in labor force participation of working age adults
  - Discouraged workers
  - Insecurity of employment
  - Multiple jobs due to short hours

# Artificial Intelligence (AI) and Robots

AI and robots are a newer form of technological change that have been a fact of life in capitalist economies since the 1800s.

These new types of technological change (TC) differ in that they not only substitute for routinized tasks and brawn; they also supplant mental tasks.

- AI reflects the ability of machines to learn from experience and so they will be able to replace at least some mental tasks.

# Motives for Technological Change (TC)

TC is adopted by firms to reduce costs (raise profits) and to keep up with TC adopted by competitors.

Profit incentives determine the type of technologies that are developed & adopted. This means that firms benefit from TC but larger society may or may not.

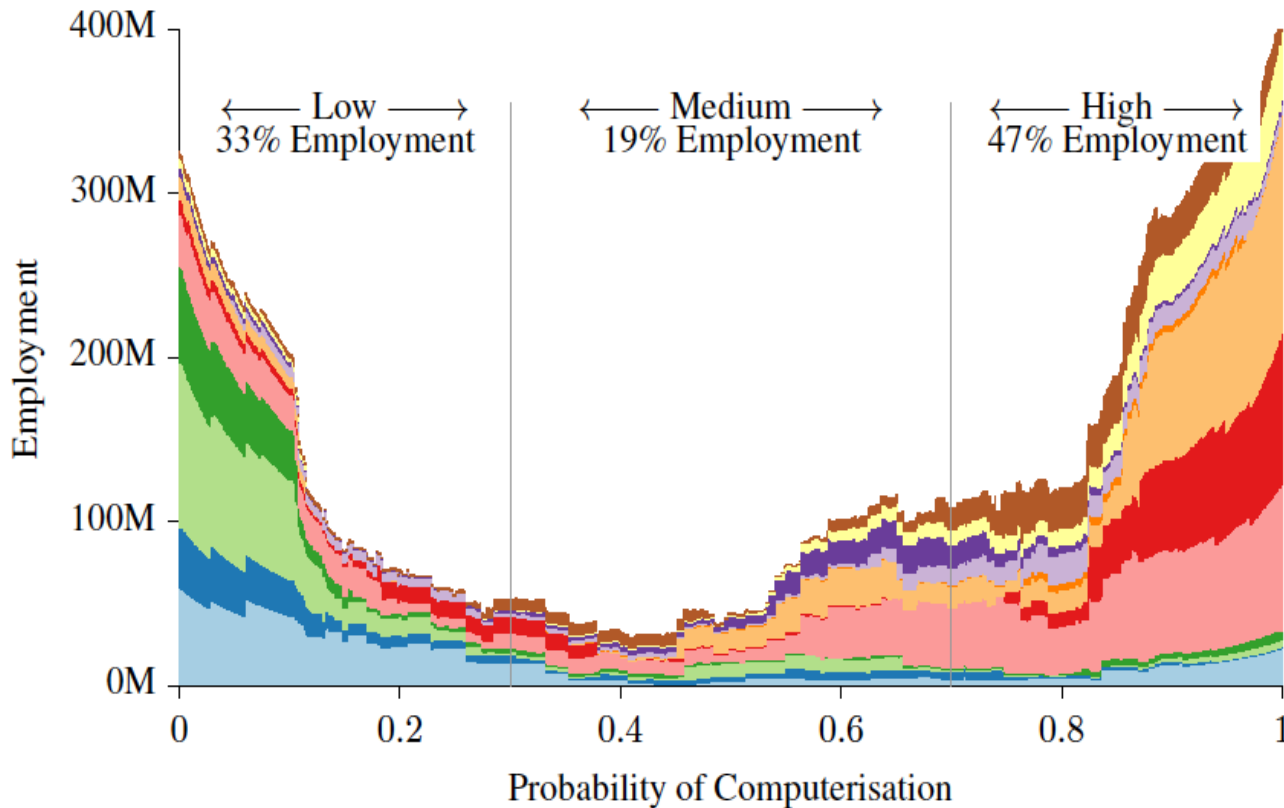
The key challenge of government is to adopt policies and regulations that ensure that firms align their profit motive with societal well-being.

Earlier  
studies  
emphasized  
potential  
loss of  
entire  
occupations  
due to TC

- Frey and Osborne (2013). “The future of employment: How susceptible are jobs to computerization\*?”
  - From data on 700 occupations, found that 47% of US employment at risk of elimination in next 10 – 20 years.
  - Use measures of perception, dexterity and manipulation; creative intelligence; and social intelligence.
- \*Job automation by means of computer-controlled equipment.

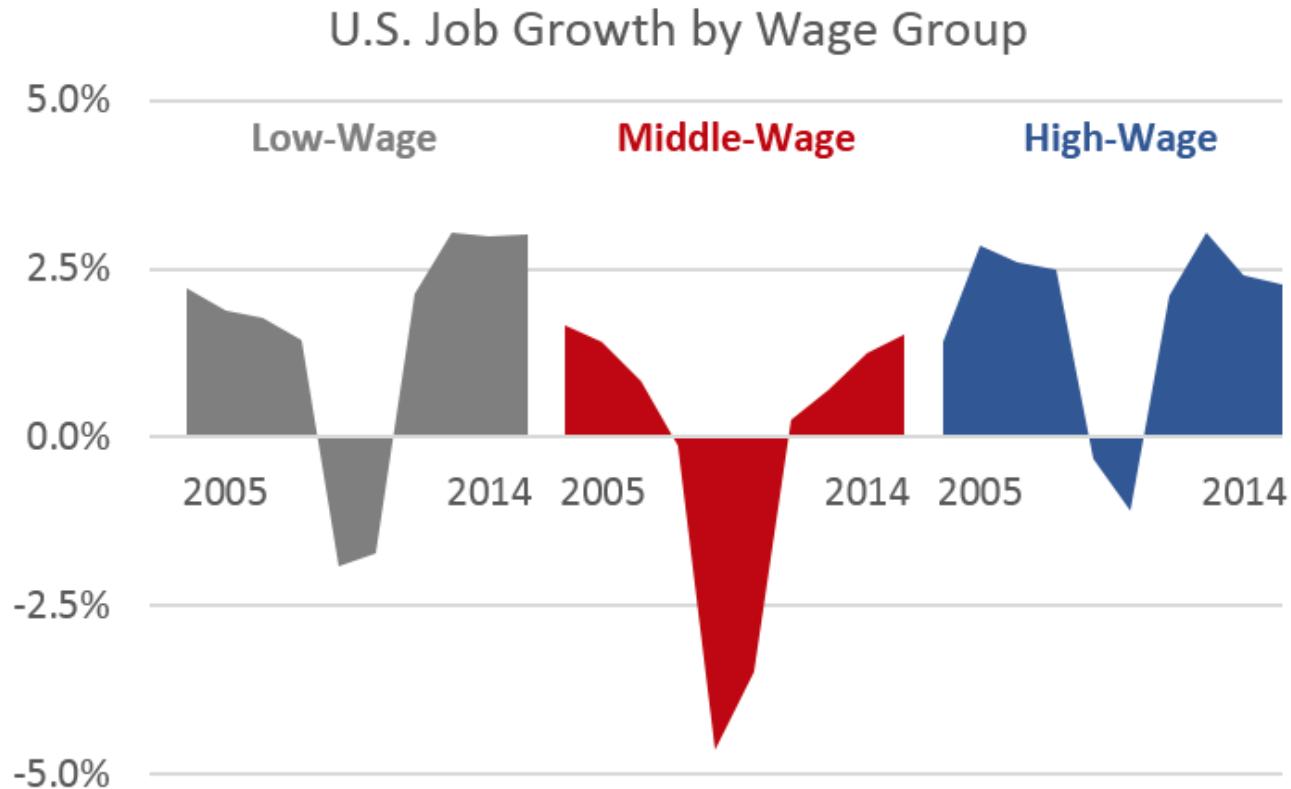
- Management, Business, and Financial
- Computer, Engineering, and Science
- Education, Legal, Community Service, Arts, and Media
- Healthcare Practitioners and Technical
- Service
- Sales and Related
- Office and Administrative Support
- Farming, Fishing, and Forestry
- Construction and Extraction
- Installation, Maintenance, and Repair
- Production
- Transportation and Material Moving

**Least likely to be automated:** jobs requiring social intelligence and those requiring creative intelligence (e.g., STEM).



Source: Frey and Osborne (2013).

# Job Polarization: A Hollowing Out of Middle Wage Jobs



Categories based on median wage for major occupational groups.  
Source: BLS, Oregon Office of Economic Analysis



# **Qualifier:** Specific tasks will be replaced rather than entire jobs eliminated.

Instead of full automation of entire jobs, we are likely to experience the redesign of jobs to include a different set of tasks.

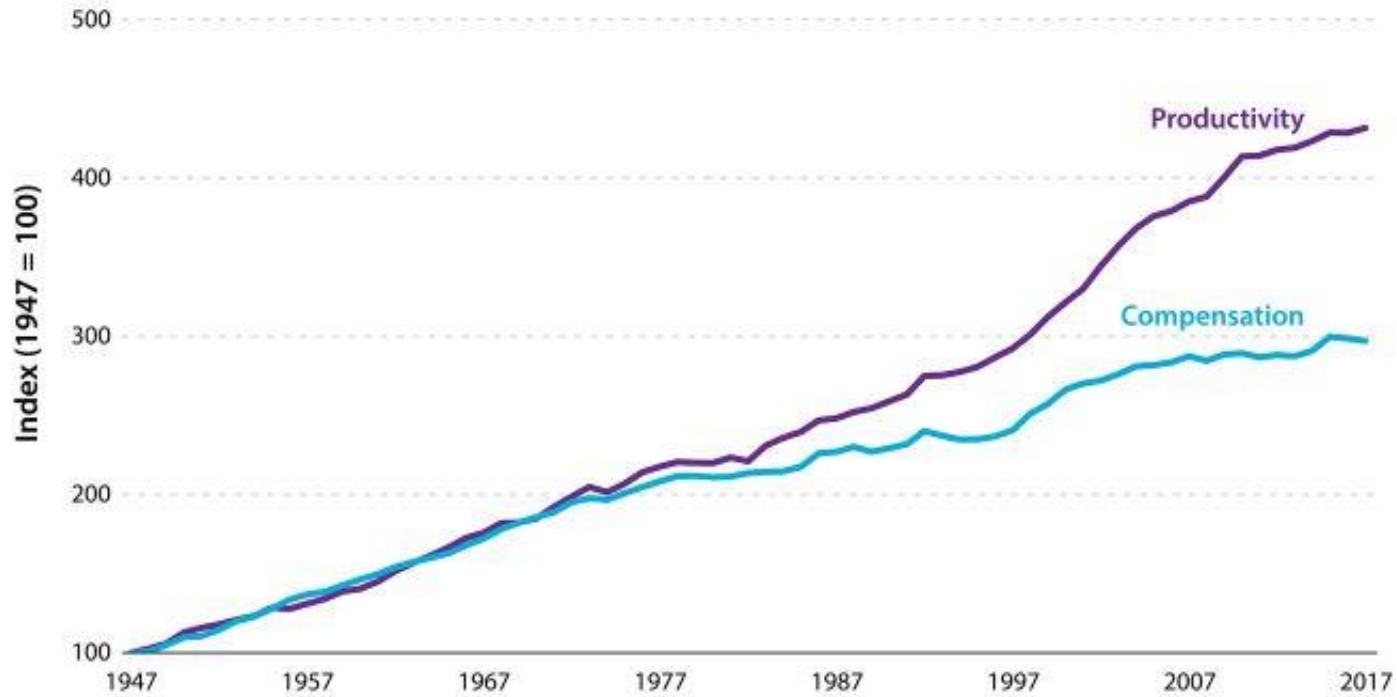
- **Administrative assistants** used to type and file. Tasks in this job category have changed to include: budget management & processing of expense reports, organizing meetings, planning events, database & website maintenance.
- **Radiologists:** AI applications can diagnose various conditions based on medical scan images. But there are 26 distinct tasks associated with being a radiologist, many of which are not suited to AI (such as interpersonal skills).
- **Bank tellers** now handle only 47% of all bank transactions, down from 90% in 2007. But # of bank tellers has risen & tasks have changed. Tellers now assist customers with online transactions, advise on bank products, & help customers use automated machines for deposits. More branches also opened.

# TC and unemployment

- One view is that the quantity of jobs is fixed and that unemployment will automatically rise. This isn't necessarily so.
- TC can raise **labor productivity**. Four outcomes are possible:
  - Firms could lower the prices of goods and services, and demand will increase, and thus employment.
  - Employers could a) raise worker wages or b) reduce work hours for the same pay), **sharing the gains of productivity growth** with them. This link has been broken & is not likely to be re-established without government action.
  - Firms could see higher profits as their costs fall (if they don't share the productivity gains with workers & consumers). If so, employment falls & inequality rises.

FIGURE B.

## Real Labor Productivity and Hourly Compensation, 1947–2017



Source: Productivity and Costs, BLS (1947–2017); authors' calculations.

Note: Productivity is the indexed value of nonfarm business real gross output per hour of all persons; hourly compensation is the indexed value of nonfarm business average real compensation per hour. Compensation is deflated using the CPI-U-RS deflator. Productivity and compensation values for 2017 are based on only the first two quarters of the year.

Firms have been able to retain the benefits of productivity growth rather than sharing with workers since 1975

- This trend is primarily due to globalization, declining value of minimum wage, de-unionization, all contributing to **loss of worker bargaining power**.
- The redistribution of income that has occurred leads to macroeconomic stagnation. Why? The wealthy tend to save a larger share of their income than workers, reducing aggregate demand.

# Ways Government Can Improve Inequality & Cushion the Impact of TC

- Fund robust **worker retraining programs** for displaced workers.
- **Raise minimum wage** to boost worker bargaining power.
- **Improve & equalize educational outcomes across groups** (particularly by class & race) to ensure access to knowledge-intensive jobs
- Use tax policy to insure fair distribution of benefits of TC.
  - One proposal has been to tax **robots**.
  - Another is **higher marginal tax rates** combined with Universal Basic Income (UBI).