

Preparing U.S. Workers & Employers for an Autonomous Vehicle Future



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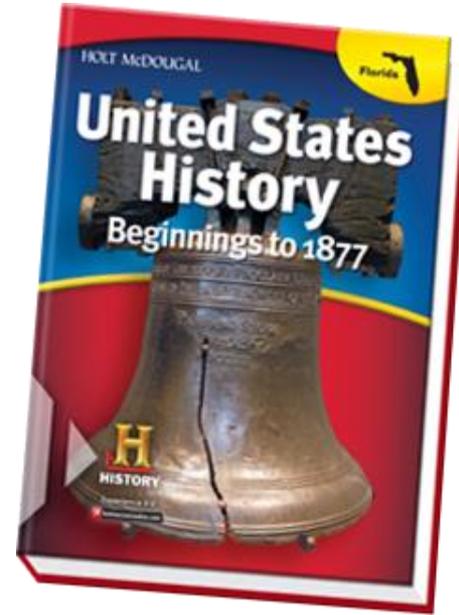
Agenda

- Lessons from past innovations
- Sizing and timing AV's impact on workers
- Next steps



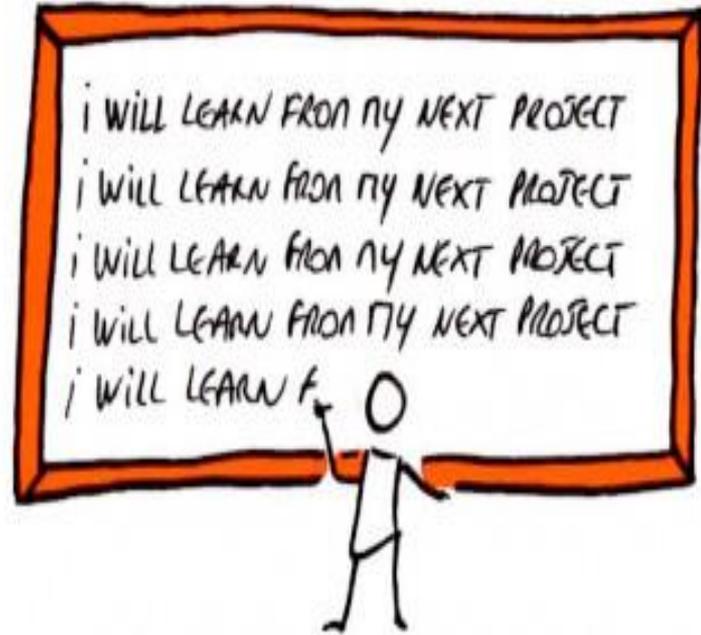
Innovation is not new

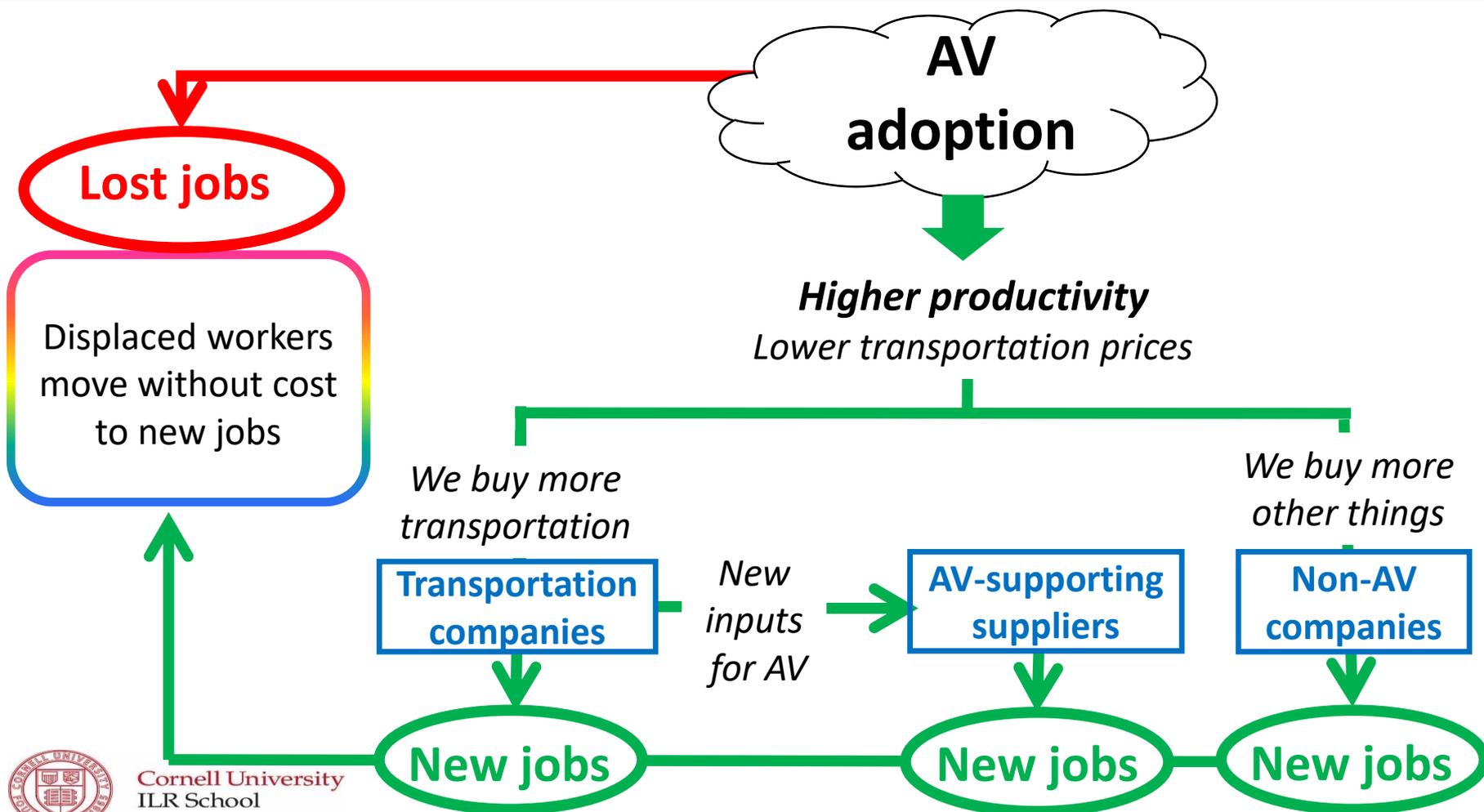
- Industrial Revolution in England, *1750-1900*
- Autopilot in aviation, *1912-now*
- Computer numerical control in machine tools, *1960-1990*
- Automation in auto assembly plants, *1980s-now*
- Automatic teller machines, *1980s-now*
- Trade expansion with China, *1990-now*
- Self-driving trucks in Australian strip mines, *2000-now*

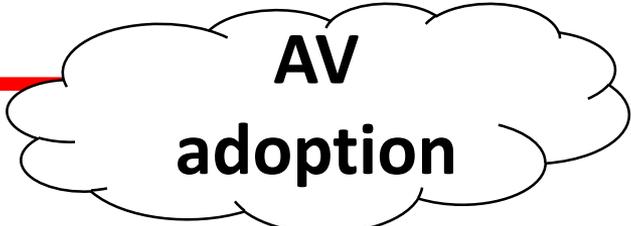


Lessons from past transitions

- Full employment returns
- Costs to workers
 - Concentrated & high
 - Uncertain
 - Precede benefits
 - Fuel unrest & resistance
- Benefits accrue diffusely & unevenly
- Policy & implementation matter







Higher productivity
Lower transportation prices

Lost jobs & income

Gaps hinder effective adjustment:

- Geography
- Skills
- Worker voice
- Investment

We buy more transportation

Transportation companies

New jobs

New inputs for AV

AV-supporting suppliers

New jobs

We buy more other things

Non-AV companies

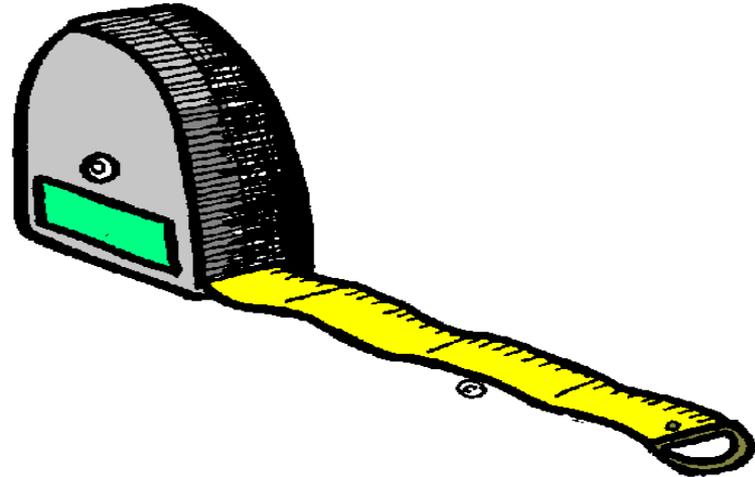
New jobs

Reducing adjustment gaps

- Key to success
- Historically neglected

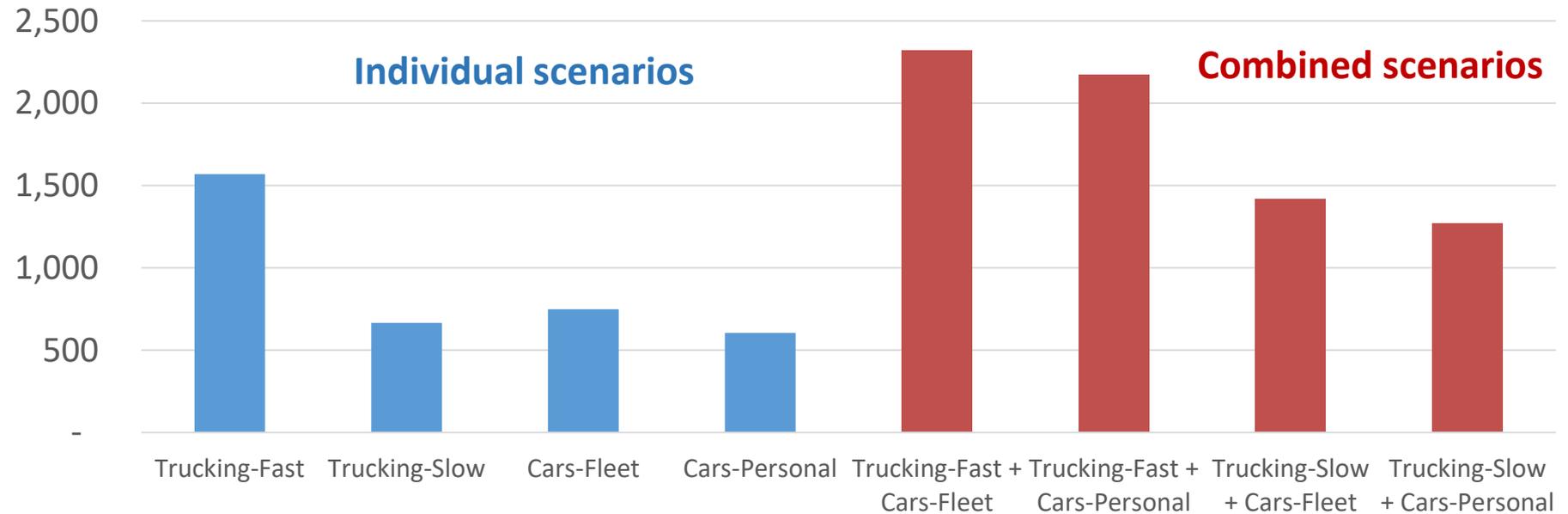


Sizing and timing AV's impacts

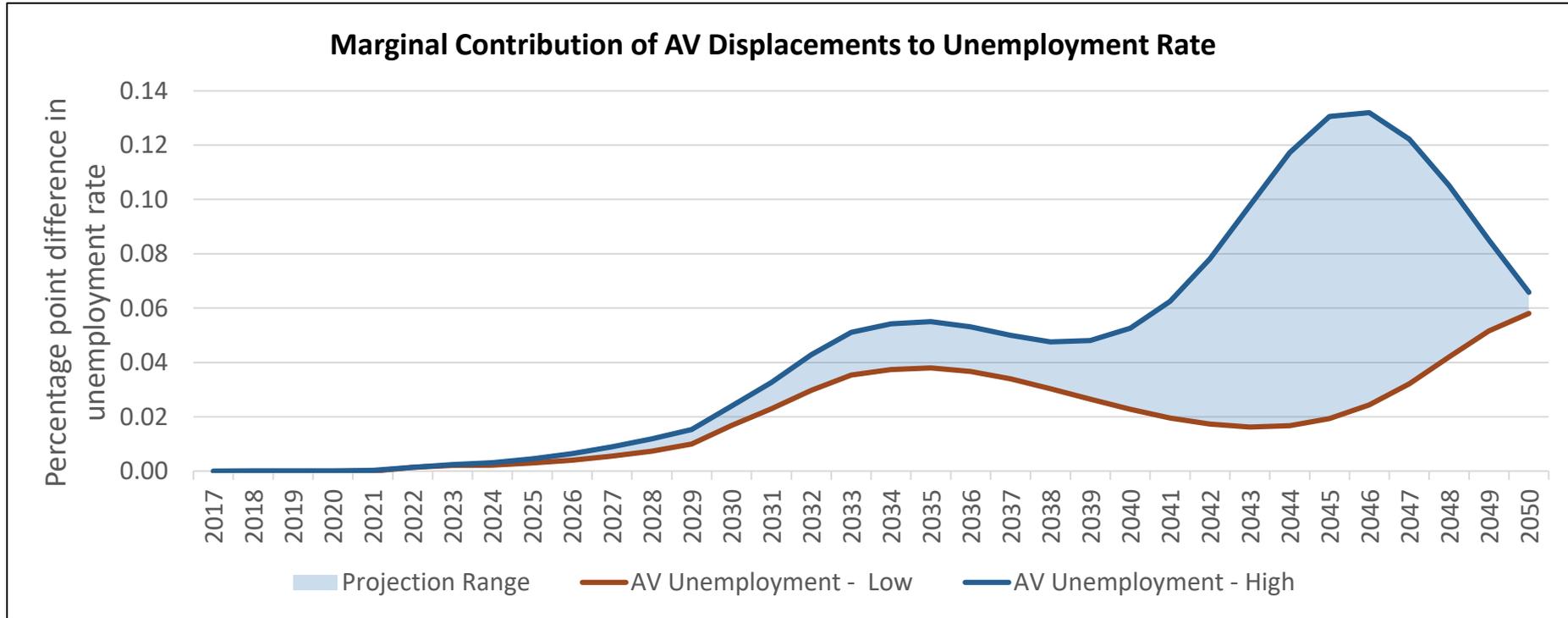


1.3 - 2.3 million workers displaced

Total Number of Workers Displaced by AV Adoption Scenario, 2018 - 2051, in Thousands



Unemployment: max +0.13 percentage pt in mid-2040s



Impact consequential & manageable

- Workers displaced (2018-2051): 1.3-2.3 M
 - +0.13 percentage pt to unemployment at peak
 - -0.1 percentage pt to participation at peak
 - ½ size of China shock
- Wealth losses: \$200-\$300 B
 - \$80-\$120K/worker
 - Worse in recessions
- Timing: max in mid-2040s
 - Starts slowly

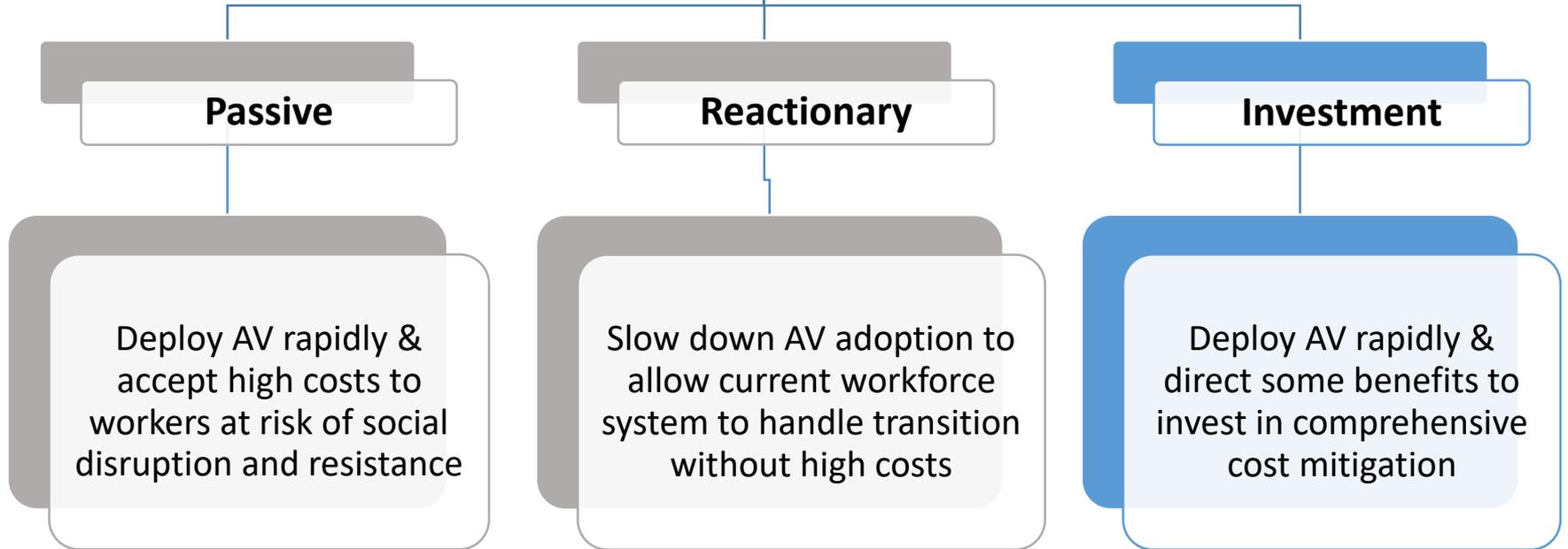


Next steps



Choose a path

Mitigation Strategy Paths



What would comprehensive cost mitigation look like?

Strengthen existing system -- UI, Workforce Innovation & Opportunity Act, CCs

Employers engaged

Adequately funded for inclusive eligibility -- not only AV

Multi-pronged

- Worker voice
- Training
- Place-based
- Income support
- Search & placement

Evidence-based

- Program experiments & evaluations
- Relevant, high-quality official statistics
- Administrative data
- Research
- Stakeholder input



Some of many tested policy tools

- Wage insurance
- Works councils
- Worker training accounts
- Universal basic income
- Flexicurity
- Public sector jobs for infrastructure
- Place-based economic development



Conclusion on mitigation investment

- Advisable
 - Avoid consequential harm
 - Promote further innovation
 - Use workers' skills & insights
- Doable
 - 10-20 years before costs mount
 - Many policy options
 - Annual AV benefits (\$800 B) >> Total costs (\$200-300 B)



Immediate steps

- ✓ Employers: start plans
 - Tap workers' skills and insights
 - Retrain & retain existing staff
- ✓ Local stakeholders: hold planning forums
 - Workforce development system
 - Tech & transportation companies
 - Worker representatives
 - Civic leaders, foundations, researchers
- ✓ National stakeholders: craft an investment strategy



CHECKLIST





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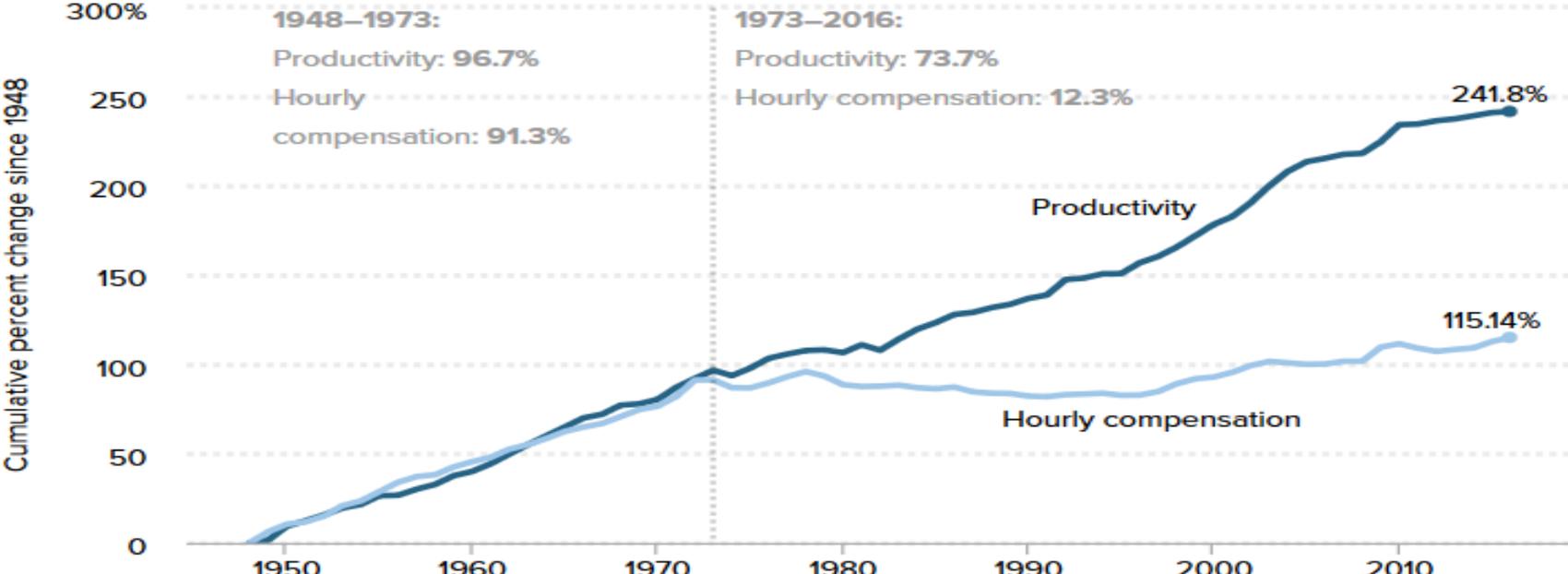
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The gap between productivity and a typical worker's compensation has increased dramatically since 1973

Productivity growth and hourly compensation growth, 1948–2016



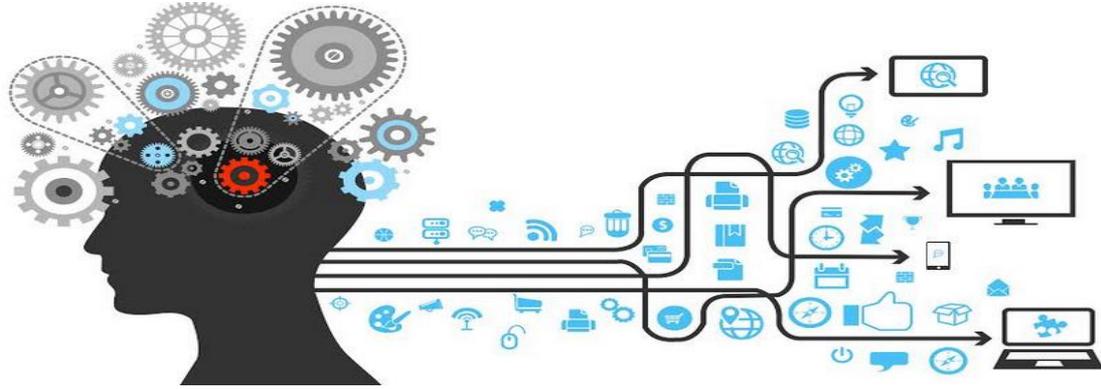
Note: Data are for compensation (wages and benefits) of production/nonsupervisory workers in the private sector and net productivity of the total economy. "Net productivity" is the growth of output of goods and services less depreciation per hour worked.

Source: EPI analysis of Bureau of Labor Statistics and Bureau of Economic Analysis data
 Updated from Figure A in *Raising America's Pay: Why It's Our Central Economic Policy Challenge*



Artificial intelligence: who is right?

- AI: replicates routine brainwork
- Techno pessimists
 - AI destroys jobs
 - Employment falls
 - Permanent pool of poor unemployed
- Techno optimists
 - AI productivity makes us rich
 - Few will need to work
- Examples: BLS, driverless cars



AI impact on labor market: temporary but costly

- Techno optimists and pessimists both wrong
- Unless we're all satisfied currently
 - Unemployment rises temporarily, perhaps a long time
 - We return to full employment
- Benefits not used to compensate displaced workers
 - Lifetime earnings losses of 1-4x previous annual earnings
 - More jobless and NLF spells, fewer hours, lower wages
 - **Suicides, poor health,..., and resistance to change**
- Policy (not technology) can reduce losses by
 - Employer and government actions
 - Closing gaps to reduce unemployment and raise wages
 - Compensating job losers

