About ITIF

- Independent, nonpartisan research and education institute focusing on intersection of technological innovation and public policy, including:
  - Innovation and competitiveness
  - IT and data
  - Telecommunications
  - Trade and globalization
  - Life sciences, agricultural biotech, and energy
- Mission to formulate and promote policy solutions that accelerate innovation and boost productivity
- Ranked by University of Pennsylvania as top science and technology think tank in United States and number two in world
ITIF Global Engagement

ITIF travel and policy engagement since 2007
Robots’ Impact on Productivity and GDP Growth

- A study of 17 manufacturing industries across 13 countries from 1993 to 2007 found robots increased the annual growth of labor productivity and GDP by 0.36 and 0.37 percent per year.

- Robots accounted for 10% of GDP growth in studied countries.

- Productivity in robot-enabled industries increased by 13.6%.
Robots’ Impact on Productivity Growth Immense

**Total Percentage Contribution to Annual Labor Productivity Growth Rates**

- **Steam Engine (1850-1910)**: 0.34%
- **Robots (1993-2007)**: 0.36%
- **IT (1995-2005)**: 0.60%

Source: Nicholas Crafts, “Steam as a GPT”; George Graetz and Guy Michaels, “Robots at Work”; Muro and Andes, “Robots Seem to Be Improving Productivity, Not Costing Jobs”
But Won’t Greater Automation Cost Jobs?

- *Mother Jones*: “The robots will probably decide not to kill us, but they’ll be taking our jobs—and sooner than you think.”

- Martin Ford: “Expect 75 percent unemployment by the end of this century.”

- Brynjolfsson & McAfee: “It may seem paradoxical that faster progress can hurt wages and jobs for millions of people, but we argue that’s what’s been happening.”
Doomsdayers have been warning us for decades that robots will destroy jobs

- With robots and AI “perhaps as much as 20% of the work force will be out of work in a generation.”
  – Gail Garfield Schwartz, 1982

- “We are beginning a gradual process whereby over the next 30-40 years many people will be displaced, creating massive problems of unemployment and dislocation.”
  – Wasily Leontief, 1983

- “We must convince our leaders that they should give up the notion of full employment. The pace of technical change is accelerating.”
  – Nils Nilson, 1984
Actually, more robots = lower unemployment and more exports.

-0.34 correlation between robot adoption and unemployment rate.

0.61 correlation between robot adoption and current account balance.

Source: Data from International Federation of Robots (15 nations)
Relationship Between Robots and Employment

PERCENT CHANGE IN MANUFACTURING EMPLOYMENT, 1996–2012

The regression line is almost flat, showing little correlation.

Source: George Graetz and Guy Michaels, “Robots at Work”; Muro and Andes, “Robots Seem to Be Improving Productivity, Not Costing Jobs
Relationship Between Productivity and Unemployment

U.S. Change in Productivity and Average Unemployment Rate by Decade, %

Source: ITIF, Are Robots Taking Our Jobs? Or Making Them?
We Really Need “Pedal to Metal” for Robots

(annual U.S. labor productivity growth)
Reality: Robots Won’t Lead to Joblessness

Most jobs are really hard to automate.

Current U.S. Employment:

- 500K pre-k teachers
- 230K athletes/coaches
- 110K detectives
- 70K massage therapists
- 45K clergy
- 25K computer scientists
- 6K fashion models
Most observers miss the second-order effects from productivity increases.

Source: ITIF, Are Robots Taking Our Jobs? Or Making Them?
Automation Technologies Create Employment Through Several Channels

1. Automation reduces prices but also spurs demand, leading to compensating job creation in other sectors.

2. Creates employment in automation-producing firms/sectors.

3. Expands output by making possible new products/services.

4. In industries where technology serves as a complement to workers, makes output more valuable, increasing demand.

Source: Deloitte *Technology and People: The great job-creating machine*
Human Wants Are Far From Being Satisfied
Policy Implications

1. Countries should focus on skills security, not job security. Worker retraining programs must play a vital role.

2. Expand credits/incentives for enterprise investments in R&D, workforce training, and modernized capital equipment.

3. Cross-border data flows fundamentally underpin the new production revolution: trade agreements must reflect this.
Thank You!

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