



On the ground
and in the air,
Robots, robots
everywhere!

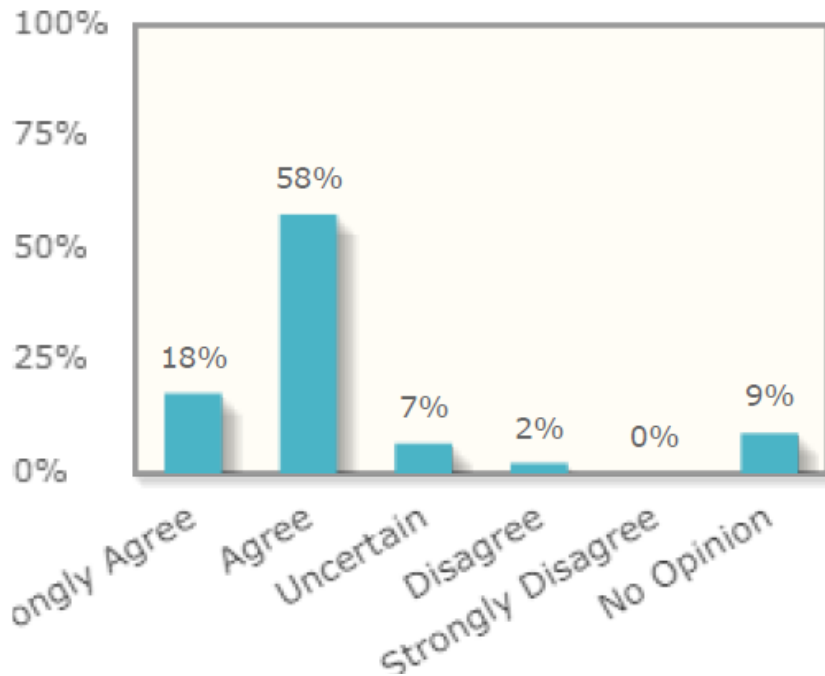
Comments on David Autor and Anna Salomons
**“Robocalypse Now: Does Productivity
Growth Threaten Employment?”**

Betsey Stevenson
University of Michigan

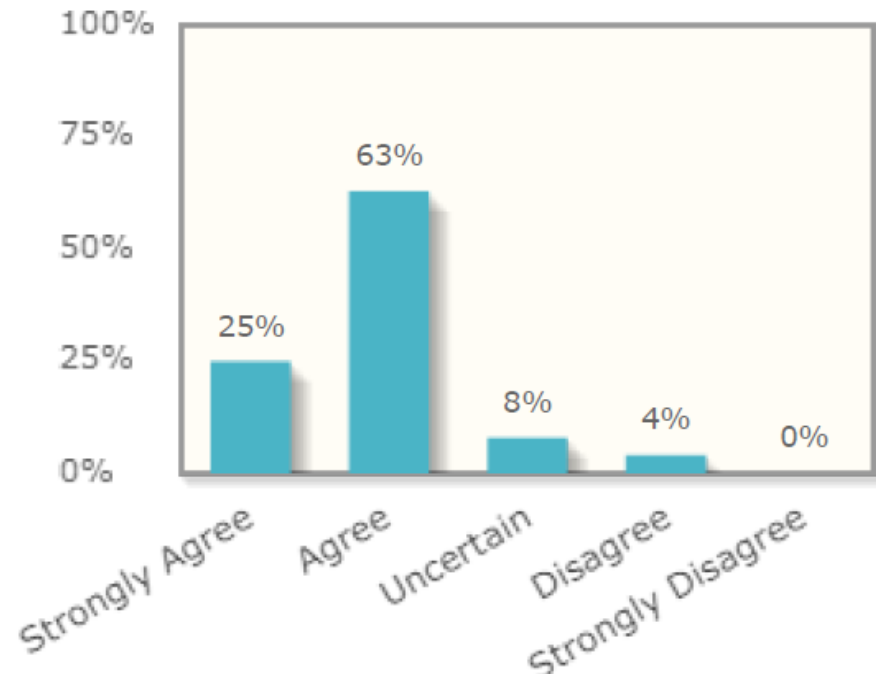
Economists Believe That Automation Has Led to More Employment in the Past

Advancing automation has not historically reduced employment in the United States

Responses



Responses weighted by each expert's confidence



Why Do Economists Believe This?

- ▶ David Autor: “Temporarily yes. Over the long run, no. Labor force participation has risen throughout most of the 20th century.”
- ▶ Nancy Stokey: “ If this had been true over the last two centuries, almost no one would be working anymore.”
- ▶ Kenneth Judd: “Productivity increases options. Employment becomes more beneficial, but it is irrelevant if people choose to work less.”
- ▶ Oliver Hart: “There has been temporary displacement but displaced workers have found jobs elsewhere, as theory might predict”

Short-run versus Long-run effects

Stokey: Thinking about the long run.

- ▶ The question most of us ask when we think about AI is what will the long-run future hold.
- ▶ Our intuition comes from looking at how growth has changed our lives: you are all in this room thinking about ideas, look 10 generations back and your relatives probably farmed.
- ▶ This paper uses high-frequency variation in productivity to see what happens in the short-run when productivity changes.
- ▶ Are these the same thing?
- ▶ What causes productivity to go up and down from year to year differentially across countries?

What do we learn?

- ▶ The impact on own and other industry employment:
 - ▶ Varies over time
 - ▶ Varies by industry
 - ▶ Varies by industry and time
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- ▶ What does this mean? Different advances have different effects. The source of the variation really matters to understand whether this is informative for the future.

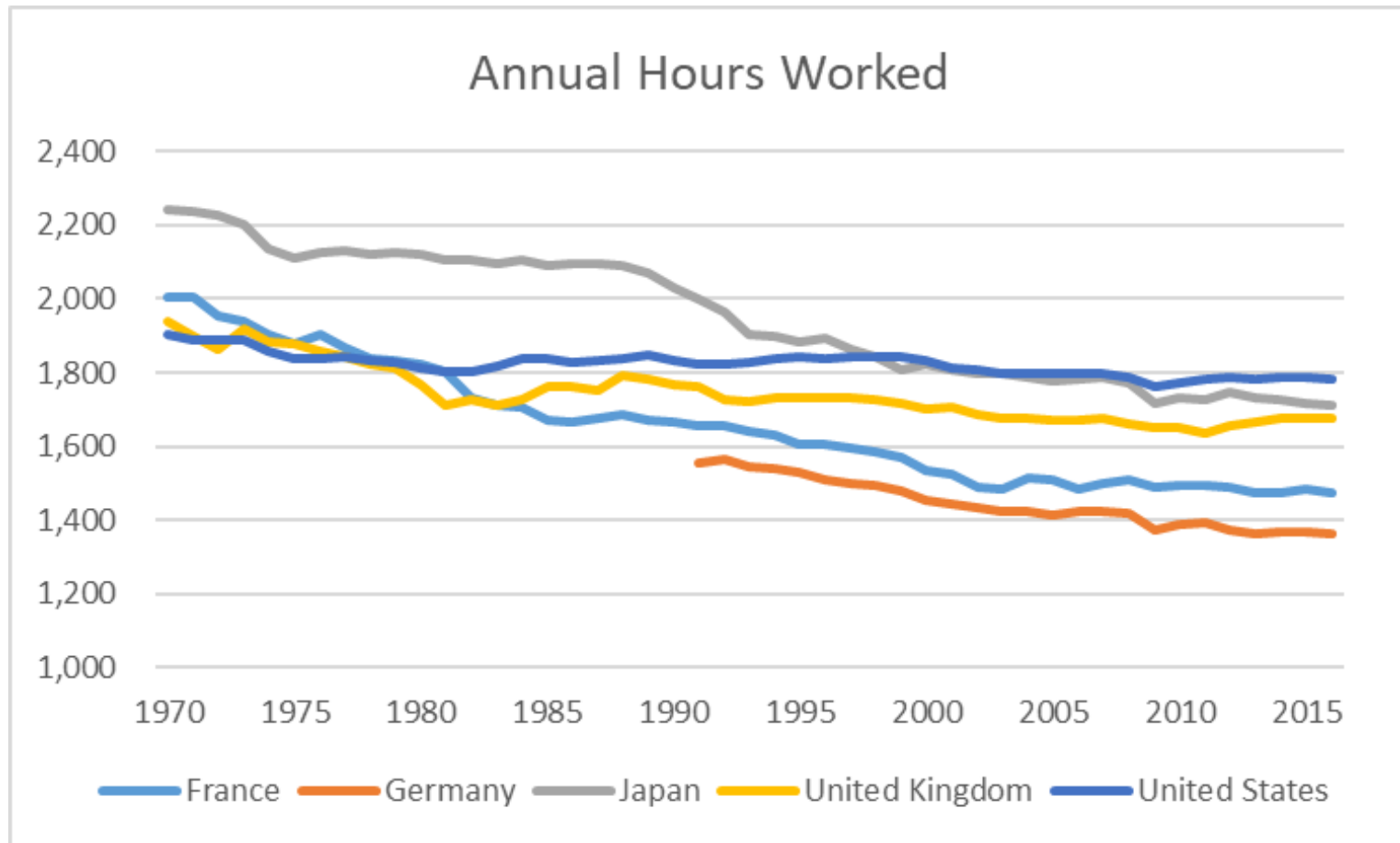
Despite Our Intuition: Work Has Declined Historically

Judd: Why do we care about employment?

- ▶ Extended youth with no paid work, partially facilitated by child labor laws but is continuing to extend without such laws (college students work less in the labor market than in the past)
- ▶ Extended retirement, also partially facilitated by government retirement policies.
- ▶ Decline in hours worked

These declines are mostly thought to be improvements in living standards.

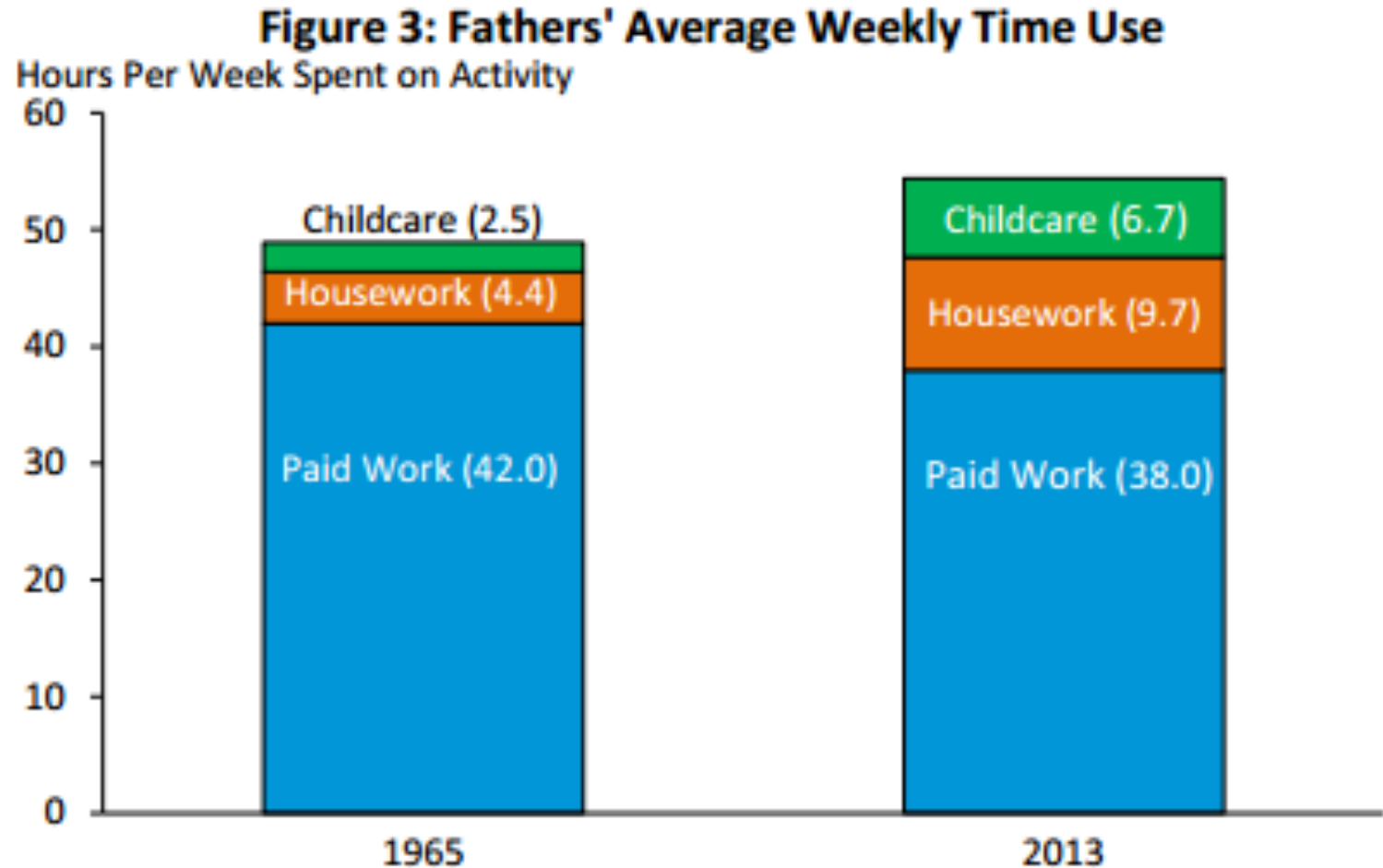
Is Employment Whether You Work or How Much You Work?



Why Do People Work for Pay?

- ▶ Trade-off: Leisure, home-produced goods, market produced goods
- ▶ 1970s was a period with increased demand for market produced goods as market goods increasingly substituted for home-produced goods
- ▶ Technological change crowded out homemade cakes and homemade dresses
- ▶ Technological change crowded in women's labor force participation
- ▶ Work shifted from outside our measurement scope to inside it
- ▶ Fewer child-care workers today than 40 years ago if you count stay-at-home moms as child-care workers

Fathers work more..when you count childcare and housework



Note: Fathers are defined as adult men ages 18-64 with children under 18.

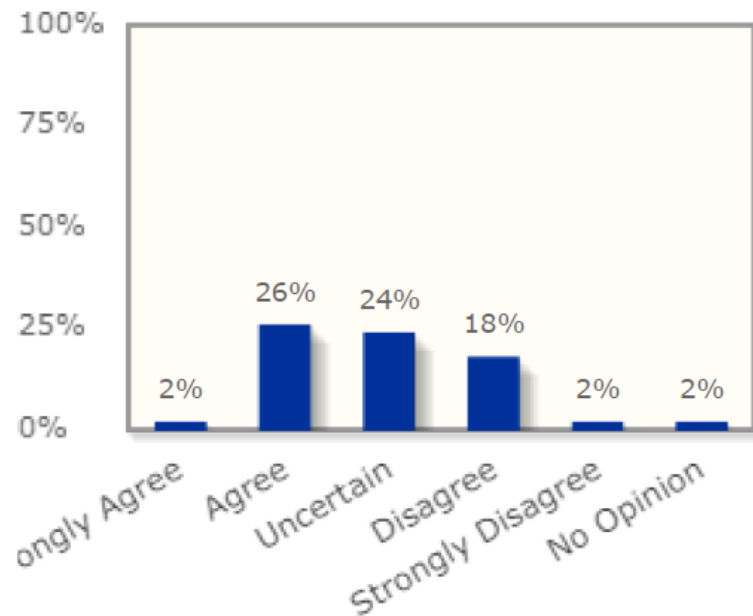
Source: Bianchi et al. (2006); 2013 American Time Use Survey; CEA calculations.



Economists Think Spells of Unemployment Will Rise

Holding labor market institutions and job training fixed, rising use of robots and artificial intelligence is likely to increase substantially the number of workers in advanced countries who are unemployed for long periods.

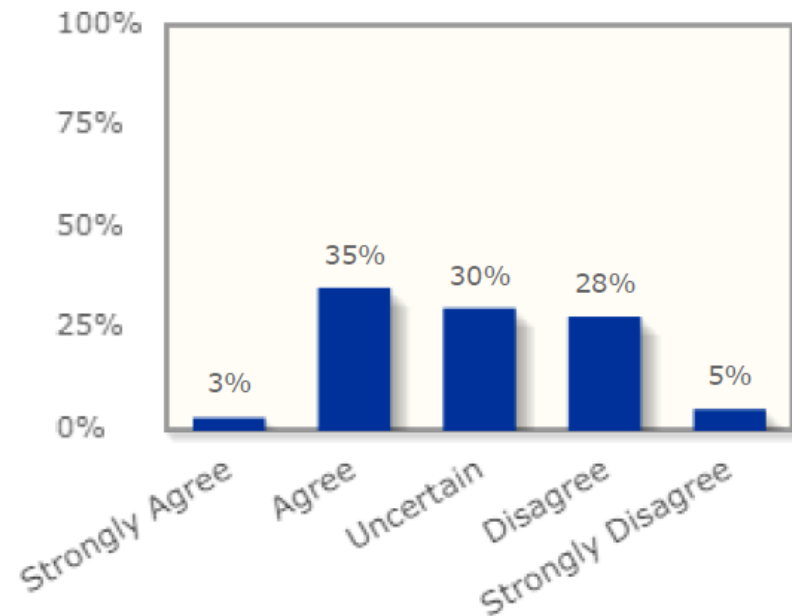
Responses



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Source: European IGM Economic Experts Panel
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Unemployment Rising is About Adjustment

- ▶ David Autor: “It's not impossible, but I'm not so far seeing the evidence that "that this time is different.”
- ▶ Jonathan Levin: “Yes, with significant uncertainty. How quickly jobs will be lost and new jobs will be created is hard to forecast.”
- ▶ Oliver Hart “There will be jobs in health and care service. Workers will need training. Unemployment may rise initially, but maybe not long-term”
- ▶ The authors findings suggest that even in the transition there isn't a shortage of jobs, just perhaps jobs that workers don't want or aren't qualified to do.

Population Growth Leads to Employment Growth

- ▶ Authors find that the most important source of employment growth is population growth
- ▶ How are robots different from people?
- ▶ Should we fear the babies?
- ▶ Historically, people have feared younger generations, but typically the babies don't take our jobs. Even though they are typically better than us.
- ▶ What's different? Babies increase labor supply and labor demand
- ▶ But if you are a small open economy, robots will raise national income and may continue to raise employment. There are important national competitiveness issues. If we don't get the robots, someone else might.
- ▶ From the world perspective, if robots can do everything, there's nothing left for workers to do. But we get to consume everything the robots make.

Robot problem

- ▶ Employment question: Can we find fulfilling ways to spend our time?
- ▶ Income question: Can we find a stable and fair distribution of income?
- ▶ These are separate questions.
- ▶ David Autor in the Wall Street Journal in 2015
“If we automate all the jobs, we’ll be rich—which means we’ll have a distribution problem, not an income problem.”
- ▶ I am confident that we can find fulfilling ways to spend our time. I am less confident that we can solve the income distribution problem.