

Automation and the Disruption of Labor Markets

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UBC

2019 Technology-Enabled Disruption Conference





A World Without Work

For centuries, experts have predicted that machines would make workers obsolete. That moment may finally be arriving. Could that be a good thing?

Adam Levey

theatlantic.com/magazine/archive/2015/07/world-without-work/395294/







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Automation: Lessons from the Past

- 1) Technological progress = human progress
 - replacing the drudgery of human work effort with machines

- 2) Effects on the labour market are uneven
 - there are winners and losers

- 3) And ...



Automation: Present

- Sort occupations based on tasks (Autor-Levy-Murnane, 2003)
 - “cognitive” versus “manual” (brain vs brawn)
 - “routine” versus “non-routine”
 - **Routine**: involve a limited set of tasks; tasks that are performed following instructions/rules/procedures
 - **Non-routine**: perform wider set of tasks that require flexibility, problem solving, discretion, human interaction

Classifying Occupations

- Non-routine Cognitive
 - physician, software engineer, economic policy analyst, financial manager, executives/directors
- Routine
 - Manual:
 - Cognitive:
- Non-routine Manual
 - waiter, groundskeeper, janitor, manicurist, home health aide, personal care aide





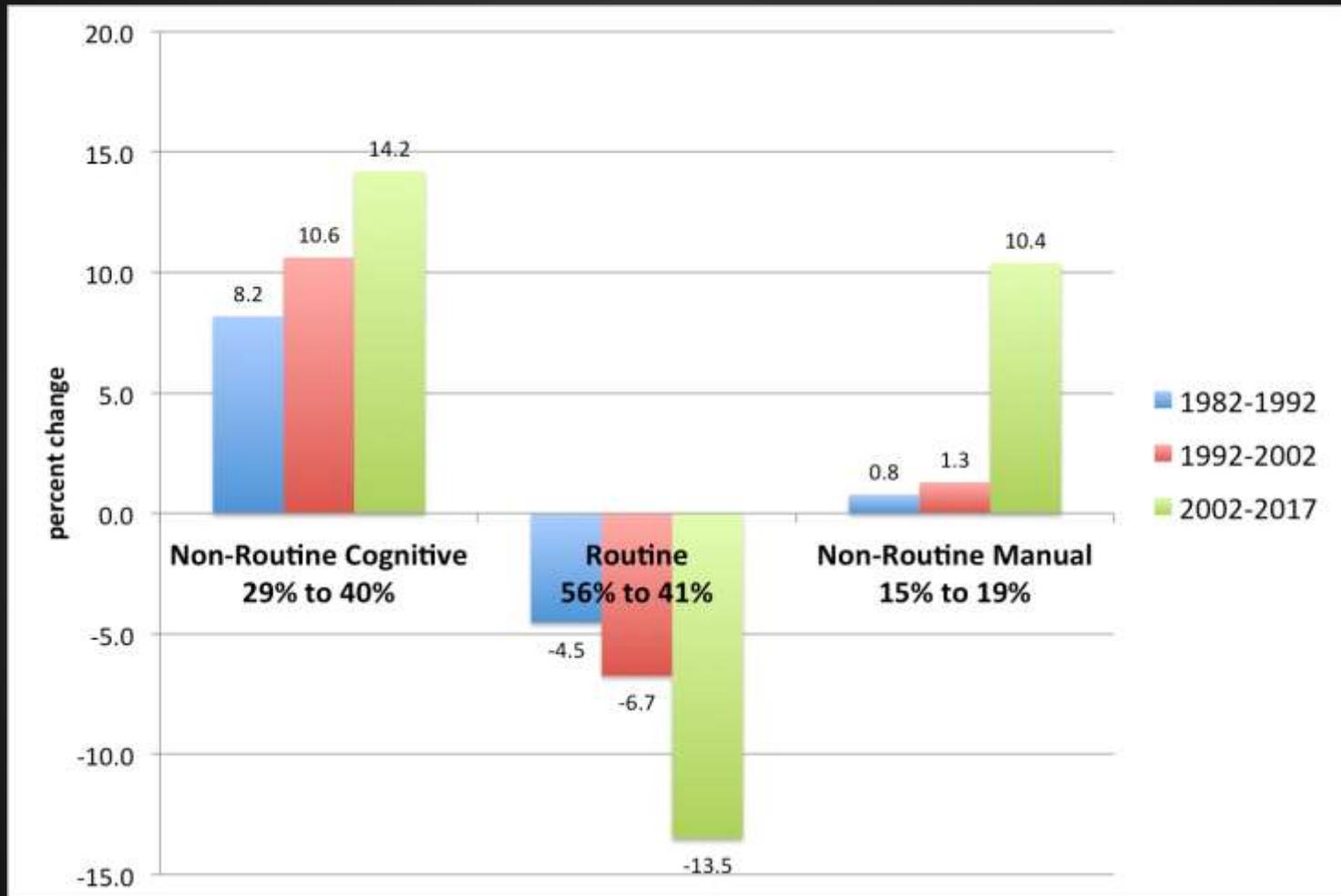




Classifying Occupations

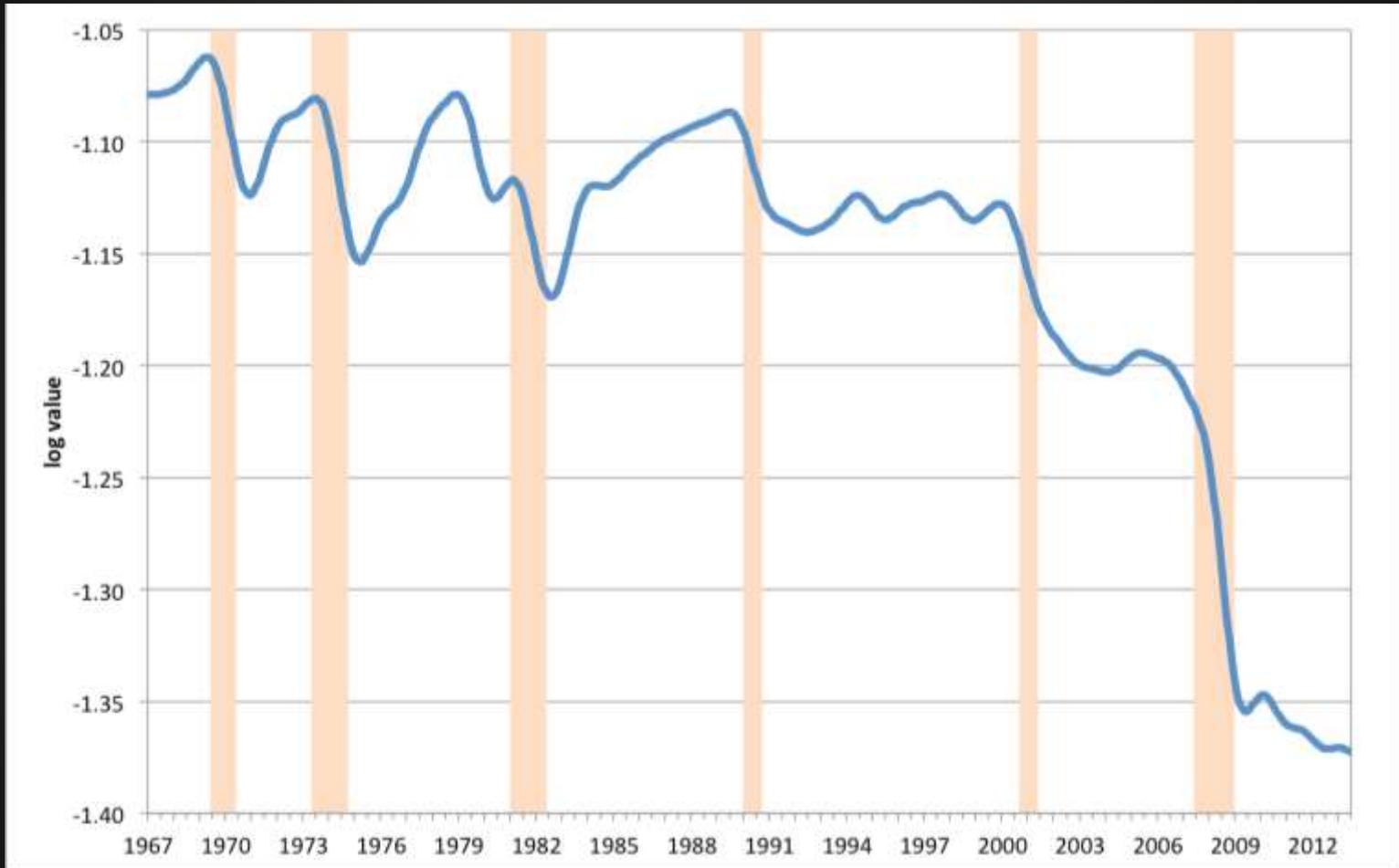
- Non-routine Cognitive
 - physician, engineer, economic policy analyst, financial manager, executives/directors
- **Routine**
 - **Manual:** machine operator, fabricator/assembler, automotive mechanic, forklift driver
 - **Cognitive:** secretary, bank teller, travel agent, data entry keyer, retail salesperson
- Non-routine Manual
 - waiter, groundskeeper, janitor, manicurist, home health aide, personal care aide

Shares of Total US Employment



Source: Jaimovich-Siu (2018)

US Per Capita Employment: Routine



Source: Jaimovich-Siu (2018)

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Metal and Plastic Machine Workers

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Summary

Quick Facts: Metal and Plastic Machine Workers	
2016 Median Pay 	\$34,840 per year \$16.75 per hour
Typical Entry-Level Education 	High school diploma or equivalent
Work Experience in a Related Occupation 	None
On-the-job Training 	See How to Become One
Number of Jobs, 2014 	1,048,700
Job Outlook, 2014-24 	-13% (Decline)
Employment Change, 2014-24 	-133,900

[What Metal and Plastic Machine Workers Do](#)

Metal and plastic machine workers set up and operate machines that cut, shape, and form metal and plastic materials or pieces.



Metal and plastic machine workers set up and operate automated and computer-controlled machinery.

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Travel Agents

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Summary

Quick Facts: Travel Agents	
2016 Median Pay ?	\$36,460 per year \$17.53 per hour
Typical Entry-Level Education ?	High school diploma or equivalent
Work Experience in a Related Occupation ?	None
On-the-job Training ?	Moderate-term on-the-job training
Number of Jobs, 2014 ?	74,100
Job Outlook, 2014-24 ?	-12% (Decline)
Employment Change, 2014-24 ?	-8,700

What Travel Agents Do

Travel agents sell transportation, lodging, and entertainment activities to individuals and groups planning trips. They offer advice on destinations, plan trip itineraries, and make travel arrangements for clients.



Travel agents sell transportation, lodging, and admission to activities to those planning trips.

Job Polarization

- Job polarization = “hollowing out of the **middle**” = “disappearing **middle-class**”
 - contributing factor to widening income inequality within industrialized economies
- Technological progress \neq greater inequality (necessarily)
 - e.g.: 2nd Industrial Revolution: mass production/assembly line

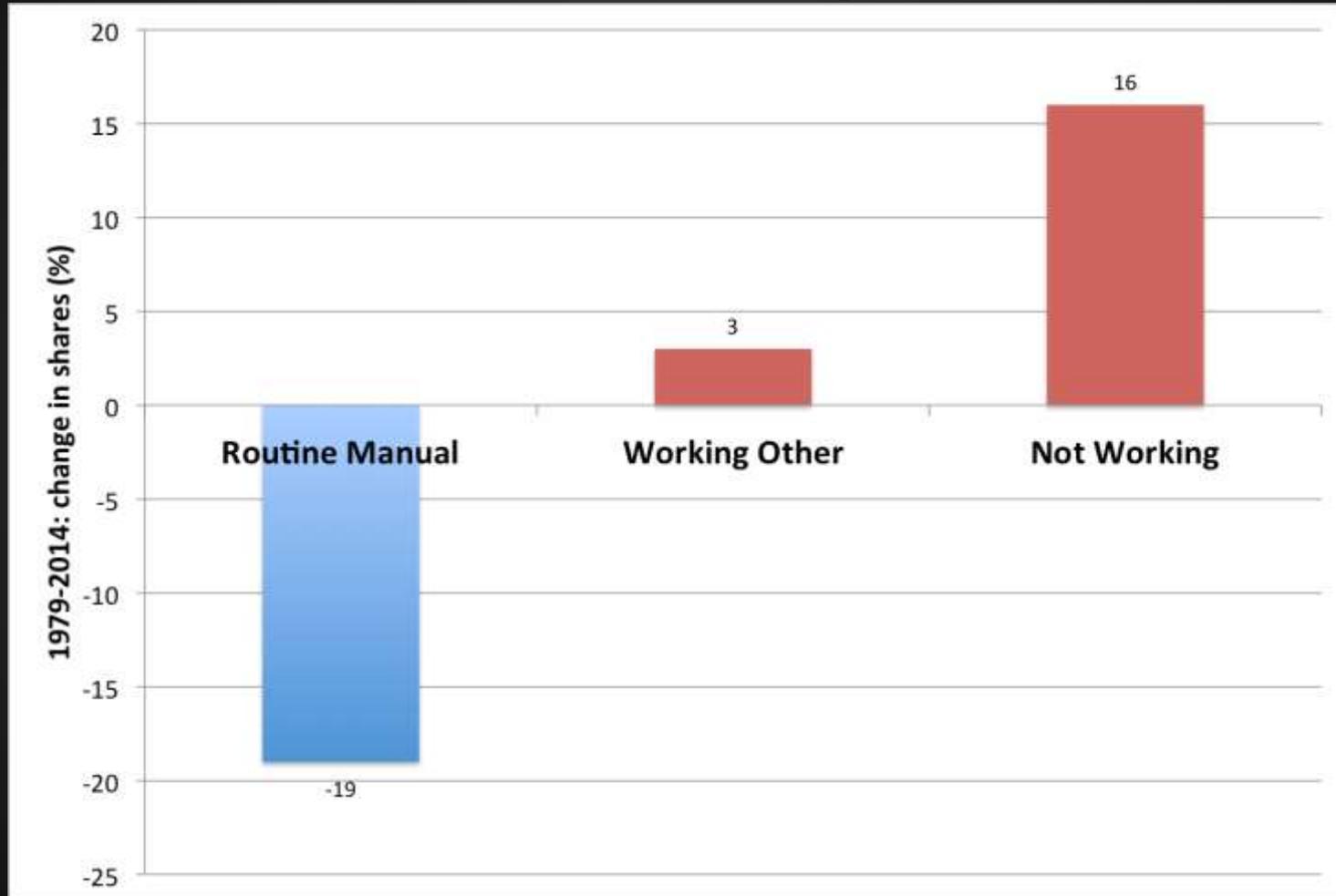


Who Works (Worked) in Routine Jobs?

- Cortes-Jaimovich-Siu (2017): lower levels of education
 - Men (largely routine manual): at most a high school diploma
 - Women (largely routine cognitive): high school diploma, some post-secondary

20-49 yr old High School Men: US

What Are They Doing Instead?



Source: based on data from Cortes-Jaimovich-Siu (2017)

Who Works (Worked) in Routine Jobs?

- Cortes-Jaimovich-Siu (2017): lower levels of education
- Account for most of the **fall in US labour force participation** among working-aged **men**, esp. young
 - “Routine women” becoming more educated, moving into better jobs
 - “Routine men” increasingly not working (put out to pasture)

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- 2000s: falling male participation, rising disability claims, pain medication use (Krueger, 2016), “recreational computer use” (Aguilar et al, 2017)
- Implications for family structure and outcomes of single- vs dual-parented children (Autor-Wasserman, 2013)

The Future Workplace

- Is simply increasing (formal) education enough?
 - Beaudry-Green-Sand (2016): since 2000s, increasing supply of high-skilled labour outpacing demand
- What's next? Artificial intelligence, machine learning / neural networking, advanced robotics (3D printing, autonomous vehicles)

TECHNOLOGY

A.I. Is Doing Legal Work. But It Won't Replace Lawyers, Yet.

By STEVE LOHR MARCH 19, 2017



Impressive advances in artificial intelligence technology tailored for legal work have led some lawyers to worry that their profession may be Silicon Valley's next victim.

But recent research and even the people working on the software meant to automate legal work say the adoption of A.I. in law firms will be a slow, task-by-task process. In other words, like it or not, a robot is not about to replace your lawyer. At least, not anytime soon.

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[A Lesson of Tesla Crashes? Computer Vision Can't Do It All Yet](#) SEPT. 19, 2016



[The Promise of Artificial Intelligence Unfolds in Small Steps](#) FEB. 28, 2016



[Robots Will Take Jobs, but Not as Fast as Some Fear, New Report Says](#) JAN. 12, 2017

nyti.ms/2np9ybO/

Artificial Intelligence

Google's AI Can Read Your Retinas to Prevent Blindness

futurism.com/googles-ai-can-read-your-retinas-to-prevent-blindness/

The Future Workplace

- Is simply increasing (formal) education enough?
 - Beaudry-Green-Sand (2016): increasing supply of high-skilled labour outpacing demand
- What's next: AI, machine learning, advanced robotics
- Technological progress creates whole new (non-routine) work opportunities, new occupations
- Non-routine occupations involve a variety of tasks
 - greater scope for transformation/evolution of jobs
 - offload some tasks, emphasize other (*more human*) tasks

The Future Workplace

- Technology substitutes for humans in some tasks, ***complements*** in others
 - Increased returns to being a “question asker” or “problem solver”
 - Logic, critical thinking, empirical reasoning
 - Curiosity, creativity/ingenuity, persistence, collaboration ... “non-cognitive” skills

The Future Workplace

- We will always have the comparative advantage at **“being human”**
 - Social skills: collaboration, communication (verbal and non-verbal), empathy, emotional intelligence
 - Growing occupations require **both** cognitive and social skills (Deming, 2017)
 - Occupations increasingly demanding **social skills**, especially **top-paying** ones (Cortes-Jaimovich-Siu, 2018)



WSJ ONLINE/HARRIS INTERACTIVE HEALTH-CARE POLL

Doctors' Interpersonal Skills Are Valued More Than Training

The Wall Street Journal Online

Updated Sept. 28, 2004 12:01 a.m. ET



People place more importance on doctors' interpersonal skills than their medical judgment or experience, according to the latest Wall Street Journal Online/Harris Interactive health-care poll, and doctors' failings in these areas are the overwhelming factor that drives patients to switch doctors.

Eighty-five percent of those polled said treating a patient with dignity and respect is an extremely important quality in a doctor, and 84% cited listening carefully and being easy to talk to as important qualities, according to the poll.

wsj.com/articles/SB109630288893728881

Emotional Intelligence In Business And Leadership



Jeff Moss Forbes Councils
Forbes New York Business Council CommunityVoice
Entrepreneurs

AN INTERVIEW WITH

Jeff Moss

CEO and Co-Founder at **Focus7 Shot**, a 2-ounce focus-enhancing shot. NYU Gallatin 2013 grad.



Getty

In recent decades, the definition of leadership has been changing, and an emphasis on emotional intelligence has emerged. Emotional intelligence, or EQ, has become recognized for its correlation to

forbes.com/sites/forbesnycouncil/2018/11/13/

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MATT SIMON SCIENCE 11.10.17 08:00 AM

TUG, THE BUSY LITTLE ROBOT NURSE, WILL SEE YOU NOW



ROBOTS SEEM SO far away. We're so many years from *Jetsons*-esque machines that live among us and wash our dishes and fold our clothes. But the reality is the robots have arrived—you're just not noticing them.

Take a robot called Tug, for instance. No, Tug can't talk philosophy with you, and Tug can't do your laundry. But Tug is a pioneer. Because in hospitals around the world, this robot is helping nurses and doctors care for patients by autonomously delivering food and drugs, shouldering the burden of time-consuming mundanity. And now, it's rolling

Chart 1. Ten fastest growing occupations, projected 2016-26



Thank you

Henry Siu

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