SCARE SKILLS, NOT SCARCE JOBS

CAPPF International Conference 2017

James Bessen
Manufacturing automation
Artificial Intelligence: Better than humans?

• Reading lips
• Playing chess, Go, Jeopardy
• Reading X-rays
“47 percent of total US employment is… potentially automatable over …perhaps a decade or two”

–Frey & Osborne (2013)
Mass unemployment?
Scarce skills,
NOT
Scarce jobs.
Major challenges

Right diagnosis
For right treatment.
AUTOMATION CAN CREATE JOBS
Weaving time required relative to handloom:

- 98% automated
What changed?
Demand

Less labor / yard

⇒

Lower price

⇒

More yards consumed
Demand

Yards of cotton & synthetic cloth per capita, US
Demand

Yards of cotton & synthetic cloth per capita, US

Full closet

1 set clothing
Today?

- Bar code scanners => MORE cashiers
- E-commerce => MORE salespeople
- E-discovery => MORE paralegals
- Like 19th century manufacturing
ATMs and bank tellers

![Graph showing the number of tellers, ATMs (1000s) from 1970 to 2010]

- **Tellers, ATMs (1000s)**
  - Fulltime equivalent workers
  - ATMs

The graph illustrates the increase in the number of ATMs and the decrease in fulltime equivalent workers over the years from 1970 to 2010.
Demand

Fewer tellers per branch

→

Cheaper to operate branch

→

More branches

→

More tellers
Industry job growth from IT

Annual rate of job growth from IT

- Manufacturing: -4%
- Non-manufacturing: 2%
Industry job growth from IT

Annual rate of job growth from IT

Satiated demand

Manufacturing  Non-manufacturing
But Demand Changes Slowly

• Information technology will create jobs over next 10-20 years
  • Even if pace of change is fast

• Longer term will be different
Substitution
Typesetter and compositor jobs

Graphic design jobs
Net Effect of Computer Automation on Occupation Job Growth

- Low wage
- Mid wage
- High wage
NEW JOBS, NEW SKILLS
Easy?
Skills & New Technology

• Not standardized
• Rapidly changing
Skills & New Technology

- Not standardized
- Rapidly changing

Means

- Schools can’t keep up
  ➔ Learning by Doing
- Labor markets can’t recognize new skills
  ➔ stagnant average wage, inequality
Typesetters & Compositors
Typesetters & Compositors

Print designers & Desktop Publishers
Typesetters & Compositors

Print designers & Desktop Publishers

Web Designers
Typesetters & Compositors

Print designers & Desktop Publishers

Web Designers

Mobile Designers

“information architects,” “user interaction specialists”…
2012 Flash
2012 – Flash

2015 – HTML5
Institutions

• Average designer:
  • Schools can’t keep up
  • Labor markets don’t recognize new skills

• Top designers
  • Teach themselves
  • Develop reputations
Institutions

- Average designer:
  - Schools can’t keep up
  - Labor markets don’t recognize new skills
    ➔ Stagnant pay

- Top designers
  - Teach themselves
  - Develop reputations
    ➔ Rising pay
New Digital Divide

- Wage inequality grows within occupations

- Access to IT is limited by skills
  - Jobs shift to IT-using occupations
  - Wages grow faster for IT users
  - Limited access → rising inequality
YOUTH
New technologies & young workers

• Textiles
  • US, Japan, China

• Electrification
  • High school grads

• Opportunity in IT?
Youth unemployment 2015
US Youth Unemployment Rate
Percent using Internet at work (US 2011-13)
POLICY
1. Learning by Doing

- Work-Study
- Apprenticeship
- Certification
- Higher education is not enough
2. Employee mobility

- Non-compete agreements
- Occupational licensing
- Expansive trade secret law
- Job protection
3. Standardization

- Open standards
- Knowledge sharing
  - E.g., procurement
New information technology

• New technology *can* create widely shared wealth

• But *only* with widely-acquired skills

• Long term may be more difficult
  • Best preparation: meet today’s challenge