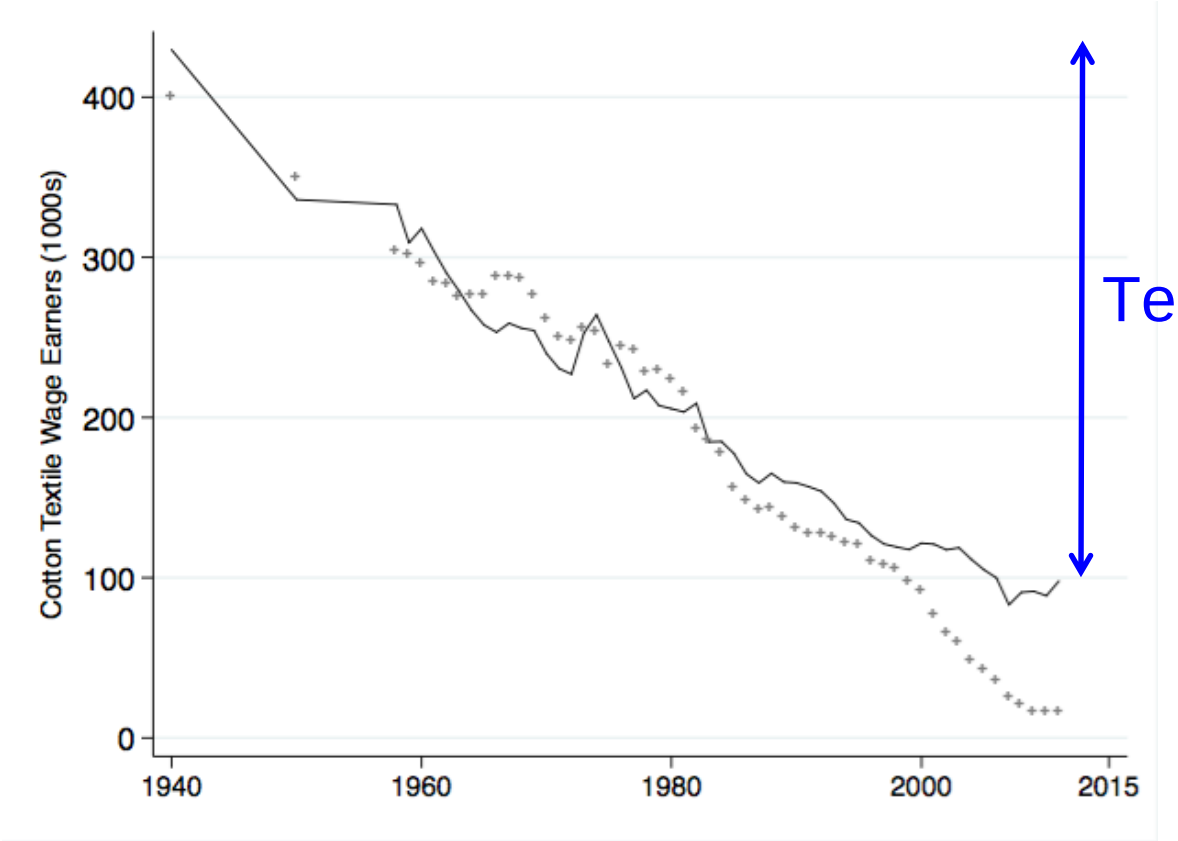
SCARE SKILLS, NOT SCARCE JOBS

CAPPF International Conference 2017

James Bessen

TECHNOLOGY & WORK

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

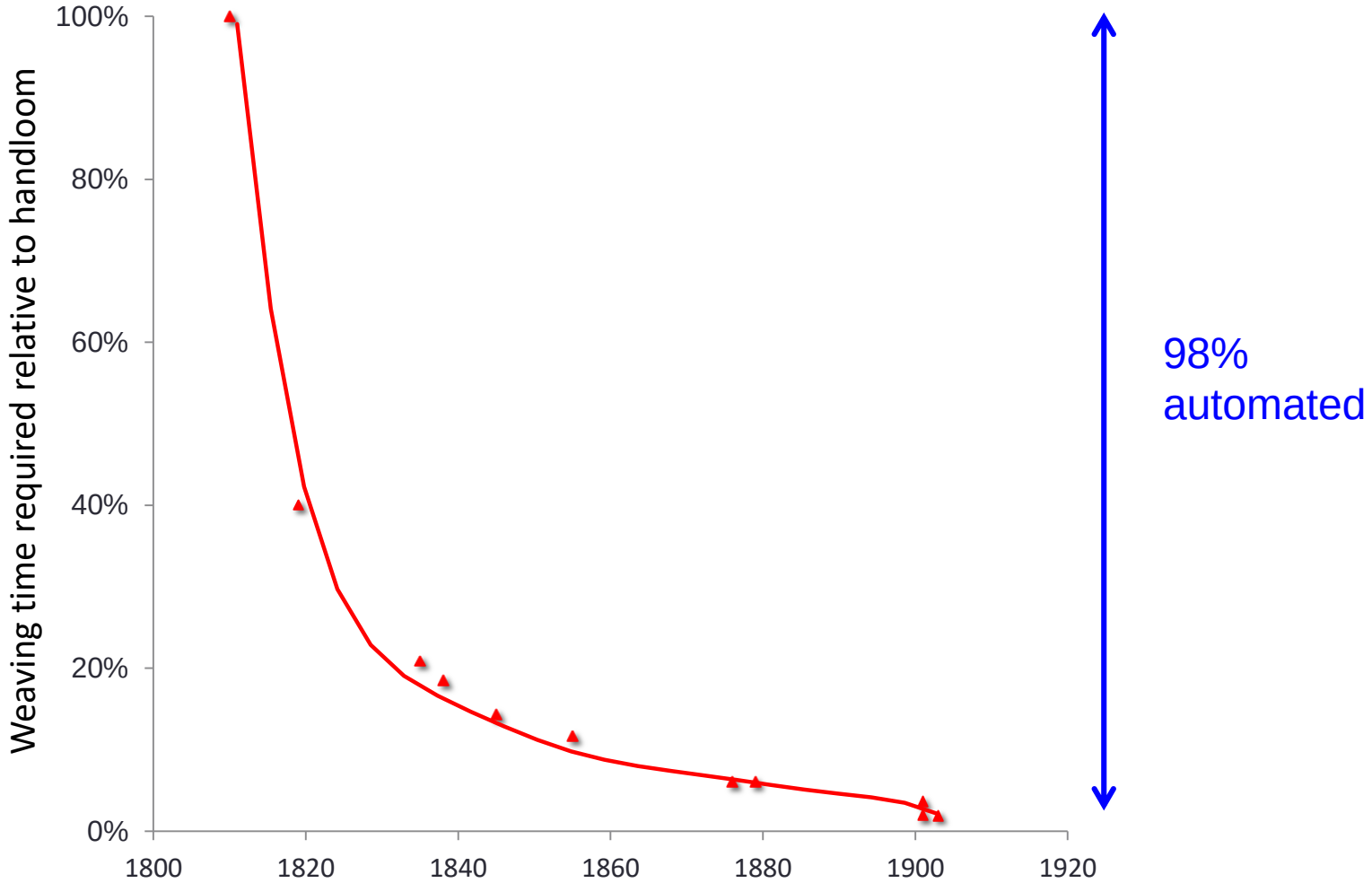
Scarce jobs.

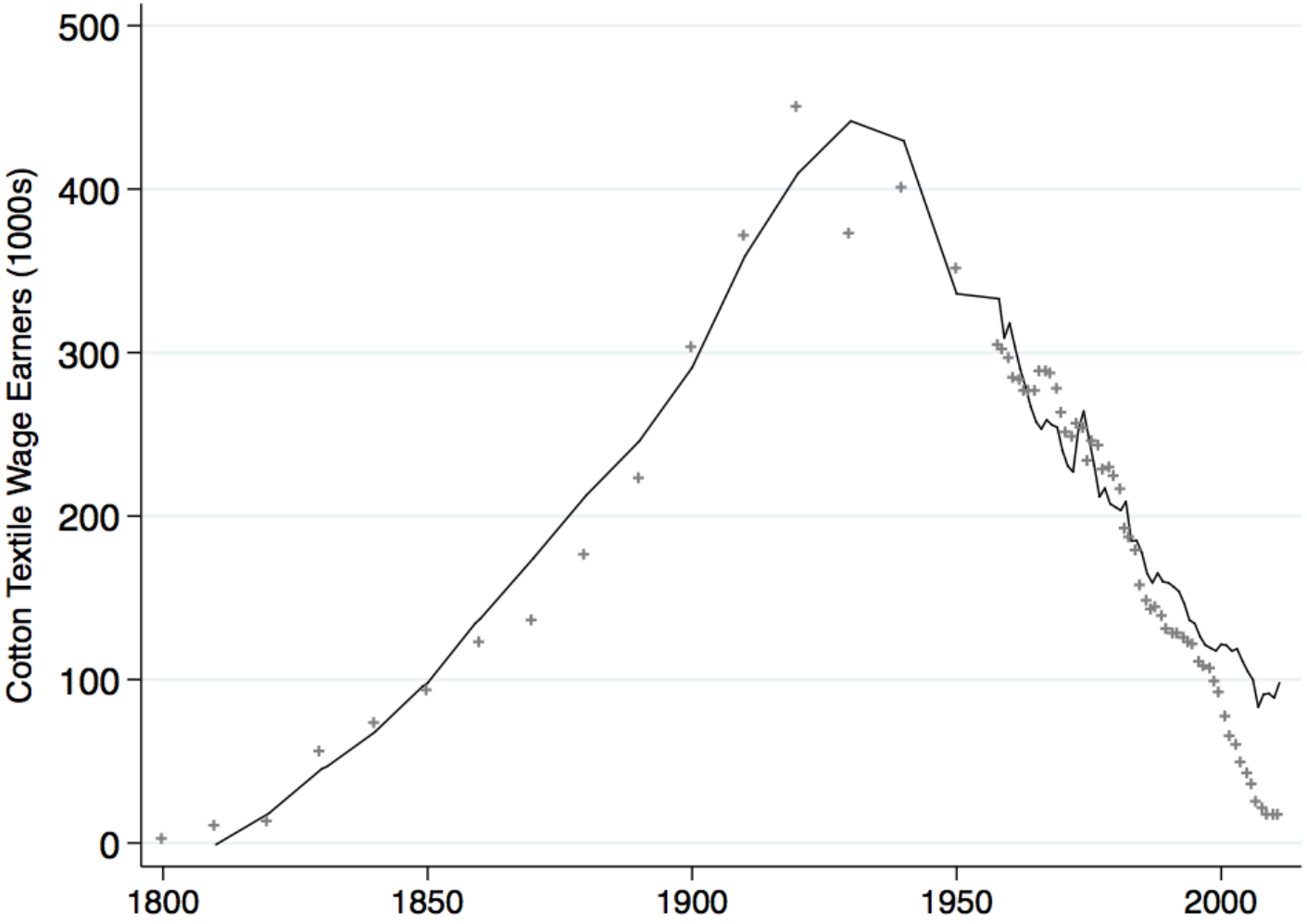
Major challenges

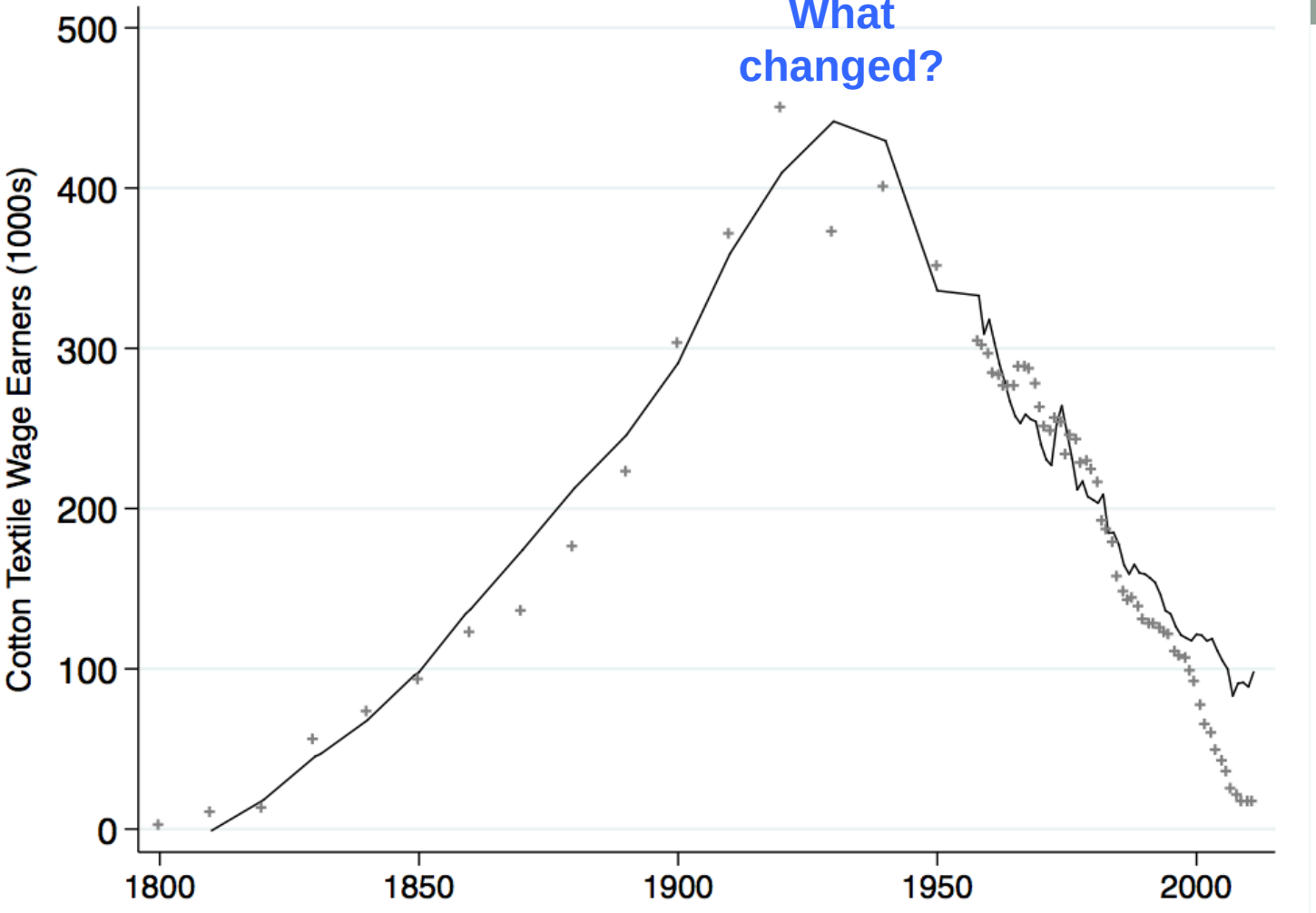
Right diagnosis

For right treatment.

AUTOMATION CAN CREATE JOBS


Weaving time required relative to handloom
100%
80%
60%
40%
20%
0%
1800
1820
1840
1860
1880
1900
1920
98%
automated


Cotton Textile Wage Earners (1000s)
500
400
300
200
100
0
1800
1850
1900
1950
2000


What changed?
Cotton Textile Wage Earners (1000s)
500
400
300
200
100
0
1800
1850
1900
1950
2000

Demand

Less labor / yard

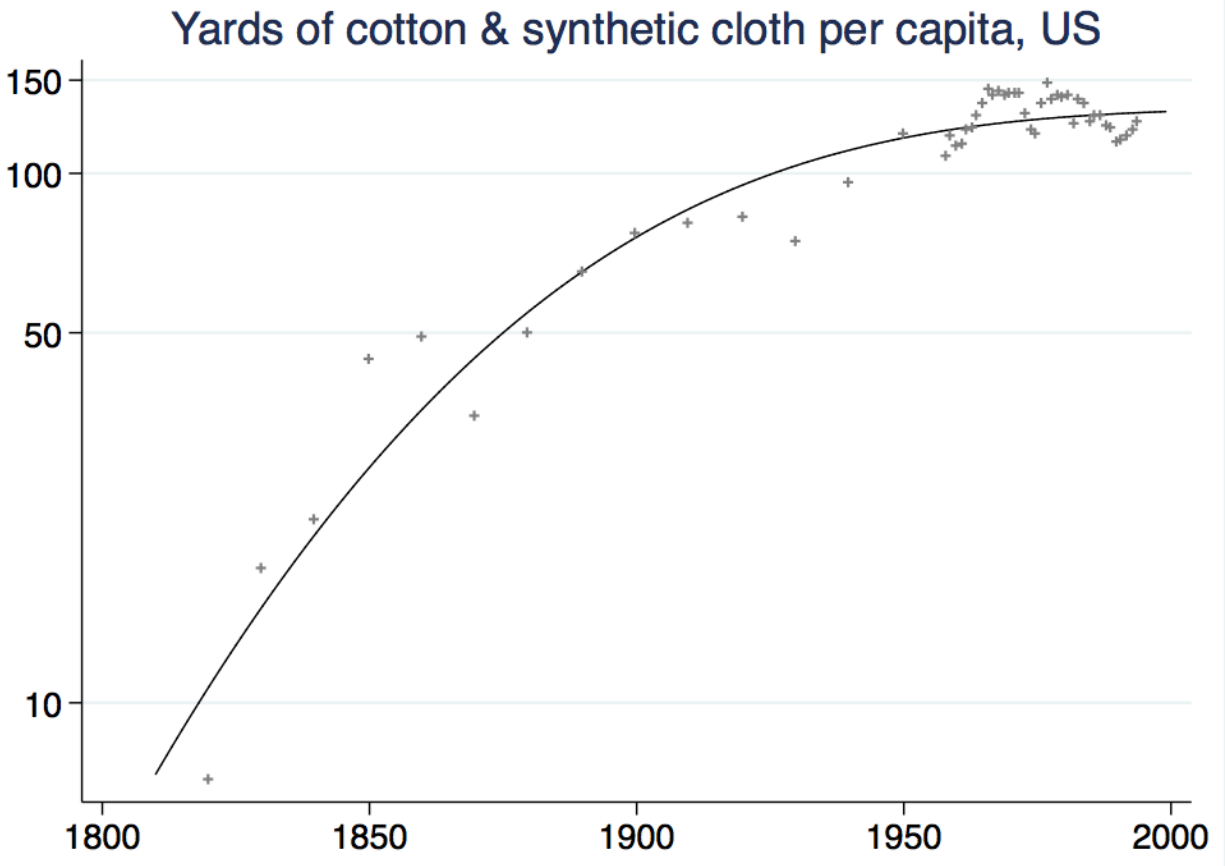
➔

Lower price

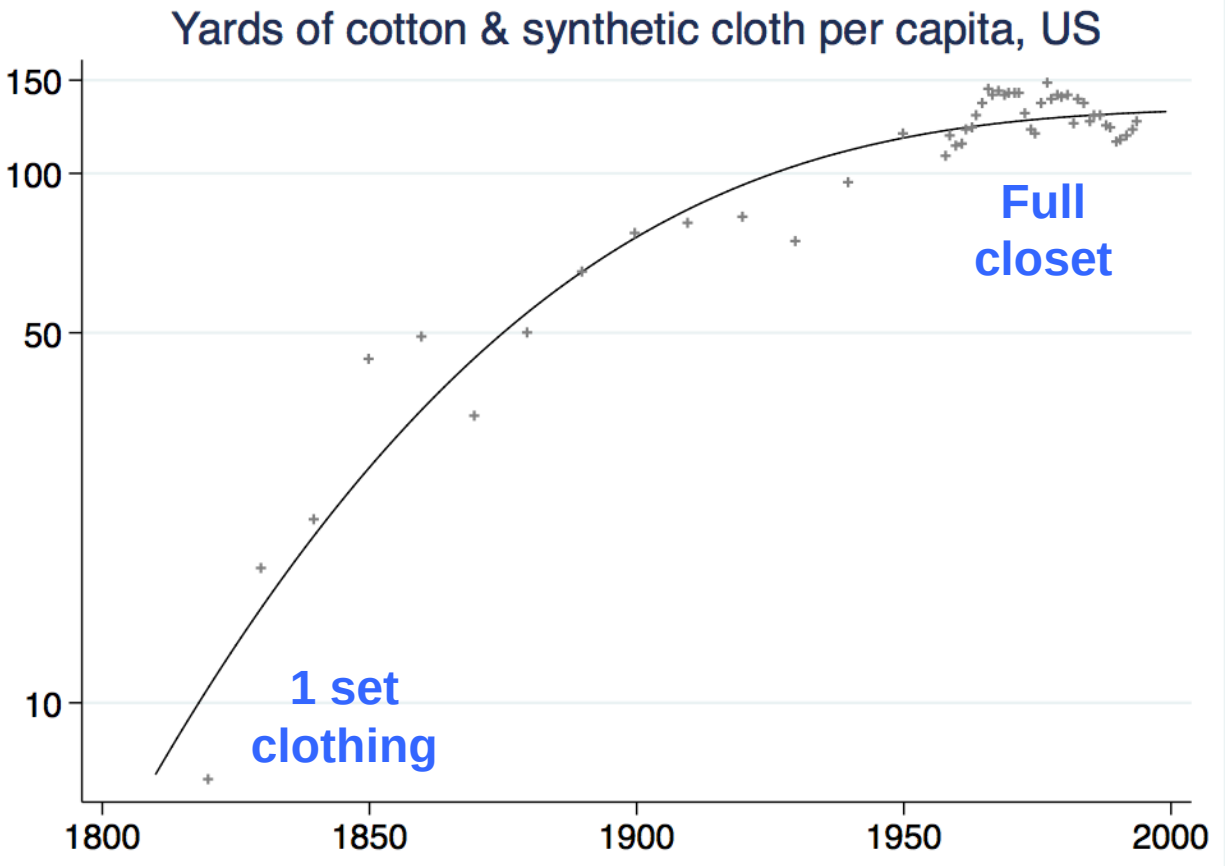
➔

More yards consumed

Demand


Yards of cotton & synthetic cloth per capita, US
150
100
50
10
1800
1850
1900
1950
2000

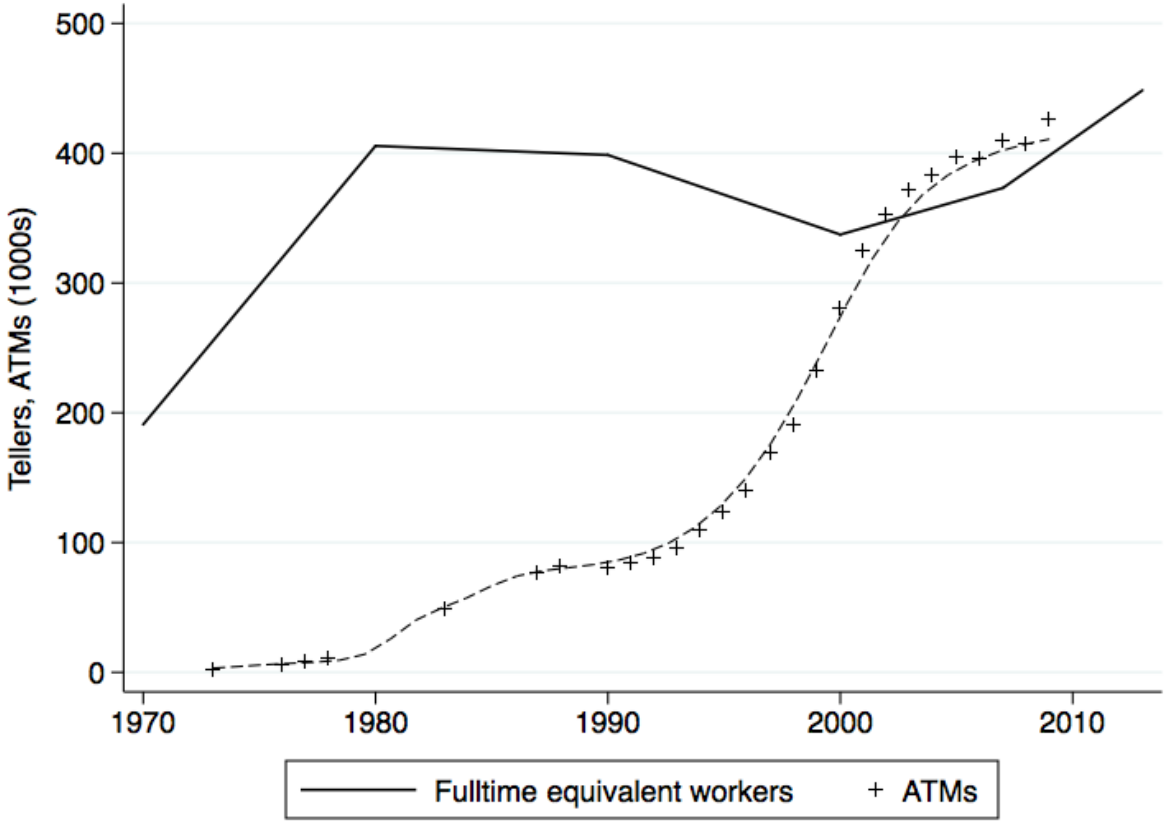
Demand


Yards of cotton & synthetic cloth per capita, US
150
100
50
10
1800
1850
1900
1950
2000
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



Demand

Fewer tellers per branch

➔

Cheaper to operate branch

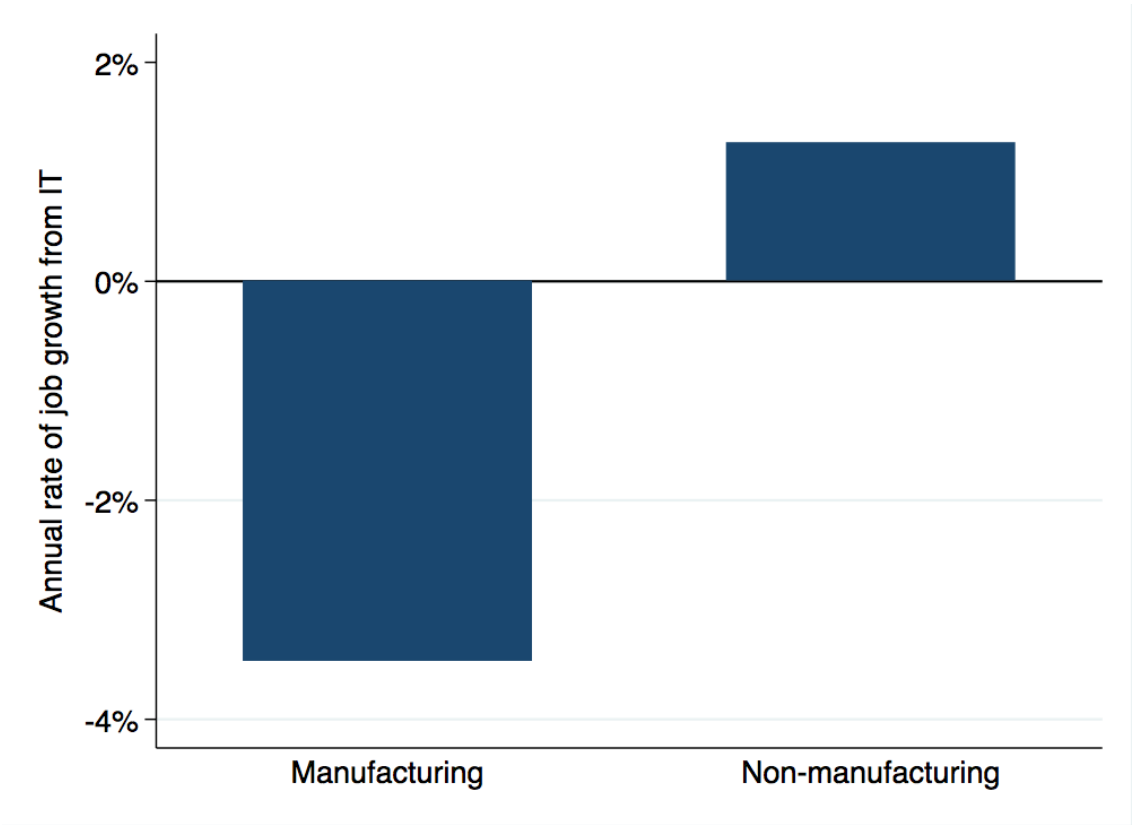
➔

More branches

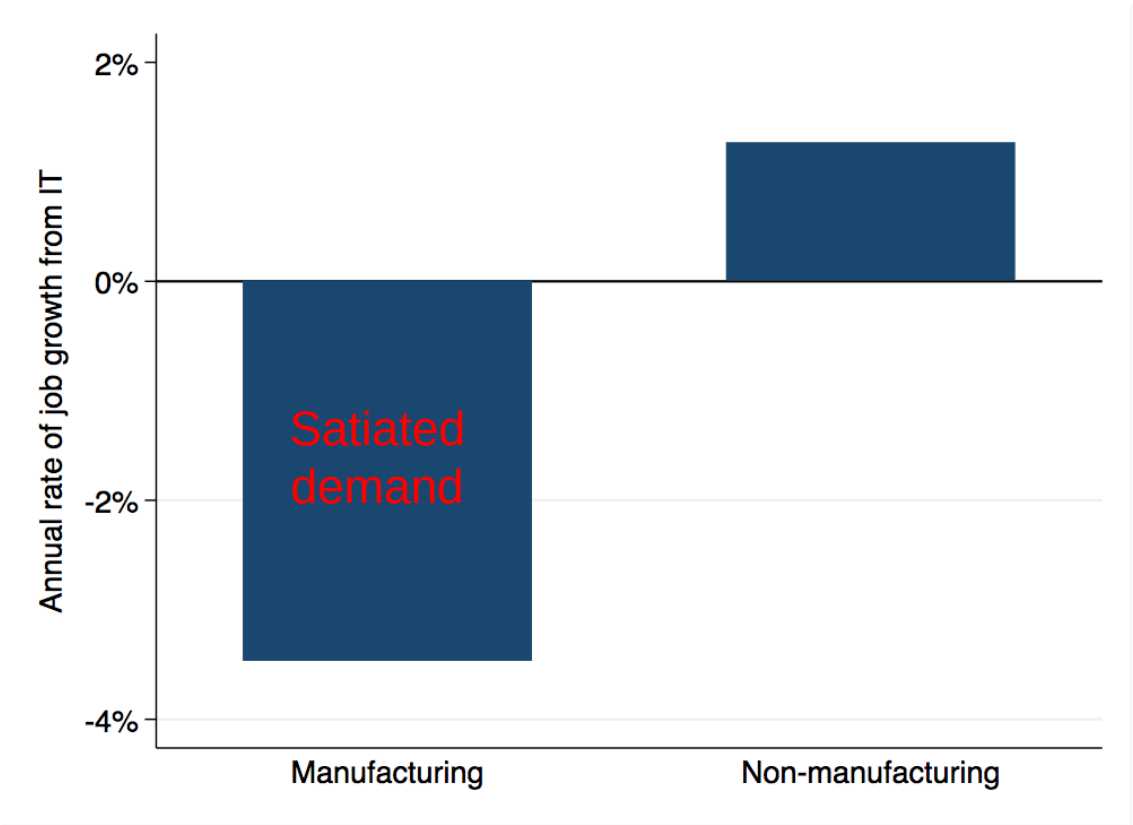
➔

More tellers

Industry job growth from IT



Industry job growth from IT



But Demand Changes Slowly

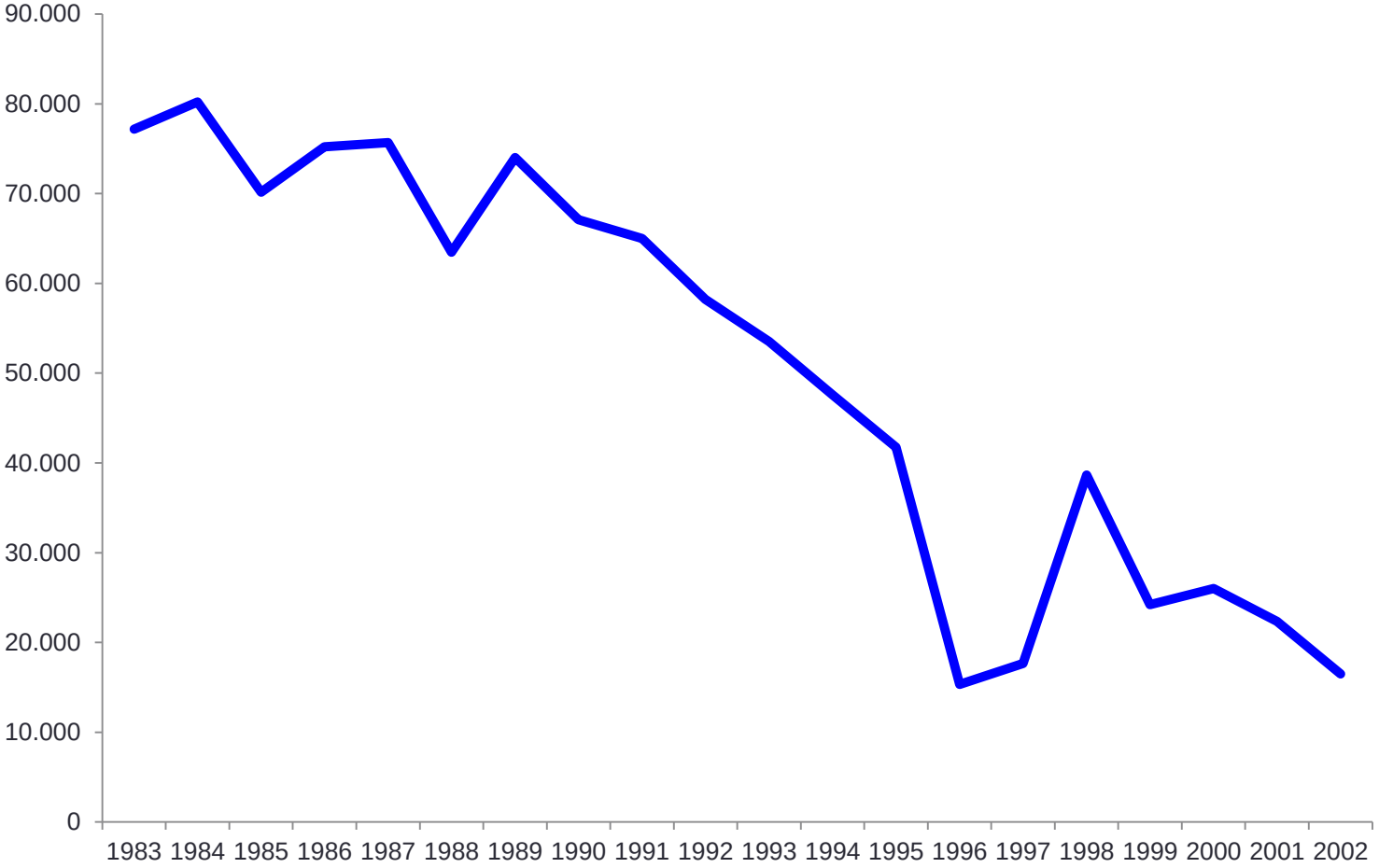
- Information technology will create jobs over next 10-20 years
  - Even if pace of change is fast

- Longer term will be different

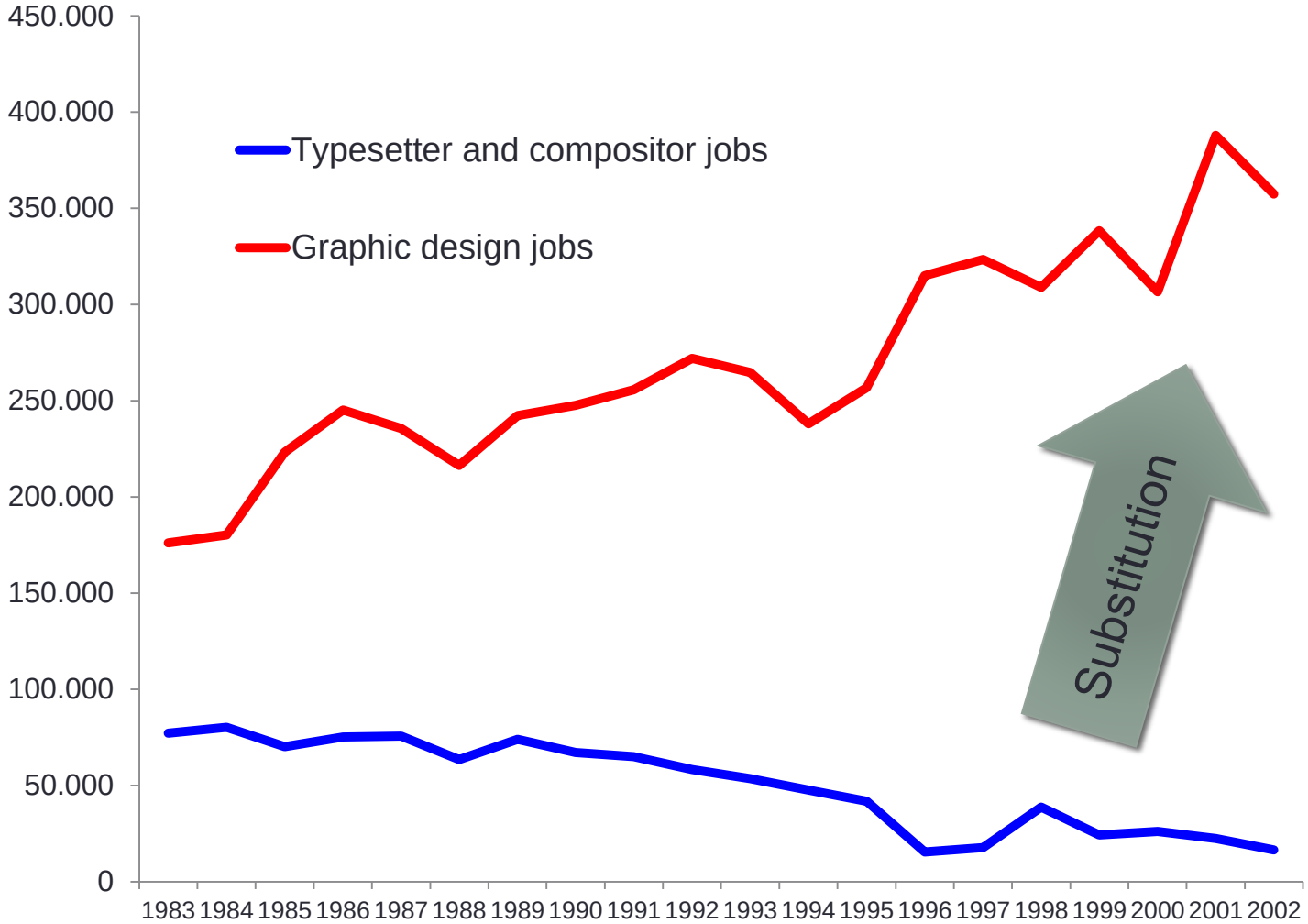
WINNERS
&
LOSERS

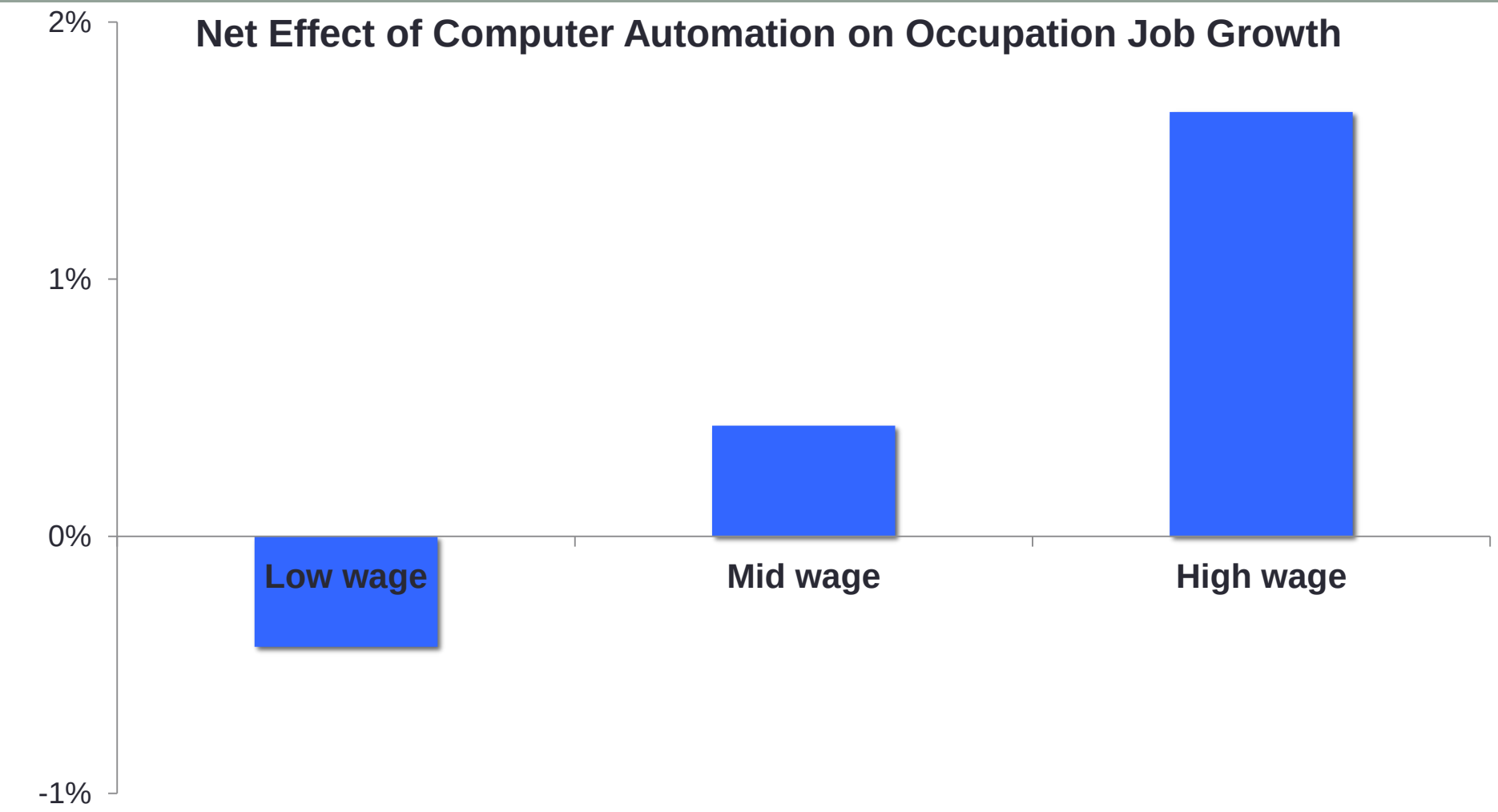
PS-9070-E

Number of Typesetters & Compositors



Substitution


450.000
400.000
350.000
300.000
250.000
200.000
150.000
100.000
50.000
0
Typesetter and compositor jobs
Graphic design jobs
Substitution
1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002


Net Effect of Computer Automation on Occupation Job Growth
2%
1%
0%
-1%
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

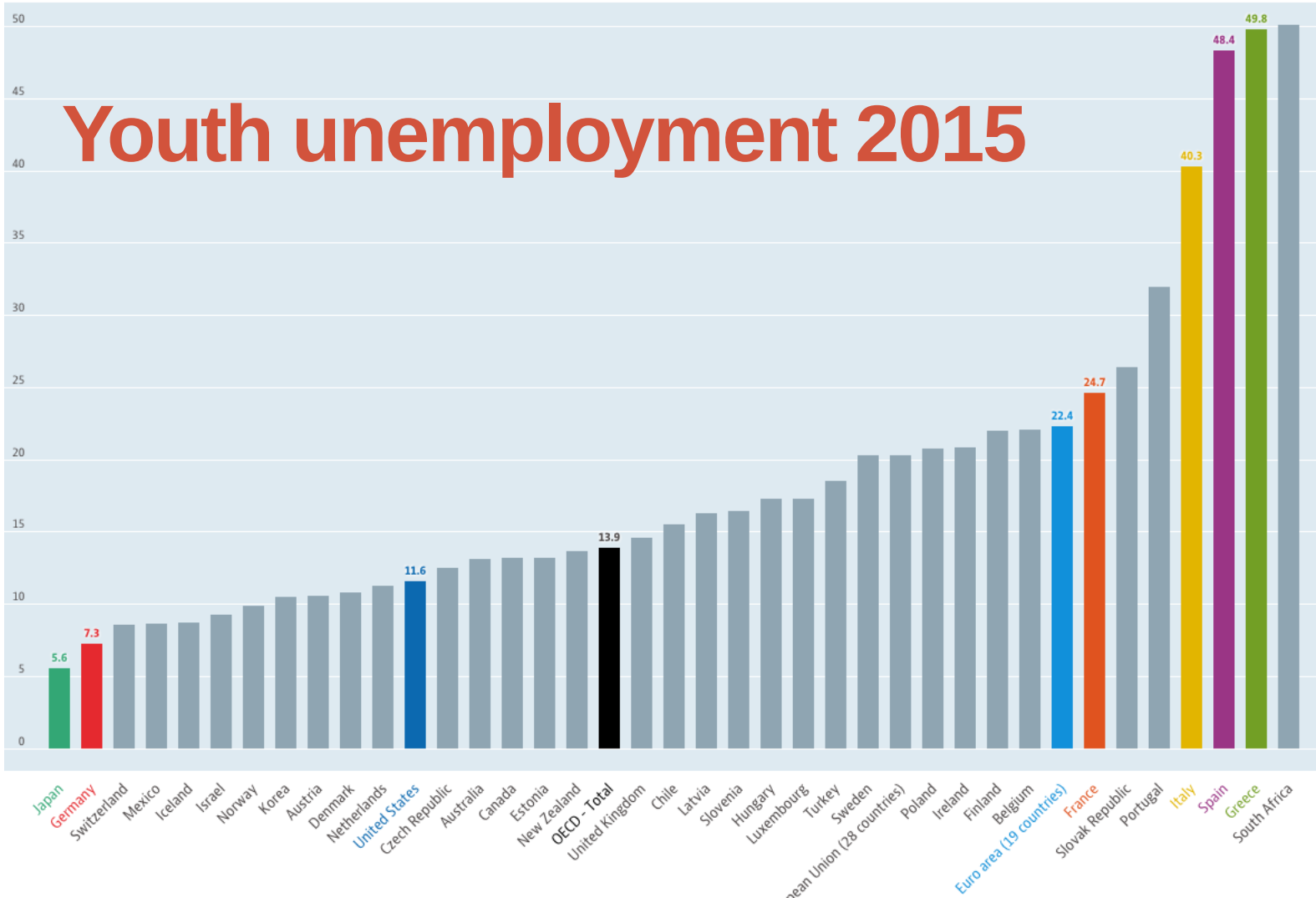
- Wage inequality grows within occupations

- Access to IT is limited by skills
  - Jobs shift to IT-using occupations
  - Wages grow faster for IT users
  - Limited access ➔ rising inequality

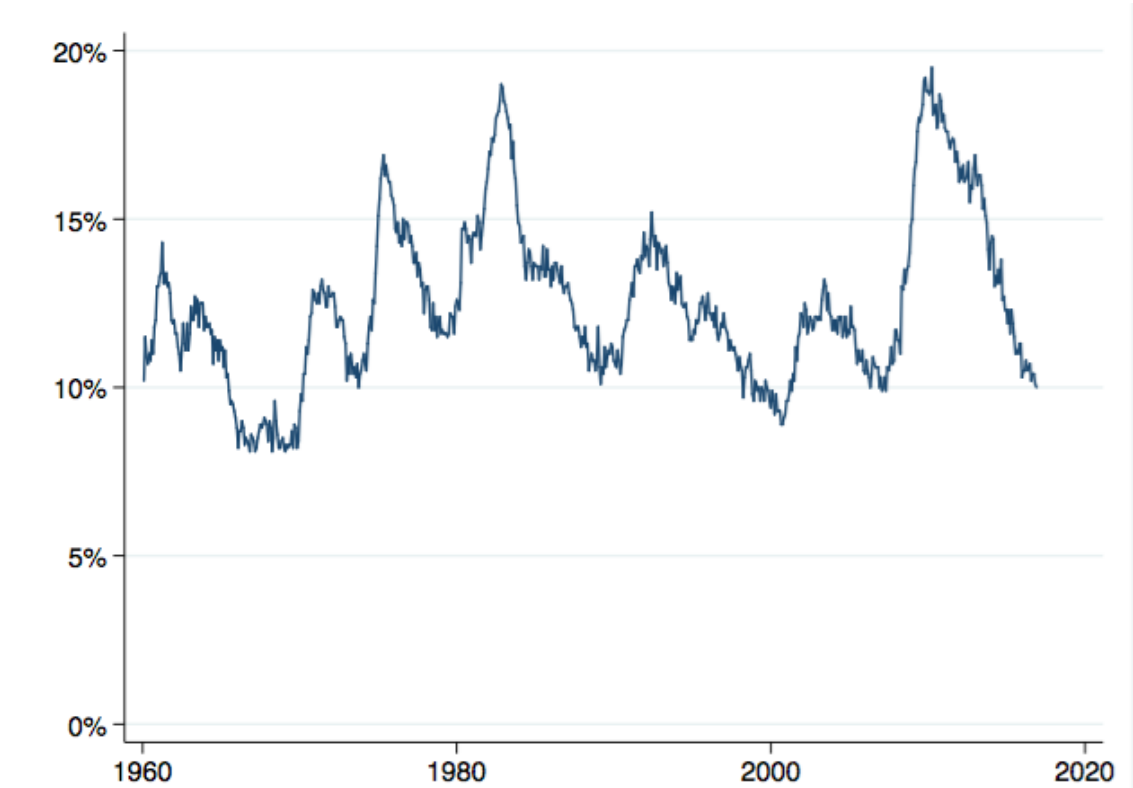
YOUTH

New technologies & young workers

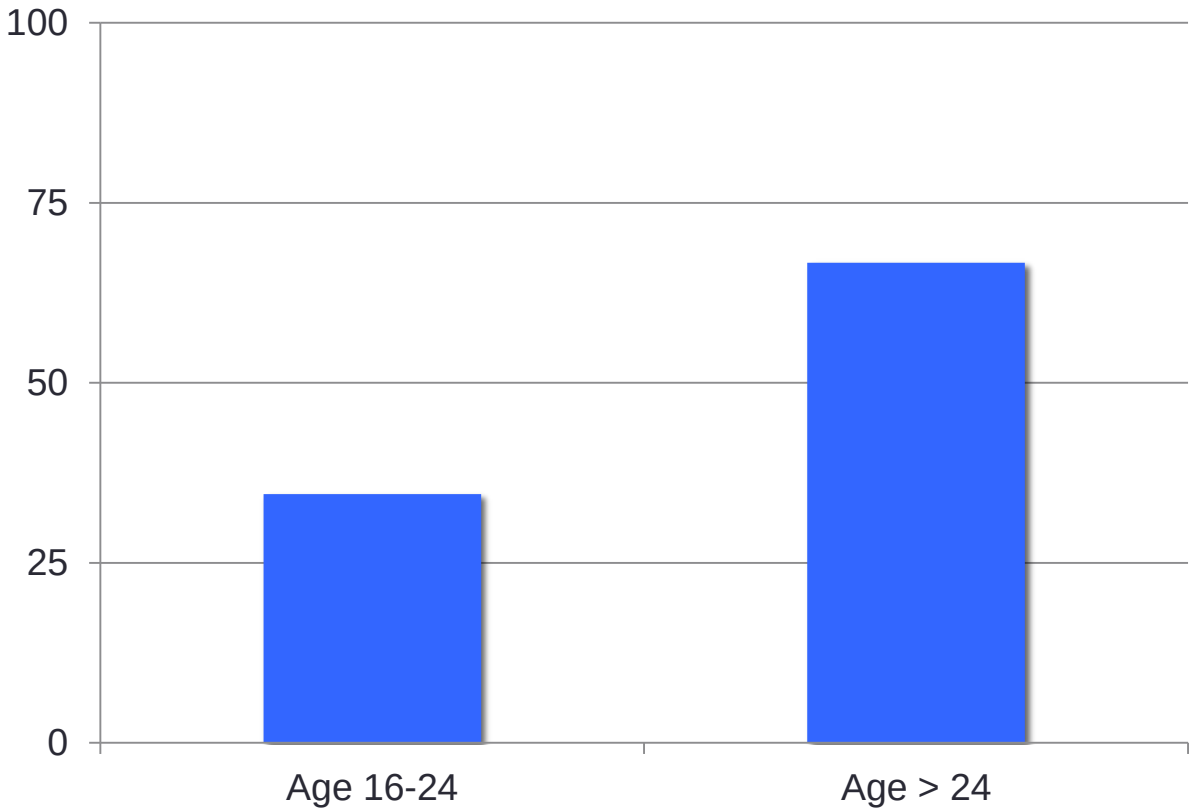
- Textiles
  - US, Japan, China
- Electrification
  - High school grads
- Opportunity in IT?


Youth unemployment 2015
50
45
40
35
30
25
20
15
10
5
0
5.6
7.3
11.6
13.9
22.4
24.7
40.3
48.4
49.8
Japan
Germany
Switzerland
Mexico
Iceland
Israel
Norway
Korea
Austria
Denmark
Netherlands
United States
Czech Republic
Australia
Canada
Estonia
New Zealand
OECD - Total
United Kingdom
Chile
Latvia
Slovenia
Hungary
Luxembourg
Turkey
Sweden
Poland
Ireland
Finland
Belgium
Euro area (19 countries)
France
Slovak Republic
Portugal
Italy
Spain
Greece
South Africa

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