Technological change and its implications for skills demand and skills policies

Alan Manning

Centre for Economic Performance, LSE

Overview

- New technology has always altered the demand for different types of skills
- There is little reason to think that the pace or nature of change is any different now from in the past – too much hype about robots/AI?
- Or that the impacts on labour markets will be worse than in the past
- Very hard to predict how demands will change – past attempts have a poor track record
- But it is important to try because supply of skills needs active intervention – cannot be left to the ‘market’
- Need a skills policy that is robust to different outcomes

There are widespread fears about the labour market impact of new technology

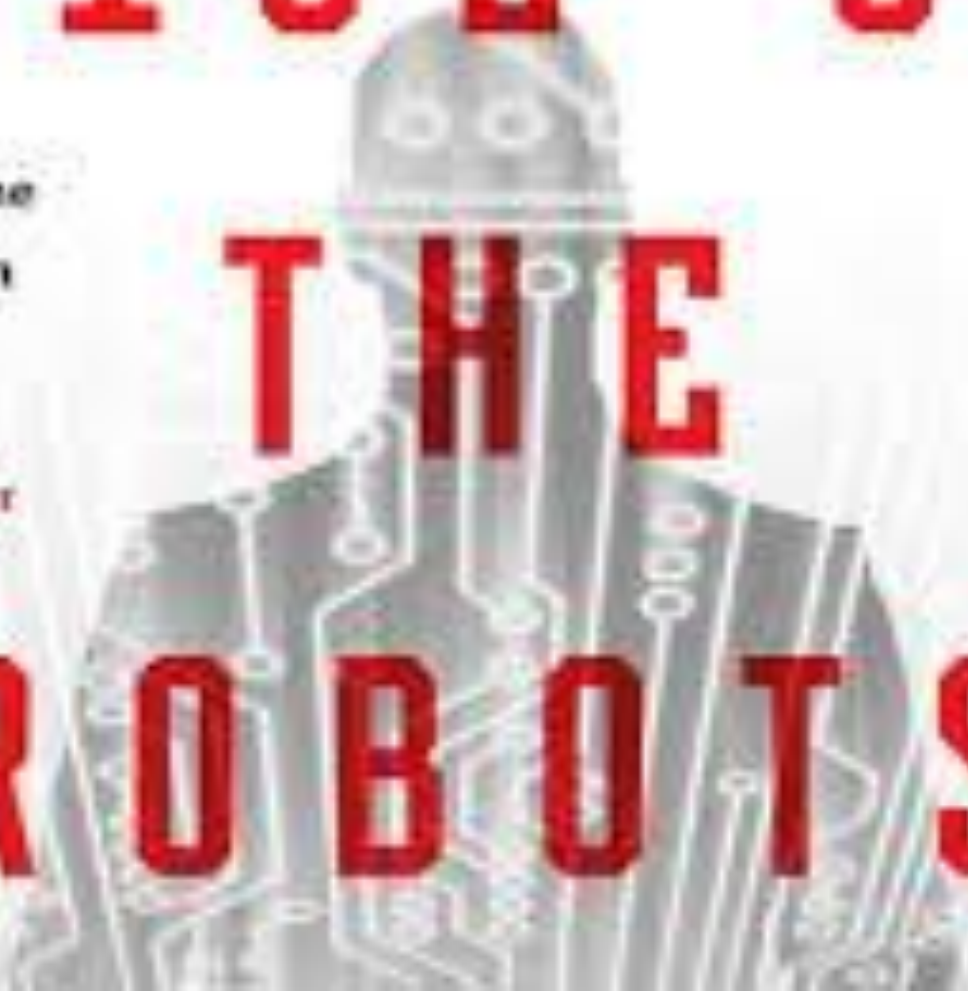
- Some think this is the end of work – there will be mass unemployment
- Some think there will be massive shift in income from labour to capital
- Some think there will be massive increases in wage inequality as demand for some types of labour rises, other types fall
- This has captured the popular imagination e.g. Martin Ford's 'Rise of the Robots'

RISE OF THE ROBOTS

"No one who cares about the future of human dignity can afford to skip this book."

— Jaron Lanier

Author of You are Not a Gadget and Who Owns the Future?



TECHNOLOGY AND THE THREAT OF A JOBLESS FUTURE

These fears are not new..

- Long history of fears about impact of new technology
- These predictions have always been wrong
  - Over medium to long-run, technology has been the source of the rise in living standards for everyone
  - though there have been big losers at times
- People often find it easy to think about new technologies they are worried about but harder to think of past new technologies they wish had never been invented (because of their labour market impact)
- But past is not necessarily a good guide to the future (‘this time its different - really’)
- It is useful to ask where past predictions went wrong

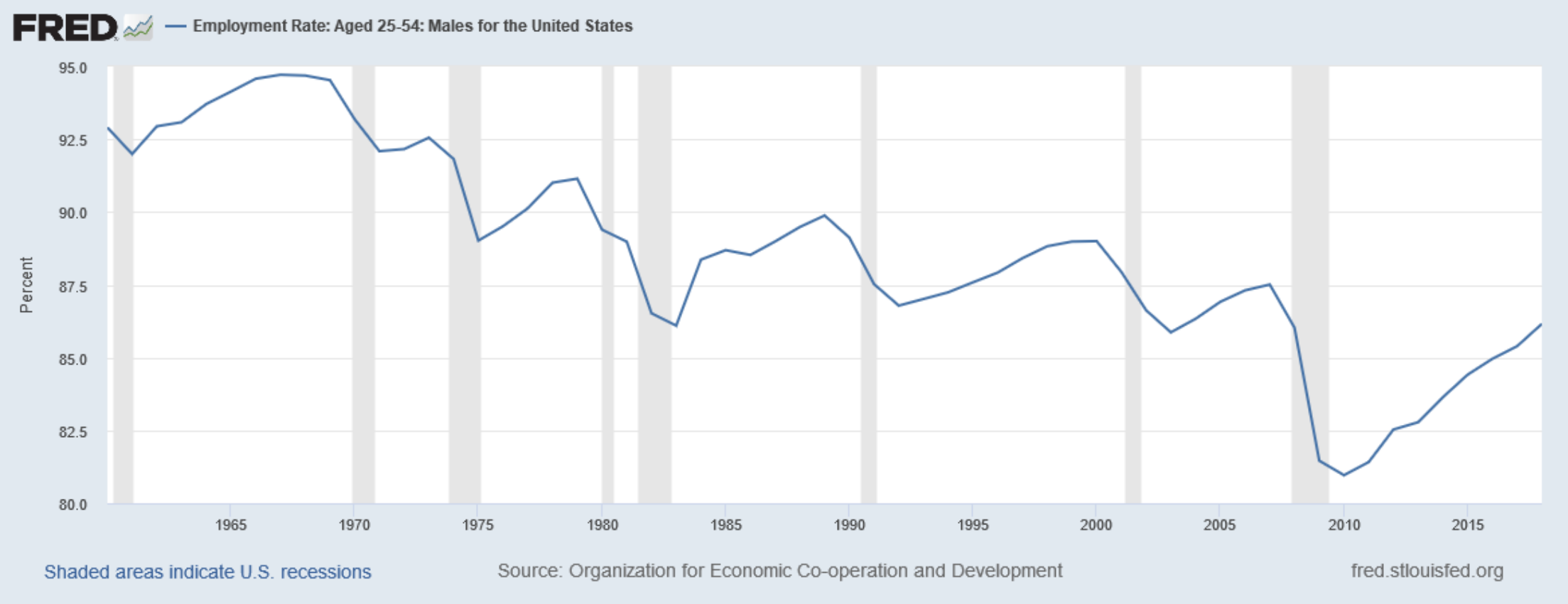
Where past predictions went wrong

- Analysis focused almost exclusively on jobs where humans were going to be displaced by new technology – the losers who are often very concentrated and visible – ‘first-round’ effects
- But analyses often missed the gainers
- Gainers are not just in new jobs created by new technology, they are mostly dispersed across ‘old’ jobs:
  - Firms adopt new technology because it lowers costs
  - if lower costs lead to lower prices then consumers have more disposable income
  - And spend this on all sorts of stuff leading to higher labour demand in many other areas

What about current predictions?

- Almost all analysis focuses again on ‘first-round effects’ ignoring second-round/general equilibrium effects which we know to have been important in the past
- True both of popular discussion and of more sophisticated econometric analyses which compare low- and high-impact jobs/areas without a way to assess aggregate impacts
- There is a real risk that the same mistakes are being made today as were made in the past

And much of current round of techno-angst stems from early 2010s and has not stood test of time



And track record of future predictions is not fantastic

- Will focus on Frey-Osborne work as this was first and was creative and innovative
- Tried to answer the question “Can the tasks of this job be sufficiently specified, conditional on the availability of big data, to be performed by state-of-the-art computer-controlled equipment”
- Produced estimates of probability of automation “over some unspecified number of years, perhaps a decade or two”
- Controversy about the estimates of numbers affected but I think these are probably better measures of relative rather than absolute probability of automation
- It is now almost 6 years since the exercize so perhaps we might begin to look for evidence – though might be future acceleration in change

Data

- US Occupational Employment Survey
- Provides data on employment and earnings for 700+ occupations
- Aligned with Frey-Osborne measures of probability of automation

Results: change in employment 2012-18

Dependent Variable	Change Log Employment	Change Log Employment
Sample Period	2012-2018	2012-2018
	Unweighted	Weighted
Probability of Automation	-0.230 (0.048)	-0.201 (0.031)
R2	0.05	0.06

- Is evidence that those with higher probability of automation have slower employment growth
- But explanatory power is very low
- Impact is not large relative to the changes seen e.g. 10th percentile of decadal change is -25%, 90th percentile is +53%

And other pieces of evidence do not line up

Dependent Variable	Change Log Employment	Change in Log Wages
Sample Period	2000-20011	2012-2018
Probability of Automation	-0.233 (0.035)	0.056 (0.008)
R2	0.07	0.07

- Slightly better predictor of employment change in earlier than recent years
- Not surprising because underlying task variables from O*NET are similar to those used to explain earlier technical change
- Wages are moving in the opposite direction though small impact

Implications for Skills Policy

- Might conclude that a skills policy is pointless because it is so hard to predict the future
- There are lots of areas where we just let stuff happen
- But we need to have an activist skills policy because there are good reasons for the market not to deliver the appropriate level and type
- Sources of market failure
  - Most skills acquisition in early career when may be serious liquidity constraints
  - Young people making decisions may have poor information
  - Mismatch between who bears costs and gets returns from training

Desirable skills policies

- Need to ensure all citizens have basic literacy and numeracy
- More emphasis on teaching people how to make good decisions – this is important not just at work, but for personal health and financial decisions etc.
- Much easier to predict ageing than new technology – caring skills will be more important
- Skills shortages are highly persistent but often represent wider labour market dysfunction e.g. wages below market levels

More difficult questions…

- Should training be specialised/inflexible or more general/flexible
  - Depends on how certain about the future one is
  - High quality vocational programmes often have high levels of general skills and high rates of occupational mobility.
- Minimum school leaving age has increased a lot over past 100 years but now seems stuck at 18
  - Is there a good reason for this?
- Does labour market polarization mean that we do not need more education for all?

Conclusion

- Having the right level and type of skills is vitally important for economies whose prosperity depends on human capital
- There are pervasive market failures in the market for skills so need to have a skills policy
- But need to be realistic about the ability to predict impact of future technology on the demand for skills (and other outcomes)
- I am skeptical about hype about impact of current wave of new technology – problems with skills policy are old not new problems
- But they are still serious problems