I will argue that the answer is likely to be

- [ ] Yes
- [x] No
- [ ] Maybe
Impossible for me not to caveat this conclusion

• More accurate summary of my position - “Cannot rely on robots to solve skill shortages”

• May well be situations in which use of robots does solve skill shortages

• But also likely to be situations where they cause skill surpluses

• This is because new technology always has and always will alter the balance between demand and supply of different types of labour

• Robots and AI will be no different though affected occupations may be different
A Simple View of Labour Shortage and the Effect of Shortages

• Shortage=Demand – Supply
• Simpler in theory than in practice – this report shows how one might operationalize that idea
• New technology and robots affect the demand for different types of labour
• Robots might reduce demand for labour across a wide range of jobs
  • reducing skill shortages sounds good, creating surpluses less good
• But could reduce demand for some jobs, raise it for others – will the demand reductions be targeted on labour markets with skill shortages?
• Will consider both of these
Solving Skill Shortages by Reducing Demand for All (or most) types of Labour – currently widespread fear about this
I think this scenario is implausible:

• Ask yourself this question
  • Consider new technologies today - are you worried about the impact of any on the labour market?
  • Consider new technologies from the past – which do you wish had not been invented because of their impact on the labour market (I don’t mean nuclear weapons, environmental impacts)

• Most people now and in the past find it much harder to answer the first question than the second

• But people in the past also worried about impacts of new technology

• But perhaps ‘this time it’s different’ (in the past they also said this)
Reasons why new technology will benefit workers on average

• Most accounts of impact of new technology focus on negative effects and ignore other more positive effects
  • New technology is adopted for producing a good because it is cheaper
  • As costs fall so do prices
  • As prices fall consumers have more money to spend on other goods/services
  • As they spend this extra income, demand for other labour rises.
  • These will mostly be ‘old’ jobs not ‘new’ jobs

• Ultimately labour is the fixed factor in the economy and we would expect the benefits of new technology of any form to go to the fixed factor

• This is a good approximation to the past
Concerns about robots should be about the distributional implications within labour

- If new technology raises demand for some jobs, reduces it for others, is there any reason to think that the impact will be biased towards solving skill shortages?

- Let's consider some
  - Theoretical ideas
  - Empirical evidence
Theoretical Ideas: Directed Technical Change

• New innovation requires an investment of resources – is not some deus ex machina (deus ex robota?)
• Those resources will go where the potential returns are highest
Factors influencing the size of the incentive to invest in a particular type of technical change:

• The marginal product of the new ‘robot’ – linked to wage of labour it is replacing
• How large is the potential size of the market for the innovation? – linked to amount of employment in the sector
• How easy is the technical advance from a scientific perspective?
• What is the market structure – who will get the gains from innovation?

• Some of these are related to measures of labour shortage
• But not all of them
• And there is no presumption that the ‘labour shortage’ factors will be the most important in determining the direction of innovation
• What seems to have happened in practice?
Evidence on recent past changes in technology

• Will look at correlation across occupations between:
  • current measures of skills shortages/surpluses (from the report, averaged across countries)
  • Measures of impact of recent technical change in the recent past – how routine is the occupation

• This correlation is strongly negative
  • Less routine occupations are much more likely to have current labour shortages
  • Perhaps this is because routinization has affected occupations that were once in shortage and has now ‘overshot’
  • I think that unlikely – more likely that new technology has increased surpluses in occupations where there were no shortages

• But is future technology going to focus on areas where there are current shortages?
The correlation between current skills shortages/surpluses and routinization
Will Future Technology have a bigger effect where there are current shortages?

• Hard to measure which occupations will be most affected by future new technology
• I know nothing about it – Tom will be much more enlightening
• Simply take some well-known measures:
  • Frey-Osborne measure of automation risk
  • Arntz/Gregory/Zierahn measure
• And see how they correlate with current shortages/surpluses (results similar – shown for Frey-Osborne)
• This is consistent with some evidence in the report (Figure 3.9, p72)
• If true, implies that new technology will exacerbate not solve existing shortages/surpluses
The correlation between current skills shortages/surpluses and risk of automation
A More Normative Analysis?

• Have focused on positive question of “will robots be the answer to skills shortages?”
• But also a normative question of “should/could robots be the answer to skills shortages?”
• Do need a public policy on what types of new technology will be most desirable
• There is no theorem in economics that says that profit-motivated innovation will be at the right level or the right type
• And there is also currently a lot of public subsidy/patents etc
Conclusion

• Robots and other forms of new technology will be important for developments in labour markets
  • Will reduce the demand for some jobs
  • Will raise the demand for others

• But there can be no presumption that these changes will act to reduce patterns of shortage/surplus

• What evidence we have suggests that both recent and future new technology is more likely to be exacerbating these patterns