

Are Robots the Answer to Skill Shortages?

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I will argue that the answer is likely to be



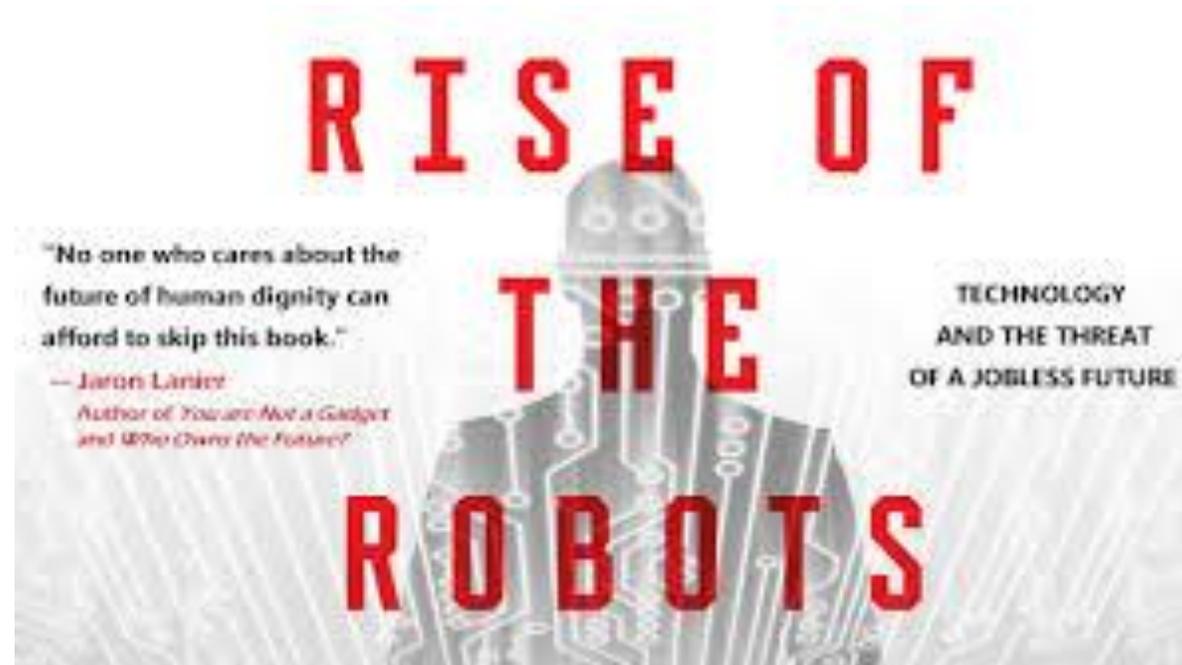
Impossible for me not to caveat this conclusion

- 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?
- Lets 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:

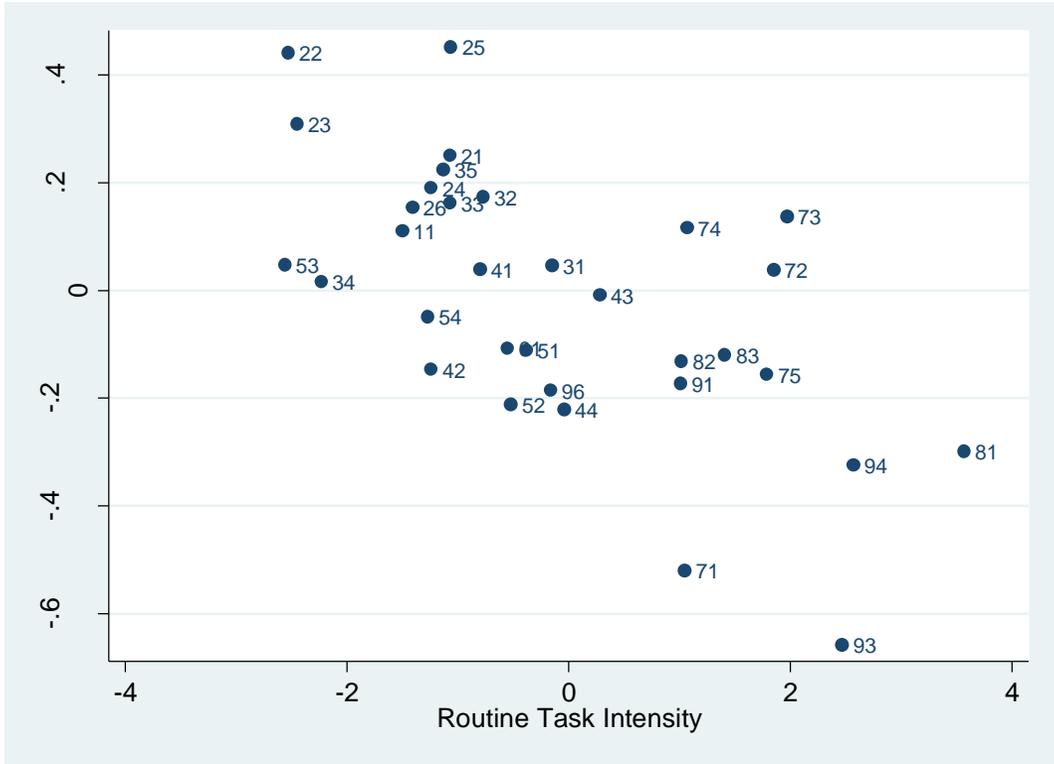
- The marginal product of the new 'robot' – linked to wage of labour it is replacing
- How large is the potential size of the market for the innovation? – linked to amount of employment in the sector
- How easy is the technical advance from a scientific perspective?
- What is the market structure – who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

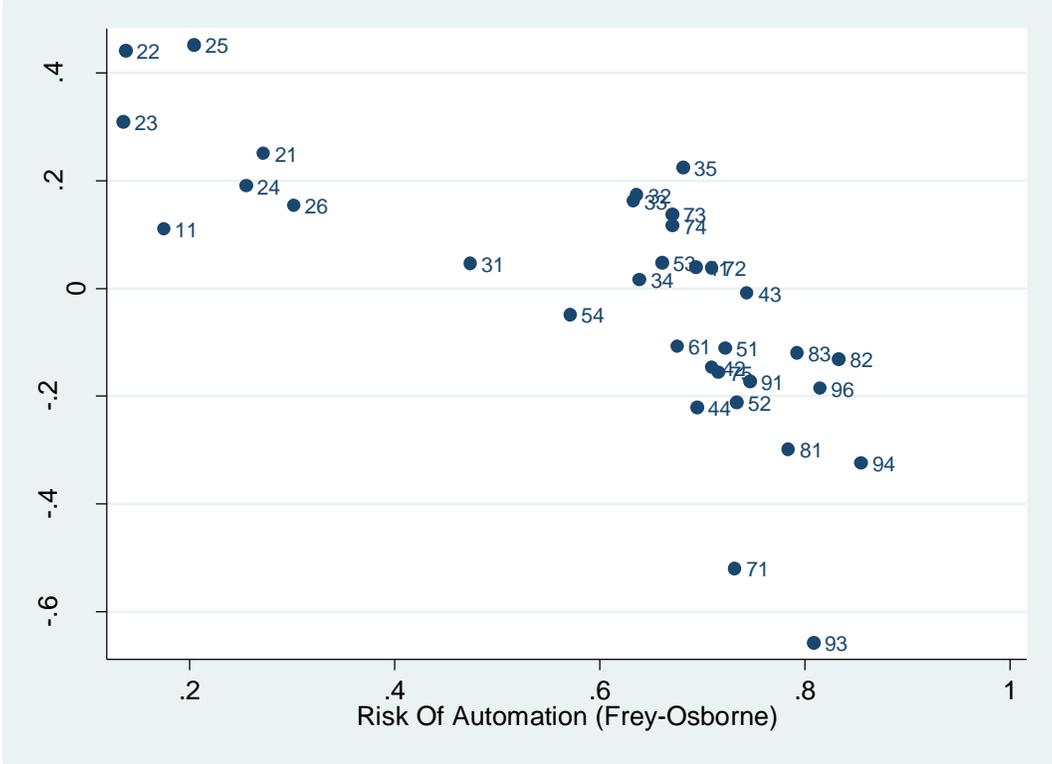
The correlation between current skills shortages/surpluses and routinization



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