Computer Adoption and the Changing Labor Market

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Takeaways

- This paper builds a model that explain some structural changes in the US labor market:
  1. Fall in the labor share
  2. Employment shift away from routine jobs
  3. Productivity speed-up

- The model takes two exogenous inputs: the (stochastic) path in the relative price of computer investment and the evolution of TFP.

- Main mechanism: substitutability between IT capital and routine labor

- Grid search to solve for transitional path and match cyclical changes:
  1. Routine job losses concentrated in recessions
  2. Jobless recovery

- Nice paper and topic! And impressive calibration work!
Cyclical changes in labor market

Figure: Unemployment for different occupations. Source: Saint Louis FED’s blog based on CPS data
Elasticity of substitution

- The results of the paper crucially depend on the assumption that \( \sigma > 1 \) (substitution between IT K and routine labor).
- Many studies have criticized this choice: Lawrence (2015), Autor et al. (2017), Autor et Salomons (2018), Oberfield and Raval (2014)...
  Although they consider substitution between capital and labor in general.
- The model is closer to Karabarbounis and Neiman (2014) in this respect.
Fall of the labor share

- The model uses a representative firm and predicts that decline in IT price would imply a decline in the labor share.
- But in that case, the decline in labor share is *within-firm*.
- The fall in the labor share is largely due to the reallocation of sales *between-firms* rather than a general fall in the labor share within incumbent firms (Autor et al., 2017; (Kehrig and Vincent, 2015).
- Labor share for the *average* firm has in fact increased.
- One needs a model where a drop in IT price may disproportionately benefit larger firms (the marginal product of IT relative to other inputs increases with firm size: Bauer, Boussard and Lashkari, 2018).
Jobless recovery

- IT fails to explain jobless recovery among routine tasks in other developed countries than the US (Graetz and Michaels, 2017).
- To give more power to your story, you could build a multi sector level and calibrate at the sector level.
- You could also check if sectors that are more likely to be automated, based on the importance of tasks that robot can perform today.
Other comments on the model

- Adjustment costs of labor are linear, what happens with non-convex/fixed adjustment costs?
- You do not include adjustment costs of $K$
- Wouldn’t it be easier to match the fall in IT price in the US rather than using a stochastic (exogenous) path?
- Non-routine and routine labor have the same wage and are perfect substitute
- Labor productivity speed-up?
Empirical test of the model

- User cost of IT is larger in areas where lightning strikes are more frequent.
- Time invariant instrument, very geographic specific.
- Alternative instrument: other countries sectoral density of robot, as in Acemoglu and Restrepo (2017)
- Do you really need an instrument?
Figure: Source: Andersen et al. (2012), RESTAT
Robot Exposure

Figure: Source: Acemoglu and Restrepo (2017)