

Artificial Intelligence, Worker-Replacing Technological Change and Income Distribution

Anton Korinek (Johns Hopkins and NBER)

Joseph E. Stiglitz (Columbia and NBER)

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Introduction

Techno-“pessimists:” AI is just the latest wave in a long process of automation

- will replace some jobs [painful in the short run]
- will create new jobs

→ nothing special, nothing to worry about in the long run

Techno-“optimists:” AI will replace humans in the last bastion in which we have comparative advantage vs machines: in thinking

- we are clearly not there yet
- however, once artificial *general* intelligence is developed, human labor will be redundant

→ this would change everything

→ rather important topic, given the implications for mankind

Worker-replacing technological change

Our paper:

considers the effects of a technology that directly replaces workers

Questions:

How does worker-replacing technological change affect...

... output

... wages

... inequality

What can policy do about it?

Worker-replacing technological change and output

Critical observation:

scarcity of labor

= the greatest constraint on output in modern economies

that's why labor (still) earns 60% of output

→ relieving this scarcity of labor boosts output

→ if *all* factors of production are reproducible,
we enjoy an *economic singularity* that allows for
unlimited growth simply via factor accumulation

Worker-replacing technological change and wages

In a market economy, labor is paid its marginal product

if labor is replaceable by AI machines,

competitive wages are determined by the user cost of AI machines

→ potentially less than human subsistence income

→ earning a living wage in the market may become impossible

but there is a silver lining...

Worker-replacing technological change and inequality

Putting together the two previous observations:

- if output goes up but wages go down:
somebody must be earning large windfall gains

Owners of scarce complementary factors will reap all productivity gains

- in short run: e.g. skilled labor, previously accumulated capital
- in long run: the main irreproducible scarce factors are land & energy
→ productivity gains accrue to their owners

Worker-replacing technological change and public policy

In principle, public policy can ensure that technological progress leads to a Pareto improvement

- gains accruing to the winners are larger than losses of the losers (workers)
- appropriate redistribution *can* make everybody better off

WARNING:

if losers are not compensated, they will oppose technological change

Worker-replacing technological change and public policy

Two reasons why at least some redistribution should be feasible from an *efficiency* perspective:

1) Compensating losers would be the first-best *market* outcome if only risk markets were complete (pre-innovation)

in the real world, macro markets for innovation are largely missing

if we believe in efficient allocations, we should welcome interventions that *emulate missing markets*

Worker-replacing technological change and public policy

2) Taxing windfall gains acts like a lump sum tax

→ no economic distortions, no inefficiency

Example: taxing price increases of land will not distort supply of land

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Worker-replacing technological change and public policy

2nd-best alternatives to redistribution:

- changes in IPR
- tighter enforcement of antitrust laws
- public investments with high demand for labor
- ...

Conclusions

Worker-replacing technological change:

- increases the size of the pie
 - but lowers wages, raises inequality

 - it creates scope for redistribution
 - which can be complemented with 2nd best policies
- with sufficient instruments, Pareto improvement is possible