

The economic impact of New Tech: some reflections on the Welfare State

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The Robot Revolution (*): old wine in new bottle? Probably not... this time seems different (larger scale / more diverse set of technologies / automation of multiple and connected tasks). Most likely:

- **labor market effects** are much larger than previous 'revolutions' (AI researchers: 50% chance that AI outperforming humans in all tasks in 45 years);
- **productivity boost** very high → 'augmenting' technology: increase quantity of non-human 'labor'; increase in the productivities of other production factors (traditional capital; labor).

Complex effects:

- Need to consider '*general equilibrium effects*' and avoid a 'narrow focus' on single markets/sectors;
- *Distributional consequences* (leaving no one behind);
- *Short versus long-term effects* (possible trade-offs)

(*) Here I generically refer to a set on new technological advancements (AI, sensors, Q computers, robots etc.)

Understanding the general equilibrium effects (Berg&al 2018, J. Mon. Econ)

Robots = new form of capital

- Complementarity with traditional capital
- Substitute with (some) type of human labour (not necessarily low-skilled)
- **Who owns robots?** Although some 'forms' of this new capital might resemble a quasi-public good, ownership is likely to be concentrated:
 - Few countries;
 - Few actors;
- Giving rise to **new rents?** [policy interventions needed to boost competition / lowers barriers to entry]

A 'simple' truth (Berg et al 2018)

As robots technologies improve:

(short term):

- (+) increase in returns to robots and non-robots capital;
- (-) decrease in real wages of MOST workers;
- (-) labor share in GDP decreases;

(long term):

- (+) increase investments in both robots and non-robots capital ;
- (+) increase in real wages (due to the expansion in capital accumulation) ...but not in case of perfect substitutability (black-hole scenario);
- (-) labor share in GDP still decreases;

Main consequences:

- Inequality increases both in the short and long term;
- Intertemporal trade-off: 'more short-run pain for a larger long-run gain';
- The short-run might be very long
- These effects are very robust to alternative assumptions on the role of new tech .

The role of Governments: need to redesign the Welfare State

- **Unemployment benefits / anti-poverty measures:** higher inequality = higher 'risks';
- **Pension systems** under stress (in particular 'unfunded' systems);
- **Health systems**
 - new tech will likely increase cost-effectiveness;
 - Unequal access? (depends on price/availability);
 - New 'dependencies'/addictions?
- **Education policy:** all workers affected (general equilibrium effects) but mostly those with higher degree of substitutability with robots (= needs for re-training/life-long learning);
- **Innovation policy.** Ambiguous effects: lower entry barriers into new tech reduce rents but increase the scale of the 'revolution' (but possibly it speeds up transition to the long term).
- **Crucial** → **Tax policy:** redistribute from winners (capital owners) to losers (workers)

Unchartered territories (gaps in economic research)

- Impacts of robots on:
 - **international trade flows** (countries' specialization patterns);
 - **international migration and capital mobility**; (lower needs for unskilled immigrants?)
- Important economic consequences also for those **countries/regions that are 'far' from the evolving revolution**;
- What is the **role of Governments** in the eco-system of these frontier innovations?
 - From harms-length player to 'owner';
 - Directing patterns of evolution through incentives, regulations, procurement..

Public policy is required to make Unicorn Land possible!

