Discussion of
The impact of industrial robots on EU employment and wages: A local labour market approach (Chiacchio, Petropoulos, Pichler)

By Eliana Viviano
Bank of Italy

ECB-CEPR workshop, 7th December 2018
The problem: how does robotization reshape LM? (1)

This is (obviously) a key question.

Robot: Automatically controlled, reprogrammable, multipurpose manipulator ... for use in industrial automation applications

Addressed in similar ways by the literature:

Data from International Federation of Robots: aggregate data by industry for a bunch of countries
The problem: how does robotization reshape LM?

(2)

- Local labour market approach: exposure to robots and outcomes (productivity, employment, wages)

- Data on robots (IFR) from mid-nineties to the pre-Crisis (2007), merged with other LM datasets, e.g. EU-KLEMS

- In this paper EU-SILC (ECHP prior to 2000), and LFS (for employment rates and wages)
Aggregate evidence

(IFR + Eurostat)

Figure 1 - Number of robots per 1,000 inhabitants (1995-2015)

This is also the period of:

1. ICT revolution
2. Globalization
3. Tertiarization

At a first look a positive relationship

Figure 6- Correlations between robot intensity, working hours, productivity and wages. (1995-2015)

Notes: Authors’ calculations on Eurostat national Accounts and IFR, 1995-2015.
Literature results

ICT, globalization and labour supply used as control variables (also in this paper)

Results:

Acemoglu and Restrepo (2017): Robots negative effects on wages and employment (US)

Dauth et al. (2017): Germany. No evidence of total job losses, but recomposition (towards services)

Gaetz and Michaels (2017): Positive effects on Y/L and TFP; no effect on employment, but low-skill workers.
This paper: Results

• Negative effects on employment, for the period before the Great Recession (previous version on the paper)

• No effect on total employment (with data until 2015)

• Sectoral negative effect: manufacturing

• Negative effect on wages (in the older version, not so large if we include 2015)
• A lot of data efforts to get regional employment rate. Check consistency with official data.

• Empirical specification:
  1. Robot exposure:

\[
\Delta \text{robot exposure}_{r,1995-2007} = \sum_{j \in j} \frac{emp_{rj,1995}}{emp_{r,1995}} \times \left( \frac{\text{robots}_{j,2007}}{emp_{j,1990}} - \frac{\text{robots}_{j,1995}}{emp_{j,1990}} \right)
\]

where \( r \) labels each NUTS2 region and \( j \) each industry.
2. Cell-level data: employment rate by gender, age-group, etc

\[ \Delta \text{employment rate}_{rg, 1995-2007} = \beta_1 + \beta_2 \Delta \text{robot exposure}_{r, 1995-2007} + u_{rg} \]

\[ \Delta \text{wage}_{rg, 1995-2007} = \beta_1 + \beta_2 \Delta \text{robot exposure}_{r, 1995-2007} + u_{rg} \]

where \( r \) labels NUTS2 regions and \( g \) the demographic group.

- Why using socio-demo groups? Regional data?

- Why do not adjust robot exposure to socio-demo?
3. Clustering: by country and then adjusted. Why? (wild clustered bootstrapping used, but it’s problematic see Canay Santos Shaikh, 2018).

• Why not country*socio-demo group? (relevant supply changes in that period)

• Why not region*time?

• Absence of pre-trends?
• IVs (UK and DK frontier, EPL) and controls for other factors like ICT. Stressed in the paper not in the presentation. My point is: why these countries? Robots much more present in the in DE and IT. Did they really are a technological frontier?

• Why ICT has a positive effect? Why ICT and labour show complementarities and labour and robots do not?
This paper: more general comments (2)

• Results by occupation: why middle-skilled? How does this paper reconcile with standard polarization story?

• Polarization is (originally) a demand story, then more recently supply (e.g. Cerina and Moro, 2018, Basso et al. 2018).

• What about tertiarization (Buera and Kabovsky, 2012). Again a demand story, consumption of services with high-skill content.
Thank you very much for your attention