Job polarisation and job quality in the European labour markets

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Preliminary work
Introduction and background

Job polarisation: the relative decline of middling occupations

Possible explanations:
  – Labour market institutions
  – Offshoring
    – Technological change, computerisation

-> Routine-biased
What are the implications?

Routine occupations are easily substituted by technology/offshore workers
Complementary to non-routine cognitive work
What about manual non-routine?

Question: what happens to those remaining in occupations?
Job quality

More than money
Important implications for wellbeing and productivity

We estimate changes in job quality in a polarising labour market, explained by computerisation/technological change.
Data (1/3)

Job polarisation

– EU-LFS 1993-2010: employment shares
– Occupations grouped by task content (Acemoglu & Autor 2011):
  - cognitive - manual and (non-)routine
– and by wage quintiles (unique by country)
→ Grouped by country-year-occupation
Difference in employment share by class 1995-2010

The graph illustrates the difference in percentage points between employment shares in 2010 and 1995 for various countries in the EU15 area, excluding Germany (beginning 2002) and Sweden, Norway, Finland, and the EU15 (beginning 1997). The countries are represented on the x-axis, and the y-axis shows the percentage change. The data is categorized into four types of jobs: manual non-routine, manual routine, cognitive routine, and cognitive, non-routine.
Data (2/3)

Job quality

Green & Mostafa: Eurofound 2012

– Work intensity
– Skills and discretion
– Good physical environment
– Working time quality

⇒ Grouped by country-year-industry-occupation
Difference in job quality by occupation, 1995-2010

Difference in average job quality within an occupation between 2010 and 1995
95% Confidence intervals, weighted
Data (3/3)

Technological change

– Investment in IT (as a share of value added of capital)
  → Grouped by country-year-industry
– EWCS: intensity of computer use
  → Grouped by country-year-occupation-industry
Difference in job quality by occupation, 1995-2010

Difference in average job quality within an occupation between 2010 and 1995
95% Confidence intervals, weighted
## IT investment / computer use

<table>
<thead>
<tr>
<th></th>
<th>IT investment (proportion of value added)</th>
<th>Computer use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive non-routine</td>
<td>0.0285</td>
<td>50.32</td>
</tr>
<tr>
<td>Cognitive routine</td>
<td>0.0374</td>
<td>66.17</td>
</tr>
<tr>
<td>Manual routine</td>
<td>0.0256</td>
<td>21.90</td>
</tr>
<tr>
<td>Manual non-routine</td>
<td>0.0258</td>
<td>11.95</td>
</tr>
</tbody>
</table>
### Correlation differences in IT investment and job quality

<table>
<thead>
<tr>
<th></th>
<th>skills and discretion</th>
<th>working time quality</th>
<th>working intensity</th>
<th>computer usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>cognitive, non-routine</td>
<td>-0.03</td>
<td>-0.01</td>
<td>-0.13</td>
<td>0.01</td>
</tr>
<tr>
<td>cognitive routine</td>
<td>-0.23</td>
<td>-0.07</td>
<td>-0.06</td>
<td>-0.08</td>
</tr>
<tr>
<td>manual routine</td>
<td>-0.11</td>
<td>0.06</td>
<td>-0.01</td>
<td>-0.02</td>
</tr>
<tr>
<td>manual non-routine</td>
<td>-0.05</td>
<td>0.03</td>
<td>-0.07</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Differences in average IT investment (over last 5 years) correlated with differences in job quality 1995-2010*

*: Germany from 2005-2010; Sweden and Finland 2000-2010
Correlation between differences in computer intensity and job quality

<table>
<thead>
<tr>
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<th>skills and discretion</th>
<th>working time quality</th>
<th>work intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>cognitive, non-routine</td>
<td>0.12</td>
<td>0.14</td>
<td>0.28</td>
</tr>
<tr>
<td>cognitive routine</td>
<td>0.20</td>
<td>0.05</td>
<td>0.14</td>
</tr>
<tr>
<td>manual routine</td>
<td>0.21</td>
<td>0.09</td>
<td>0.23</td>
</tr>
<tr>
<td>manual non-routine</td>
<td>0.21</td>
<td>-0.12</td>
<td>0.13</td>
</tr>
</tbody>
</table>

differences in intensity of computer use correlated with differences in jq 1995-2010*
*: Germany from 2005-2010; Sweden and Finland 2000-2010
regression

\[ JQ_{o,i,c,y} = \text{Occ}_o + Year_y + \text{Ind}_i + \text{Country}_c + \text{Dem}_{o,i,c,y} + TC_{i,c,y} \]

Technological change (TC) as changes in IT investment and as changes in computer intensity

Robustness: country*year, year*industry, country*industry
## Preliminary results

<table>
<thead>
<tr>
<th></th>
<th>Skills and discretion</th>
<th>Work intensity</th>
<th>Working time quality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognitive routine</strong></td>
<td>-11.23** (0.73)</td>
<td>0.56 (0.63)</td>
<td>-0.91 (0.61)</td>
</tr>
<tr>
<td><strong>Manual routine</strong></td>
<td>-16.03** (0.82)</td>
<td>-1.83** (0.63)</td>
<td>0.69 (0.63)</td>
</tr>
<tr>
<td><strong>Manual non-routine</strong></td>
<td>-22.57** (0.69)</td>
<td>2.07** (0.71)</td>
<td>6.16** (0.68)</td>
</tr>
<tr>
<td><strong>Average IT investment</strong></td>
<td>-28.58* (15.05)</td>
<td>-10.09</td>
<td>41.29** (14.79)</td>
</tr>
<tr>
<td><strong>Computer intensity</strong></td>
<td>0.17** (0.01)</td>
<td>0.10** (0.01)</td>
<td>0.00 (0.01)</td>
</tr>
</tbody>
</table>

*: p<0.1  **: p<0.05
Conclusions and discussions

• Differences between occupations
• Technological change does not explain differences, but is differently distributed and does affect job quality
• Extension to new member states
• How to identify effect?
Difference in employment share by quintiles 1995-2010

The graph shows the difference in employment share between quintiles for the years 1995 and 2010 across various countries. The x-axis represents the countries, and the y-axis represents the percentage change in employment share. The countries are ranked from EU15 to individual countries like AUT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, NO, PT, SE, UK.

- **lowest quintile occupations**: Represented by blue bars.
- **middle 60%**: Represented by red bars.
- **best paying occupations**: Represented by green bars.
- **manual non-routine**: Represented by brown bars.

The difference in percentage points between employment shares in 2010 and 1995 is shown. The exception includes DE (begin 2002) and Sweden, Norway, Finland, and the EU15 (begin 1997) quintiles based on average pay in occupations.