The Role of Labor Market Changes in the Slowdown of European Productivity Growth

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Employment, Productivity, and Policy

- EU labor productivity catches up to US level up to 1995 then falls back
- Hours worked moves in the opposite direction
  - Did one cause the other?
- Major increase in heterogeneity
- Understanding these issues will help us understand the effects of gov’t policy
Our Basic Accounting Identity

- Output = Y
- Hours Worked = H
- Employees = E
- Population = N

\[ Y/N = Y/H \times H/N \]
\[ = Y/H \times H/E \times E/N \]

- We largely neglect hours per employee because there has been no major turnaround
- Focus is on labor productivity and the employment rate
  - We say their sum is output per capita
- We’re concerned with growth rates
Our Main Contribution is to the Policy Debate

- For 20 years, Europe had low employment and hours, high unemployment
- Slowdown in productivity post-1995
  - Especially embarrassing compared to US
- EU wants to change it all with reforms – some to raise employment, others to raise productivity
- They Can’t Have It Both Ways
The Employment-Productivity Tradeoff

- Take any CRS production $F(K,L)$
  - Intensive form, $L \cdot F(K/L,1) = L \cdot f(K/L)$
  - $Y/L = f(K/L)$

- As long as capital is fixed, an increase in employment lowers labor productivity

- We don’t know how fast capital adjusts though; the tradeoff may be quantitatively small (maybe Europe is a small open economy?)

- A major goal of this paper is to quantify the tradeoff
Outline

1. Basic Data
2. Explaining Employment
3. Employment and Productivity
4. Effects of Government Policies
5. Conclusion
Labor Productivity Growth

We would have expected the growth rates to converge but the EU Keeps Slowing...
Figure 3. Ratio of Europe-15 to the United States, Output per Capita and Output per Hour, 1960-2004
Turnarounds in Hours and Output

- Turnarounds are 1995-2006 minus 1980-1995 growth
- The relative turnarounds (EU minus US) cancel each other out

\[
\frac{Y}{H} + \frac{H}{N} = \frac{Y}{N}
\]

- 1980-2005 Y/N growth is identical
- But the EU is not catching up
Labor Turnarounds

- Most of the action is in E/N
- This fits with the focus of the previous literature
- Studying employment gives us more data, i.e. by age and sex
Employment Explanations

- Prescott – taxes explain everything
  - Uses a labor supply elasticity of -0.9
  - This is probably too large

- Alesina, Glaeser, Sacerdote – unions
  - There’s a coodrination problem

- Blanchard – taste for leisure

- Others simply throw it all into a regression
  - That’s where we fit in
Employment Explanations

- Everybody misses the post-1995 turnaround
- What caused it?
  - Changes in regulations, taxes?
  - Decline in unions?
  - Shift in preferences?
    - Whose preferences?
- Note H/E hasn’t started rising
Employment Regressions

- Cover 1980-2003 EU-15, N=320, population weighted

- **Explanatory Variables:**
  - Output Gap
  - Average Replacement Rate (ARR)
  - Employment Protection Legislation (EPL)
  - Product Market Regulation (PMR)
  - Union Density
  - Tax wedge
  - Various dummies

- These are common across this literature
Taxes in Europe

Anglo-Saxon (right hand axis)
Continental
Mediterranean
Nordic
Unemployment Benefits

- Continental
- Nordic
- Mediterranean
- Anglo-Saxon
### Employment Regression Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Gap</td>
<td>0.52***</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Product Market Regulation</td>
<td>-0.44</td>
<td>0.55</td>
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</tr>
<tr>
<td>Union Density</td>
<td>-0.46***</td>
<td>0.10</td>
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</tr>
<tr>
<td>Employment Protection Legislation</td>
<td>0.86</td>
<td>0.79</td>
<td></td>
</tr>
<tr>
<td>Unemployment Benefits (ARR)</td>
<td>-0.18***</td>
<td>0.05</td>
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</tr>
<tr>
<td>High Corpratism Dummy</td>
<td>-2.04**</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Tax Wedge</td>
<td>-0.28***</td>
<td>0.07</td>
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<tr>
<td>Post-1995 Dummy</td>
<td>0.94***</td>
<td>0.15</td>
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</tr>
<tr>
<td>R2</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMSE</td>
<td>1.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>320</td>
<td></td>
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</tr>
</tbody>
</table>

- Our tax wedge coefficient is consistent with what others have found.
- EPL and PMR seem to have no effects.
- Everything else has the correct sign – regulations and taxes reduce employment.
- The post-1995 dummy is substantial.
  - Growth in the employment rate rose by 1% after ‘95.
Employment Regression Results

**Robustness**

- Results are the same if population weights are dropped or year dummies are added.
- Dropping the Mediterranean countries or Spain does not affect the size of the post-1995 dummy.
Employment Regression Results

- With all of our dummies, it is not clear from the regressions what effects policy choices had.

- So we plot predicted values with policy fixed at its 1995 level.

- The output gap and dummies are still allowed to vary.
Female Employment

Effect of the Policy variables (1.75%)

Effect of the post-95 dummy (2.38%)
Male Employment

Effect of the post-95 dummy (6.32%)
Effect of the Policy variables (1.47%)
Productivity Regressions

Suppose we are in a Cobb-Douglas world. What coefficient would we expect on employment?

\[ y = 0.33k + 0.67l \]

\[ (y-l) = 0.33(k/l) \]

- If capital is fixed, the coefficient will be -.33
- If capital adjusts it will be smaller
- If labor is not homogenous it could be larger
  - The last people to enter the labor force are likely the least skilled and experienced
Productivity Regressions

- We can’t simply regress productivity on employment
- A shock to productivity affects wages and hence employment
Identification

- We want variables that affect employment but not productivity
- The tax wedge is our best candidate
- We also consider using the post-1995 dummy and union density
  - Pragmatism
  - This gives more power, passes identification tests, but seems somewhat questionable
### Productivity Regressions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Rate</td>
<td>-0.64 ***</td>
<td>(0.20)</td>
<td></td>
</tr>
<tr>
<td>Output Gap</td>
<td>0.68 ***</td>
<td>(0.11)</td>
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<tr>
<td>Product Market Regulation</td>
<td>0.56</td>
<td>(0.45)</td>
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<td>Union Density</td>
<td>0.03</td>
<td>(0.12)</td>
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<td>Employment Protection Legislation</td>
<td>1.66 ***</td>
<td>(0.65)</td>
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<tr>
<td>Unemployment Benefits (ARR)</td>
<td>0.14 ***</td>
<td>(0.05)</td>
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<tr>
<td>High Corpratism Dummy</td>
<td>-0.49</td>
<td>(0.94)</td>
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</tr>
<tr>
<td>Post-1995 Dummy</td>
<td>-0.14</td>
<td>(0.24)</td>
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<tr>
<td>R2</td>
<td>0.63</td>
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</tr>
<tr>
<td>RMSE</td>
<td>0.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>320</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Tax wedge is the only instrument in this version
- Coefficient on employment is twice what we would expect
- EPL and ARR have independent positive effects on productivity
- We can drive the SE on employment down to 0.10, but the result remains the same
- Not dependent on Med.
**Level of Labor Productivity**

**Policy Effect**
- Lowered growth by .25% per year
- Cumulates to 2.5% decline in the level
- 1/3 of the total shortfall
Effects of Government Policy

- Assuming hours per employee is stable, $E/N + Y/H = Y/N$

- Policy has effects on both employment and productivity

- We just add these effects up
## Effects of Government Policy

<table>
<thead>
<tr>
<th></th>
<th>Shock Size</th>
<th>Employment</th>
<th>Productivity</th>
<th>Output Per Capita</th>
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</thead>
<tbody>
<tr>
<td><strong>Product Market Regulation</strong></td>
<td>0.9</td>
<td>-0.14</td>
<td>0.35</td>
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<td></td>
<td>(0.24)</td>
<td>(0.25)</td>
<td>(0.22)</td>
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<tr>
<td><strong>Union Density</strong></td>
<td>23.32</td>
<td>-7.93</td>
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<td>-2.85</td>
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<td></td>
<td>(1.17)</td>
<td>(1.23)</td>
<td>(1.07)</td>
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<tr>
<td><strong>Unemployment Benefits (ARR)</strong></td>
<td>11.31</td>
<td>-0.90</td>
<td>1.37</td>
<td>0.47</td>
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<tr>
<td></td>
<td>(0.34)</td>
<td>(0.31)</td>
<td>(0.25)</td>
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<tr>
<td><strong>Employment Protection Legislation</strong></td>
<td>0.87</td>
<td>0.74</td>
<td>0.23</td>
<td>0.97</td>
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<tr>
<td></td>
<td>(0.36)</td>
<td>(0.37)</td>
<td>(0.31)</td>
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<tr>
<td><strong>High Corpratism Dummy</strong></td>
<td>1</td>
<td>-1.02</td>
<td>0.65</td>
<td>-0.37</td>
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<td></td>
<td>(0.48)</td>
<td>(0.33)</td>
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<tr>
<td><strong>Tax Wedge</strong></td>
<td>9.21</td>
<td>-2.67</td>
<td>1.71</td>
<td>-0.96</td>
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<tr>
<td></td>
<td>(0.64)</td>
<td>(0.53)</td>
<td>(0.4)</td>
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</table>

- Tax wedge and union density lower \(Y/N\)
- ARR and EPL have *positive* effects
  - Driven by their direct effects on productivity
Effects of Government Policy

Why would ARR and EPL raise productivity and output?

- Acemoglu and Shimer on reservation wages and matching
- Match quality may improve
- More incentive to create job-specific human capital
Conclusion

- A good deal of the changes in employment and productivity are unexplained
  - But this paper is not about $R^2$’s
- There is a strong tradeoff between LP and employment
- A 1% increase in employment only raises output by .36% in the short-run
- The effects of gov’t policy are ambiguous
  - Some regulations may increase output
Conclusion

What will happen in the future?

- EU productivity speeds up, US slows down
  - This may already be happening
- What happens to female employment?
- Will investment pick up in the EU?
A short detour to age groups

- Unemployment explains maybe 4%
- LFPR gives 10%
- The age distribution actually goes the other direction

<table>
<thead>
<tr>
<th>age distribution</th>
<th>unemployment</th>
<th>LFPR</th>
<th>E/N ratio</th>
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<tbody>
<tr>
<td>EU</td>
<td>EU</td>
<td>EU</td>
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<td>90.77</td>
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<tr>
<td>EU</td>
<td>US</td>
<td>US</td>
<td>102.1</td>
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Breaking Down Employment

Employee to population ratio

Hours per employee

Output per capita to output per hour ratio