The drivers of productivity growth over the last 15 years

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Pre-2000s

• Failure to converge in some countries

• Tied to difficulties to adopt new technologies

• However, TFP growth in Germany, UK and US similar
Why is there a slowdown in productivity post-2000s?

• Two hypotheses:
  
  • Bad luck: Slowdown in productivity for reasons others than the financial crisis
  
  • Endogenous response to business cycle conditions:
    
    • Reduction in innovation activity and in investments to bring in new technologies
Evidence

• R&D cyclicality

• Cyclicality of speed of diffusion

• Particularly during the GR
Figure 2: R&D Expenditures by US Corporations, 1983-2013
Share of sales from new or improved products

Weighted by yearly share of sales
Table 1: Cyclicality of the Speed of Technology Diffusion

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<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
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<tbody>
<tr>
<td>$\hat{y}_t$</td>
<td>3.73</td>
<td>3.7</td>
<td>3.64</td>
<td>4.12</td>
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<tr>
<td></td>
<td>(3.59)</td>
<td>(2.81)</td>
<td>(3.94)</td>
<td>(3.17)</td>
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<tr>
<td>$\hat{y}_t \times$ US</td>
<td>0.07</td>
<td>-0.74</td>
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<td></td>
<td>(0.04)</td>
<td>(0.53)</td>
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<tr>
<td>lag$_{it}$</td>
<td>-0.057</td>
<td>-0.057</td>
<td></td>
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<td></td>
<td>(5.22)</td>
<td>(4.76)</td>
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<tr>
<td>lag$_{it}^2$</td>
<td>0.001</td>
<td>0.001</td>
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<td></td>
<td>(2.52)</td>
<td>(2.12)</td>
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<tr>
<td>ln(lag$_{it}$)</td>
<td></td>
<td></td>
<td>-0.29</td>
<td>-0.29</td>
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<td></td>
<td></td>
<td></td>
<td>(6.68)</td>
<td>(6.65)</td>
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<tr>
<td>R2 (within)</td>
<td>0.11</td>
<td>0.11</td>
<td>0.13</td>
<td>0.13</td>
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<tr>
<td>N technologies</td>
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<td>N observations</td>
<td>327</td>
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</table>

Notes: (1) dependent variable is the speed of diffusion of 26 technologies, (2) all regressions include technology specific fixed effects, (3) t-statistics in parenthesis, (4) $\hat{y}_t$ denotes the cycle of GDP per capita in the country and represents the high and medium term components of output fluctuations, (5) $\hat{y}_t \times$ US is the medium term cycle of GDP per capita times...
Figure 3: Speed of Diffusion

Avg. diffusion
Avg. diffusion (3 year MA)
Figure 4: Diffusion of Technologies on Business use of Internet in UK, 2004-2013
TFP decomposition

• Decompose TFP between exogenous and endogenous components

• How? Combine:
  • A DSGE model with endogenous technology
  • observations on cyclicality of adoption
  • actual R&D series
Figure 8: Endogenous TFP, TFP and Labor Productivity
Figure 9: Endogenous TFP Decomposition
Figure 12: R&D efficiency in data versus model

Linearly detrended level of R&D, production of the estimated level of R&D in year $t$ and average of the estimated level of R&D between years $t-1$ and $t$ ($\bar{\chi}_t$).
Conclusions

• The decline in productivity during and after the GR is due to an endogenous response of companies to financial and business cycle conditions.

• The pre-GR decline in TFP growth is surely a reflection of the lower productivity in R&D