

Comments: ICT Impact on Energy Consumption

Roundtable discussion: ICT and e-Business Implications for Energy Consumption

Brussels February 7, 2008

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The way I understand the presentation ... (1)

- Based on the descriptive analysis we see that
 - ICT-Capital: electricity has been used more efficiently (all countries, all sectors; 03/04)
 - ICT-Capital: electricity has been used less efficiently in the chemical sector and in Finland, Germany, Italy, and Spain; 03/04).
 - Question: Why only compare 03-04? Long run development?
 - Metal industry: Ratio IIE / ICT capital decreases (all countries)
 - Chemical industry: Ratio IIE / ICT capital decreases with the exemption of Italy
 - Energy efficiency of ICT capital increased with the exemption of Italy in the chemical industry (what happened in Italy?)
 - Tendency in ICT-Capital compensation similar in all country with the exemption of UK (what happened in UK?)

The way I understand the presentation ... (2)

- Based on an explorative empirical analysis
 - Output elasticity differs among input factors like material and ICT capital, or non-ICT capital
 - Elasticity for ICT-capital and energy is lower compared to other factors
 - Output elasticity of input factors differs among sectors like chemical industry vs. basic metals and fabricated metals
 - Energy has lower elasticity in the chemical industry
 - ICT-capital and non-ICT-capital lower elasticity in metals

We see differences, but what we know about the differences?

- Bridge to the discussion in the last E-business Watch workshop
 - Between explorative/econometric analysis and industry-level case studies
 - Unless not more detailed data are available
- What are possible factors responsible for low productivity impact of ICT-capital or energy
 - Diffusion of ICT – positive network effects
 - Absorptive capacity within firms (detect new more efficient technologies)
 - Learning abilities (efficient use of new technologies)
 - Positive interaction between human capital and ICT capital
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Econometrics

- The results are based on econometric (OLS) estimations
 - Estimating a energy input function for Austria (chemical industry)
 - Estimating a production function for different industries

- Two Cobb-Douglas production functions were given
 - One without interaction terms
 - One with interaction terms (results not shown) - would be important

Technical issues ... (1)

- Key issues that estimations could be biased
 - Multicollinearity
 - Autocorrelation
 - Heteroscedasticity
- Not clearly if these issues were considered
 - Indication for autocorrelation
 - Estimation for Austria (Durbin-Watson statistics) indicates autocorrelation
 - Likely that independent variables are correlated (test it)
 - Test for heteroscedasticity

Technical issues ... (2)

- Alternative suggestion for an efficient estimator:
 - GLS considering autocorrelation and heterosc.
 - GLS enables to test for heteroscedasticity
 - Should be no problem if panel is balanced

- Alternative suggestion for the empirical model
 - Why not try to explain differences (growth rates) rather than levels?
 - Why not try to explain productivity (gross value added) instead of gross output?

Possible questions for discussion

- Energy efficiency of ICT capital increased with the exemption of Italy in the chemical industry (what happened in Italy?)
- Tendency in ICT-Capital compensation similar in all countries with the exemption of UK (what happened in UK?)
- What are possible (further) factors responsible for low output (productivity) impact of ICT-capital or energy

- Model setting
 - Productivity instead of gross output, growth rates instead of levels.
 - What about the interaction terms?

Thank you for your attention!

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