

Impact of Informational Mobility *

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Introduction

- Based on Maliranta and Rouvinen 2006 paper:
Informational Mobility and Productivity: Finnish Evidence.
Economics of Innovation and New Technology, 15(6).
<http://dx.doi.org/10.1080/10438590500418935>
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- Portable & inter-connectable ICT →
 - Independence of time & place →
 - Effects on labor productivity?
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- The concept of informational mobility ...
- ... its effects in Finnish business

Implementation

- Lancaster's (1991) consumer theory re-defined
 - Goods do not boost productivity, their characteristics do
 - Characteristics exist in various combinations
 - Joint use alters goods/characteristics
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- Productivity effects of ICT characteristics
 - Effects on a worker, but with grouped (firm) data
 - An extended Cobb-Douglas production function
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- Key variables: Shares of the firms' workers using various types of ICT

Data & estimation

- Matching & aggregating various individual- & firm-level registers & surveys at *Statistics Finland*
- Year 2001 cross-section of 2,358 business firms
- Weighted heterosked. & outlier robust (constraint) OLS
- Non-ICT variables (controls)
 - Capital intensity, size, age & multiple establishments (dummy)
 - Worker age & gender and educational field & level (shares)
 - 40 industry & 20 regional indicators (dummies)

Shares of workers using using ICT at work – From goods to characteristics with the delta method

- Not using computer at work
 - Desktop
 - Laptop
 - Desktop with LAN
 - Laptop with LAN
 - Desktop with WLAN
 - Laptop with WLAN
- ICT goods
(the bundles of ICT characteristics)

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- Processing & storage
 - Portability
 - Wireline connectivity
 - Wireless connectivity
- ICT characteristics

TABLE I The ICT bundles, their characteristics, and ways of distinguishing them.

<i>ICT bundle</i>		<i>ICT characteristics</i>			
		<i>Processing and storage capability</i>	<i>Portability</i>	<i>Wireline connectivity</i>	<i>Wireless connectivity</i>
0	Not using computer at work	–	–	–	–
a	Desktop	Yes	–	–	–
b	Laptop	Yes	Yes	–	–
c	Desktop with LAN	Yes	–	Yes	–
d	Laptop with LAN	Yes	Yes	Yes	–
e	Desktop with WLAN	Yes	–	Yes	Yes
f	Laptop with WLAN	Yes	Yes	Yes	Yes
Characteristic distinguishable by comparing bundles defined in the leftmost column above		a–0	b–a d–c f–e	c–a d–b	e–c f–d

Note: The empirical definitions of the bundles discussed in the data section. In some estimations below various ways of calculating bundle coefficients are constrained to be equal.

- Shares of workers using various ICT goods at work → Effects of the ICT characteristic bundles on workers' productivity
- Comparison of otherwise similar ICT goods with & w/o the characteristic → Identification of a particular characteristic's effect

Results

- The effects on a workers productivity

- Processing & storage +9% **
- Portability +32% ***
- Wireline connectivity +14% ***
- Wireless connectivity +6% **

- Interpretations

- A worker with a non-connected desktop is 9% more productive than a similar worker w/o computer
- A worker with a non-connected laptop is 42% (9% + 32%) more productive than a similar worker w/o computer

- ICT output elasticity (see the paper for derivation)

- Processing & storage +5% ** (= the mean Stiroh's meta stud)
- Overall +12% *** (within Stiroh's 90% conf. interval)

Discussion

- Firms equate marginal costs & returns
 - ICT to labor cost in 1999 (M. & R. 2003) 14.2%
 - Returns of ICT usage to labor cost in 2001 16.8%
- Especially portability has sizable effects
 - Proxies for overall organizational agility?
 - More unmeasured/unpaid work?
 - Could go either way...
 - No change in the amount, but now more productive?
- Expected wireline effects; wireless less stellar
 - As of 2001, wireless was at its infancy & still experimental
- The setup & results quite robust
 - Consistent in large samples with weak assumptions (see the Appendix)
 - Selectivity: More skilled use ICT? Extensive controls ...

Conclusions

- The observed effects of portability & connectivity are large but nevertheless reasonable & robust
- Having a (plain vanilla) computer can no longer be a source of productivity growth
→ Having one with new characteristics can
(ICT capital deepening & related organizational changes)
- How do individuals/organizations differ in their abilities to benefit from various ICT characteristics?
 - Multi-establishment firms in particular benefit from portability
 - Maliranta & Rouvinen (OECD: The Economic Impact of ICT): Younger plants