The Impact of ICT Use in Manufacturing Firms in Thailand

Joint UNCTAD - Thailand NSO Project

by Ruamporn Sirirattrakul
National Statistical Office, Thailand

Workshop on Information Society Statistics: Core ICT Indicators, 6-8 Nov. 2007, Bangkok
Outline

- Research Methodology and Data Sets
- Some results
- Lessons learned, experience gained from the joint project
- Recommendation
Research Methodology

The research based on 2 data sets:

- 2007 ICT Business Survey (70,800 sample firms) for overview of ICT uptake by firms
- 2003 Manufacturing Survey (8,862 sample firms) for productivity analysis using econometric techniques

Study firms with at least 1 employee
Empirical models

Cobb Douglas framework

\[
\ln\left(\frac{sales}{L}\right) = \beta_0 + \beta_1 ICT\ variables + \beta_2 \ln\left(\frac{K}{L}\right) + \beta_3 \ln\left(\frac{M}{L}\right) + \beta_4 \ln(L) + \beta_5 Multi\_unit + \\
+ \beta_6 Foreign\_capital + \beta_7 region + \beta_8 Industry + u
\]

where \(i\) takes values between 1 and 14 and \(h\) between 1 and 6.

- Labour productivity measured by value of sales per employee
- \(K = \) Capital, \(M = \) Spending on materials, \(L = \) Labor
- ICT variables comprise of presence of computers, access to internet and presence of website
  - including intensity of computer; proportion of employee using computers and number of computers per employee
- \(Multi\_unit = \) Form of economic organization (head offices, branches or single unit)
- \(Foreign\_capital = \) Foreign capital participation
Percentage of Firms by Economic Activities

- Trade & Services: 83.6%
- Manufacturing: 13.6%
- Land Transport: 1.6%
- Construction: 1.0%
- Hospital: 0.2%
Percentage of Firms by size of Firm and Industry: 2007

- Total
- Trade & Services
- Manufacturing
- Construction
- Land Transport
- Hospital

Industry

- 1 - 50 Persons
- 51 - 200 Persons
- Over 200 Persons
Percentage of Firms with Access to Internet: 2007

- **Total**: 29.3% in 2004, 33.1% in 2005, 36.6% in 2006, 43.5% in 2007
- **Trade & Services**: 9.0% in 2004, 10.7% in 2005, 16.9% in 2006, 12.1% in 2007
- **Manufacturing**: 17.6% in 2004, 10.1% in 2005, 11.3% in 2006, 12.9% in 2007
- **Construction**: 15.4% in 2004, 10.2% in 2005, 11.8% in 2006, 12.6% in 2007
- **Land Transport and Activities of Travel Agencies**: 9.6% in 2004, 10.1% in 2005, 12.6% in 2006, 12.9% in 2007
- **Hospital**: 9.0% in 2004, 10.1% in 2005, 11.3% in 2006, 12.9% in 2007

Percentage of Firms with Access to Internet: 2007

- **Total**: 29.3% in 2004, 33.1% in 2005, 36.6% in 2006, 43.5% in 2007
- **Trade & Services**: 9.0% in 2004, 10.7% in 2005, 16.9% in 2006, 12.1% in 2007
- **Manufacturing**: 17.6% in 2004, 10.1% in 2005, 11.3% in 2006, 12.9% in 2007
- **Construction**: 15.4% in 2004, 10.2% in 2005, 11.8% in 2006, 12.6% in 2007
- **Land Transport and Activities of Travel Agencies**: 9.6% in 2004, 10.1% in 2005, 12.6% in 2006, 12.9% in 2007
- **Hospital**: 9.0% in 2004, 10.1% in 2005, 11.3% in 2006, 12.9% in 2007
Percentage of Firms by presence of Web site and purposes of using web site: 2007

- Advertisement of products and firms 84.4%
- Inquiry / Contact facility 67.5%
- Receiving purchased order 16.3%
- Providing after sales services 8.9%
- Online payment 2.4 %
- Internal Information networking 5.7%

Note: An Establishment could answer more than 1 purpose
Some results of ICT impact on productivity

- Computer Use, Internet access and Web presence in manufacturing firms are associated with significantly higher sales per employee (labor productivity)
  - computer presence: 14.6%
  - internet access: 3.7%
    additional from computers
  - web presence: 3.8%
    additional from computers and internet
Some results

- Intensity of computer use was reflected in higher productivity gains
  - 3.6% higher labor productivity with 10% increase in the share of employees using computers
  - 4% higher labor productivity with 10% increase in no. of computers per employee
Lessons learned, experience gained from the joint project

1. Learning of applying Econometrics for ICT data analysis and using software SPSS from training

2. Learning by doing own in-depth data analysis in parallel with UNCTAD (as best practice) who provide technical assistance via email
   - conceptual framework, empirical modeling, and model selection techniques
   - solving heteroskedasticity and checking robustness
   - data analysis and interpretation
Lessons learned, experience gained from the exercise

- Gain more skill in processing micro firm data and applying econometric in data analysis
- Gain more techniques in data manipulation
- Gain in motivation for using Eviews software in running regression by our own
Recommendation

- An appropriate software for econometric analysis should be selected for learning and practicing at the beginning, i.e., Eviews.

- Technical assistance provided via long distance (email) is suitable for whom quite skills in statistics, data processing, fare English and regular communication.
THANK YOU

Sawaddee Ka