

IT Capital Spillovers In Korea



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Introduction

▣ Study Issues in This Field

- ◇ Objective: IT Capital and Spillover Effects
 - ★ Labor Productivity
 - ★ Total Factor Productivity
- ◇ Target: Manufacturing Industry Sector
 - ★ 11 Manufacturing Sectors using I/O Analysis
- ◇ Different Methodology Testing the Relationship and IT's Contributions
 - ★ Traditional Cross Section and Panel Analysis
 - ★ Time Series Analysis ←
 - ★ Clustering Method and DEA Method
 - ★ AHP and others

▣ What Implications from the study

Literature Review and Testing Methodology

- ▣ Controversy about the Contribution of IT Capital
 - ◇ Positive View
 - ★ Greenspan(1999)
 - ★ Oliner&Sichel(2000)
 - ★ Jorgenson(2001)

 - ◇ Negative View
 - ★ Solow(1987)
 - ★ Gordon(2000)
 - ★ Kiley(1999)

Literature Review and Testing Methodology

- ▣ Previous Empirical Results about Korea Case
 - ◇ Lee et al. Study(2001)

Variables	Target Sample			Data	Estimation Method
	All	OECD	Non-OECD		
Direct Effect	0.023 (0.014)	0.040 (0.021)	-0.038 (0.040)	Over1992-1999 For 50 Countries	Traditional Panel
Indirect Effect	0.303 (0.131)	-0.188 (0.140)	0.941 (0.265)		

- ◇ Problems
 - ★ Misusing Data Characteristics
 - ★ Results is Uncommon

Literature Review and Testing Methodology

▣ Testing Methodology

- ◆ Longer Data set: 1980-1999
- ◆ 11 Manufacturing Sectors
- ◆ Using I/O Table to Measure Indirect Effect
- ◆ Using Non Stationary Panel Data Analysis
- ◆ Using Coe & Helpman Model(1995)

★ Specification

$$\ln y_{i,t} = \alpha_i + \alpha_i^d \ln x_{i,t}^d + \alpha_i^f m_i \ln z_{i,t}^f$$

Empirical Results

□ Data

- ◇ Sources: ETRI Data Set
- ◇ Period: 1980 to 1999
- ◇ Sectors: 11 Sector:

Food, Beverages & Tobacco

Textiles, Apparel & Leather

Wood Products , Furniture & Paper

Chemical Products

Non-Metallic Mineral Products

Basic Metal Industries

Metal Products

Non-Electrical& Electrical Machinery

Transport Equipment

Professional Goods

Other Manufacturing

Empirical Results

Empirical Results

IPs Panel Unit Root Tests

Variables	1lag	2lag	3lag
Labor Productivity	1.9820 (0.0237)	3.281 (0.0005)	2.800 (0.0025)
	-0.4474 (0.3272)	0.513 (0.3036)	-0.3395 (0.3671)
Direct IT Capital	5.0971 (0.000)	5.924 (0.0000)	5.5603 (0.000)
	1.0117 (0.1558)	2.020 (0.0216)	2.1967 (0.0142)
Indirect IT Capital	0.8066 (0.2099)	0.250 (0.4010)	-0.484 (0.3141)
	1.0477 (0.1473)	0.7145 (0.2374)	1.1884 (0.1173)

Empirical Results

◆ Co-integration Test

Lag	1lag	2lag	3lag
Kao (1999) Test	-1.1243 (0.1304)	-1.7265 (0.0421)	-1.3033 (0.0962)

◆ Contribution Estimation using Three Estimators

Estimation	PMG		MG		Static Panel OLS	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Variables (t-Value)	0.242 (165.66)	-0.041 (-24.780)	0.287 (1.846)	0.361 (0.967)	0.2484 (11.382)	0.1287 (2.1851)
Hausman Test	1.92 (0.38)					

Empirical Results

▣ Empirical Findings

- ◆ IT Capital Stock is Non-stationary
- ◆ The Existence of Co-integration Relationship among Variables
- ◆ Different Estimations, Different Results

Estimations	Panel OLS	MG	PMG
Direct	+ (Significant)	+ (Significant)	+ (Significant)
Indirect	+ (Significant)	+ (Insignificant)	- (Significant)

Summary and Implications

▣ Implications

◇ IT Capital Spillover Effect In Korea is little

- ★ Adjustment Cost Problem
- ★ Learning By Doing or Using
- ★ Time Lag so Longer Time Series
- ★ Shorter Technology Life Cycle
- ★ etc

◇ IT Capital Stock Measurement Problem

- ★ IT Definition and Scope
- ★ Capital Calculation Methods

▣ Limitations and Future study



Questions/Thanks