International Outsourcing, Foreign Ownership, Exporting and Productivity: Evidence from plant level data

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Introduction

International outsourcing a growing phenomenon in world trade (Feenstra, 1998)

Trade in outsourced components in v.i.

- 21% of exports (Hummels et al., 2001)

Outsourcing growth: 30% between 1970 and 1990

Manpower survey

- 68% firms outsource some services: cost reduction

New trend: outsourcing of "high abstraction" activities

- LR strategic viability: 56% respondents say quality worse
- 11% say induces production setback

Question: does outsourcing improve productivity?

Contribution

Impact of international outsourcing on Productivity

Investigation of Interactive Effects

- Ownership and Export Status
- Motivated by Grossman and Helpman (2004)
- Importance of Factors e.g search costs & supplier mkt. thickness

Investigation of these factors for a small, open economy

- such economies reliant on fragmentation (Hummels et al., 2001)
- Ireland an important host country for multinational affiliates (Ruane and Sutherland, 2002)

Outsourcing and Productivity

Theoretical rationale for productivity gains

- assume goods produced in multi-stage process
- 2 labour types: skilled and unskilled with former having higher MP than latter
- Outsourcing can induce higher labour productivity within the plant
- Can also shift production function

Two Types of Effect: Direct & General Equilibrium

Direct Effects

- Reallocation of production (cheaper factors of production abroad)
- Refocus towards skilled production induces labour productivity to rise

General Equilibrium Effect

- Changes in relative demand for production factors in the economy
- Affects relative prices

Our Analysis

- Most likely to capture short run effects i.e. direct effects

Related Literature

Outsourcing and Wages

- focus on wage effects of outsourcing
- mandated regression approaches (Feenstra and Hanson, 1999; Hijzen, 2003)

Outsourcing and Labour Productivity

- productivity of low skilled labour (Egger and Egger, 2001)
- short run losses with cross-border fragmentation

Studies using Firm Level data

- Study of Japanese outsourcing on firm level labour demand by Head and Ries (2002)
- Find changes in skill intensities consistent with low skilled outsourcing

Link between Outsourcing and total factor productivity

- No analysis, to our knowledge, has looked at this using firm-level data

Empirical Methodology

Outsourcing in a production function

$$(y-l)_{it} = \pi + \eta(y-l)_{it-1} + \delta outs^{m,s}{}_{it} + \alpha(k-l)_{it} + \gamma(m-l)_{it} + \kappa(s-l)_{it} + \lambda l_{it} + \mu_i + \varepsilon_{it} \quad [3]$$

- assume that production reallocations due to outsourcing shift the production function
- $outs^{m,s}$ is outsourcing intensity for materials and services respectively
- μ_i captures unobserved fixed effects not accounted for in the model

Econometric Issues

- Need to remove firm specific, time invariant effects through first differencing
- Lagged dependent variable leads to biased estimates if using OLS (Baltagi, 2001)
- Outsourcing / productivity relationship may be endogenous
- Also factor inputs optimally treated as endogenous
- Solution: GMM estimator (Arellano and Bond, 1991)

Irish Economy Expenditure Survey Data

- Undertaken annually by Forfás
- Annual survey of plants with >= 20 employees
- Information on output, exports, employment, capital employed, plant's labour, materials and service inputs spend
- Response rate 60-80 percent
- Period covered 1990-1998

Outsourcing Variable in the Data

- Substitute for in-house production
- In SR this might lead to wage bill cuts
- Accordingly equal to opportunity wage
- As in Girma and Görg (2004) we calculate outsourcing as imported intermediates over total wage bill

Material and Service Inputs Bought-In

Material and service inputs calculated separately

- service inputs include direct and indirect cost
- exclude materials, wages, rent, interest payments and depreciation
- includes contracted in services such as consultancy, security and catering

	Low Productivity		High Productivity	
	Mean	Std. Deviation	Mean	Std. Deviation
Materials o/s intensity ($outs^m$)	1.00	1.15	2.43	4.16
Services o/s intensity ($outs^s$)	0.21	1.84	0.44	2.15
Domestic firms	5828 (59%)		2497 (36%)	
Foreign firms	4005 (41%)		4359 (64%)	

- higher productivity plants demonstrate higher average outsourcing intensities
- applies to both material and service inputs
- greater number of foreign firms in higher productivity category

Results (1): Foreign and Domestic

	(1)	(2)	(3)
	All	Foreign	Domestic
$outs^s$	-0.001	-0.004	0.009
	(0.003)	(0.003)	(0.009)
$outs^m$	0.012	0.017	0.009
	(0.002)*	(0.002)*	(0.004)*
(y-l) lagged	0.102	0.077	0.158
	(0.012)*	(0.014)*	(0.019)*
(k-l)	0.025	0.045	0.021
	(0.009)*	(0.010)*	(0.011)
(m-l)	0.385	0.301	0.411
	(0.019)*	(0.021)*	(0.019)*
(s-l)	0.066	0.087	0.076
	(0.013)*	(0.015)*	(0.015)*
l	-0.033	-0.039	-0.113
	(0.017)	(0.022)	(0.022)*

- Coefficients on production factors as expected
- w.r.t. $outs^m$: positive and statistically significant: not for $outs^s$
- Increase in $outs^m$ by 1% raises productivity by 1.2%
- Size of $outs^m$ coefficients larger for foreign firms than for domestic

Results (2): Exporting Status

	(1)	(2)	(3)	(4)
	foreign exporters	foreign non-exporters	domestic exporters	domestic non-exporters
$outs^s$	-0.003	0.052	-0.003	-0.005
	(0.003)	(0.024)	(0.009)	(0.022)
$outs^m$	0.017	-0.015	0.014	-0.001
	(0.002)*	(0.008)	(0.004)*	(0.009)
(y-l) lagged	0.074	0.113	0.151	0.091
	(0.014)*	(0.026)*	(0.019)*	(0.027)*
(k-l)	0.046	0.016	0.057	-0.015
	(0.010)*	(0.018)	(0.012)*	(0.011)
(m-l)	0.297	0.729	0.374	0.538
	(0.021)*	(0.024)*	(0.019)*	(0.030)*
(s-l)	0.075	0.073	0.092	0.126
	(0.015)*	(0.024)*	(0.015)*	(0.020)*
l	-0.036	-0.120	-0.110	-0.126
	(0.022)	(0.038)*	(0.022)*	(0.036)*

- Outsourcing +ive related to productivity for materials inputs for both domestic & foreign exporters
- Coefficients largely similar
- Only exporting plants appear to benefit from production networks

Conclusions

Positive productivity gains accrue to:

- exporting firms engaging in international outsourcing

Reasons for gains:

- these firms enjoy extensive production networks
- Superior knowledge allows them source most competitively priced inputs (Grossman & Helpman, 2004)
- Further reason: output scale economies permit lower per unit costs of outsourcing

Benefits to Services Outsourcing:

- not clear cut
- Rewards to services procurement might be non-existent
- our results in line with mixed messages from practitioners