EXPORT INTENSITIES AND BACKWARD LINKAGES

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INTRODUCTION: RESEARCH QUESTION

Consider

$$TEXTILES \rightarrow^{SUPPLYING\ TO} GARMENTS$$

Questions:

1. Horizontal Spillover: Does increase in export intensity of a TEXTILES firm lead to an increase in productivity of the textile industry as a whole?
2. Backward spillover: Does increase in export intensity of a GARMENTS firm lead to an increase in productivity of TEXTILE industry?

HORIZONTAL AND BACKWARD SPILLOVERS

Horizontal Spillovers	Backward Spillovers
Entry of foreign exporter in host market leads e.g. Initiation by Daewoo. ➔to fall in entry costs ➔ Domestic firms copying them through observation BUT: Trade Secrecy & Intellectual Property Rights ➔Hiring workers trained by such foreign firms BUT: High wages to prevent labour turnover ➔Tough competition forces domestic firms to be efficient BUT: Business Stealing effect **The more export intensive an industry is ➔ more technologically advanced and efficient you have to be ➔ as competitive as foreign firm ➔ export intensity imitating foreign presence**	• More the export intensity of firm, the more the MNC customers abroad will provide services to the firm to extract the best quality. E.g. Auditors sent to firms to check quality and giving suggestions for improvement, providing special equipment. • Export intensity rises quality and delivery demands will also rise and the same will hold true. • Export intensity rises ➔ greater amounts exported ➔ Economies of scale.

DATA

Firm-level panel data, based on a firm survey conducted by World Bank

- 5 years, spanning from 1999 to 2003
- TEXTILES industries (144 firms) and the estimation sample is 133 firms after removing subcontracting firms
- Contains information on production variables, firm characteristics and business environments.

$$export\ intensity\colon\ x = \frac{realexport\ of\ product\ k\ by\ firm\ i}{total\ realoutput\ of\ firm\ i}$$

BASE PAPER AND EXISTING LITERATURE

- Base Paper: Javorcik, B. S. (2004). Does Foreign Direct Investment Increase in the Productivity of Domestic Firms? In search of Spillovers Through Backward Linkages. *The American Economic Review 94*(3), 605-627.

- As per existing research for developing countries:

➔Significant positive Backward linkage

➔Insignificant horizontal linkage in some papers and significant negative linkage in some.

- My contribution: Linking textiles output and garments input based on HS Codes to create the Back variable.

ESTIMATION STRATEGY

- $\ln y_{it} = \alpha + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 \ln M_{it} + \beta_4 horizontal_{it} + \beta_5 back_{it} + \alpha_t + \alpha_r + \varepsilon_{it}$

Horizontal ➔ Export-intensity of textile firms by product ➔ of firm i and product k

$$Horizontal_t = \sum \frac{realexport_{jkt}}{realoutput_{jkt}} * \frac{total\ sales\ of\ product\ k\ by\ firm\ i}{total\ \ sales\ of\ product\ k}$$

$$= \sum_k \frac{realexport_{ikt}}{realoutput_{ikt}} * \frac{Y_{ikt}}{\sum Y_{kt}}$$

BACK VARIABLE

Step 1: Using GARMENTS data, for each garment firm j and input k (63 unique inputs):

Generating α_k: **Product – Specific Export Intensity Measure**

$$\alpha_k = \sum \frac{realexport_{jkt}}{realoutput_{jkt}} * \frac{material\ cost\ of\ input\ k\ _{jkt}}{total\ material\ cost\ of\ input\ k_{kt}}$$

And summing over all products…

Step 2: Using Textiles data, for each textile firm I and output k (64 unique products)

$$Back_t = \sum_k \alpha_k * \frac{total\ sales\ of\ product\ k\ by\ firm\ i}{total\ \ sales\ of\ product\ k}$$

ECONOMETRIC ISSUES

- **SIMULTANEITY BIAS**: Inputs like labour, materials etc are observable to the firm but not to the econometrician➔ endogeneity (expressed as ω_i)

$$\ln y_{it} = \alpha + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 \ln M_{it} + \beta_4 horizontal_{it} + \beta_5 back_{it} + \alpha_t + \alpha_r + \varepsilon_{it} + \omega_i$$

- Industry level variables and firm level variables are regressed together in the regression ➔ standard errors have serious downward bias ➔ needs to be accounted for.

- **Solution**: **OLLEY AND PAKES** method

➔Create a variable as a proxy for investment, which is approximated using fourth order polynomial series in investment and capital. Do OLS since unobserved variation accounted for. Gives coefficient for material and labour.

➔Finding the coefficient for capital using Non-linear estimation.

➔ Calculate $tpf_{it} = y_{it} - \beta_l * l_{it} - \beta_m * m_{it} - \beta_k * k_{it}$ and regress this on control variables, back and horizontal.

RESULTS

	Dependent variable: log(realoutput)		Dependent Variable: tpf estimated with Olley Pakes	
	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
Back	-0.06412 (0.0714)	0.1044 (0.153)	0.0676 (0.306)	0.06414 (0.0711
Horizontal	-0.0034 (0.0164)	0.0487 (0.0247)	0.01120 (0.0184)	0.06414 (0.0146)
No. of Observations	568	568	278	278
R-squared	0.9828	0.9802	0.0326	0.0321

NEXT STEPS

Based on current results:

- ➔Export intensity of a textile firm does not improve productivity of other textile firms
- ➔Export intensity of garments firms does not improve the productivity of textile industry.

Possibility of presence of spillovers in

- ➔Firms who are more technologically advanced (interaction between back and RD expenditure).
- ➔Firms with more skilled labour reap greater spillovers from both back and horizontal.

APPENDIX: OLLEY PAKES

Step 1: Let liquidation value = $\Phi\ dollars$

$$V_{it}(K_{it}, \omega_{it}) = Max[\Phi, sup_{I_{it} \geq 0} \Pi_{it}(K_{it}, \omega_{it}) - C(I_{it}) + \beta E\{V_{it+1}(K_{it+1}, \omega_{it+1}) | J_{it}\}]$$

So, if $E[\omega_{it+1} | K_{it}, \omega_{it}] > \Phi$ ➔ Stay or else Exit

To get over this endogeneity,

$$y_{it} = \beta_l * l_{it} + \beta_m * m_{it} + \phi(i_t, k_{it}) + \eta_{it}$$

Where $\phi(i_t, k_{it}) = \beta_0 + \beta_k * k_{it} + h(i_t, k_{it})$

In this study, $i_t = \log(K_{it} - K_{it-1} + 0.15K_{it-1})$ and $h(i_t, k_{it})$ is the 4th order polynomial expansion series.

Step 2: Involves removing selection bias by accounting for exit of firm ➔ ignored since 4/133 exit.

Step 3: Non linear estimation to find coefficient of capital and generate real output values which are corrected for these biases.

$$y_{it} - \beta_l * l_{it} - \beta_m * m_{it} = \beta_0 + \beta_k * k_{it} + g(\Phi_{t-1} - \beta_k * k_{it}) + \xi_{it} + \eta_{it}$$

Where g(.) is a fourth order polynomial.

Since selection bias in not corrected, the coefficient of capital is from OLS.

➔ Calculate $tpf_{it} = y_{it} - \beta_l * l_{it} - \beta_m * m_{it} - \beta_k * k_{it}$ and regress this on control variables, back and horizontal.