

Global Sourcing — Evidence from Spanish Firm-Level Data

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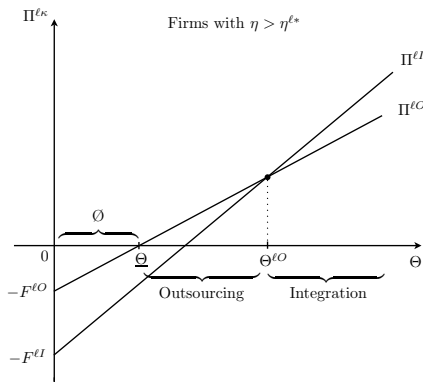
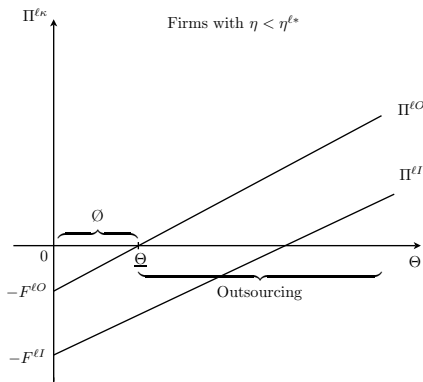
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The “Global Sourcing”-Matrix, GAO (2004)

		Domestic	Offshore
In-house	Domestic in-house production	<p>Example: Company produces its products domestically without any outside contracts</p>	<p>Example: Company uses services supplied by its own foreign-based affiliate (subsidiary)</p>
	Outsourced	<p>Example: Company uses services supplied by another domestically-based company</p>	<p>Example: Company uses services supplied by an unaffiliated foreign-based company</p>

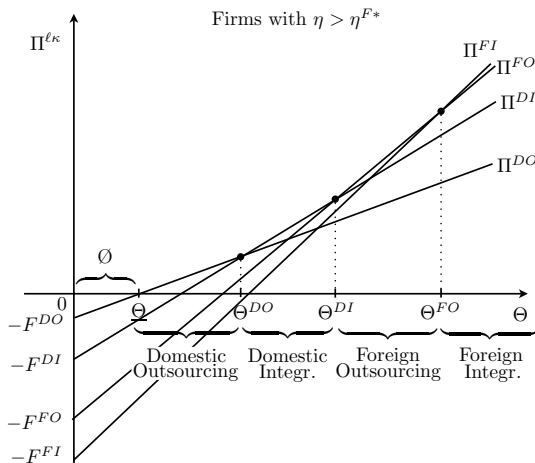
Antràs & Helpman (2004)

Antràs effect with fixed cost heterogeneity



Antràs & Helpman (2004)

Productivity-ranking of firms



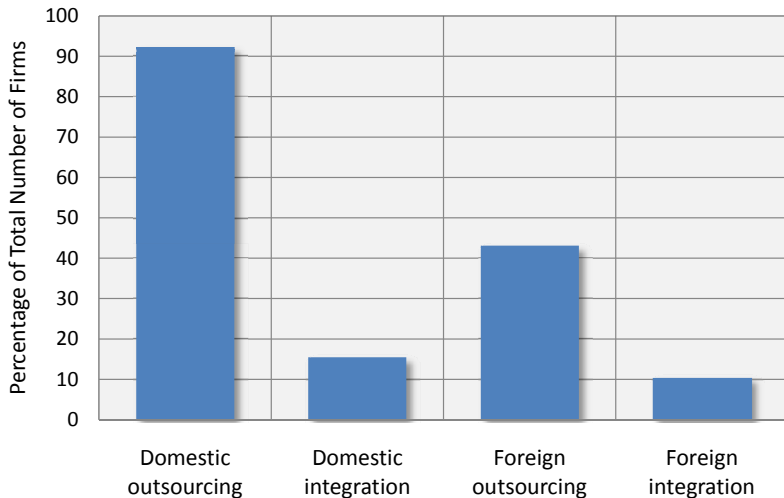
Contribution to the Literature

- The higher a firm's **capital intensity** and **productivity** the higher is her probability of **vertically integrating** intermediate input production into the boundaries of control, both at home and abroad.
- Importantly, the effect of **productivity** is larger the higher the **capital intensity** of the firm.
- The **productivity-ranking** of firms engaging in different sourcing modes is impressively consistent with the data.

Data Description

- Spanish **firm-level panel data set** (ESEE, 2000-2007) with a coverage of approx. 2.000 manufacturing firms per year.
- From 2006 onwards we are able to differentiate between the **four intermediate input sourcing strategies**.
- Intermediate inputs are goods that have been acquired from a **different legal entity** (either related or unrelated to the firm) and *“incorporated and transformed in the production process”*.
- **Total factor productivity** convincingly computable (Olley & Pakes, 1996)
- **Ownership structure** of firms visible
- No transaction-level information

Spanish Firms' Sourcing Modes in 2007



Econometric Model I

$$\left(\frac{M^{FI}}{M^{FI} + M^{FO}} \right)_{it} = \beta_0 + \beta_1 KAPINT_{it} + \beta_2 SKILLINT_{it} + \beta_3 PROD_{OPit} + \beta_4 AGE_{it} + \varphi_j + \vartheta_t + \epsilon_{it},$$

$$\left(\frac{M^{DI}}{M^{DI} + M^{DO}} \right)_{it} = \beta_0 + \beta_1 KAPINT_{it} + \beta_2 SKILLINT_{it} + \beta_3 PROD_{OPit} + \beta_4 AGE_{it} + \varphi_j + \vartheta_t + \epsilon_{it}.$$

Estimation Results Ia

Table 3: Intra-firm Share of Foreign Intermediate Input Sourcing (TOBIT Model)¹

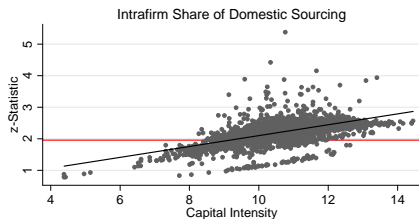
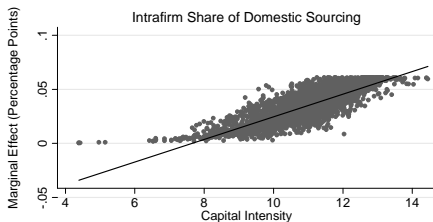
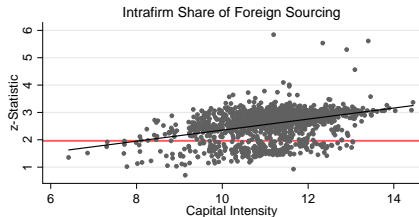
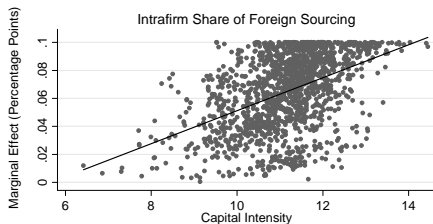
VARIABLES	Pooled	Random-Effects	Bivariate Constrained	Bivariate Unconstrained	
	(1)	(2)	(3)	(4)-(2006)	(5)-(2007)
<i>KAPINT</i>	0.045*** (0.013)	0.029*** (0.008)	0.030*** (0.011)	0.022* (0.012)	0.039*** (0.013)
<i>SKILLINT</i>	0.127*** (0.046)	0.091*** (0.029)	0.101** (0.042)	0.106** (0.043)	0.125*** (0.048)
<i>PROD_{OP}</i>	0.066*** (0.022)	0.023*** (0.009)	0.021* (0.011)	0.031** (0.014)	0.011 (0.015)
<i>AGE</i>	0.001** (0.001)	0.001*** (0.000)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)
Constant	-1.726*** (0.250)				
ρ		0.931*** (0.010)	0.923*** (0.015)	0.936*** (0.012)	
Industry Fixed Effects	Yes	Yes	Yes	Yes	
Year Fixed Effects	Yes	Yes	Implicit	Implicit	
Observations	1482	1482	1118	1118	
Pseudo R^2	0.11				
Log (Pseudo-)Likelihood	-765.724	-561.084	-407.395	-392.155	
$F(.,.)$ / Wald χ^2	6.55	95.52	517.77	2937.38	
$Prob > F / Prob > \chi^2$	0.000	0.000	0.000	0.000	

Estimation Results Ib

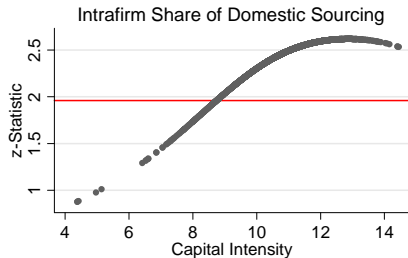
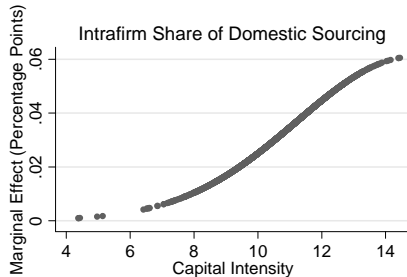
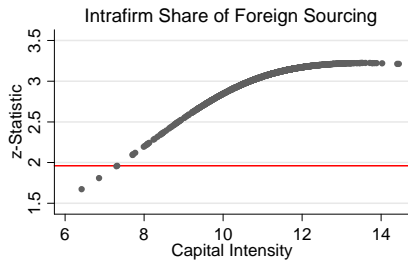
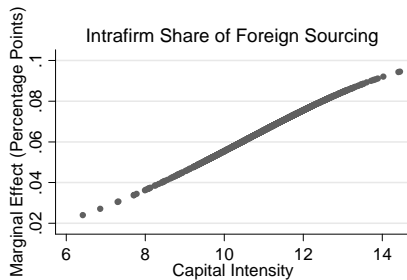
Table 4: Intra-firm Share of Domestic Intermediate Input Sourcing (TOBIT Model)¹

VARIABLES	Pooled	Random-Effects	Bivariate Constrained	Bivariate Unconstrained	
	(1)	(2)	(3)	(4)-(2006)	(5)-(2007)
<i>KAPINT</i>	0.058*** (0.010)	0.048*** (0.007)	0.053*** (0.009)	0.044*** (0.009)	0.045*** (0.007)
<i>SKILLINT</i>	0.076** (0.030)	0.078*** (0.025)	0.079*** (0.031)	0.088*** (0.028)	0.061** (0.030)
<i>PROD_{OP}</i>	0.032** (0.013)	0.010 (0.045)	0.019** (0.009)	0.011 (0.008)	0.021** (0.010)
<i>AGE</i>	0.000 (0.000)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	-1.127*** (0.122)				
ρ		0.890*** (0.011)	0.895*** (0.014)	0.901*** (0.013)	
Industry Fixed Effects	Yes	Yes	Yes	Yes	
Year Fixed Effects	Yes	Yes	Implicit	Implicit	
Observations	3282	3282	2878	2878	
Pseudo R^2	0.11				
Log (Pseudo-)Likelihood	-1306.356	-960.526	-831.133	-801.957	
F(..) / Wald χ^2	8.38	147.30	173.05	700.74	
$Prob > F / Prob > \chi^2$	0.000	0.000	0.000	0.000	

Marginal Effects of Productivity



Marginal Effects of Productivity



Econometric Model II

$$PROD_{OPit} = \beta_0 + \beta_1 FI_{it} + \beta_2 FO_{it} + \beta_3 DI_{it} + \beta_4 AGE_{it} + \\ + \beta_5 EXPORT_{it} + \beta_6 SIZE_{it} + \varphi_j + \vartheta_t + \epsilon_{it},$$

$$PROD_{OPit} = \beta_0 + \beta_1 FI_{it} + \beta_2 FO_{it} + \beta_3 DI_{it} + \beta_4 DO_{it} + \beta_5 AGE_{it} + \\ + \beta_6 EXPORT_{it} + \beta_7 SIZE_{it} + \varphi_j + \vartheta_t + \epsilon_{it},$$

- Sourcing dummies are hierarchical and mutually exclusive.
- Productivity premia are relative to the domestic-outsourcing and to the non-sourcing category, respectively.

Estimation Results IIa

VARIABLES	<i>PROD_{OP}</i>					
	Pooled OLS		Between Estimator		Random-Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>FI</i>	0.432*** (0.120)	0.213* (0.117)	0.553*** (0.152)	0.298** (0.149)	0.347*** (0.098)	0.176* (0.091)
<i>FO</i>	0.204*** (0.033)	0.134*** (0.031)	0.237*** (0.038)	0.157*** (0.037)	0.150*** (0.032)	0.098*** (0.031)
<i>DI</i>	0.213** (0.085)	0.059 (0.090)	0.202** (0.091)	0.019 (0.090)	0.132* (0.070)	0.021 (0.070)
<i>AGE</i>	-0.002* (0.001)	-0.004*** (0.001)	-0.002** (0.001)	-0.004*** (0.001)	-0.001 (0.001)	-0.003*** (0.001)
<i>EXPORT</i>	0.184*** (0.032)	0.094*** (0.033)	0.191*** (0.034)	0.097*** (0.035)	0.179*** (0.030)	0.097*** (0.030)
<i>SIZE_L</i>		0.137*** (0.015)		0.137*** (0.015)		0.138*** (0.015)
Constant	9.751*** (0.076)	9.306*** (0.086)	9.712*** (0.087)	9.274*** (0.096)	9.752*** (0.076)	9.299*** (0.086)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	No	No	Yes	Yes
H0: <i>FI</i> = <i>FO</i>	0.05	0.49	0.04	0.34	0.04	0.38
H0: <i>FI</i> = <i>DI</i>	0.13	0.27	0.04	0.10	0.07	0.16
H0: <i>FO</i> = <i>DI</i>	0.92	0.38	0.71	0.13	0.79	0.27
Observations	2278	2278	2278	2278	2278	2278
<i>R</i> ²	0.18	0.23	0.21	0.26		

Estimation Results IIb

VARIABLES	<i>PROD_{OP}</i>					
	Pooled OLS		Between Estimator		Random-Effects	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>FI</i>	0.415*** (0.124)	0.183 (0.122)	0.540*** (0.161)	0.274* (0.158)	0.326*** (0.101)	0.149 (0.095)
<i>FO</i>	0.188*** (0.051)	0.103** (0.048)	0.228*** (0.072)	0.133* (0.071)	0.131*** (0.043)	0.070* (0.042)
<i>DI</i>	0.198** (0.093)	0.030 (0.093)	0.193* (0.109)	-0.004 (0.107)	0.113 (0.076)	-0.006 (0.076)
<i>DO</i>	-0.012 (0.047)	-0.027 (0.045)	-0.006 (0.069)	-0.021 (0.067)	-0.016 (0.039)	-0.024 (0.038)
<i>AGE</i>	-0.002* (0.001)	-0.004*** (0.001)	-0.002** (0.001)	-0.004*** (0.001)	-0.001 (0.001)	-0.003*** (0.001)
<i>EXPORT</i>	0.195*** (0.031)	0.103*** (0.032)	0.198*** (0.033)	0.104*** (0.034)	0.182*** (0.028)	0.100*** (0.029)
<i>SIZE_L</i>		0.137*** (0.015)		0.137*** (0.014)		0.139*** (0.015)
Constant	9.765*** (0.086)	9.336*** (0.092)	9.730*** (0.106)	9.308*** (0.111)	9.777*** (0.082)	9.328*** (0.090)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	No	No	Yes	Yes
H0: <i>FI</i> = <i>FO</i>	0.05	0.49	0.04	0.34	0.04	0.37
H0: <i>FI</i> = <i>DI</i>	0.13	0.27	0.04	0.09	0.06	0.15
H0: <i>FI</i> = <i>DO</i>	0.00	0.07	0.00	0.04	0.00	0.06
H0: <i>FO</i> = <i>DI</i>	0.91	0.39	0.71	0.13	0.80	0.27
H0: <i>FO</i> = <i>DO</i>	0.00	0.00	0.00	0.00	0.00	0.00
H0: <i>DI</i> = <i>DO</i>	0.01	0.51	0.03	0.85	0.06	0.79
Observations	2426	2426	2426	2426	2426	2426
<i>R</i> ²	0.18	0.23	0.21	0.26		

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