

The Effects of Service Offshoring on Productivity: Evidence from Italy and Western Europe

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Introduction

Over the last decade, growing attention paid at service offshoring and its potential consequences for the industrialized economies

[See, e.g., Bhagwati et al., (2004), Samuelson (2004), Amiti and Wei (2005), Blinder (2006), Mankiw and Swagel (2006)]

Two main issues:

1. Employment and skills
2. Productivity and welfare

Introduction

What is special about service offshoring?

1. Rather new phenomenon: Trade in services and ICT
(Freund and Weinhold, 2002; Lipsey, 2006; Feenstra, 1998, 2007)
2. Still small but growing: Anecdotal evidence and official statistics
(Unctad, 2004; Oecd, 2007)
3. Modeling approach: Old theory, new paradigm, or both?
(Blinder, 2006; Baldwin, 2006; Grossman and Rossi-Hansberg, 2008; Markusen and Strand, 2008)
4. Offshored activities: Not just call-centers...
(Levy and Murnane, 2006; Blinder, 2007; Blinder and Krueger, 2009; Crinò, 2009 and forthcoming)

Introduction

This paper:

Empirically studies effects of service offshoring on productivity, using comparable data on Italy and other 8 Western European countries

Service offshoring: Share of imported services in total input purchases. Computed using Import Matrixes and economy-wide service import data from Eurostat

Output, input, and control variables: Mostly sourced from EUKLEMS (Timmer et al., 2007)

Introduction

Focus on:

1. Overall service offshoring
2. Offshoring of individual services

Preview of the results:

1. Positive and precisely estimated effects on productivity
2. Moderate economic magnitude (1 p.p.↑ in S.O.↑ productivity by $\approx 0.4\%$)
3. Heterogeneity across individual services
4. Similar evidence for Italy and other countries

Outline of the presentation

- Related literature
- Data and stylized facts
- Preliminary evidence
- Empirical model
- Results
- Conclusion

Related literature

Theoretical studies

(Samuelson, 2004; Antras et al., 2006; Baldwin and Robert-Nicoud, 2007; Rodriguez Clare, 2007; Grossman and Rossi-Hansberg, 2008; Markusen and Strand, 2008)

Empirical studies on offshoring and productivity

(recently surveyed by Olsen, 2006)

1. Type of offshoring analyzed
2. Data, measurement and empirical approach
3. Industrialized economies or developing countries

Related literature

1. Type of offshoring analyzed

So far, most of attention devoted to *material* offshoring. Yet, number of studies on service offshoring grew in recent years

2. Data, measurement and empirical approach

Both industry- and firm-level data. Offshoring proxied by imports of intermediates/services. Focus on both Labor Productivity and Total Factor Productivity (TFP)

3. Countries

So far, most of studies on industrialized economies, but those on LDCs are growing. [See, e.g., Morrison and Jasar (2007); Kasahara and Rodriguez (2008).]

Related literature

Studies related to this paper

1. Criscuolo and Leaver (2005): Firm-level data on the UK
2. Gorg and Hanley (2005) and Gorg et al. (2008): Firm-level data on Ireland
2. Amiti and Wei (2009): Industry-level data on the US
3. Hijzen et al. (2009): Firm-level data on Japan
4. Crinò (2008): Industry-level data on Western Europe
5. Daveri and Jona-Lasinio (2008): Industry-level data on Italy

Data and stylized facts

Table 1 - Sample Composition and Coverage

Industries			
NACE Code	Description	NACE Code	Description
15, 16	Food, bev., tobac.	30-33	Electrical, optical eqpmnt.
17-19	Text., leath., footwear	34, 35	Transport eqpmnt.
20	Wood and cork	36, 37	Manufacturing, nec
21, 22	Pulp, paper, print., publ.	50	Wholesale and retail, motor vehicles
23	Coke, ref. petr. and nucl. fuel	51	Wholesale, except motor vehicles
24	Chemicals	52	Retail, except motor vehicles
25	Rubber and plastics	60-63	Transportation and storage
26	Other non metall. min. prod.	64	Post and telecommunication
27, 28	Basic metals and fabr. met. prod.	70	Real estate
29	Machinery, nec	71-74	Other business activities

Countries	% of private sector employment in 2004
Austria	75.0
Finland	81.0
France	79.0
Germany	80.0
Italy	77.0
Netherlands	80.0
Spain	70.0
Sweden	82.0
U.K.	77.0

Data and stylized facts

Following Amiti and Wei (2005, 2009), service offshoring is measured by the share of imported private services in total non-energy input purchases.

Main problem: lack of official service import data at the industry-level

Usual solution: estimate these figures by combining Input-Output Accounts and economy-wide service import data

Calculation procedure used in this paper: borrowed from Crinò (forthcoming)

Data and stylized facts

From Eurostat, retrieve Import Matrixes for 1995 and 2000 (element of the I-O Accounts) and economy-wide imports of five services (communication, finance and insurance, computer and information, other business services, royalties and license fees)

Using Import Matrixes, compute each industry's average share in economy-wide imports of each of these services

$$\bar{\theta}_{i,c,s} = (\theta_{i,c,s}^{95} + \theta_{i,c,s}^{00}) / 2$$

where i industry, c country and s service.

Data and stylized facts

Then, apply these shares to the economy-wide imports ($M_{c,s,t}$) and sum throughout

$$IMPS_{c,i,t} = \sum_{s=1}^5 \bar{\theta}_{c,i,s} * M_{c,s,t}$$

Finally, normalize by the total purchases of non-energy inputs (NE)

$$SOS_{c,i,t} = \frac{IMPS_{c,i,t}}{NE_{c,i,t}}$$

Do the same for each service to get individual measures

$$SOS_{c,i,t}^s = \frac{IMPS_{c,i,t}^s}{NE_{c,i,t}} \quad \forall s = 1, \dots, 5$$

Data and stylized facts

Main limitations of this indicator and proposed solutions

- Normalization based on inputs: Use industry output as an alternative. [As in Hijzen et al. (2005) and Horgos (2009).]
- Estimation of industry-level imports: Use official data from Import Matrixes, available only for 1995 and 2000
- Heterogeneity across services: Figure it out using service-specific indicators

Data and stylized facts

Other variables

MOS: share of imported intermediates in total non-energy input purchases (proxy for material offshoring, as in Feenstra and Hanson, 1996, 1999). Computed as explained above using Eurostat Import Matrixes and import data from STAN (Oecd)

Y: real output; *L*: number of worked hours; *K*: capital services.
Sourced from EUKLEMS

IMPEN: imports over GDP (World Development Indicators); *ICT*: share of Information and Communication Technology in capital services (EUKLEMS); *EN. PRICE*: price of energy (EUKLEMS)

Table 2 - Descriptive Statistics

	N	Mean	Std. Dev.
SOS	2317	2.69	3.82
MOS	2368	22.5	19.5
ICT	2550	14.6	14.7
ln Y	2610	9.82	1.65
ln L	2610	5.56	1.36
ln K	2569	7.67	1.84
ln M	2610	9.25	1.63
ln (VA/L)	2610	3.31	0.99
ln (K/L)	2569	2.11	1.33
L_{HS}/L	2590	9.72	8.65
ln EN. PRICE	2548	0.09	0.24
IMPEN	2610	33.79	12.63

Table 3 - Service Offshoring, Whole Sample and Italy

	N	Mean (%)	Std. Dev. (%)	Δ 1990-2004 (p. perc.)
<i>Whole Sample</i>				
Service Offshoring	2317	2.69	3.82	0.62
Business Services	2317	1.95	3.32	0.53
Communication	2317	0.23	1.26	0.15
Finance and Insurance	2317	0.18	0.33	-0.09
Computer and Information	2317	0.06	0.14	0.08
Royalties and license fees	2317	0.27	0.76	-0.06
<i>Italy</i>				
Service Offshoring	300	2.04	2.21	0.10
Business Services	300	1.18	1.27	0.57
Communication	300	0.21	0.70	0.14
Finance and Insurance	300	0.43	0.59	-0.54
Computer and Information	300	0.04	0.08	0.02
Royalties and license fees	300	0.18	0.16	-0.10

Preliminary evidence

Service offshoring and labor productivity (value added per worked hour)

Empirical specifications

$$\ln(VA / L)_{c,i,t} = \alpha_0 + \alpha_1 SOS_{c,i,t} + \alpha' \Omega_{c,i,t} + \varepsilon_{c,i,t}$$

and

$$\ln(VA / L)_{c,i,t} = \alpha_0 + \sum_{s=1}^5 \alpha_s SOS_{c,i,t}^s + \alpha' \Omega_{c,i,t} + \varepsilon_{c,i,t}$$

where Ω vector of control variables and ε white-noise disturbance.

Both models estimated on whole sample and Italy.

Table 4 - Service Offshoring and Labor Productivity in Europe

Dependent Variable: $\ln(VA/L)$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SOS	0.007*	0.029***	0.029***	0.026***	0.026***	0.024***	0.021***	0.027***	0.014***	0.009***	0.008***
	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]	[0.002]
$\ln(K/L)$							0.001***			0.257***	0.277***
							[0.000]			[0.021]	[0.022]
L_{HS}/L								0.041***		0.009***	0.009***
								[0.002]		[0.002]	[0.002]
$\ln(M/L)$									0.813***	0.528***	0.512***
									[0.013]	[0.019]	[0.020]
$\ln Y$		0.324***	0.323***	0.328***	0.358***	0.361***	0.342***	0.412***	0.096***	0.113***	0.112***
		[0.013]	[0.013]	[0.013]	[0.012]	[0.012]	[0.012]	[0.009]	[0.006]	[0.007]	[0.008]
Year Effects	no	no	yes	no	no	yes	yes	yes	yes	yes	no
Country Effects	no	no	no	yes	no	yes	yes	yes	yes	yes	yes
Industry Effects	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Year-Country Effects	no	no	no	no	no	no	no	no	no	no	yes
Year-Industry Effects	no	no	no	no	no	no	no	no	no	no	yes
N	2317	2317	2317	2317	2317	2317	2288	2299	2317	2271	2271
R^2	0.00	0.31	0.31	0.31	0.70	0.70	0.73	0.77	0.90	0.92	0.93

OLS regressions with heteroskedasticity robust standard errors in square brackets. ***, **, *: significant at 1%, 5% and 10%, respectively.

Table 6 - Offshoring of Individual Services and Labor Productivity in EuropeDependent Variable: $\ln(VA/L)$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Business Services	0.028*** [0.005]					0.033*** [0.005]	0.033*** [0.005]	0.010*** [0.002]	0.008*** [0.003]
Communication Services		0.049*** [0.005]				0.048*** [0.006]	0.048*** [0.006]	0.023*** [0.004]	0.012** [0.005]
Finance and Insurance			0.435*** [0.071]			0.457*** [0.074]	0.481*** [0.075]	0.051* [0.030]	0.061*** [0.017]
Computer and Information Services				-0.381*** [0.115]		-0.677*** [0.110]	-0.756*** [0.111]	-0.255*** [0.052]	-0.106*** [0.037]
Royalties and License Fees					0.003 [0.015]	-0.035* [0.018]	-0.038** [0.019]	0.005 [0.007]	-0.001 [0.006]
$\ln(K/L)$								0.438*** [0.016]	0.110*** [0.022]
L_{HS}/L								0.010*** [0.001]	0.000 [0.003]
$\ln(M/L)$								0.191*** [0.016]	0.430*** [0.037]
$\ln Y$	0.322*** [0.013]	0.311*** [0.013]	0.311*** [0.013]	0.314*** [0.013]	0.311*** [0.013]	0.329*** [0.013]	0.329*** [0.013]	0.147*** [0.006]	0.216*** [0.062]
Year Effects	no	no	no	no	no	no	yes	yes	yes
Country-Industry Effects	no	no	no	no	no	no	no	no	yes
N	2317	2317	2317	2317	2317	2317	2317	2271	2271
R^2	0.31	0.30	0.32	0.30	0.29	0.35	0.35	0.86	0.98

Table 7 - Offshoring of Individual Services and Labor Productivity in ItalyDependent Variable: $\ln(VA/L)$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Business Services	0.283*** [0.048]					0.062* [0.036]	-0.015 [0.045]	0.091* [0.053]	0.009 [0.027]
Communication Services		1.597** [0.656]				5.922*** [1.038]	6.035*** [1.005]	3.367*** [0.558]	0.210 [0.227]
Finance and Insurance			1.059*** [0.144]			1.461*** [0.078]	1.645*** [0.100]	0.698*** [0.112]	0.051 [0.032]
Computer and Information Services				-0.746** [0.301]		-9.364*** [1.338]	-9.536*** [1.289]	-5.258*** [0.684]	-0.091 [0.308]
Royalties and License Fees					-0.325 [0.306]	-2.773*** [0.225]	-2.517*** [0.224]	-0.427** [0.204]	0.314*** [0.119]
$\ln(K/L)$								0.423*** [0.044]	0.045* [0.023]
L_{HS}/L								-0.022*** [0.004]	-0.012** [0.005]
$\ln(M/L)$								0.044 [0.064]	0.394*** [0.077]
$\ln Y$	0.557*** [0.105]	0.357*** [0.089]	0.536*** [0.083]	0.469*** [0.105]	0.436*** [0.093]	0.199*** [0.032]	0.170*** [0.030]	0.083*** [0.022]	0.445** [0.183]
Year Effects	no	no	no	no	no	no	yes	yes	yes
Industry Effects	no	no	no	no	no	no	no	no	yes
N	300	300	300	300	300	300	300	285	285
R^2	0.26	0.16	0.43	0.13	0.13	0.79	0.80	0.95	0.99

Empirical model

Following, e.g., Amiti and Wei (2009), assume production function of representative firm in each country and industry is

$$y = A(SOS, \Omega) \cdot f(L, M, K)$$

where A TFP.

Assume Cobb-Douglas functional form

$$y = A(SOS, \Omega) \cdot L^{\beta_L} \cdot K^{\beta_K} \cdot M^{\beta_M}$$

Taking logs yields

$$\ln y_{c,i,t} = \ln A(SOS_{c,i,t}, \Omega_{c,i,t}) + \beta_L \ln L_{c,i,t} + \beta_M \ln M_{c,i,t} + \beta_K \ln K_{c,i,t}$$

Empirical model

Use the following specification for TFP

$$\ln A_{c,i,t} = \beta_{c,i} + \beta_{SOS} SOS_{c,i,t} + \beta' \Omega_{c,i,t} + u_{c,i,t}$$

where $\beta_{c,i}$ country-industry fixed effect; u white-noise disturbance.

Substituting and rearranging terms yields

$$\ln y_{c,i,t} = \beta_{c,i} + \beta_L \ln L_{c,i,t} + \beta_M \ln M_{c,i,t} + \beta_K \ln K_{c,i,t} + \beta_{SOS} SOS_{c,i,t} + \beta' \Omega_{c,i,t} + u_{c,i,t}$$

Similar equation for offshoring of individual services

$$\ln y_{c,i,t} = \beta_{c,i} + \beta_L \ln L_{c,i,t} + \beta_M \ln M_{c,i,t} + \beta_K \ln K_{c,i,t} + \sum_{s=1}^5 \beta_{SOS}^s SOS_{c,i,t}^s + \beta' \Omega_{c,i,t} + u_{c,i,t}$$

Both models estimated on whole sample and Italy.

Table 8 - Service Offshoring and TFP in EuropeDependent Variable: $\ln(Y)$

	<i>LSDV</i>			<i>LSDV - IV</i>				<i>AB - GMM</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SOS	0.008***	0.007***	0.006***	0.006***	0.006***	0.006***	0.005***	0.005***	0.004***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]
ln L	0.077***	0.103***	0.109***	0.109***	0.108***	0.109***	0.093***	0.096***	0.046
	[0.026]	[0.035]	[0.032]	[0.032]	[0.032]	[0.032]	[0.016]	[0.020]	[0.048]
ln K	0.052***	0.045***	0.063***	0.063***	0.063***	0.063***	0.059***	0.080***	0.035***
	[0.010]	[0.009]	[0.012]	[0.012]	[0.012]	[0.012]	[0.006]	[0.012]	[0.010]
ln M	0.753***	0.702***	0.695***	0.695***	0.697***	0.695***	0.710***	0.730***	0.559***
	[0.029]	[0.042]	[0.037]	[0.037]	[0.038]	[0.037]	[0.018]	[0.021]	[0.063]
MOS			0.001	0.001	0.001	0.001	0.001**	0.001**	0.002*
			[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
ICT			0.003***	0.003***	0.003***	0.003***	0.003***	0.004***	0.000
			[0.001]	[0.001]	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]
IMPEN				0.027					
				[0.092]					
ln EN. PRICE					0.014				
					[0.014]				
ln Y_{t-1}									0.240***
									[0.048]
Year Effects	no	yes	yes	yes	yes	yes	yes	yes	yes
Linear and Quadratic Trend	no	no	no	no	no	yes	no	no	no
N	2288	2288	2288	2288	2288	2288	1806	1795	2122
R ²	0.93	0.94	0.94	0.94	0.94	0.94	0.95	0.95	
F-stat. Excl. Instr. (min - max)							34.2	(12.9 - 205.0)	
Cragg-Donald stat.							34.2	22.6	
P-value Hansen J-stat.							0.21	0.06	1.00
P-value AR(2) test									0.15

Fixed effects, IV and GMM panel regressions; standard errors corrected for heteroskedasticity and clustering within country-industry pairs in square brackets. ***, **, *: significant at 1%, 5% and 10%, respectively.

Table 8 - Service Offshoring and TFP in Europe (Cont.) - Other Issues

Dependent Variable: $\ln(Y)$, unless otherwise indicated

	Issue: Definition of Service Offshoring			Issue: Empirical Approach		
	SOS_Y	SOS_OFF	SOS_NoRoy	Dep. Var. TFP (CD)	Dep. Var. TFP (TL)	Dep. Var. TFP Index
Service Offshoring	0.009** [0.004]	0.009* [0.005]	0.009*** [0.002]	0.008*** [0.002]	0.007*** [0.002]	0.004** [0.002]
N	2288	324	2288	2288	2288	2288
R ²	0.97	0.97	0.93	0.07	0.05	0.01
	Issue: Outliers				Issue: Productivity Growth (Dep.Var. Growth in Lab. Prod.)	
	Trimming 1%	Trimming 5%	Trimming 10%	Outlier-Robust	Whole Sample	Italy
Service Offshoring	0.008*** [0.003]	0.015*** [0.004]	0.020*** [0.006]	0.008*** [0.001]	-0.003 [0.002]	-0.005 [0.004]
N	2241	2057	1825	2288	2122	280
R ²	0.933	0.936	0.941		0.154	0.201

Table 10 - Service Offshoring and TFP in Italy

Dependent Variable: $\ln(Y)$

	<i>Overall Service Offshoring</i>				<i>Individual Services</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SOS	0.014***	0.017***	0.028***	0.028***				
	[0.004]	[0.004]	[0.007]	[0.007]				
Business Services					0.005	-0.005	-0.004	-0.003
					[0.015]	[0.008]	[0.009]	[0.009]
Communication Services					0.088**	0.117*	0.117*	0.117*
					[0.033]	[0.063]	[0.064]	[0.064]
Finance and Insurance					0.096***	0.102***	0.108***	0.109***
					[0.024]	[0.020]	[0.019]	[0.020]
Computer and Information Services					-0.277	-0.423	-0.240	-0.239
					[0.214]	[0.279]	[0.307]	[0.314]
Royalties and License Fees					-0.196	-0.138	-0.063	-0.072
					[0.133]	[0.104]	[0.108]	[0.107]
$\ln L$	0.065**	0.059**	0.060**	0.059**	0.028	0.061	0.060	0.057
	[0.026]	[0.028]	[0.028]	[0.029]	[0.047]	[0.110]	[0.106]	[0.105]
$\ln K$	0.054***	0.050***	0.031***	0.031**	0.049***	0.045***	0.027	0.027
	[0.008]	[0.009]	[0.012]	[0.012]	[0.015]	[0.014]	[0.016]	[0.016]
$\ln M$	0.645***	0.659***	0.671***	0.672***	0.654***	0.585***	0.604***	0.605***
	[0.017]	[0.025]	[0.026]	[0.026]	[0.090]	[0.168]	[0.169]	[0.169]
MOS			-0.001	-0.001			-0.001	-0.001
			[0.001]	[0.001]			[0.001]	[0.001]
ICT			-0.003**	-0.003***			-0.003*	-0.003*
			[0.001]	[0.001]			[0.001]	[0.001]
Year Effects	no	yes	yes	yes	no	yes	yes	yes
Linear and Quadratic Trend	no	no	no	yes	no	no	no	yes
N	300	300	300	300	300	300	300	300
R ²	0.94	0.94	0.94	0.94	0.95	0.96	0.96	0.96

Table 11 - Service Offshoring and the Skill Composition of Domestic Activities

Dependent Variable: (L_{HS}/L)

	<i>Overall Service Offshoring</i>						<i>Individual Services</i>					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SOS	0.120***	0.059***	0.035*	0.039**	0.027	0.036*						
	[0.021]	[0.019]	[0.019]	[0.019]	[0.019]	[0.019]						
Business Services							0.111***	0.077***	0.057***	0.060***	0.045**	0.057***
							[0.024]	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]
Communication Services							0.116	0.167**	0.171**	0.175**	0.176**	0.171**
							[0.084]	[0.071]	[0.071]	[0.071]	[0.070]	[0.071]
Finance and Insurance							0.136	0.522***	0.301**	0.326**	0.349**	0.298**
							[0.171]	[0.145]	[0.149]	[0.149]	[0.149]	[0.149]
Computer and Information Services							0.869*	-2.295***	-2.273***	-2.358***	-2.206***	-2.274***
							[0.501]	[0.438]	[0.434]	[0.435]	[0.433]	[0.434]
Royalties and License Fees							0.104	-0.082	-0.105	-0.085	-0.103	-0.099
							[0.099]	[0.085]	[0.084]	[0.084]	[0.084]	[0.084]
MOS			0.032***	0.031***	0.034***	0.032***			0.030***	0.029***	0.032***	0.030***
			[0.007]	[0.007]	[0.007]	[0.007]			[0.007]	[0.007]	[0.007]	[0.007]
ICT			0.020***	0.023***	0.020***	0.019***			0.020***	0.023***	0.020***	0.020***
			[0.005]	[0.005]	[0.005]	[0.005]			[0.005]	[0.005]	[0.005]	[0.005]
IMPEN				2.701**						3.172***		
				[1.222]						[1.222]		
ln EN. PRICE					0.783***						0.775***	
					[0.184]						[0.184]	
ln Y	6.606***	2.314***	2.678***	2.723***	2.730***	2.679***	6.566***	2.200***	2.506***	2.560***	2.562***	2.508***
	[0.184]	[0.240]	[0.250]	[0.251]	[0.249]	[0.250]	[0.193]	[0.241]	[0.251]	[0.252]	[0.250]	[0.251]
Year Effects	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
Linear and Quadratic Trend	no	no	no	no	no	yes	no	no	no	no	no	yes
N	2299	2299	2299	2299	2299	2299	2299	2299	2299	2299	2299	2299
R ²	0.39	0.56	0.57	0.57	0.57	0.57	0.39	0.57	0.58	0.58	0.58	0.577

Conclusion

This paper studied effects of service offshoring on productivity, using comparable industry-level data on Italy and other 8 Western European countries

Results show positive and significant effects of service offshoring on productivity

Economic magnitude is moderate: a 1 p.p. increase in service offshoring raises TFP by about 0.4%

There is heterogeneity across individual services:

- positive effects for business services, communication, and finance-insurance
- negative effects for computer and information services

Similar evidence for Italy and other countries

Appendix tables

Highest and lowest values of *SOS* and *MOS*

SOS

Services (3.2%)

Post and telecommunication (8.4%)

Other business activities (5.9%)

Transportation and storage (4.3%)

...

Manufacturing (2.2%)

Machinery, nec (1.4%)

Rubber and plastic (1.3%)

Metal products (0.7%)

MOS

Manufacturing (24.7%)

Electric. and optical equip. (56.9%)

Transport equip. (42.7%)

Textile, leather and footw. (38.5%)

...

Services (20.2%)

Retail trade (5.4%)

Wholesale trade (4.9%)

Real estate (2.4%)

Figure 2 - Service Offshoring and Labor Productivity in Each Country

