

# On the role of imports in enhancing manufacturing exports

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## Impact of imports on exports: the Channels

- common sunk costs (Muûls and Pisu, 2009; Aristei, Castellani&Franco, 2011);
- productivity enhancing effect of imports which favours exports (Kashara & Lapham, 2008; Bas & Strauss Kahn, 2011);
- trade liberalisation fosters competitiveness across all import intensive firms (Bas, 2009)

### Our aim:

- dissect the impact of imports on exporting at the firm level, once accounted for export sunk costs and productivity
- dissect the cost saving from the technology channel: imports from low income economies vs, imports from high income countries

- Source: ISTAT - ISTAT Annual report 2006;
- Sample: Balanced panel of about 40,000 firms 2000-2004;
- Representativeness: 40% of total manufacturing employment and output - sectoral distribution;
- Imports: from H1c and L1c countries;
- Exports: firm export activity with no information about export destinations;
- other firm level characteristics: turnover, intermediates, employees, 3 digit NACE sector of activity, and other features retrievable from balance sheet data.

## Importers and Exporters and Importing Exporters

<b>Panel A:</b>		<i>% Imp</i>	<i>% Imp<sub>LI</sub></i>	<i>% Imp<sub>HI</sub></i>	<i>% Imp<sub>HILI</sub></i>	<i>% Exp</i>
2000	All firms	37.32	20.88	31.44	15.00	61.34
2004		38.89	24.99	31.50	17.59	63.82
<b>Panel B:</b>		<i>% Imp<sub>LI</sub></i>	<i>% Imp<sub>HI</sub></i>	<i>impshare<sub>LI</sub></i>	<i>impshare<sub>HI</sub></i>	
2000	All firms	20.88	31.44	1.96	5.04	
2004		24.99	31.50	2.58	4.87	
2000	Non Exporters	3.47	6.68	0.46	1.45	
2004		3.75	6.29	0.44	1.35	
2000	Exporters	31.55	46.74	2.91	7.32	
2004		36.71	45.51	3.80	6.88	

*Imp<sub>LI</sub>*, *Imp<sub>HI</sub>*, *Imp<sub>HILI</sub>* and *Exp* respectively identify importers from low income countries, importers from high income countries, importers from both groups of countries and exporters. *impshare<sub>LI</sub>* and *impshare<sub>HI</sub>* are the average import shares across all the firms in the sample from low income and high income countries.

## Export Starters vs Never Exporters

	Starters	Never	t-test
$imp_{LI\ t-1}$	0.066	0.021	-13.252
$imp_{HI\ t-1}$	0.106	0.042	-13.541
$impshare_{LI\ t-1}$	0.007	0.002	-6.207
$impshare_{HI\ t-1}$	0.018	0.010	-5.151
$imp_{LI\ t-2}$	0.061	0.020	-11.835
$imp_{HI\ t-2}$	0.106	0.042	-13.236
$impshare_{LI\ t-2}$	0.007	0.002	-6.129
$impshare_{HI\ t-2}$	0.018	0.010	-5.041

$imp_{LI}$  and  $imp_{HI}$  are dummies for the import activity from Low Income and High Income Countries.  $impshare_{LI}$  and  $impshare_{HI}$  are import share from the two groups of countries. (t-1) and (t-2) refers to one year and two years before the export entry.

## High and Low income imports into Italy - 6 digit HS 1996 - year 2000

Product category	Codes	Import Share from:					
		High Income			Low Income		
		Codes	mean	p50	Codes	mean	p50
01-05 Animal & Animal Products	199	199	0.85	1.00	114	0.22	0.09
06-15 Vegetable Products	315	315	0.75	0.89	248	0.30	0.20
16-24 Foodstuffs	186	186	0.82	0.97	147	0.21	0.04
25-27 Mineral Products	138	138	0.67	0.79	105	0.38	0.29
28-38 Chemicals & Allied Industries	779	778	0.89	0.98	555	0.13	0.04
39-40 Plastics / Rubbers	198	198	0.86	0.96	178	0.12	0.02
41-43 Raw Hides, Skins, Leather, & Furs	74	74	0.55	0.53	70	0.42	0.39
44-49 Wood & Wood Products	227	226	0.80	0.93	196	0.20	0.07
50-63 Textiles	822	820	0.61	0.63	787	0.37	0.34
64-67 Footwear / Headgear	55	55	0.43	0.42	55	0.53	0.53
68-71 Stone / Glass	195	195	0.81	0.93	168	0.17	0.06
72-83 Metals	535	535	0.83	0.92	438	0.17	0.09
84-85 Machinery / Electrical	804	804	0.88	0.94	727	0.09	0.03
86-89 Transportation	125	125	0.87	0.95	102	0.10	0.03
90-97 Miscellaneous	389	389	0.77	0.88	371	0.19	0.06
Total	5,041	5,037	0.79	0.92	4,261	0.21	0.08

Source: WITS-COMTRADE. Own calculations. We compute the weight of high and low income countries for every HS six digit products and we present the average and the median shares by groups of two digit HS96 products.

## Import share from High and Low Income countries

	<b>Import share:</b>			
	Year 2000		$\Delta$ - 2000/2004	
	from HI	from LI	from HI	from LI
$\log UV$	0.014*** [0.002]	-0.021*** [0.003]		
$\Delta \log UV$			0.052*** [0.008]	-0.060*** [0.010]
Constant	0.779*** [0.005]	0.234*** [0.006]	-0.062*** [0.003]	0.069*** [0.004]
Observations	7,484	6,396	3,697	2,982
R-squared	0.018	0.025	0.03	0.031

Source: WITS-COMTRADE. Own calculations. Dependent variable share of imports from high income countries in columns 1 and 3 and from low income countries in columns 2 and 4.  $UV$  is the product unit value calculated as the total value imports over total quantity.

## The empirical framework

$$C(w, p_m, p_d, \gamma) = \frac{\gamma}{\phi} \left(\frac{w}{q_w}\right)^\alpha \left[\left(\frac{p_h}{q_h}\right)^\gamma p_l^\delta p_d^{1-\gamma-\delta}\right]^{1-\alpha} \text{ with } 0 \leq \alpha, \gamma, \delta \leq 1 \quad (1)$$

Assuming firms face monopolistic competition in the **unique** export market and that preferences are represented by a C.E.S. over a continuum of varieties (Dixit&Stiglitz, 1977; Krugman, 1980; Melitz, 2003):

$$p_y = \frac{\sigma}{\sigma - 1} * \frac{\left(\frac{w}{q_w}\right)^\alpha \left[\left(\frac{p_h}{q_h}\right)^\gamma p_l^\delta p_d^{1-\gamma-\delta}\right]^{1-\alpha}}{\phi} \quad (2)$$

$$\Pi = \left[ \frac{\left(\frac{w}{q_w}\right)^\alpha \left[\left(\frac{p_h}{q_h}\right)^\gamma p_l^\delta p_d^{1-\gamma-\delta}\right]^{1-\alpha}}{(\sigma - 1)\phi} \right] \gamma \quad (3)$$



In equilibrium we can express output of each variety as

$$y = Y \left[ \frac{p_y}{P} \right]^{-\sigma} \quad (4)$$

with  $Y$  representing the aggregate good made up of the varieties consumed and

$P = [\int_{\omega} p(\omega)^{1-\sigma} d\omega]^{\frac{1}{1-\sigma}}$  representing the aggregate price.

Finally, plugging 4 into 3 we get the following expression

$$\Pi = \frac{YP}{\sigma} \left[ \frac{(\sigma - 1)}{\sigma} \frac{\phi P}{\left(\frac{w}{q_w}\right)^{\alpha} \left(\frac{1}{q_h^{1-\mu}}\right)^{\gamma(1-\alpha)} p_l^{\delta(1-\alpha)}} \right]^{\sigma-1} \quad (5)$$

where price  $p_d$  is taken as the numeraire and we assume  $\frac{p_h}{p_d} = q_h^{\mu}$  with  $\mu < 1$  (Halpern, Koren&Szeidl, 2005).

## The empirical framework

We index sectors with  $j$  and define the export sunk cost as made up of a sector specific  $\delta_j$  component and a sector-firm idiosyncratic shock,  $\rho_{ijt}$

$$F_{exp} = e^{\delta_j + \rho_{ijt}} \quad (6)$$

$$\frac{\Pi}{r} = \frac{\frac{Y^P}{\sigma} \left[ \frac{(\sigma-1)}{\sigma} \frac{\phi P}{\left(\frac{w}{q_w}\right)^\alpha \left(\frac{1}{q_h} - \mu\right)^\gamma (1-\alpha) \rho_l^{\delta(1-\alpha)}} \right]^{\sigma-1}}{r} > F_{exp} \quad (7)$$

substituting 6 into 7, taking logs and assuming  $\rho_{ijt}$  is normally distributed:

$$\begin{aligned} \Pr(\text{Exp}_{ijt} = 1) &= \Pr(\beta_0 + \beta_1 \ln \phi + \beta_2 \ln q_{h\ it} - \beta_3 \ln p_{l\ it} - \beta_4 \ln w_{it} + \\ &\quad + \beta_5 \ln q_{w\ it} - \beta_4 \ln r - \delta_j > \rho_{ijt}) \end{aligned} \quad (8)$$

## Probit Model on export starters

	Base	1-year Lags	Intangible assets		Tangible assets	
$impsh_{LI\ t-2}$	1.681*** [0.343]	1.529*** [0.33]	1.700*** [0.346]	1.562*** [0.395]	1.522*** [0.345]	1.677*** [0.343]
$impsh_{HI\ t-2}$	0.287* [0.154]	0.292* [0.157]	0.283* [0.154]	0.294* [0.165]	0.203 [0.155]	0.286* [0.154]
$TFP_{ind\ t-2}$	0.190*** [0.043]	0.148*** [0.0438]	0.175*** [0.042]	0.194*** [0.046]	0.275*** [0.042]	0.251*** [0.046]
$l_{t-2}$	0.175*** [0.017]	0.172*** [0.0172]	0.154*** [0.018]	0.160*** [0.019]	0.0826*** [0.02]	0.172*** [0.017]
$w_{t-2}$	0.00779 [0.052]	0.103* [0.0535]	0.00453 [0.051]	0.0305 [0.055]	-0.116** [0.053]	-0.0328 [0.053]
$k_{int\ t-2}$			0.0204*** [0.004]			
$ky_{int\ t-2}$				0.0126* [0.007]		
$k_{tan\ t-2}$					0.0980*** [0.011]	
$ky_{tan\ t-2}$						0.0366*** [0.012]
Obs.	22838	22841	22838	19107	22838	22838
pR2	0.026	0.0276	0.0286	0.0241	0.0324	0.0268
LL	-6590	-6584	-6573	-5721	-6547	-6585

## Dynamic LPM - SYS GMM estimates

	Base	1-year Lags	Intangible assets		Tangible assets	
$exp_{t-1}$	0.598*** [0.038]	0.590*** [0.038]	0.596*** [0.038]	0.581*** [0.042]	0.595*** [0.038]	0.598*** [0.038]
$impsh_{L,t}$	0.241*** [0.041]	0.201*** [0.039]	0.239*** [0.041]	0.247*** [0.043]	0.232*** [0.041]	0.240*** [0.041]
$impsh_{H,t}$	-0.109 [0.087]	-0.0483 [0.054]	-0.115 [0.087]	-0.131 [0.090]	-0.107 [0.088]	-0.109 [0.087]
$TFP_{ind,t}$	0.0442*** [0.005]	0.0440*** [0.005]	0.0427*** [0.005]	0.0536*** [0.006]	0.0525*** [0.006]	0.0541*** [0.006]
$l_t$	0.0528*** [0.005]	0.0508*** [0.005]	0.0484*** [0.005]	0.0211*** [0.005]	0.0364*** [0.004]	0.0252*** [0.005]
$w_t$	0.0202*** [0.005]	0.0204*** [0.004]	0.0185*** [0.005]	0.0443*** [0.006]	0.00604 [0.005]	0.0352*** [0.005]
$k_{int,t}$			0.00357*** [0.000]			
$ky_{int,t}$				-0.00159*** [0.000]		
$k_{tan,t}$					0.0147*** [0.002]	
$ky_{tan,t}$						-0.00717*** [0.001]
Hansen	0.411	0.312	0.317	0.244	0.4	0.415
AR2	0	0	0	0	0	0

## Robustness

	[1]	[2]	[3]	[4]
	Export Openness	Import Penetration	Output Tariffs	Input Tariffs
$impshare_{LI,t-2}$	1.676*** [0.372]	1.653*** [0.372]	1.677*** [0.343]	1.677*** [0.343]
$impshare_{HI,t-2}$	0.25 [0.159]	0.243 [0.159]	0.285* [0.154]	0.286* [0.154]
$Exp.Open_{t-2}$	... 0.626*** [0.109]	...	...	...
$Imp.Pen_{HI,t-2}$		-0.12 [0.144]		
$Imp.Pen_{LI,t-2}$		1.594*** [0.537]		
$OutputTariff_{LI,t-2}$			0 [0.016]	
$OutputTariff_{HI,t-2}$			-0.025 [0.028]	
$InputTariff_{LI,t-2}$				0.007 [0.029]
$InputTariff_{HI,t-2}$				-0.058 [0.055]
Obs.:	18864	18741	22838	22838
pR2	0.0268	0.0243	0.026	0.026
LL	-5539	-5505	-6589	-6589

## Robustness

	[1]	[2]	[3]	[4]
	Export Openness	Import Penetration	Output Tariffs	Input Tariffs
$exp_{t-1}$	0.583*** [0.0405]	0.582*** [0.0404]	0.598*** [0.038]	0.598*** [0.038]
$impshare_{L,t}$	0.203*** [0.0396]	0.203*** [0.0398]	0.242*** [0.041]	0.243*** [0.041]
$impshare_{H,t}$	-0.103 [0.0889]	-0.113 [0.0894]	-0.11 [0.087]	-0.111 [0.087]
$Exp.Open_t$	... 0.185*** [0.0202]	...	...	...
$Imp.Pen_{H,t}$		0.0189* [0.00982]		
$Imp.Pen_{L,t}$		0.314*** [0.0452]		
$OutputTariff_{L,t}$			-0.001 [0.001]	
$OutputTariff_{H,t}$			-0.001 [0.001]	
$InputTariff_{L,t}$				-0.001 [0.002]
$InputTariff_{H,t}$				-0.002* [0.001]
Hansen	0.283	0.396	0.431	0.444
AR2	0	0	0	0

# Conclusions

- imports affect the probability to export;
- heterogeneity according to the input origin: only imports from low income economies stimulate the export probability;
- this effect is not driven by the overall sector level trade openness and liberalisation in input and output markets.
- an increase by 10 percentage points in imports from low income economies implies an increase in the probability to become an exporter by about 2.4-2.6% points. The higher effect is detected for the first time export entry.

# Thank you!