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CENTRO RICERCHE ECONOMICHE NORD SUD

ITALIAN FIRMS' TRADE PATTERNS: A FIRST LOOK AT INTERNATIONAL AND INTERREGIONAL TRADE DECISIONS

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MOTIVATION / 1

- A firm's decision to enter a new market entails production, transportation and sunk costs.

- Sunk costs are related to the identification of the demand of interest and the adaptation to the institutional setting linked to that demand (e.g., market regulation, social norms, consumption habits, technological standards).

- Adaptation efforts are proportional to the 'institutional distance' of the targeted market ⇒ the ability of reaching 'distant' markets is an implicit sign of competitiveness.

- Inter-regional markets can be seen as a midway point between local and global international markets.

MOTIVATION / 2

- Firms are bounded rational complex organizations that build competitive advantage on technological knowledge and learning abilities.
- Success on one market depends on the 'degree of fitness' of the organization with respect to the selection mechanism at work on that market ⇒ competitive advantages are market specific and may depend upon different factors from one market to the other.
- The degree of importance of technological factors, learning abilities and firm's characteristics may differ depending on the 'institutional distance' of the reference market.
- Competitiveness on inter-regional markets may be connected with different factors than those connected with international competitiveness.

AIMS

1. To understand whether and how firms' past experiences, connections, innovative activities, and local surroundings' characteristics have influenced the degree of competitiveness of Italian firms on 'distant' - inter-national and inter-regional markets.

2. To investigate whether and how the importance of these factors changes according to the 'distance' of the market.

3. To detect whether and to what extent the effects of the same factors change across the Italian macro-regions.

Background Literature / 1

New Trade Theories

- models *á la* Krugman (1979) stress the role of productivity to be successful in an environment characterized by monopolistic competition and increasing returns;
- differently from traditional theories, the emphasis is placed on firms rather than on factors endowment distribution across sectors and countries.

New-new International Trade

- aims to reconcile trade theories with firm heterogeneity highlighted by empirical works (Bernard and Jensen 2004, 1999, 1995);
- heterogeneity in productivity levels at the roots of domestic-exporters differences: productivity remains the only direct channel through which sunk costs can be overtaken (Melitz, 2003; Yeaple, 2005);
- importance of technological change bound to its contribution to productivity improvements (Aw *et al.*, 2008; Costantini and Melitz, 2008).

BACKGROUND LITERATURE / 2

EVOLUTIONARY APPROACH

- The role of technology is much more complex and not exclusively linked to productivity improvements ⇒ connection with the demand side and the creation and exploitation of new business opportunities (Malerba, 2006);
- competitive advantages do not stem exclusively from the improvement in production efficiency: there are multiple ways to overcome trade costs connected to the different strategies of the firms ⇒ innovative activities and learning processes may have a direct role in this matter (Dosi, Pavitt, and Soete, 1990; Dosi and Nelson, 2010):
  - innovation ⇒ temporary quasi-rents (Dosi,1988; Barletta *et al.*,2014);
  - interaction with the surrounding environment ⇒ changes in firm's evolution process (Malerba, 2006) and different types of spillovers, some of which are not connected with productivity (Aitken *et al.*, 1997; Koenig, 2009).

Previous Empirical Studies / 1

- Importance of sunk costs revealed by the degree of persistency of firm's export status through time (Roberts and Tybout, 1997; Bugamelli and Infante, 2003).
- Large body of evidence highlighting the connections between the facets of firm heterogeneity and export activities (Bernard and Jensen, 2004):
  - exporters coupled with higher productivity levels: *self-selection* mechanism (Clerides *et al.*, 1998; Greenway and Kneller, 2004);
  - positive association with innovation and R&D expenditure (Basile, 2001; Castellani and Zanfei, 2007; Cassiman and Golovko, 2011): (i) from export to innovation/R&D (e.g. Aw et al, 2007; Bratti and Felice, 2012) (ii) from innovation/R&D to export (Nassimbeni, 2001; Roper and Love, 2002; Nguyen et al, 2008; Caldera, 2010; Becker and Egger, 2013)
- Local environment and industry characteristics found to be important to explain firm-level export activities (Becchetti e Rossi, 2001; Antonietti and Cainelli, 2011; Lopez-Baso and Motellon, 2013; Choquette and Meinen, 2015).

PREVIOUS EMPIRICAL STUDIES / 2

- In a preceding work (Brancati, Marrocu, Romagnoli, Usai, ICC 2018) we test whether innovative activities and learning abilities played a direct role (over and above productivity and structural characteristics) on Italian firms' intensive and extensive export margins.
- Results suggest that past trade experiences, R&D, innovation and specific regional-sectoral features enhance firm's capabilities to reach markets beyond national borders, whilst exports intensity hinges only on structural characteristics and regional-sectoral features of the environment.

Main Contributions of the Paper

- Empirical analysis of firms' inter-regional trade activities: a novelty in the literature.
- Comparison between the factors underpinning the propensity to trade on inter-regional markets and those underpinning the propensity to trade on inter-national markets.
- Use of a large dataset apt to study a very wide range of firm-level phenomena ⇒ granular analyses on trade activities.
- *In progress:* analysis of firms' joint trade patterns by estimating a dynamic structural non-linear model ⇒ a deeper analysis of trade and distance .

Preview of Main Results

- Export and inter-regional trade activities are only to some extent alike.
- Higher productivity levels, larger sizes and lower degrees of indebtedness are associated with higher probabilities to trade on 'distant' markets.
- Long term commitment to innovation (R&D) is always important, but actual innovation is significant for export markets only.
- Importance of learning abilities: past experiences on 'distant' markets help the firm to trade on these markets today.
- Importance of the type of business environment within which firms' operate. However, we detect significant differences across macro-regions in the effects of export spillovers (probably due to the location of the majority of exporters).
- Firms located in the northern regions display lower sunk costs for both inter-national and inter-regional trade activities (trade activities are more persistent in central and southern regions).

DATASET / 1

We focus on the Italian case thanks to a new database (the MET survey) which has collected information at the firm level in four waves, every two years, since 2007/8.

The MET survey is designed to focus on firm's structure and strategies (in particular R&D and innovation activities, internationalization processes, geographical destination of market sales and network phenomena).

- Population:
  all Italian firms in industrial (manufacturing, energy, mining) and production services (except finance and insurance, real estate, transportation for private consumption) sectors (micro-firms included).

- Stratification criteria:
  Size classes: micro (1-9), small (10-49), medium (50-249), large (≥250);
  Regions: 21 Italian NUTS 2 regions;
  Sectors: 12 NACE Rev. 2 sectors;

- Methodology:
  CATI (Computer Assisted Telephone Interview);
  CAWI (Computer Assisted Web Interview).

DATASET / 2

- Since we want to explain current performance with past determinants, firms have to appear at least in two consecutive waves to be included in our analysis.
- MET data have been matched with CRIBIS data to collect information on some important financial and economic indicators available in balance sheets.
- The final sample for our analysis thus consists of 16,541 firms.

Wave	MET firms	Two-period panel	Match with CRIBIS
2008	24,894	-	-
2009	22,340	11,549	6,016
2011	25,090	13,901	5,797
2013	25,000	10,537	4,728
Total	97,324	35,987	16,541

DESCRIPTIVE STATISTICS / 1

Size class and geographical distributions of the final sample

	Total		Manufacturing		Production Services	
	N. of obs.	%	N. of obs.	%	N. of obs.	%
micro	5,622	34.0	3,112	30.0	2,510	40.7
small	6,953	42.0	4,795	46.2	2,158	35.0
medium	3,144	19.0	1,979	19.1	1,165	18.9
large	822	5.0	485	4.7	337	5.5
Total	**16,541**	**100.0**	**10,371**	**100.0**	**6,170**	**100.0**
North West	3,397	20.5	2,219	21.4	1,178	19.1
North East	4,226	25.6	2,943	28.4	1,283	20.8
Centre	4,770	28.8	2,678	25.8	2,092	33.9
South	2,977	18.0	1,841	17.8	1,136	18.4
Islands	1,171	7.1	690	6.7	481	7.8
Total	**16,541**	**100.0**	**10,371**	**100.0**	**6,170**	**100.0**

DESCRIPTIVE STATISTICS / 2

	Overall Sample	Inter-national Exporters	Inter-regional Exporters
At *t*			
Export propensity	39%	100%	53%
Inter-regional trade propensity	64%	85%	100%
At *t-2*			
Export propensity	37%	74%	46%
Inter-regional trade propensity	60%	79%	76%
Innovation	38%	45%	41%
Productivity	10.61	10.64	10.60
R&D intensity	1.39	2.2	1.7
R&D dummy	15%	24%	19%
Leverage	12.0	10.0	11.6
Size	68	93	82
Age	19	21	20
Group	19%	26%	22%
Local network	41%	39%	41%
Obs.	16541	6510	10594

Descriptive Statistics / 3

	Inter-regional Exporters Only	Both Types of Exporters	Inter-national Exporters only
At *t*			
Export propensity	0%	100%	100%
Inter-regional trade propensity	100%	100%	0%
At *t-2*			
Export propensity	14%	74%	75%
Inter-regional trade propensity	67%	85%	48%
Innovation	35%	46%	38%
Productivity	10.57	10.62	10.76
R&D intensity	1.1	2.3	1.4
R&D dummy	10%	26%	14%
Leverage	13.3	10.1	9.8
Size	61	101	52
Age	19	21	18
Group	17%	27%	15%
Local network	44%	39%	37%
Obs.	5031	5563	947

DESCRIPTIVE STATISTICS / 4

	North West	North East	Centre	South	Islands
At time *t*					
Export propensity	50.5%	45.0%	36.4%	29.6%	23.8%
Inter-regional trade propensity	70.2%	67.7%	64.3%	58.8%	45.1%
At time *t-2*					
Innovation	40.7%	42.0%	38.5%	31.1%	29.0%
R&D intensity	1.8%	1.5%	1.3%	1.0%	1.0%
Employees	88.0	76.1	62.3	54.3	40.0
Productivity - VA per worker	10.6	10.6	10.7	10.5	10.7
Age	22.5	21.6	17.8	16.1	16.8
Export spillovers	20.2%	22.9%	15.3%	14.3%	13.9%
Regional public R&D	0.4%	0.5%	0.8%	0.6%	0.6%
Regional private R&D	1.1%	0.7%	0.5%	0.3%	0.2%

ECONOMETRIC MODEL

Assume firm *i*'s ability to trade on either international or inter-regional markets (y^*_{isrt}) as:

$$y^*_{isrt} = \theta_1 export_{isr,t-1} + \theta_2 interreg_{isr,t-1} + \boldsymbol{X}'_{isr,t-1}\boldsymbol{\beta} + \alpha_i + \mu_s + \delta_r + \gamma_t + \varepsilon_{isrt}$$

where:

- $\boldsymbol{X}_{isr,t-1}$ is a k×1 vector including (i) innovative activity (innovation dummies, R&D expenditure); (ii) relationships with other firms (dummies for group and local network memberships); (iii) environmental characteristics (export spillovers, regional private and public expenditures in R&D); (iv) firm's characteristics (employees, age, leverage, labour productivity);
- α_i are (unobserved) time-fixed firm-specific components (e.g., management preference for specific markets, or the ability to manage complex activities);
- μ_s are macro-sector dummies capturing time-fixed sector-specific characteristics;
- δ_r are macro-regions dummies capturing time-fixed local-specific characteristics;
- γ_t are time dummies capturing business-cycle components.

ECONOMETRIC ISSUES / 1

MAIN ISSUES:

1. y^*_{isrt} is unobservable; what we know is actual international or inter-regional trade activities y_{isrt}, i.e.

$$y_{isrt} = \begin{cases} 1 \text{ if } y^*_{isrt} > 0 \\ 0 \text{ if } y^*_{isrt} \leq 0. \end{cases}$$

2. some explanatory variables may both affect and be affected by trade activity;
3. firm's past activity on inter-regional and inter-national markets, innovative activities, location as well as the majority of its structural characteristics are likely to be correlated with the unobservable specific-component, α_i

ECONOMETRIC ISSUES / 2

SOLUTIONS:

1. we recover the parameters of interest indirectly by estimating a *non-linear model* (via maximum-likelihood), by assuming that $\varepsilon_{ijt} \sim \Lambda(0, \sigma_\varepsilon)$ similarly to Roberts and Tybout (1997);
2. we attenuate the *simultaneity issue* by taking lags of the explanatory variables like in Bernard and Jensen (2004), Koenig *et al.* (2010), Choquette and Meinen (2015);
3. we deal with both the correlation of some of our regressors with α_i and with the *initial conditions problem* due to the dynamic nature of our model by estimating a *random effect* model integrating out the 'random' part of α_i, specified as

$$\alpha_i = a_0 + a_1 \bar{x}_i + a_2 y_{i1} + u_i$$

in line with Mundlak (1978), Chamberlain (1982) and Wooldridge (2005, 2010).

EXPORT AND INTER-REGIONAL TRADE PROPENSITIES

	LPM		*Pooled Logit*		*RE Logit*	
	Export Prop.	Inter-regional Trade Prop.	Export Prop.	Inter-regional Trade Prop.	Export Prop.	Inter-regional Trade Prop.
Innovative Efforts						
Innovation	0.013**	0.001	0.110**	0.025	0.129**	0.026
	(0.007)	(0.007)	(0.048)	(0.042)	(0.056)	(0.047)
R&D intensity	0.001**	0.001*	0.009**	0.010**	0.011**	0.011**
	(0.0005)	(0.0001)	(0.004)	(0.004)	(0.005)	(0.005)
Learning Processes						
Past export	0.558***	0.044***	2.312***	0.248***	1.973***	0.263***
	(0.008)	(0.008)	(0.074)	(0.046)	(0.105)	(0.051)
Past inter-regional trade	0.055***	0.372***	0.378***	1.291***	0.440***	1.057***
	(0.007)	(0.009)	(0.048)	(0.060)	(0.057)	(0.086)
Export spillovers	0.001***	0.001***	0.005**	0.008***	0.006**	0.009***
	(0.0003)	(0.0003)	(0.002)	(0.002)	(0.003)	(0.002)
Regional public R&D	-0.025**	0.010	-0.160*	0.067	-0.195*	0.071
	(0.011)	(0.013)	(0.084)	(0.073)	(0.102)	(0.084)
Regional private R&D	0.022***	0.019***	0.174***	0.073*	0.214***	0.086**
	(0.006)	(0.007)	(0.047)	(0.039)	(0.060)	(0.045)
Group	0.006	0.014*	0.017	0.100*	0.022	0.114*
	(0.008)	(0.009)	(0.060)	(0.056)	(0.072)	(0.062)
Local network	-0.007	0.004	-0.035	0.016	-0.051	0.024
	(0.006)	(0.007)	(0.045)	(0.040)	(0.053)	(0.044)
Firm Characteristics						
Labour Productivity	0.026***	0.021***	0.196***	0.123***	0.236***	0.140***
	(0.003)	(0.003)	(0.023)	(0.019)	(0.028)	(0.021)
Size	0.026***	0.032***	0.174***	0.174***	0.215***	0.205***
	(0.002)	(0.003)	(0.018)	(0.017)	(0.025)	(0.021)
Age	-0.004	0.011**	-0.856***	-0.469**	-0.956***	-0.551***
	(0.004)	(0.005)	(0.211)	(0.193)	(0.245)	(0.212)
Leverage	-0.007***	0.003	-0.045**	0.014	-0.055**	0.013
	(0.003)	(0.003)	(0.022)	(0.019)	(0.026)	(0.020)
Constant	-0.186***	0.128***	-4.452***	-2.138***	-5.301***	-2.409***
	(0.039)	(0.046)	(0.307)	(0.262)	(0.401)	(0.301)
TIME FE	YES	YES	YES	YES	YES	YES
MACRO-SECTOR FE	YES	YES	YES	YES	YES	YES
MACRO-REGION FE	YES	YES	YES	YES	YES	YES
C.M.W. correction	NO	NO	YES	YES	YES	YES
Log-likelihood	-6,978.51	-9,135.55	-7,177.59	-8,733.25	-7,159.15	-8,724.15
Obs.	16,541	16,541	16,541	16,541	16,541	16,541

Export and Inter-regional Trade Propensities

Random Effects Logit Model

	Export Propensity		Inter-regional Trade Prop.	
Innovative Efforts				
Innovation	0.129**	(0.056)	0.026	(0.047)
R&D intensity	0.011**	(0.005)	0.011**	(0.005)
Learning Processes				
Past export	1.973***	(0.105)	0.263***	(0.051)
Past inter-regional trade	0.440***	(0.057)	1.057***	(0.086)
Export spillovers	0.006**	(0.003)	0.009***	(0.002)
Regional public R&D	-0.195*	(0.102)	0.071	(0.084)
Regional private R&D	0.214***	(0.060)	0.086**	(0.045)
Group	0.022	(0.072)	0.114*	(0.062)
Local network	-0.051	(0.053)	0.024	(0.044)
Firm Characteristics				
Labour Productivity	0.236***	(0.028)	0.140***	(0.021)
Size	0.215***	(0.025)	0.205***	(0.021)
Age	-0.956***	(0.245)	-0.551***	(0.212)
Leverage	-0.055**	(0.026)	0.013	(0.020)
Constant	-5.301***	(0.401)	-2.409***	(0.301)

MACRO-REGIONAL DISPARITIES

		North West	North East	Centre	South	Islands
Past export prop.	Export prop.	1.929***	1.631***	2.264***	2.310***	2.335***
		(0.147)	(0.135)	(0.134)	(0.160)	(0.233)
	Inter-regional prop.	0.372***	0.480***	0.004	0.265**	0.356*
		(0.106)	(0.096)	(0.096)	(0.124)	(0.184)
Past inter-regional prop.	Export prop.	0.362***	0.332***	0.361***	0.765***	0.591***
		(0.123)	(0.103)	(0.105)	(0.139)	(0.218)
	Inter-regional prop.	0.774***	0.832***	1.337***	1.216***	1.027***
		(0.127)	(0.116)	(0.108)	(0.123)	(0.174)
Export spillovers	Export prop.	0.010**	0.009**	0.004	-0.010	0.010
		(0.004)	(0.004)	(0.006)	(0.007)	(0.007)
	Inter-regional prop.	0.007*	0.016***	0.013***	-0.005	0.007
		(0.004)	(0.004)	(0.005)	(0.005)	(0.006)
Regional public R&D	Export prop.	0.358*	-0.408*	-0.304*	-2.774***	2.584
		(0.212)	(0.235)	(0.169)	(0.732)	(2.617)
	Inter-regional prop.	0.391**	-0.286	0.234*	-0.459	-0.717
		(0.182)	(0.207)	(0.139)	(0.575)	(1.830)
Regional private R&D	Export prop.	-0.268	0.568**	0.296	0.724***	0.018
		(0.201)	(0.281)	(0.192)	(0.156)	(0.194)
	Inter-regional prop.	0.058	0.257	-0.261*	0.248**	-0.079
		(0.169)	(0.241)	(0.158)	(0.119)	(0.140)
Group	Export prop.	0.303**	-0.019	-0.020	-0.352*	0.141
		(0.146)	(0.116)	(0.122)	(0.202)	(0.331)
	Inter-regional prop.	0.037	0.110	0.061	0.232	0.404
		(0.128)	(0.107)	(0.105)	(0.171)	(0.256)
Local network	Export prop.	-0.201*	-0.071	0.096	-0.134	0.008
		(0.110)	(0.095)	(0.097)	(0.129)	(0.219)
	Inter-regional prop.	0.025	0.021	0.050	-0.064	0.088
		(0.095)	(0.085)	(0.080)	(0.100)	(0.157)

Main Results and Preliminary Conclusions

Inter-regional Trade and Export Propensities

- Export and inter-regional trade activities are *only to some extent* alike.
- Higher productivity levels, larger sizes and lower degrees of indebtedness are coupled with higher probabilities to trade on 'distant' markets.
- Long term commitment to innovation (R&D) is always important, but actual innovation significant for export markets only: strong demand downturns amplify *knightian uncertainty*.
- Importance of *learning abilities*: past experiences on 'distant' markets help the firm to trade on these markets today.
- Importance of the type of business environment within which firms' operate:
  - the share of same-sector surrounding exporters and the amount of resources invested in R&D positively correlated with the probability of operating on 'distant markets';
  - results for public R&D are more puzzling.

Main Results and Preliminary Conclusions

Macro-regional Disparities

- firms located in the northern regions display lower sunk costs for both inter-national and inter-regional trade activities ⇒ trade activities are more persistent in central and southern regions; regional policies oriented to break this path dependence are more necessary in certain areas of the country rather than in others;
- sharp differences in export spillovers for export activities (probably due to the location of the majority of exporters);
- differences in the role of regional (private and public) R&D expenditures ⇒ has this to do with the type and quality of these expenditures?

LIMITATIONS

We still have to account for:

- the large literature in international business on the role of institutional factors on firms' decisions to internationalize production (e.g. Jackson and Deeg, JIBS 2008; Cantwell, Dunningand Lundan, JIBS 2010);
- relevant past empirical works in the Strategic Management Literature to explain how firms react to the characteristics of their operational environments, *ceteris paribus* their heterogeneous capabilities (e.g. Ang, SMJ, 2008; Chung and Alcacer, MS 2002; Hill and Rothaermel, AMR 2003);
- interrelation between inter-regional and inter-national trade propensities;
- other entry modes that are alternative to trade (greenfield, M&A, joint ventures);
- characteristics of the market of entry.