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CATTOLICA  
del Sacro Cuore

SMEs dealing with the crisis. Empirical  
evidences for regional innovation policy:  
impact study of public supports to firm  
growth

Serena Novero



# Economic crisis / recession ...

Interventions supporting firm growth /  
innovation

Public Bodies   National /  
Local EU Governments





**“winning strengths towards  
innovation”**



# Economic ground of public programs:

- Systemic approach to innovation (Malerba, 1996; Smith, 2000)
- Market failures in incentive to firms (Klette *et al.*, 1999; Gonzalez *et al.*, 2005)

## Innovation

- Critical factor for long-term prosperity in dynamic markets (Schumpeter, 1934; Porter, 1980; Schulz, Jobe, 2001; Garofoli, 1999, 2011; Patterson *et al.*, 2009)
- Key determinant for success (Shipton *et al.*, 2006; Franco, 2012)



Italian firms



low R&D expenditure/ PIL (1,3% in 2010)

competitiveness lack (Franco, 2012)

1990/2010:

- New economic operators (Antonelli, 1986; Bergek *et al.*, 2008; Signorini, Omiccioli, 2005; Cappellin *et al.*, 2014)



- Labour division (Rothschild, Darr, 2005)
- Firms' specialization (Patterson, Kerrin, Gatto-Roisard, 2009)
- Italian district network structures (Signorini, 2000; Garofoli, 1999, 2011)

Central  
position in  
public  
interventions

Role of SMEs :  
Technological  
driving forces



**Nowadays..**      Technological change (Signorini, Omiccioli, 2005)

New ICT productions / Lower production costs (Baldwin, 2006, 2012; Chudnovsky *et al.*, 2006)



- “unbundling impulses”
- intersections of technological and globalizing pressures (Iuzzolino, Micucci, 2011; Di Giacinto *et al.*, 2012)



- **Ambiguous** (Bergek *et al.*, 2008; Marzenna, 2014), **mixed** and **bidirectional** (Shefer, Frenkel, 2005) **effects** of interventions



- **Complementarity** Public / Private investments (David *et al.*, 2000)
- Dependence by **several factors**:
  - **Measurement** adopted (Rolfo, Calabrese, 2006)
  - Firm **network** (Hujer, Radic, 2005)
  - **Sector** of Activity (Cohen, Levinthal, 1989; Piergiovanni *et al.*, 2007; Bergek *et al.*, 2008; Franco, 2012)
  - **Micro / Macro** level (Franzoni, Vitali, 2005; Rolfo, Calabrese, 2006)
  - Firms' **strategic areas** and **policy** biased by structural elements :
    - firms' **age/size** (Shefer, Frenkel, 2005- Karlsson, Tavssoli (2015)
    - **location** (Garofoli, 2011; Wetters, Boschma, 2005, 2007; Audretsch, 1998)
  - **Number / power of customers-suppliers-competitors-employees** (World Bank, 2008; Patterson *et al.*, 2009; Ready *et al.*, 2010).
  - gaps **theoretical research / management** of results (Conti, Salone, 2012)



# Rules for innovation policies?

- Sample: 239 firms/SMEs in Canavese Technological District (Piedmont, Italy)
- Innovative, high-tech, computer, telecommunication, high-precision mechanic sectors
- Olivetti S.p.A.



Since 1990 competitiveness and innovation gaps (Objective 2 Area)

513 Public Technological Innovative interventions, by Canavese Technological District Consortium (CTDC), over 1999-2006 period

## 3 Projects:

- TS Canavese - Technology and Development in Canavese (1999 - 2001) → 118 Traditional SMEs / HT Interventions
- PIA 01-02-03 Project (2003- 2006) → 92 HT firms (79 SMEs) / Traditional interventions
- DIADI (2004-2006) → 58 HT firms (33 SMEs) / Traditional interventions



## 166 Firms' balance sheet data

### Intervention characteristics and timing of insertion

- *Descriptive analysis*      **2 effects :**
- Shorter time (2-3 years): 131 firms/SMEs (55%) have had a very good performance
- Longer time (8 years): 92 firms/SMEs (38%) have performed better than the Canavese



- 55 firms (23%) with previous positive balance sheet results



growing performance

- TS Canavese : Satisfactory results only immediately → they lost them gradually
- PIA 01-02-03: Positive results by the projects
- DIADI (2004-2006): Strengthened of firms' innovation level



# Probit model (González *et al.*, 2005)

Variables	Longer time: $Y_{i,t} = \text{Better / Worse}$	Short time: $Y_{i,t} = \text{Impact Effect}$
Projectsdummy	41.71 (38.24)	1.717*** (0.350)
Legal form	5.897 (22.2)	
Canavese		-2.533*** (0.368)
Atecodummy		1.925** (0.660)
Employees	-0.313 *** (0.004)	0.002* (0.001)
Small		1.567***
lab_productivity		0.519* (0.225)
pers_costs		-3.22e-08* (1.56e-08)
Sales	-5.91e-07*** (1.86e-08)	
Profit	-1.21e-06 * (5.85e-07)	
Constant	-488.62*** (52.698)	0.234*** (0.001)
Long time:	Wald test $\chi^2(5) = 35186.98$ Prob > $\chi^2 = 0.0000$	(p-value = 0.000) Rho = 0.9999
Short time:	Wald test $\chi^2(7) = 139,51$ Prob > $\chi^2 = 0.0000$	(p-value = 0.000) Rho = 0.97
Source: Stata	*** $p < 0.01$ , ** $p < 0.05$ , * $p < 0.1$	



# Regression Models (Random Effects): $Y_{it} = X'_{it} \beta + z'_i \delta + \varepsilon_{it}$

Variables	Profit	Ln Sales	Ln Added Value	Labour Productivity
Canavese		-0.23*	-0.139***	
		(0.124)	(0.04329)	
Sales	-0.015**			
	(0.005)			
Employees	3489.9*	0.0002***	0.00005**	0.0005***
	(1938.9)	(0.00004)	(0.0000178)	(0.0001)
Ln Personnel Costs			0.928***	0.750***
			(0.0137)	(0.1126)
Labour Productivity			0.095***	
			(0.00546)	
Ln Added Value		0.73***		
		(0.0347)		
Firm Age	119445*			
	(55159.7)			
Firm Size <sup>8</sup>	2886702*	-0.320***		-0.824**
	(1320011)	(0.0711)		(0.308)
ATECO Dummy			-0.169*	-1.267*
			(0.0919)	(0.6298)
Number of Projects		0.11*		
		(0.0551)		
Feasibility Study		0.3*		
		(0.1396)		
Gained Results		-0.38**	0.082**	
		(0.1462)	(0.0356)	
Products Modifications	6911715**			-0.761*
	(2458750)			(0.340)
Successive Developments	4813323*			0.647*
	(2458255)			(0.339)
Productive Relapses	-3943767***	0.078*		-0.189*
	(727998)	(0.0359)		(0.1026)



Variables	Profit	Ln Sales	Ln Added Value	Labour Productivity
New Orders Foresighted	-8984826*	0.246*		
	(4424921)	(0.1312)		
Technological Status		0.112*		
		(0.0597)		
Engagement			0.186*	-3.266***
			(0.0929)	(0.631)
Potential Engagements	1.15e+07**			
	(5720998)			
Relationship with the Centre		-0.267**		
		(0.0949)		
Constant	-1426989	4.89***	1.29***	13.16***
	(1657068)	(0.5667)	(0.203)	(1.706)
Y <sub>it</sub> = Profit :	Wald test $\chi^2$ (9)	= 63.79	(p-value = 0,000)	
Prob > $\chi^2$	= 0.0000	Rho = 0.98		
Y <sub>it</sub> = Ln Sales:	Wald test $\chi^2$ (11)	= 1331,6	(p-value = 0,000)	
Prob > $\chi^2$	= 0.0000	Rho = 0.99		
Y <sub>it</sub> = Ln Add Value	Wald test $\chi^2$ (7)	= 7519,76	(p-value = 0.0000)	
Prob > $\chi^2$	= 0.0000	Rho = 0.99		
Y <sub>it</sub> = Labour Prod.	Wald test $\chi^2$ (8)	= 98,27	(p-value = 0.000)	
Prob > $\chi^2$	= 0.0000	Rho = 0.99		
Source: Stata	*** p<0.01,	** p<0.05,	* p<0.1	



## Sales regression model with specific interventions

Dependent variable: Log Sales <sub>it</sub>	Model [A]	Model [B]	Model [C]	Model [D]
Employees	0.0002 (0.00004) ***	0.0002 (0.00004)***	0.0002 (0.00004)***	0.0001 (0.00004)***
Ln Added Value	0.74 (0.03)***	0.73 (0.035)***	0.75 (0.034)***	0.75 (0.033)***
Small	-0.32 (0.07)***	-0.32 (0.07)***	-0.31 (0.07)***	-0.34 (0.07)***
Canavese	-0.24 (0.12)*	-0.23 (0.123)*	-0.23 (0.12)*	
Collaboration H	0.16 (0.07)*			
Collaboration I		0.31 (0.159) *		
Collaboration E			0.2 (0.12)*	
Collaboration P				0.61 (0.19)**
Feasib. Study	0.32 (0.139)*	0.35 (0.14) *	0.31 (0.14)*	
Gained Results	-0.39 (0.146)**	-0.38 (0.145)**	-0.38 (0.14)**	
Tech. Status	0.11 (0.059)*	0.12 (0.06)**	0.12 (0.06)*	0.096 (0.06)*
Product. Relapses	0.08 (0.036)*	0.06 (0.036)*	0.06 (0.036)	0.06 (0.03)*
Centre Relation	-0.22 (0.083)**	-0.17 (0.08)*	-0.17 (0.079)*	-0.16 (0.07)*
New Orders	0.26 (0.1306)*	0.21 (0.13)*	0.28 (0.13)*	0.26 (0.13)*
Constant	4.78 (0.57)***	4.85 (0.56)***	4.56 (0.56)***	4.46 (0.53)***
Collaboration H:	Wald $\chi^2$ (11) = 1346.07		(p-value = 0,000)	
Collaboration I:	Wald $\chi^2$ (11) = 1364.73		(p-value = 0,000)	
Collaboration E:	Wald $\chi^2$ (11) = 1435.38		(p-value = 0,000)	
Collaboration P:	Wald $\chi^2$ (8) = 1416.97		(p-value = 0,000)	
Source: Stata	*** $p < 0.01$ ,	** $p < 0.05$ ,	* $p < 0.1$	



- Short time Better performances
- Long time Ambiguous effects: firms follow again previous regressive path, except in the cases they are already technologically advanced / economically strong

### Winning solution:

- Interventions should last in the time

internalization obtained results  
innovative solutions  
firms' internal renovation



Centrality of:

- timing/way of insertion of the implemented interventions
- interventions and firms characteristics

a relatively large size,

a dynamic structure

an advanced technological status

solid balance sheet values in the period before public interventions



in accordance with the firms technical level