The economic impact of regional industrial policies

Roberto Gabriele[1] Marco Zamarian[1] Enrico Zaninotto[1]

[1]
DISA (Department of Management and Computer Science)
University of Trento

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Outline

Motivation of the study

Understand how does public policy determine aggregate system performances and
provide "recipes" for future policies

Research question 1

Is it possible to single out effects of direct firms subsidies policies (FSP) at aggregate level?

in particular:

Research question 2

Is competitivity of firms and employment level at local level affected by FSP? And, which are indicators we should look at?

Literature review

Temporary effects

Bergstrom, 1998; Becchetti 1998: short run effects on productivity and employment level

Effects on additional investments and employment

Faini and Schiantarelli, 1986; Schalk and Untied, 2000

Results for Italy

Pellegrini and Centra, (2006); Bronzini and De Blasio, 2006

Outline of the talk

Main characteristics of the Provincial laws 1

Intervention tools of PAT

- LP 4/81 inspiring principles
- aims
- *modus operandi*
- the adoption of LP 6/99:
  - simplification and more efficiency in the procedures
  - reorganization of access criteria (easier)

Some issues:

- Modifications along the time window under analysis
- Interactions/overlapping with other level legislations (EU)
- Constraints imposed by EU

Main characteristics of the Provincial laws 2

Definition of intervention "Priority" classes:

1. new initiatives and restructurations
2. investments that guarantee a 20% employment gain
3. investments that lead to higher enviromental protection
4. investments in less developed areas
5. tecnology tranfers, high tech capital, recapitalization of firms
6. other investments

Main characteristics of the Provincial laws 3

Magnitude of interventions:

The structure of the maximum amount of money firms can receive for the investments proposed:

class of intervention	*small firms*	*bigger firms*
restructuring activity	30%+ de minimis	25%+ de minimis
Leasing mobiliare (LM)	15%+ de minimis	15%+ de minimis
LM (with employment constraint)	20%+ de minimis	20%+ de minimis
Re-capitalization	15%+ de minimis	15%+ de minimis

Outline of the talk

Data description 1

The PINC8199 database

We build the dataset starting by:

- **Source:** Pitagora (balance sheets for population of companies with share capital in Trentino)
- data about firms subsidies (LP 4/81 and LP 6/99)

Main features:

- Level of analysis: firm level observations
- **Coverage:** the population of Trentino firms
- **Time coverage:**1998 – 2003
- **Sectoral coverage:** all the industrial sectors involved in the public subsidies program.

Data description 2

Observations available

year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Pitagora				1742	1799	1802	1948	1961	1859
L 4/81	129	104	188	155	231	152	203	263	202
L6/99						6	290	399	241

The balanced panel 1 (for years 1998-2001) contains 1292 obs.

Methods used in the analysis 1

Our aim: try to evaluate differences in performances of two different group of firms performances (subsidized *vs* non-subsidized)

1 - Propensity score matching approach:

the method allows us to conduct a counterfactual study

- The need of a counterfactual: non experimental setting (self selection, sample selection bias)
- Why do we need of propensity score estimation? Other methods (Diff-Diff, OLS, ...)
- Panel structure of data: some issues (advantages of panel structure)

Some details on the methodology:

The counterfactual problem

The starting problem:

$$Y_i = Y_i(1)D_i + (1 - D_i)Y_i(0), \tag{1}$$

in which Y is the variable under observation.

The Causal effect we would investigate:

$$\Delta Y_i = Y_i(1) - Y_i(0), \tag{2}$$

$$\tau = E[Y_i(1) - Y_i(0)]. \tag{3}$$

$$\begin{aligned} \tau &= E\{Y_i(1) - Y_i(0)\} = \\ &= E\{Y|D_i = 1\} - E\{Y|D_i = 0\}, \end{aligned} \tag{4}$$

When is the last expression meaningful?

Some details on the methodology:

The PSM approach

The definition of the Propensity score:

$$P(x) = Prob(D = 1|X = x). \tag{5}$$

Two key assumptions:

- *Balancing property*: $D \perp X|P(x)$; it ensures that given the propensity score the treatment and the observables are independent;
- *Unconfoundedness property*: if $Y(1), Y(0) \perp D|X$ then $Y(1), Y(0) \perp D|P(X)$; it ensures that given the propensity score the treatment and the potential outcomes are independent.

Methods used in the analysis

Technical steps of the procedure:

- decide dependent and independent variables
- estimate a propensity score
- create strata based on propensity score
- test for balancing property
- estimate average treatment effect on treated (ATT) using different estimators
- interpret the results obtained for different objective variables

Outline of the talk

Some methodological remarks

Base assumptions

we look at concessions instead of payments: hp on expectations of firms

Accounting issues

Different ways of registering subsidies in the balance sheet lead to different outcomes in terms of relevant indicators (labor productivity, profitbility, etc.)

Inertia of economic variables and noise

Some variables react with a delay to perturbation and there is a lot of noise together with original reactions

Outline of the talk

Role of infrastructure subsidies on firms performances

1

Structure of the models 1

Relevant aspects to study: profitability, labor productivity, capacity of growth, capital intensity.

independent variables:

EBITDAxempl(t), ROI(t), ROE(t), Dempl(t), Kxempl(t)

dependents variables:

sectors, ROI(t-k)=EBITDA(t-k)/(Capital), EBITDAxempl(t-k), TSxempl(t-k), DEB(t-k)=(total debt)/(capital), empl(t-k)

Role of infrastructure subsidies on firms performances 2

Estimated models

We grouped treatements: *"if the firm i received a treatment in years t, t+1, t+2 then T=1"*

id of the model	indipendent variable	treatment
1	Y(98)	T(95/97)
2	Y(99)	T(96/98)
3	Y(00)	T(97/99)
4	Y(01)	T(98/00)
5	Y(00)	T(96/98)
6	Y(01)	T(97/99)

Proepensity score estimation results 1

We use the procedures of Becker and Ichino (2003): PS estimation; definition of strata and test of balancing property
independent variable: T(97-99)

Variable	***Coefficient***	***(Std. Err.)***
add98du	*-1.206*	*(0.207)*
roesq98	*-0.024*	*(0.020)*
add98cub	*0.000*	*(0.000)*
addroi98	*0.026*	*(0.009)*
roe98	*-0.040*	*(0.074)*
roi98	*-0.326*	*(0.288)*
kxadd98	*0.000*	*(0.000)*
at1dd	*0.218*	*(0.117)*
at1df	*-0.023*	*(0.137)*
Intercept	*-1.048*	*(0.100)*

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Proepensity score estimation results 2

Other results from the estimation:

- Number of obs. used = 1209
- LR chi2(9) = 88.52, Prob > chi2 = 0.0000
- Log likelihood = -444.87098; Pseudo R2 = 0.0905
- Optimal block number: 12

Role of infrastructure subsidies on firms performances 1

Effects on LABOR PRODUCTIVITY:

Short run		
Year	*year control vars X*	*ATT*
1998	1998	4.956*
1999	1998	25.095
2000	1998	8.23
2001	1998	43.881*
long run		
2000	1998	-11.26
2001	1998	7.125
*: pr<.10; **: pr<.05; **: pr<.0.01		

Role of infrastructure subsidies on firms performances 2

Effects on GROWTH RATE OF FIRMS:

Short run		
Year	*year control vars X*	*ATT*
1999	1998	8.649*
2000	1998	1.938*
2001	1998	1.516*
long run		
2000	1998	-9.223
2001	1998	-1.031
*: pr<.10; **: pr<.05; **: pr<.0.01		

Role of infrastructure subsidies on firms performances

3

Results of the analysis

Main findings that can be obtained from the estimated models:

indicator:	Short run	Long run
Labor Productivity	x	
growth rate	x	
ROE and ROI	x	x
Capital intensity	-	-

x: positive significant effect;

-: negative significant effect.

Conclusions

General conclusion:

There exists a "transient" effect of direct regional public policies on key aspects of industry dynamics: growth rate, labor productivity, profitability

In particular, there are some qualifications to the above:

Causal effects

- Accounting issues introduce a substantial bias in the results
- There exist transient effects on variables related to competitivity of firms
- There are permanent modifications in the capital intensity of firms: undercapitalization?

Future analysis

Effect on TFP

Do subsidies modify TFP? (role of: intangibles, knowledge, etc.)

Competing interventions

deepen the EHA performed taking into account competing events:

- multiple treatment within the framework of local Laws
- interactions among different level laws (local, national, EU)

Spatial comparisons

Is it possible to find out a reasonable comparable setting?

thank you for your attention!

Comments and suggestions are welcome

Authors e-mail addresses:
rgabriel@economia.unitn.it
marco.zamarian@economia.unitn.it
enrico.zaninotto@economia.unitn.it

For Further Reading I

a selection of the literature