La RICA e l'analisi controfattuale per la valutazione degli impatti della PAC

Salvioni C.[1] and Sciulli D.[2]

1 DEC, University of Chieti-Pescara, Pescara, Italy and SPERA
2 DMQTE, University of Chieti-Pescara, Pescara, Italy and SPERA

"LA RICA COME STRUMENTO PER LA VALUTAZIONE"

29 Marzo 2011, Roma

agriregionieuropa

Scopo della presentazione

- Un punto centrale nella valutazione delle politiche è la definizione di un scenario “baseline” o controfattuale al fine di determinare l’impatto netto addizionale dell’intervento.

- Cosa sarebbe successo a quelli che hanno ricevuto il trattamento se non lo avessero ricevuto (o vice versa)?

- **I metodi di matching** rappresentano uno strumento utile per determinare se si verificano differenze causali e statisticamente significative nelle variabili obiettivo tra le aziende oggetto di intervento (trattate) e non.

- Intervento: prima programmazione PSR (2000-06).

EU RD policy objectives

A **menu of measures** (22+4) that can be structured around 3 axes aiming at

a) improving the competitiveness of agriculture and forestry by encouraging farmers to structural changes (Axis 1);

b) improving the environment and the countryside (Axis 2);

c) improving the quality of life in rural areas and encouraging diversification of economic activity (Axis 3)

General goals of RD policy:

- To increase employment and GDP growth (Lisbon Strategy)
- Sustainable development (Goteborg Strategy)

Alla ricerca del controfattuale

- Conosciamo aziende trattate (partecipanti) e non trattate, ma non sono confrontabili.

- Manca il gruppo di controllo.

- Il matching consiste nell'identificare un gruppo di non-partecipanti confrontabile in termini di caratteristiche aziendali essenziali col gruppo di quelli che hanno partecipato.

- Si tiene conto di Selection bias: partecipazionenon è random, selezione dovuta a variabili non osservabili.

Propensity Score Matching

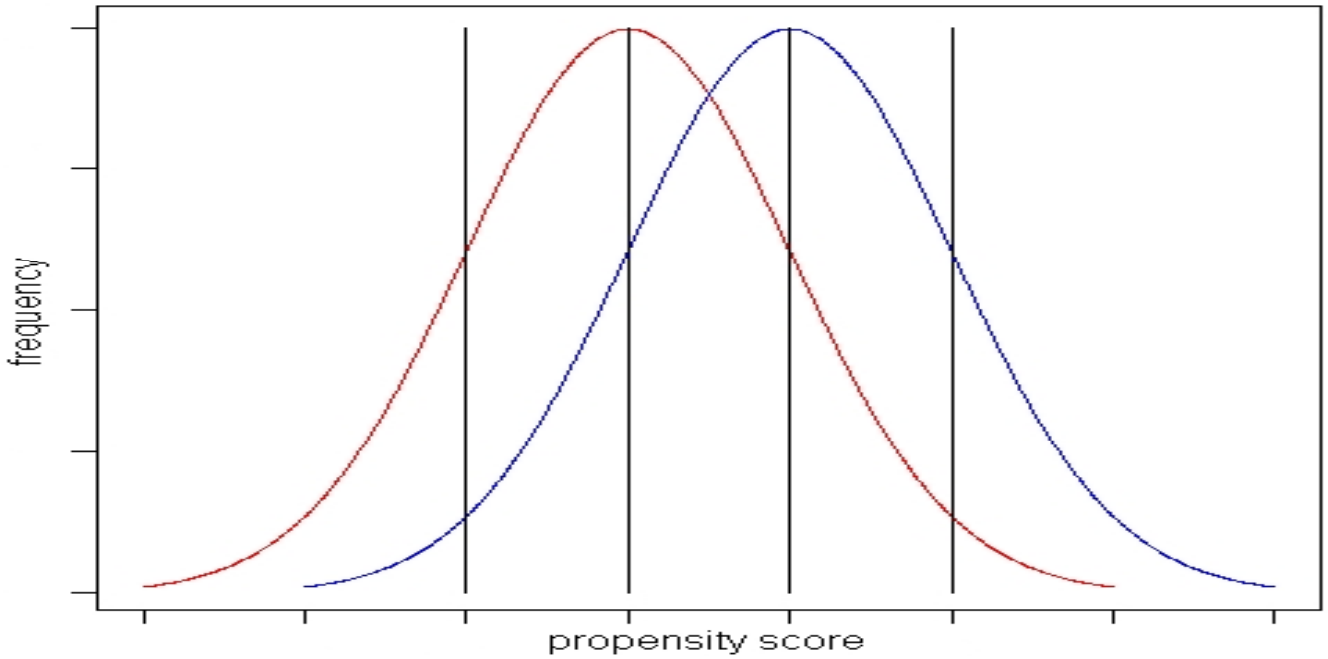
Both participating and non-participating groups should be matched on the basis of either a few observed characteristics or a number of them that are known or believed to influence both participation and programme outcomes.

Matching is done by using the **propensity score, i.e.** predicted probability of participation given observed characteristics, which is estimated as a function of individual characteristics based on a statistical model (logit or probit model).

This method allows one to find a comparison group from a sample of non-participants closest to the treatment group in terms of observable characteristics.

- Stratificazione

I dati sono divisi in strati sulla base del propensity score



KNAW, March 29, 2007

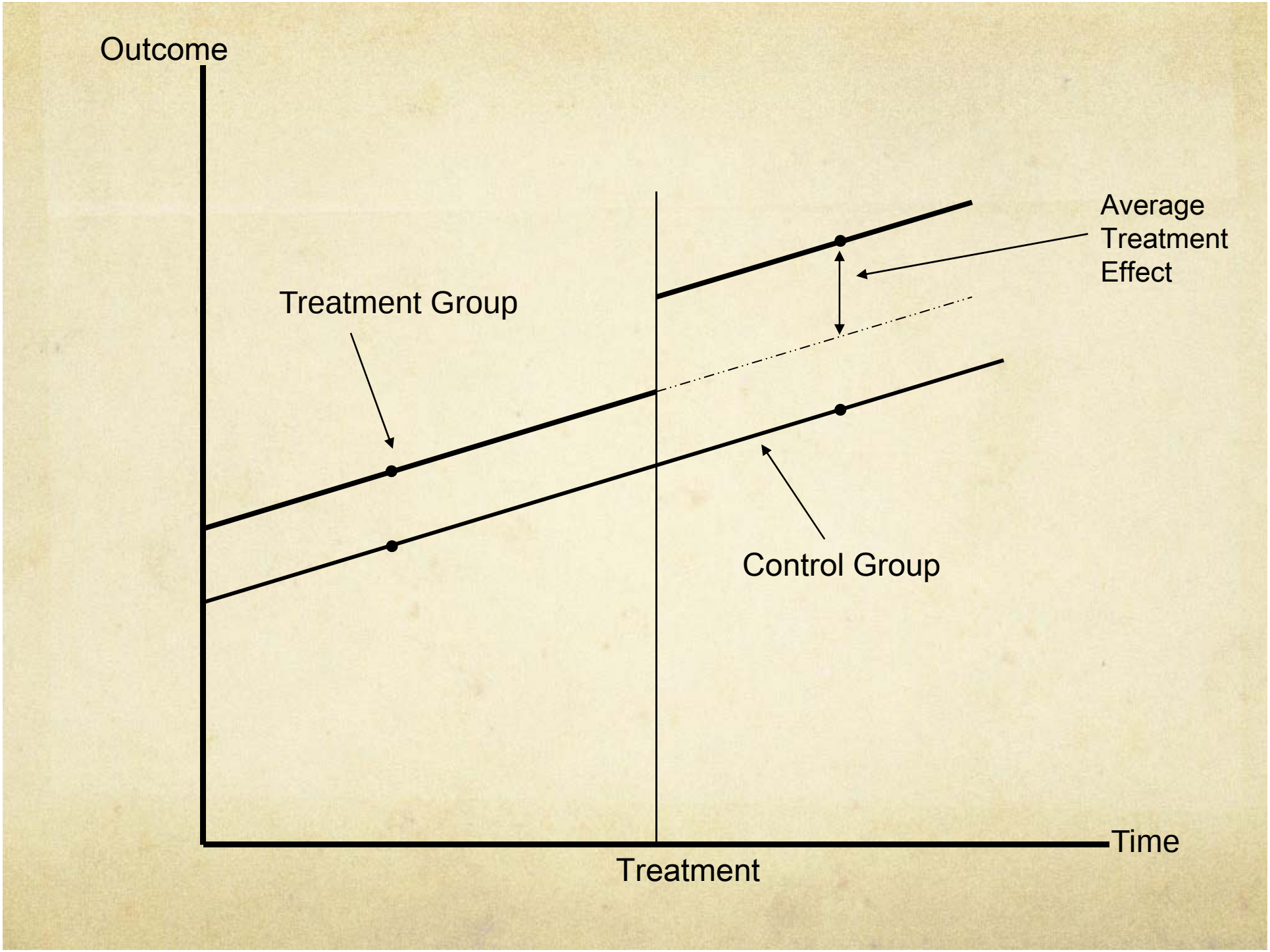
Difference-In-Difference/DiD

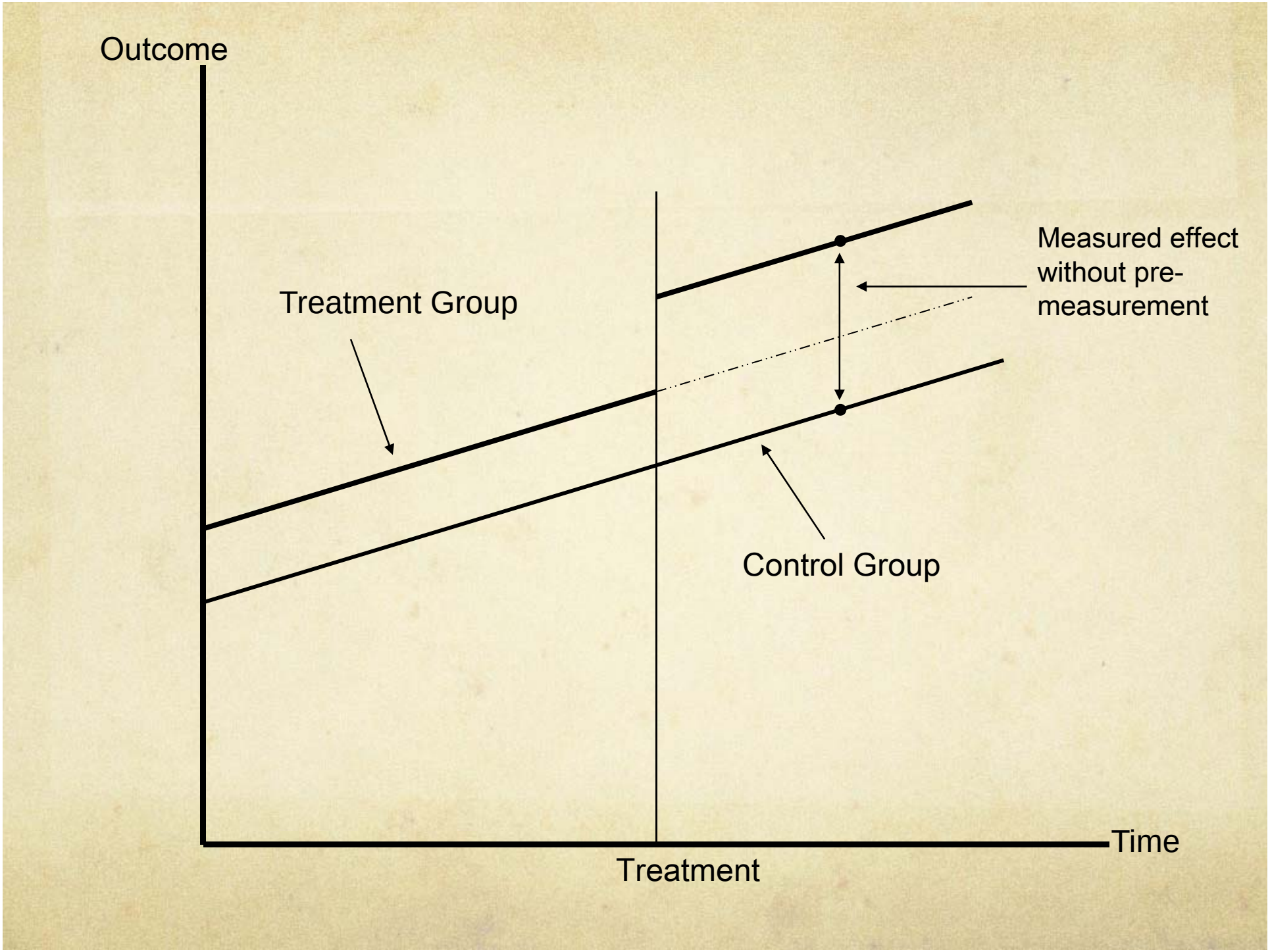
- Confrontare cambiamenti in una variabile risultato (outcome) prima e dopo il trattamento
  - Impatto: differenza tra cambiamenti negli outcome

- Impatto = $(Y_{t_1} - Y_{t_0}) - (Y_{c_1} - Y_{c_0})$

- T =gruppo trattati
- C = gruppo di controllo

- This method can be combined with propensity score method to adjust for pre-treatment differences that affect the parameter in question (e.g. economic growth, employed people).


Outcome
Average
Treatment
Effect
Treatment Group
Control Group
Time
Treatment


Outcome
Treatment Group
Measured effect without pre-measurement
Control Group
Time
Treatment

Data

The analysis is based on a panel of more than 3000 Italian **family** farms drawn from the 2003-2007 Italian FADN sample.

Sample: stratified according to criteria of geographical region, economic size (ESU) and farming type (FT).

Field of observation: commercial farms (economic size greater than 4 ESU - 4,800 euro)

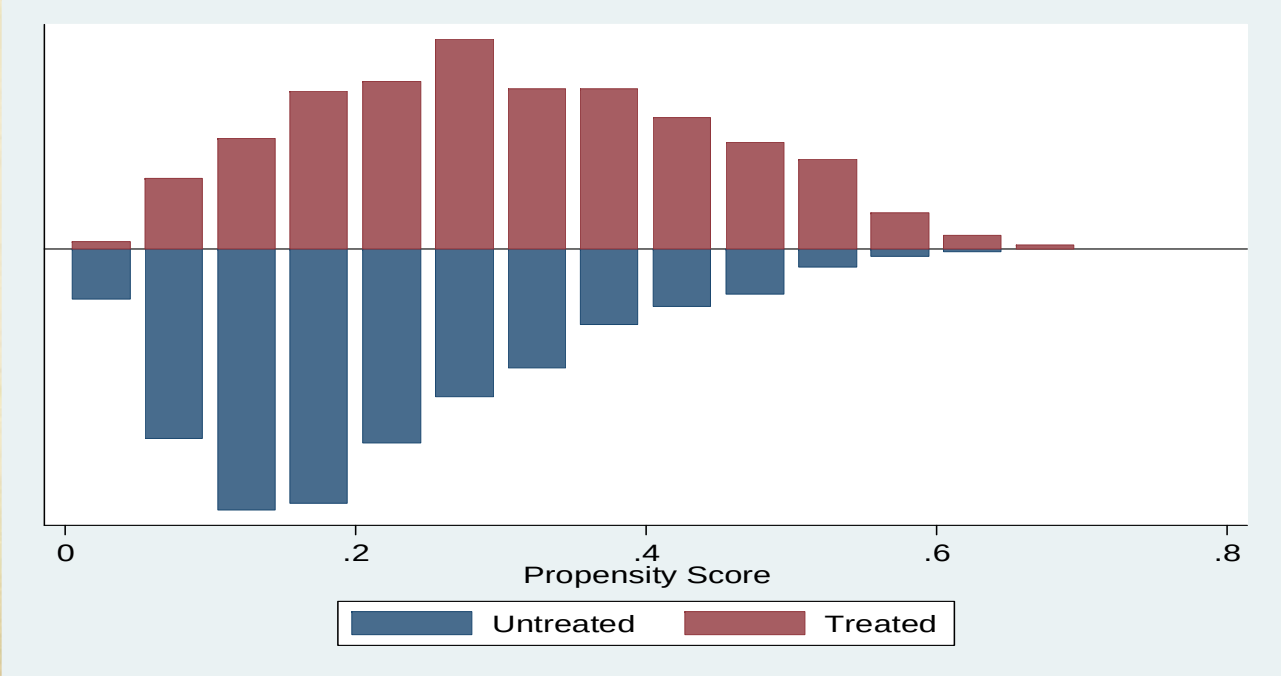
5 waves balanced panel of farms containing only those holdings for which information where collected in all years of the 2003-2007 period.

2000-03	2003	2004-2006	2007	2008 …
Volontary survey (not representative)	Pre-treatment (no RDP payments)	Treatment group: 341 farms (13.32%) Control group: 2200 farms	outcomes	Not available (yet)

Horizontal axis: intervals of the propensity score;
height of each bar on the vertical axis: fraction of the relevant sample with scores in the corresponding interval.

The figure shows that the overlapped region is quite wide, hence it is not needed to eliminate a relevant number of observations.

Propensity score histograms by treatment status



Average Treatment Ettect of the treated (ATT) – RDP

Type	Variables	Mean	Std. Dev.	Mean	Std. Dev.	
	D FAWU	**0.077**	**0.608**	**0.003**	**0.592**	**
	D AWU	0.320	2.229	0.153	2.082	
Outcomes	**D UAA**		**22.152**	**-0.375**	**12.460**	*
(2003-2007)	**D TAA**		**74.608**	**-0.454**	**14.208**	***
	D Added value*/AWU	2090.295	34733.780	1120.656	29729.130	
	D Profit/FAWU ratio		**3418.284**	**-12.257**	**799.997**	***

	Gaussian Kernel Matching			Nearest Neighbor Matching		
	ATT	Std. Err.	t	ATT	Std. Err.	t
FAWU	**0.066**	**0.036**	**1.830**	0.034	0.056	0.604
AWU	0.148	0.124	1.186	0.024	0.198	0.120
UAA	1.249	1.174	1.063	1.415	1.598	0.886
TAA	6.144	4.239	1.449	6.344	4.011	1.582
Added value*	**17643.697**	**5821.995**	**3.031**	11911.344	8789.928	1.355
Added value*/AWU	1769,809	1931,202	0,916	895,240	2761,874	0,324
Profit/FAWU ratio		**179.246**	**1.810**	**314.846**	189.233	1.664

Results

- Not significant impact on AWU: **RDP did not produce a direct impact on agricultural employment**.
- Significant positive impact on FAWU.

  Family labor substituted to waged labor force
  - Self-exploitation (accepting returns to owned labour and land lower than the market wage and rent) to cope with external economic pressures and survive economic crisis;
  - Maximization of farm family income (cope with high unemployment in rural areas – diversification increases on farm labor opportunities).

- Significant positive impact on FNVA/AWU and profits/FAWU: **RDP did produce a direct positive impact on agricultural and rural GDP.**
- Not significant impact on farm land, either total and cropped.

Work in progress: the LFAs scheme

		Treated (obs. 140)		Untreated (obs. 1203)		T-test
Type	Variables	Mean	Std. Dev.	Mean	Std. Dev.	
Outcomes (2003-2007)	D FAWU	0.164	0.730	0.033	0.500	***
	D AWU	0.506	2.397	0.206	1.753	*
	D Profit/FAWU ratio	11.548	305.740	-14.501	776.229	
	D UAA	0.940	17.754	-0.156	16.205	
	D TAA	1.775	19.598	-0.123	18.187	
	D added value*	11137.480	47499.410	6722.658	78411.750	
	D PLV	18007.020	62100.700	9257.317	90008.800	
	D PLV/SAU	185.939	4677.834	2590.671	27795.590	
Covariates (2003)	Age of the operator	54.829	12.666	51.422	13.752	***
	Male operator	0.764	0.426	0.794	0.404	
	North-West	0.250	0.435	0.164	0.370	**
	North-East	0.229	0.421	0.187	0.390	
	Centre	0.064	0.246	0.219	0.413	***
	South	0.250	0.435	0.346	0.476	**
	Islands	0.207	0.407	0.085	0.278	***
	Plane	0.086	0.281	0.119	0.324	
	Mountain	0.507	0.502	0.323	0.468	***
	ESU < 8	0.157	0.365	0.210	0.408	
	FT olive	0.064	0.246	0.089	0.285	
	FT wine	0.050	0.219	0.050	0.217	
	FT field crops	0.150	0.358	0.323	0.468	***
	FT citrus	0.043	0.203	0.144	0.351	***
	FT livestock	0.421	0.496	0.167	0.373	***
	Environ.l protected areas	0.064	0.246	0.042	0.200	
	Pluriactivity	0.057	0.233	0.137	0.344	***
	Diversified farms	0.550	0.499	0.493	0.500	

Average Treatment Effect of the treated – LFA

	Gaussian Kernel Matching			Nearest Neighbor Matching		
	ATT	Std. Err.	t	ATT	Std. Err.	t
AWU	0.108	0.071	1.508	0.052	0.095	0.550
FAWU	0.244	0.217	1.123	0.363	0.310	1.170
UAA	0.897	1.821	0.493	1.123	3.051	0.368
TAA	1.751	1.909	0.917	1.516	2.964	0.511
Total output	9460.815	6813.95	1.388	8136.062	7890.629	1.031
Total output per ha	**-1979.187**	**964.248**	**-2.053**	362.937	3231.979	0.112
Added value*/AWU	3583.449	2891.667	1.239	2103.306	4599.302	0.457
Profit per FAWU	59.715	34.422	1.735	43.591	77.314	0.564

Our findings suggest that the measure **promoted the extensivation of farm** production, while **not negatively affecting farmers' income**.

These evidences appear to be encouraging in respect with the use of payments for ecosystem services (PES), that is payments, such as the compensatory allowances paid under the LFAs scheme, to compensate farmers for maintaining or promoting the use of sustainable farming systems in environmentally sensitive areas, in view of preserving farmland landscapes and conserving fragile environments.

Problemi incontrati nell'applicazione

2000-03	2003	2004-2006	2007	2008 …
Volontary survey (not representative)	Pre-treatment (no RDP payments)	Treatment group: 341 farms (13.32%) Control group: 2200 farms	outcomes	Not available (yet)

1. mancanza di informazioni sul pre-trattamento (usato 2003);
2. impossibilità di misurare l'effetto nel lungo periodo (2007 anno finale);
3. dal 2007 non so distinguere i trascinamenti della prima programmazione dai pagamenti della nuova programmazione;
4. il campione costante non è rappresentativo …

Il campione costante può essere rappresentativo

- "Le famiglie *panel* possono presentare caratteristiche socio-demografiche in parte diverse rispetto a quelle dell'intero campione, sostanzialmente a causa del processo di deterioramento della componente panel legato alla non partecipazione in successive *wave* (*attrition*). Per correggere tale possibile fonte di distorsione delle stime, si procede a una stratificazione a posteriori della parte *panel* del campione sulla base di alcune caratteristiche relative alla precedente indagine." (BdI Supplementi al Bollettino Statistico. Indagini campionarie. I bilanci delle famiglie italiane nell'anno 2008. 8 Anno XX - 10 Febbraio 2010)

Grazie