



**SAPIENZA**  
UNIVERSITÀ DI ROMA



**Ministero dello Sviluppo Economico**  
**Dipartimento per lo Sviluppo e la Coesione Economica**  
**Direzione Generale per l'Incentivazione**  
**delle Attività Imprenditoriali**

# **Policies subsidising private firms**

## **Experiences using the Counterfactual Method.**

**Guido Pellegrini**  
***Dipartimento di Teoria Economica e***  
***Metodi Quantitativi per le scelte politiche***

***La Sapienza, Università di Roma***

# Why to evaluate the impact of public subsidies?

Introduction

Methods

Policies

Conclusions

Regional (and industrial) policies using subsidies to private firms are important in the EU:

Total State aid granted by the EU-25 Member States was estimated at 67 billion euros in 2006. In absolute terms, Germany granted the most aid (20 billion) followed by France (10 billion) and Italy (5.5 billion).

In relative terms, State aid amounted to 0.6% of EU GDP in 2006.



# Why to evaluate the impact of public subsidies?

Introduction

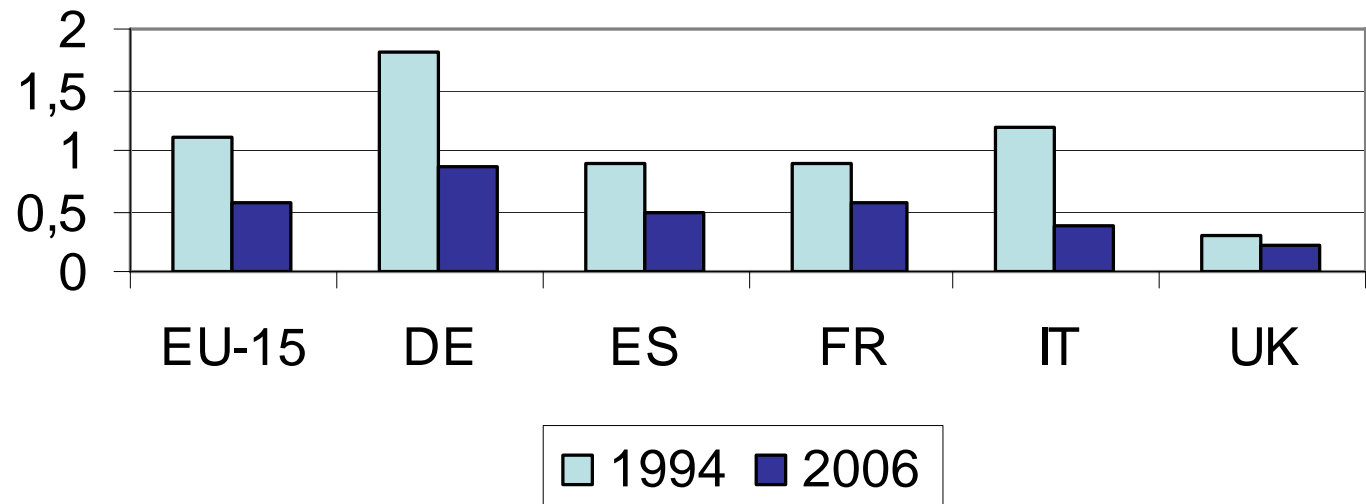
Methods

Policies

Conclusions

From the high levels of State aid in the '90s, the overall volume of aid fell dramatically at the end of the decade. The Member States that contributed most were Italy, Germany, France.

## Total state aid by Member State as a percentage of GDP



# Why to evaluate the impact of public subsidies?

Introduction

Methods

Policies

Conclusions

## Are subsidies really effective?

Actually, policies based on subsidies to private capital accumulations are affected by two serious problems :

■ ***Subsidies can reduce productive efficiency*** by distorting the allocations of resources among different projects

■ ***The additional impact of subsidy policies on growth can be null*** (or negative) because the asymmetric information on investment project between State and firm: only the firm knows if the investment project has a firm ground and if the investment is genuinely additional.



# Regional policies and subsidies

Introduction

Methods

Policies

Conclusions

- Subsidy to capital accumulation have been a key component of regional policy in less developed Italian areas
- The target: to influence the regional allocation of investments and employment, in order to increase competitiveness and self-sustaining growth
- Subsidy to R&D are also an important instrument to stimulate innovation in all the regions
- The government has implemented a wide range of policy instruments to subsidise firms.

# Regional policies and subsidies

Introduction

Methods

Policies

Conclusions

Financed also using EU Structural Funds

- ❑ L.488/1992 (Investment Grant and Loan)
- ❑ PIA (Investment + R&D Grant)
- ❑ Program Agreement (addressed to large firms and industrial groups to promote industrial large investments)

Financed only by national funds:

- ❑ Credito d'imposta (Investment Tax Credit)
- ❑ Automatic Incentives (Investment Grant)
- ❑ FIT (R&D Grant and Loan. A small part financed also by UE SF)



# Evaluation of public subsidies

## Introduction

## Methods

## Policies

## Conclusions

The *Direzione generale per l'incentivazione delle attività imprenditoriali* has a long experience in monitoring and evaluating public subsidies. The activity is delegated and financed by Law 266/1997.

- Every year from 1999 the DG produces a “*Relazione sugli interventi di sostegno alle attività economiche e produttive*” (Report on policies to support economic activity)
- More than 15 evaluation studies on the principal instruments (488, FIT, Program Agreements etc.) are published.



# Evaluation of public subsidies: Methods

Introduction

**Methods**

Policies

Conclusions

## How we can measure subsidy effects?

Using indicators (the before-after intervention difference) is not appropriate: the difference can be affected by several (confounding) factors

Using the difference of an outcome (for instance, employment or turnover) between subsidized and not subsidized firms? No, because the two groups can have different characteristics, and therefore the outcome can be different also in absence of the policy





# Evaluation of public subsidies: Methods

The correct measure of the policy effect is:

**Policy effect**

=

**The result after the policy**

-

**The result in absence of the policy  
(the counterfactual scenario)**

=

**observable outcome-counterfactual outcome  
(the counterfactual outcome is estimated)**

Introduction

**Methods**

Policies

Conclusions



# Evaluation of public subsidies: Methods

Introduction

**Methods**

Policies

Conclusions

**Some examples:  
Effect of smoking**

=

**Health of smokers smoking for N years**

-

**Health of the same smokers in absence of  
smoking for N years (counterfactual)**

And not

Health of smokers - health of non smokers  
because smoking is often associated to alcohol etc.



# Evaluation of public subsidies: Methods

Introduction

**Methods**

Policies

Conclusions

Some examples:

**Effect of graduate studies on income**

=

**Income of graduated people**

-

**Income of the same people in absence of  
graduate studies (counterfactual)**

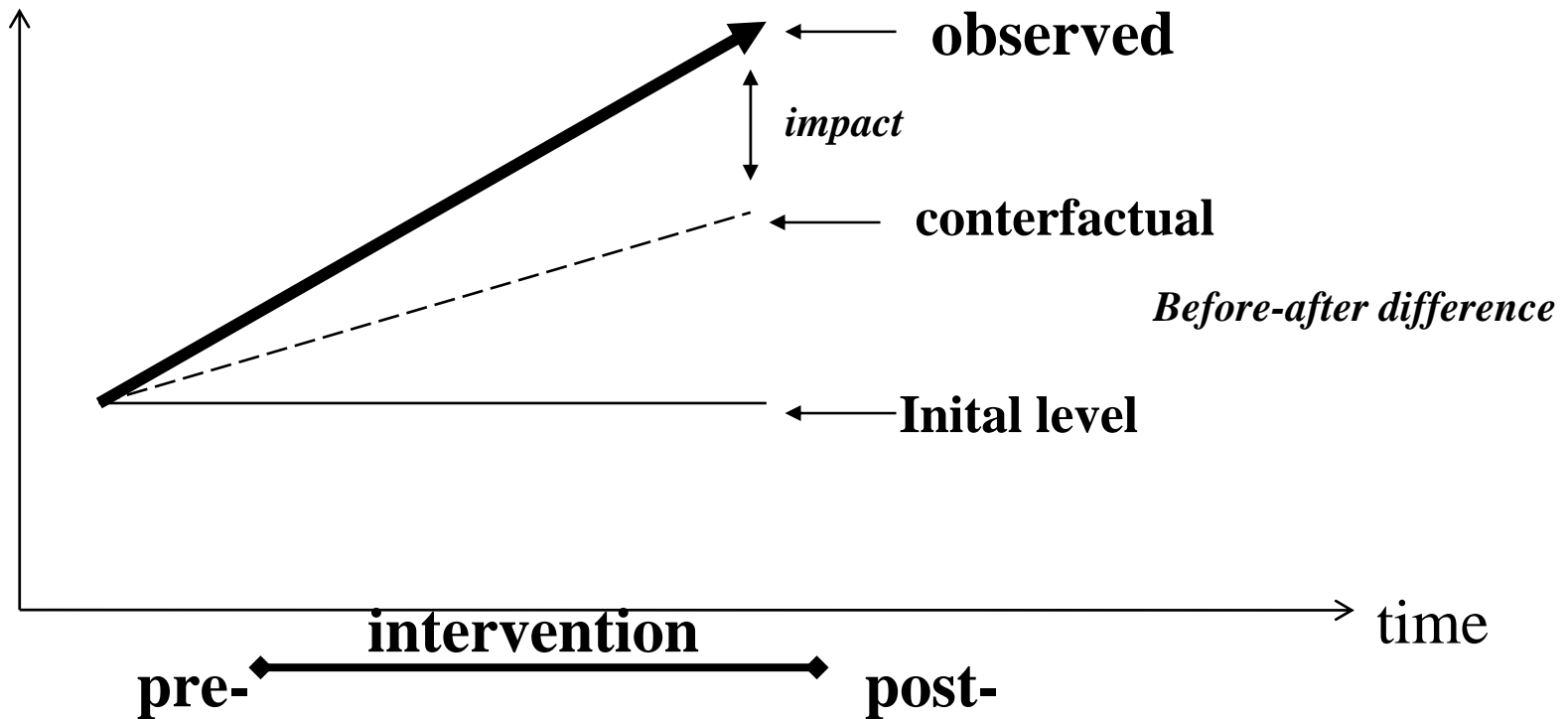
And not

Income of graduated - income of non graduated  
because graduated have generally more skills.



It does not depend only by the policy ...  
...if the result is positive

outcome



# Evaluation of public subsidies: Methods

Introduction

**Methods**

Policies

Conclusions

## How to estimate the counterfactual outcome?

Counterfactual: the performance of subsidized firms is confronted with what would have taken place without the subsidies

### 2 approaches:

- Using the past behavior**
- Using a control sample**

The control group approach is widely applied in the evaluation of subsidies:



# Evaluation of public subsidies: Methods

Introduction

**Methods**

Policies

Conclusions

- A statistical approach based on a control sample is used in order to estimate the counterfactual outcome
- The statistical evaluation methods are based on the **analysis of the differences in outcomes between “treated” and “not treated” units** (i.e. affected or not affected by the policy intervention)



# Evaluation of public subsidies: Methods

Introduction

**Methods**

Policies

Conclusions

- In fact, the selection process of the treated units is not random. The aim of the analysis is **to remove any bias associated with differences in observable and unobservable characteristics** among the treated and non treated units.
- Statistical matching techniques tackle the problem, by confronting only treated and not treated units with the same observable characteristics



# Evaluation of L. 488

Introduction

Methods

Policies

Conclusions

1. Law 488/92 represents the 30% of total financial aid to firms in Italy and **it is characterized by rigorous and transparent selection procedure**
2. It is based on an auction mechanism that allows the matching of subsidies demand and supply;
3. The selection procedure is based on 3 main indicators (other two indicators are less relevant):
  - *the share of owners' funds on total investment;*
  - *the new job creation by unity of investment;*
  - *the cut on the maximum possible capital subsidies accepted by the firm (the auction mechanism).*

The sum of the standardized and normalized indexes determines a (regional) rank. Firms are subsidized following the rank until the financial resources are completely utilized.





# Evaluation of L. 488

Introduction

Methods

Policies

Conclusions

The L. 488 selection procedure has two important features:

1. **the indicators are the selection variables.** They explain the main part of the differences between the subsidized and the non subsidized firms. This helps in the construction of the counterfactual scenarios
2. **the presence of a set of firms willing to invest,** that have a valid investment project **but they did not receive any subsidies** because their scores were too low. These firms are especially eligible to be a control group, as they show a propensity to invest very similar to that of subsidised firms



# Evaluation of L. 488

Introduction

Methods

Policies

Conclusions

The original data set contains more than 15,000 subsidized projects and almost 30,000 not subsidized projects.

Excluding projects funded in auctions dedicated to North, or to areas devastated by an earthquake or to tourism and retail sectors, or project whose investment program have not yet concluded or projects which the year of conclusion has preceded the year of the auction or other anomalous projects, the remaining projects are more than 5,000 (subsidized) and 10,000 (not subsidized).

The matching with AIDA (financial data), excluding the starting-up firms, leads to **665 subsidized firms and 1,493 not subsidized firms suitable for the analysis**. The impact of the imputation procedure is basically the same between the two groups (like the under representation of small firms).



# Evaluation of L. 488/1992

Introduction

Methods

**Policies**

Conclusions

Year 0 Variables	Median		
	Not financed	Financed	Diff. (%)
Turnover	3575628	3783176	5.8
Employees	27	30	11.1
Fixed assets	1293725	1420256	9.8
Gross margin / Turnover	0.089	0.102	0.01
ROI	4.125	5.57	1.4
ROE	4.195	6.99	2.8
Fin. charges / Turnover	0.028	0.028	0.0
Turnover / Employees	169852	159485	-6.1
Fin. charges / Debt	0.045	0.046	0.0
Value Added	920671	1103340	19.8



# Evaluation of L. 488/1992

Introduction

Methods

**Policies**

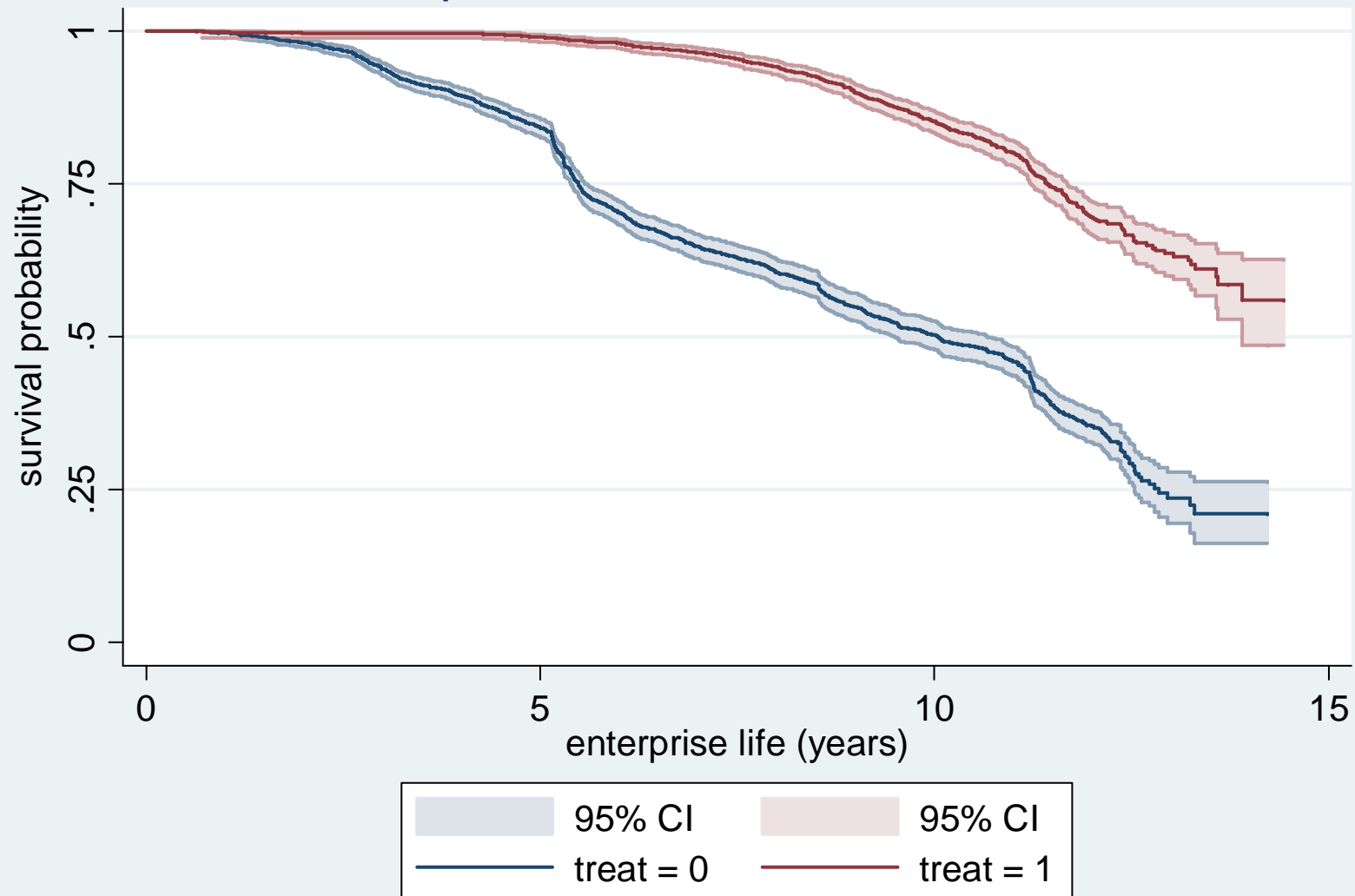
Conclusions

Variable (differences)	Kernel matching estimation				
	Subsid.	Non subs.	ATT	Std. Error	t-stat.
Turnover	405	660	10.665	9.278	1.149
Employment	433	630	27.938	10.793	2.589
Fixed Assets	412	661	76.210	17.435	4.371
Gr. margin/turnover	409	651	0.742	0.679	1.093
ROI	391	659	0.033	0.835	0.039
ROE	390	637	-0.123	1.120	-0.110
Fin. charges/turn.	399	632	-0.000	0.005	-0.027
Per capita turnover	408	635	-17.388	6.981	-2.491
Fin. charges/debt	406	662	0.053	0.197	0.268



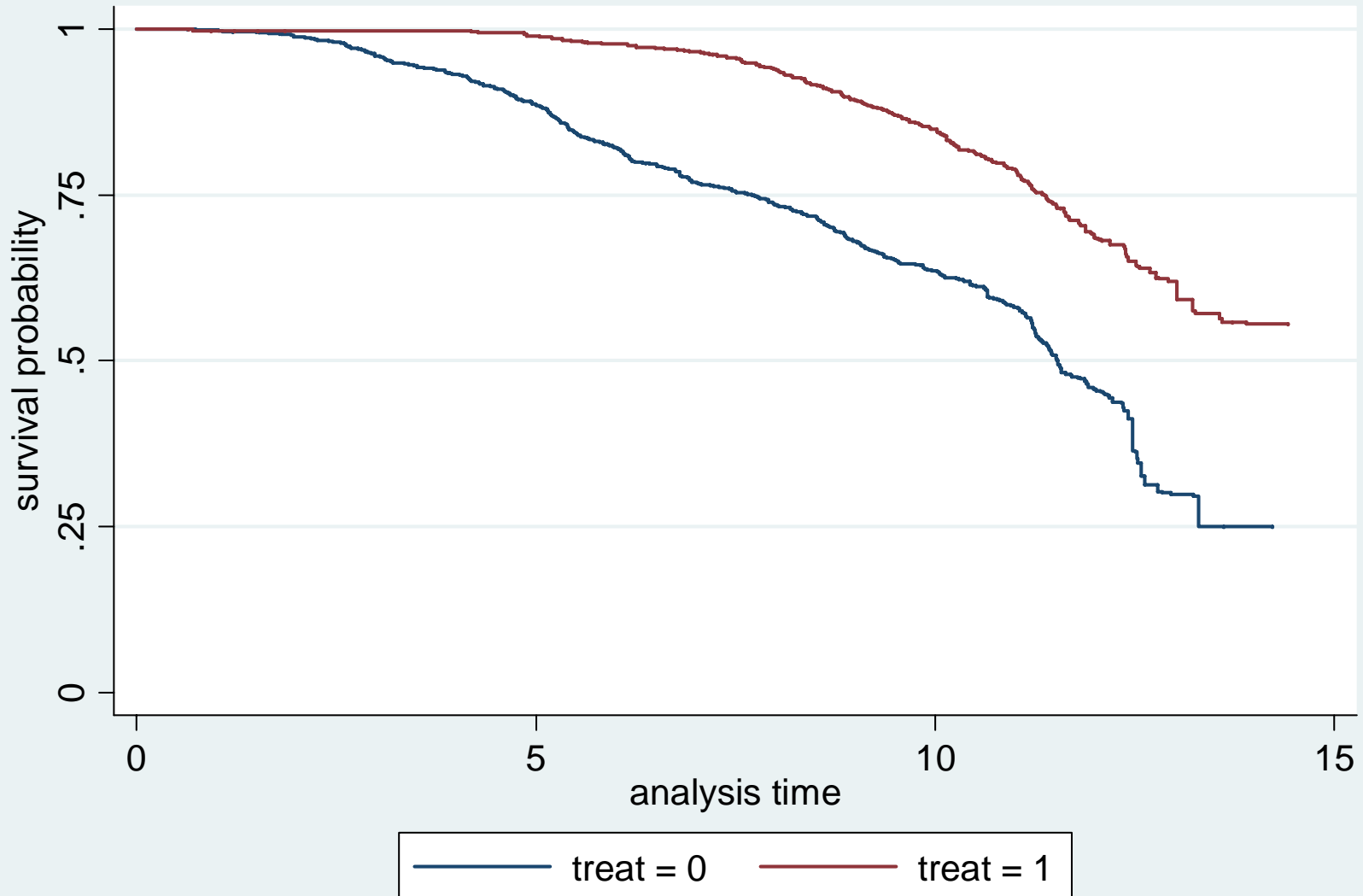
# L. 488/1992: survival of “new” firms

Kaplan-Meier survival estimates



# L. 488/1992: survival of “new” firms

Kaplan-Meier survival estimates



# Conclusions

Introduction

Methods

Policies

**Conclusions**

- Growth in turnover, employment and fixed assets has been more dynamic in the subsidized firms. The expected life of new subsidized firms is longer
- As a whole, the L. 488 has achieved the (implicit or explicit) targets selected by the policy makers: the subsidized firms have invested more than usual, and they have increased the number of employees more than the non subsidized ones.



# Conclusions

Introduction

Methods

Policies

**Conclusions**

- The productivity of subsidized firms grows less than in the non subsidized firms. The firms prefer to overshoot the optimal amount of employment in order to gain the subsidy. This behaviour can affect long run efficiency and growth.
- The result is not unexpected. In fact, the policy makers use the financial incentive to change the firm preferences, and to push the firm to invest in projects that, without incentive, would be abandoned.



# Conclusions

Introduction

Methods

Policies

**Conclusions**

- A correct evaluation (using a good counterfactual estimate) helps the policy makers to implement effective policies and not to waste public funds.