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Complementarity and substitution among industrial incentive schemes:
measures targeted to SME versus measures targeted to large projects

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Abstract

In Europe several countries adopt different incentive schemes to increase regional development. Some subsidies are targeted to small and medium enterprises, others to large enterprises. Even if the subsidies are targeted to specific industrial aspects, there is a substantial degree of territorial overlapping among them.
Generally, every incentive scheme operates in isolation, and the evaluation of the different measures does not take into account the presence of complementarities or substitution among them. On the other hand, the presence of the SME and large firms in the same area can generate positive externalities: this can explain the integration of different incentive schemes on the same region. The aim of this paper is to explore the impact of SME (Small Medium Enterprises) and large project incentive schemes in two cases: in areas where financial assistance has been taken up by SME and large firms, and in areas where only SME are subsidized.
The analysis is based on the two major measures for local development in Italy: incentives by Law 488/92, mainly devoted to SME, and contratti di programma (program agreements), created for large projects. Using data for 365 local labour systems in the South of Italy, we estimate the employment effect of subsidies, conditioning to the presence of spontaneous local growth patterns and for spatial spillovers, using appropriate spatial models. The analysis shows that incentives for SME have higher impacts in area where a project financed by program agreement is located. This suggests the presence of a relevant level of empirical complementarities between the two incentive measures.

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1. **Introduction**

In Italy, as well as in other European countries, several measures for local development are oriented to private capital subsidies. The most important incentive schemes are Law 488/92, providing subsidies to small and medium enterprise projects, and program agreements, focused on large investment projects. Although both instruments have a common dimension, related to target, area of implementation and recipients, they are implemented in an isolated context, without explicit elements of integration. Also evaluation studies of local development policies rarely tackle the simultaneous presence of different instruments applied to the same area.

There are several reasons why the joined impacts of several instruments on the same region differ from the sum of individual impacts. For example, the territorial concentration of different policies could promote local aggregations of firms, generating positive local agglomeration externalities[2] . Moreover, the joint use of different policy instruments can facilitate the location of local systems of enterprises organized by hierarchical relations, whereas large firms are linked to smaller ones by vertical relations (subforniture, externalisation).[3] Finally, the use of a set of instruments can improve the matching between firm needs and incentive supplies.

The presence of such positive effects is basically an empirical matter. Therefore, the aim of this paper is to evaluate the simultaneous impact of instruments of subsidies when operating in the same area. The estimated effects include both the impact of the distinct instruments, evaluated in terms of creation of new jobs, as well as the presence of complementarity or substitution effects between them.

The analysis is carried out over at a very disaggregated territorial level, using the grid of the local labour system (LLS, territorial unit), in the South of Italy. This allows the analysis of spill over effects between LLS, that are estimated through an econometric model with spatial dependence. The analysis uses non-experimental statistical evaluation methods, based on a modified version of the *difference-in-differences* model, to assess the impact of public subsidies in regions of different dimensions.

The literature about quantitative evaluation of regional effects of industrial aid schemes to firms is not very wide. Some studies, encouraged by the availability of the data, used statistical methods to evaluate the impact of Enterprise Zone Programs, US incentive schemes to firms located in disadvantaged areas (for example Bondonio, 1998, Bondonio and Engberg, 1999). In Italy, subsidies impact studies based on quantitative methods in the South of Italy and in depressed areas have considered both micro (on firms) and macro (on a specific area) aspects. The analyses have implied both Law 488/92 (for example Del Monte, 1997; Chiri, Pellegrini and Sappino, 1998; Pellegrini, 1999; Ministery of Industry, 2000, Scalera e Zazzero, 2002; Ministery of Productive Activities , 2003; Carlucci and Pellegrini, 2003, Bondonio, 2004) and program agreements (Giunta, 1998; Florio e Giunta, 2002; De Castris, 2003). On the other hand, none of the previous essays considered the interaction of different instruments, that is the main innovation presented in this paper.

The paper is divided into the following parts: in the second section a brief review of the two incentive schemes (Program Agreements and Law 488/92) is presented; in the third one the

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[2] See Rosenthal and Strange (2004) for a recent review on agglomeration economies.
[3] See Markusen (1996a) and (1996b) for evidence on hierarchical districts

analysis of the spatial distribution of the instruments, evaluating overlapping, concentration and spatial correlation, is described; in the fourth one we illustrate the methodological aspects of our analysis and describe the econometric model we used. In the fifth one data and statistical source are presented, and in the following one results of the estimate. The last section is dedicated to the conclusions of our analysis.

2. Industrial aid schemes in the South of Italy: the Law 488/92 and program agreements

The incentive policies to firms in the South of Italy are oriented to sustain the accumulation of private capital and to support employment growth. In Italy a first change in aid policies was introduced by the Law 64/1986. This law represents not only the end of the well-known "Cassa per il Mezzogiorno", a State Agency devoted to the management of financial resources to develop Southern Italy infrastructures and private capital. It has introduced the "planned negotiation", where the definition of investments is the objective of a negotiation between the Public Administration (mainly Regions and Central Administrations) and firms. The planned negotiation has changed the relations between public institutions and private economic operators because it substitutes a more constructive and horizontal approach for a hierarchical one. This approach is oriented not only to the sharing of resources but basically to the identification and conclusion of public investments.

One of the different new instruments developed in the framework of planned negotiation was the program agreement. This instrument is addressed to large firms and industrial groups to promote the implementation of industrial large investment whose project plans have to be negotiated with the Public Administration.

The instrument has new features with respect to the old ones. It is oriented to the attraction of domestic and international projects, which favours competition between areas and countries; by taken into account ex ante evaluation of positive and negative externalities of each project. Moreover, the Public Administration can address the choices of investment to produce social-economic effects at national and local level.

From the introduction of program agreements (Cipe Deliberation 28/5/1987) up to now, the instrument has been modified to answer to the transformation of productive sectors of the country and to assure a larger impact in the areas where the incentives are located. At the beginning, only large investments were financed; in the following years the instrument has been extended to the sector of tourism (Law 196/1997), agricultural and fishing (Legislative Decree 173/1998). A further important transformation is the extension to consortia of small and medium enterprises and to industrial districts, which are important subjects of Italian economy (Cipe Deliberation, 21/3/1997).

The carrying out of program agreements was problematic mainly for difficulties related to the implementing of adequate administrative procedures: the approval time of each project and the provision of financial resources were very long, especially in the first stage of the life cycle of the instrument (1986-1992). The difficulties were overcome by the improvement of the program agreement regulation. On the other hand, a faster instrument for private capital accumulation was defined (faster both in the approval phase and in the allocation of financial resources). The instrument was implemented by the Law 488/92.

The main feature of Law 488/92 is to allocate subsidies through a "rationing" system based on an auction mechanism which guarantees compatibility of demand and supply of incentives. Subsidies are granted on the basis of the amount of the funding available.

Interventions to be subsidised are selected on the basis of merit, identified by 3 indicators, in accordance with legislators' evaluations [4]. The indicators are the following ones: 1) share of owner capital invested in the project; 2) number of new employees per unit of investment; 3) ratio between the maximum subsidy which can be allocated and that requested by the firm. In order to draw up rankings to grant subsidies, each application receives a score obtained by adding up the values of the single standardised and normalised indicators. The rankings are drawn up through the decreasing order of the score awarded to each project and the subsidies are allocated to projects until funding granted to each region is exhausted. These rankings are constructed at a regional level. There are also special rankings for large projects and reserved lists for small and medium-sized firms.

There is a mechanism related to the amount of aids requested by the firm (with respect to threshold established by the European Union) which affects the possibility of obtaining the incentive. The lower the percentage requested, the greater the likelihood of receiving it), and this allows firms to influence the probability of obtaining the subsidy and the State to reduce the "rent" granted to the firm. By ranking and selecting projects and subsidies, the government can stimulate projects with different earning capacities in different ways and maximize the number of subsidised investments with the overall amount of resources available.

From 1992, the two instruments acted on the same areas of the South of Italy. It is not known to what extent the presence of program agreements has favoured the growth of new investments implemented with the Law 488/92, and vice versa. This is the object of the following analysis.

3 Territorial diffusion and concentration of the two instruments

These two instruments are addressed to different typologies of firms: both kinds of incentives are specialized in different categories of projects (the program agreements are oriented to large and medium projects, the Law 488/92 to medium and small projects), and selection and allocation process of both instruments support this choice. Actually, there is a *trade-off* between the time lag of subsidies disbursement and the amount of the incentive. On the one hand the expenditure schedule of Law 488/92 is fixed and very strict, whereas program agreements do not have a predetermined timetable for the benefit assignment. On the other hand, the procedure of handing over prescribed by Law 488/92 implies a reduction of the amount of benefit with respect to the maximum allowable, large firms, without strong budget constraints, prefer program agreement that instead allow the disbursement of the maximum incentives. The consequence is that the firm usually does not use both instruments at the same time. The interaction among instruments happens by the effects on behaviour of firms localized in the same region.

The choice of policy makers to implement territorial growth policies using the same map designed for the allowance of EU structural financial funding and for the areas in derogation of concurrence policy following the articles 87.3.a and 87.3.c. has favoured the presence of both instruments on the same area. This is consistent to the principles of concentration of the State intervention as prescribed by EU regulation. The concentration of different policies on

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[4] There were three indicators in the period the empirical analysis refers to. Two more were added to them, subsequent to the intervention: an indicator linked to specific regional, sectorial or territorial priorities, and an indicator linked to the level of awareness of environmental issues.

the same area favours the achievement of a sufficient agglomeration of firms required for the creation of positive externalities attracting new firms and promoting development process.

The regional analysis by instrument shows that 561 (71,6%) of 784 Italian LLS have received incentives, i.e., they include at least one municipality in which subsidized firms by Law 488/92 or program agreement are located (Table 1).

As expected, the LLS's in which there is at least one intervention, are basically localized in the South of Italy: there are 332 subsidized LLS in the southern regions, (59.1% of the total). The territorial diffusion in the two areas is deeply different: in the Centre and North regions the LLS with incentives are the 54.7% of the total, the 91% in the South.
Therefore, the process of incentive concentration is under way in the Central and Northern regions, even though less intensive with respect to the southern regions it is almost nonexistent. The reason is mainly due to the map of eligible areas for incentives, that includes all southern regions and only some areas of the North-Centre. This indicates that, ex post, in the considered period, any action of concentration of the intervention in the South of Italy does not have any relevant effect.

The process of concentration can be analyzed also by the exam of new job creation by subsidized firms. The regional distribution of new employment by instrument is presented in Table 2. On the whole, completed interventions have created 145,000 new jobs, a little more than 2% of industrial occupation in 2001 of the whole country. However, the industrial occupation represents, with 37,000 new employed, only the 0,7% of industrial employment in the North-Centre, while in the South the share is equal to 7.5% of industrial occupation in this area.

Table 1- Local labour systems by the presence/absence of subsidized firms (by program agreement and Law 488) by region (period 1996-2001)

LLS GROUP	North-Centre	South	Italy
No incentives	190	33	223
Only Law 488/92	227	300	527
Both instruments	2	32	34
Total	419	365	784

Table 2- New employment produced by program agreements and Law 488/92 in the local labour system by regions. (*number of workers*).

LLS GROUP	North-Centre	South	Italy
No incentives	0	0	0
Only Law 488/92	27247	53391	80638
Both instruments	9685	54521	64205
Total	36931	107911	144843
Share %	North-Centre	South	Italy
No incentives	0.0	0.0	0.0
Only Law 488/92	73.8	49.5	55.7
Both instruments	26.2	50.5	44.3
Total	100.0	100.0	100.0

The analysis by instrument, showed in tables 3a and 3b, indicates that all program agreements insist on LLS where also Law 488/92 is present. Therefore, the territorial diffusion of state subsidized policies is dominated by the spatial presence of the Law 488/92, particularly diffused in the South regions.

The Law 488, in the period 1996-2001 has created about 123,000 new job, the 70% in the South (table 3a). Nearly 35% of employment are in the LLS where program agreements are also localized, showing a large overlap of the instruments also from the point of view of the extent of the intervention.

The subsidised firms of Law 488/92 have created in the period 1996-2001 a cumulative number of jobs equal to 1.8% of industrial occupation in 2001. The share increases to 6% in the South, showing that the contributing of incentives in these regions is very important, also without taking into account spill-over effects.

The program agreement impact is lower than the 488/92 one. In the considered period the instrument has created over 22,000 new jobs, almost all (97%) in the South (table 3b). On the whole, the program agreement have created the 0.3% of industrial employment in 2001, the 1.5% of the southern one.

The analysis of program agreements has to consider the exceptional concentration of state aids in the local labour system of Melfi, caused by FIAT investments that attracted other investments for mechanical component activities. The employment generated by program agreement are over 8,550; if we exclude Melfi's LLS, the share of southern employment due to program agreement goes down to the 0.9% (tab. 3c).

Table 3a - New employment generated by Law 488/92 in the local labour system by regions. (*number of workers*). Year 2001.

LLS GROUP	North-Centre	South	Italy
No incentives	-	-	-
Only Law 488/92	27,247	53,391	80,638
Both instruments	9,256	32,768	42,023
Total	36,502	86,158	122,661

Share (%) of employment generated by Law 488/92 in the local labour system compared with domestic industrial employment of the year 2001.

LLS GROUP	North-Centre	South	Italy
No incentives	-	-	-
Only Law 488/92	0,8	6,9	2,0
Both instruments	4,0	5,2	4,9
Total	0,7	6,0	1,8

Table 3b - New employment generated by program agreement in the local labour system by territorial sections. (*number of employeed*). Year 2001.

LLS GROUP	North-Centre	South	Italy
Absence of incentives	-	-	-
Only Law 488/92	-	-	-
Both incentives	429	21,753	22,182
Total	429	21,753	22,182

Share (%) of employment generated by program agreement in the local labour system compared with domestic industrial employment of the year 2001.

LLS GROUP	North-Centre	South	Italy
Absence of incentives	-	-	-
Only Law 488/92	-	-	-
Both incentives	0.2	3.4	2.6
Total	0.0	1.5	0.3

The spatial distribution analysis of incentives examines if they are concentrated in some areas or they are randomly scattered. The notion of employment concentration generated by the above two incentives is ambiguous. In fact, it can be twofold: it can be related only to single LLS, that is, if new employment is equally distributed in the LLS, otherwise it is concentrated only in some LLS; it can be related to aggregation of SLL, i.e. if there are aggregation of adjacent LLS that show high levels of new employment, compared to agglomeration where there is a low level. The first notion can be quantified with a concentration index by LLS, as the Herfindhal index: the second one with an index of spatial correlation by LLS, as Moran index[5].

The Herfindhal index is presented in table 4. While in the North-Centre the distribution of State aids by Law 488/92 follows the geographical map defined by UE Commission, in the southern regions it follows the spatial concentration of total employment in the regions. The distribution of incentives is driven by a concentration process of firms by LLS rising in a spontaneous way: this is due to the fact that there are non spatial options in the allocation of funding in these regions. Actually, from the fourth rounds, regions introduced area selection indicators, but the spatial distribution of subsidized firms has only slightly changed.

For the program agreement the distribution is more concentrated. This is implicit in the feature of the instruments that it is addressed to few, if big, incentives. Even if the LLS of Melfi is excluded, the Herfindahl concentration index is over three times greater of the index referred to the Law 488/92.

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[5] See Pellegrini (2004) for technical details.

Table 3c - New employment generated by program agreements in the local labour system (net Melfi's LLS) by territorial sections. (*number of workerd*). Year 2001

LLS GROUP	North-Centre	South	Italy
Absence of incentives	-	-	-
Only Law 488/92	-	-	-
Both incentives	429	13.204	13.633
Total	429	13.204	13.633

Share (%) of employment generated by program agreements in the local labour system (net Melfi's LLS) compared with domestic industrial employment of the year 2001.

LLS GROUP	North-Centre	South	Italy
Absence of incentives	-	-	-
Only Law 488/92	-	-	-
Both incentives	0.2	2.1	1.6
Total	0.0	0.9	0.2

Table 4 - Territorial concentration of employment by instrument (Herfindahl index by LLS)

VARIABLES	HERFINDAHL INDEX
New jobs l. 488/92	0,023
New jobs PA (Program Agreement)	0,184
New jobs PA excluding Melfi LLS	0,081
- total employment in Italy by LLS	0,026

The spatial correlation analysis through Moran index for southern regions is shown in table 5. We observe a positive and significant spatial correlation of new jobs generated by l. 488/92 that is greater than the total employment correlation. Therefore the degree of spatial agglomeration of l. 488/92 is higher than the naturally generated agglomeration. Actually, if we analyse the share of l. 488/92 employees compared to all of the employees using a Moran index, we notice a significant and even higher spatial correlation. This agglomeration is therefore a peculiarity of the instrument and it highlights spill-over effects between neighbouring LLS.

Table 5 - Spatial correlation of employees by instrument (Moran index by LLS)

VARIABLES	MORAN INDEX	*P-VALUE*
New employees l. 488/92	0.078	0.000
Share of new employees l. 488/92 compared to total employees of LLS	0.193	0.000
New employees PA	-0.006	0.370
Share of new employees PA compared to total employees of LLS	-0.011	0.097
- total employees for LLS 2001	0.045	0.000

There are at least two reasons that justify this spatial diffusion model of incentives: the entrepreneurs can understand that there are positive benefits in localizing near LLS where are subsidized firms (or, on the contrary, negative localization factors can affect neighbours); the

development of LLS can spread out "by contagion", beginning from a LLS and influencing adjacent LLS.

This aspect describes a dynamic local development model, present in the recent literature (Pellegrini, 2004). As expected, instead, the program agreements do not show statistically robust spatial correlation. The share of new employees of program agreement compared to total employees show a negative correlation, not significant at 5% level.

4. Methodology for evaluating territorial ex-post impact of subsidies

The methodology for evaluating ex-post impact of subsidies on a region is based on the analysis of the counterfactual scenario, following the recent literature on evaluation of public policy . However, the small number of LLS without policy intervention (in our case without the presence of incentive by Law 488/92) does not allow the use of the classical model where the counterfactual is represented by a sample of not subsidized LLS.

We meet three main problems that affect the evaluation of the impact of the two instruments:
1. identifying the effects of incentive separating from the (expected) growth of LLS;
2. evaluating the impact of different amount of incentives across LLS;
3. specifying the interaction between the two forms of incentives.

The first problem is related to the presence of auto-selection: the subsidized firms choose to localize in areas where perspectives are higher; therefore larger growth could be caused not by the incentives but also by the idiosyncratic features of these areas. In this case we can use econometric strategies based on the knowledge of observable and not observable auto-selection variables to remove the *selection bias* and find the correct impact coefficient. In the case of selection on not observable variables (that are considered constant in the period) the standard model is the *difference-in differences* estimator:[6] the analysis does not compare the level of performance variable but its difference before and after the intervention, across subsidized and not subsidized areas. In our case the simple differences could be misleading because LLS have different extension (and therefore different employment levels). We decided to use logarithmic differences, i.e. the growth rate of employment. The growth rates differentials are attributed to the features of each LLS, in particular the degree of structural development level and cyclical variables. These features can be approximated by proxy observable variables considered in the model.

An other important aspect for the specification of the evaluation model is the presence of an high spatial correlation across LLS that could influence the estimates. This correlation could be representative of a specific territorial development model, partially influenced by the incentive, that has to be included in the analysis. From the econometric point of view, this means considering a lagged spatial variable or a spatial error model, to be chosen using appropriate tests of spatial specification.

The second problem is related to the choice of the correct parameterization of the intervention variable. The use of a simple flag to single out areas with or without incentive, as often used in the literature, is in our case not sufficient, because there is a inadequate number of LLS

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[6] See Blundell e Costa Dias (2000) e (2003) for technicalities.

without incentives and also because there is a high variability across LLS of the amount of subsidies.

Given the available data, the dimension of the subsidized investment has be approximated by the number of new workers, that is a signal of the amount of the intervention realized, under the hypothesis of a linear relation between the number of new jobs and substitution effects or complementarities on the area[7]. The use of logarithmic differences requires to normalize the number of new employees due to incentive to eliminate the effect of different dimensions. The adopted parameterization is to normalize the new created jobs by total employment of LLS before intervention. This facilitates the interpretation of the coefficient of the intervention variable, because it represents the number of additional employees in the LLS when there is an increase of one unit in the number of employees due to subsidies.

The model of the interaction is complicated by the fact there are not LLS with program agreement and without incentive by Law 488/92. Therefore it is not easy to identify the contribution of each instrument. We have chosen to evaluate three basic questions:
1. How much does the impact of l.488/92 change if the effects of program agreements are included?
2. To what extent does the coefficient of l.488/92 modify if it can change in the LLS with program agreement?
3. To what extent does the coefficient of l.488/92 modify if the interaction represented by the product of employment in the LLS with program agreement has been added?

The base model is therefore specified by:

(1) $\Delta(\ln TE)_t = \alpha + \beta \Delta(\ln TE)_{t-1} + \gamma X_{t-1} + \delta\ (intervention_t/TE_{t-1}) + \varphi\ (interaction_t) + \varepsilon_t$

where *TE* is a vector of Nx1 observations of the dependent variable total employment for LLS (N=365), *X* is a matrix Nxk of observations of the exogenous variables, *intervention* is the new employment created by incentive of l.488/92 or by program agreement, *interaction* represents the variables that capture the interaction, $\alpha,\ \beta,\ \gamma,\ \delta,\ \varphi$ are (Kx1) vectors of regression parameters, ε_t is a vector of homoschedastic not correlated and normal distributed error. The observables variables that capture the business cycle are the lagged dependent variable ($\Delta(\ln TE)_{t-1}$) and the growth rate of value added in the services[8]; those that capture the structural aspects are the employment share in agriculture at the time t-1 and unemployment rate at the time t-1. It was also used an other dummy variable to single out a LLS with outlier value for the employment growth rate. The results are presented in the table 6.

This specification has been tested for the presence of spatial correlated errors or for a spatial lag model (LM test as proposed in Anselin, 2001). Both tests have strong positive value (table 7).

The model is therefore estimated before in the form of *spatial lag*:

(2)

$\Delta(\ln TE)_t = \alpha + \beta \Delta(\ln TE)_{t-1} + \gamma X_{t-1} + \delta\ (intervention_t/TE_{t-1}) + \varphi\ (interaction_t) + \rho W \Delta(\ln TE)_t + \varepsilon_t$

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[7] The test on the presence of non linear relation (COSUM test) was done.
[8] A similar variable was used in a paper of Bondonio (2004).

where $W \Delta(\ln TE)_t$ is the spatial lagged endogenous variable (W is the adjacencies matrix, made by binary values, that have been calculated on the basis of the maximum distance, about 46,5 km) and ρ the autoregressive spatial parameter

and in the form of *spatial error model*:

(3) $\Delta(\ln TE)_t = \alpha + \beta \Delta(\ln TE)_{t-1} + \gamma X_{t-1} + \delta$ *(intervention $_t$/TE $_{t-1}$* $+ \varphi$ *(interaction $_t$)* $+ \varepsilon_t$

with $\varepsilon_t = \lambda W \varepsilon_t + \mu_t$

where λ is the autoregressive spatial parameter and μ_t is a vector of homoschedastic and not correlated normally distributed errors.

The models 2 and 3 have been estimated by LM (Anselin, 1988). The diagnostic test about the model includes simple and adjusted R-square, whereas, in the case of the models with spatial dependence, it presents the variance ratio (a statistic similar to the R-square based on the ratio between dependent variable estimate variance and the observed variance).

5. Data

The working of the model requires data at disaggregated territorial level, sometimes not available from official sources. The statistical sources used are from the National Institute of Statistics (Istat) and from administrative sources.

The following statistical sources have been considered:

- Istat, time series 1996-02 of domestic employment and value-added in the sector of agriculture, industry and services, at the territorial level of LLS;
- Istat, homogenous data of Industry and Service Census years 1991, 1996, 2001 related to employees of local unit, in the LLS, in the sector of agriculture, industry and services;
- Istat, data from the XIV Census of Population, year 2001;
- Istat, time series (estimate) 1998-02 resident employment and unemployed persons, at the territorial level of LLS;
- Istat, estimate of resident employment and unemployed persons, at the territorial level of LLS, year 1996.

Administrative database:

- Micro data base of program agreement, realized in the period 1987-2000, that contains investments and new employees by program agreement, and single project of investment at the level of municipality. Data have been taken from deliberation of Cipe - Inter Ministerial Committee for Economic Planning – and completed with documents from Ministry of Productive Activities. The database contains new job created by incentive and the value of investments in the LLS.
- The database of investments realized by the Law 488, contains data on investments and new actual job (they are not equal to the planned number) on the basis of the relation of concessionary banks, at the territorial level of LLS.

6 . Results

The regression model (1) has been estimated: the growth rate 1996-2001 (pre-post) of total employment for LLS is related to the growth rate 1991-1996 of total employment and a set of exogenous variables for the 365 LLS in the South of Italy.

The results of the OLS estimate (without spatial effects) are shown in table 6. The model without incentive has a good fit and significant parameters. We observe that the coefficient of unemployment rate is negative, showing the permanence of structural negative effects.

Introducing the variable taking into account new jobs by Law 488/92 normalized with employee of the year 1996, we get a positive and significant coefficient equal to 0.46. The job creation by subsidies increases the total employment of about a half worker for each new job. The transfer is not complete because a part of the growth "substitute" job that could be created without incentive firms, cutting into half the net effect.

The inclusion of the variable on program agreement coefficient has positive signs but are not significant. Moreover, the net effect could be lower than that of Law 488. Otherwise including both instruments, with two variables, we note an increase of the significance and in the value of coefficient of program agreement, while the value of the coefficient for 488/92 is not different.

Also the case of interaction is very interesting: if the coefficient of the l.488/92 changes in the LLS with program agreements, we obtain a positive and statistically significant coefficient, while the coefficient decreases in the LLS without program agreement. This implies that in the LLS there is an effect of complementarities, although smaller, between the two instruments.
Moreover, the interaction reduces as expected the specific effect of the l.488/92, or the coefficient that in the past included the effect of complementarities with program agreement. The measured interaction is defined as the product between new employment created by the two instruments is always positive but not statistically significant.

These results can be influenced by the presence of spatial correlation. The test, presented in table 7 show as it is possible to exclude the presence of a model with residual spatial correlation in all those estimated models.

Table 6 – estimate of linear regression model (dependent variable: growth rate of employee 1996-2001)

Variables	MOD.1	MOD.2	MOD.3	MOD.4	MOD.5	MOD.6
Lagged growth rate of employee (1991-96)	-0.13 (-2.75)	-0.15 (-3.22)	-0.16 (-3.07)	-0.19 (-3.66)	-0.19 (-3.81)	-0.15 (-3.31)
Share of agriculture employment 1996	-0.11 (-2.33)	-0.16 (-3.17)	-0.12 (-2.47)	-0.17 (-3.37)	-0.16 (-3.36)	-0.15 (-3.09)
Growth rate VA service sector (1996-01)	0.13 (4.37)	0.10 (3.28)	0.14 (4.43)	0.11 (3.31)	0.11 (3.35)	0.11 (3.33)
Unemployment rate 1996	-0.25 (-3.51)	-0.22 (-3.14)	-0.25 (-3.46)	-0.22 (-3.06)	-0.21 (-3.04)	-0.22 (-3.07)
Dummy LLS 616	0.72 (6.35)	0.68 (6.10)	0.71 (6.30)	0.67 (6.03)	0.67 (6.09)	0.68 (6.14)
Share of new employees l. 488/92 (a)	-	0.46 (3.77)	-	0.48 (3.92)	0.43 (3.58)	0.42 (3.28)
Share of new employees of program agreement (b)	-	-	0.28 (1.37)	0.35 (1.74)	-	-
Interaction: flag PA* (a)	-	-	-	-	18.52 (2.05)	-
Interaction: (a)*(b)	-	-	-	-	-	0.39 (1.28)
R^2	0.21	0.24	0.21	0.24	0.24	0.24
Adjusted R^2	0.19	0.22	0.20	0.22	0.23	0.22
Number of observations	365	365	365	365	365	365

Models under two hypotheses of the presence of lagged spatial variables (model with spatial lag) and the presence and spatial correlated error (model with spatial error) have been estimated by ML. The results are in tables 8 and 9.

In all the models the spatial coefficients are significant even though the probability is higher for spatial lag model than for correlated spatial error model. The results are similar to those of OLS estimates. In the whole there is a reduction of the coefficient for both the instruments: this is caused by the spatial interrelation that gets the spill-over between areas.

Table 7 - Test of spatial dependence for the model

Test of spatial dependence	MOD.1	MOD.2	MOD.3	MOD.4	MOD.5	MOD.6
Spatial Error						
Lagrange multiplier*	20.15	24.88	23.80	18.21	18.62	16.9
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Spatial lag						
Lagrange multiplier*	12.74	6.39	12.08	5.64	6.39	5.42
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.02)

*p-value between parentheses.

Table 8 – Estimate of regression model with spatial lag (dependent: growth rate of total employment 1996-2001).

Variables	MOD.1	MOD.2	MOD.3	MOD.4	MOD.5	MOD.6
Lagged growth rate of employee (1991-96)	-0.13	-0.15	-0.17	-0.19	-0.19	-0.15
	(-2.93)	(-3.32)	(-3.17)	(-3.68)	(-3.83)	(-3.41)
Share of agriculture employment 1996	-0.13	-0.17	-0.14	-0.17	-0.17	-0.16
	(-2.76)	(-3.41)	(-2.88)	(-3.59)	(-3.58)	(-3.34)
Growth rate VA service sector (1996-01)	0.14	0.12	0.15	0.11	0.12	0.12
	(4.59)	(3.55)	(4.65)	(3.57)	(3.60)	(3.60)
Unemployment rate 1996	-0.22	-0.21	-0.22	-0.20	-0.19	-0.20
	(-3.18)	(-2.94)	(-3.15)	(-2.88)	(-2.86)	(-2.87)
Dummy SLL 616	0.70	0.67	0.70	0.67	0.67	0.68
	(6.40)	(6.18)	(6.36)	(6.12)	(6.18)	(6.23)
Share of new employees l. 488/92 (a)	-	0.40	-	0.42	0.39	0.36
		(3.27)		(3.43)	(3.14)	(2.82)
Share of new employees of program agreement (b)	-	-	0.25	0.32	-	-
			(1.25)	(1.61)		
Interaction: flag PA* (a)	-	-	-	-	17.00	-
					(1.91)	
Interaction: (a)*(b)	-	-	-	-	-	0.38
						(1.30)
Rho	0.012	0.009	0.011	0.008	0.008	0.009
	(2.96)	(2.24)	(2.89)	(2.12)	(2.09)	(2.24)
Number observation	365	365	365	365	365	365
Variance Ratio	0.22	0.25	0.23	0.25	0.25	0.25

Table 9 – Estimates error spatial model (dependent: growth rate of total employment 1996-2001)

Variables	MOD.1	MOD.2	MOD.3	MOD.4	MOD.5	MOD.6
Lagged growth rate of employee (1991-96)	-0.13 (-2.98)	-0.15 (-3.30)	-0.17 (-3.22)	-0.19 (-3.66)	-0.19 (-3.81)	-0.15 (-3.39)
Share of agriculture employment 1996	-0.12 (-2.40)	-0.15 (-3.00)	-0.13 (-2.50)	-0.16 (-3.15)	-0.16 (-3.15)	-0.15 (-2.92)
Growth rate VA service sector (1996-01)	0.18 (4.57)	0.14 (3.55)	0.18 (4.58)	0.14 (3.53)	0.14 (3.55)	0.15 (3.60)
Unemployment rate 1996	-0.20 (-2.36)	-0.18 (-2.03)	-0.19 (-2.30)	-0.17 (-1.96)	-0.17 (-2.01)	-0.17 (-2.00)
Dummy SLL 616	0.69 (6.28)	0.67 (6.08)	0.68 (6.23)	0.66 (6.01)	0.66 (6.06)	0.66 (6.13)
Share of new employees l. 488/92 (a)	-	0.41 (3.24)	-	0.43 (3.38)	0.38 (3.09)	0.36 (2.81)
Share of new employees of program agreement (b)	-	-	0.26 (1.31)	0.32 (1.61)	-	-
Interaction: flag PA* (a)	-	-	-	-	16.84 (1.88)	-
Interaction: (a)*(b)	-	-	-	-	-	0.38 (1.29)
Lambda	0.013 (2.57)	0.011 (1.98)	0.013 (2.51)	0.011 (1.87)	0.011 (1.85)	0.011 (1.97)
Number of observation	365	365	365	365	365	365
Variance Ratio	0.22	0.24	0.22	0.24	0.25	0.24

On the whole the coefficient of Law 488/92 decreases up to 0.38-0.36, that of program agreement until 0.25-0.26. The interaction calculated as a product of the levels is not significant.

7. Conclusions

In this paper we have focused on the evaluation of territorial interaction effects of the principal incentive instruments in the South of Italy, the Law 488/92 and program agreement. Special emphasis was put on the evaluation of employment effects in the local labour system of each instruments and on their interactions. The objective is twofold: firstly, the selection procedure of subsidies firms could determine negative effects on not subsidized firms, with a general small effect in terms of employment in the local labour system, or even a negative effect; secondly, it could be the case in which the instruments are complementary and thus creating firms agglomeration and externalities for different investment extention; if this does not happen, they substitute one for another reducing the total effect in the area.

The evaluation of employment impact is not simple because it requires to divide the economic and social dynamics from those effect due to a casual link with the incentives.

The analysis is based on non experimental statistical methods at a disaggregated territorial level. The model used is *difference-in-differences* applied to the case of heterogeneous territorial areas with respect to the dimension.

Both instruments have a positive impact: the Law 488/92 has a significant contribution to the employment growth that change between 0.3 and 0.5 (0.4 with spatial effects).

This means that for one hundred new employees created by the Law 488/92, about a third or a half represents the net impact of the incentive. It is a relevant effect that points out the utility of the instrument.

The power of creating new employment with program agreements is lower than the one Law 488/92, and statistically less significant. This depends mainly on the exiguity of observations, making the estimates less accurate and on the peculiarity of the instrument, more occasional, with long period for the realization that could have had an influence on the additionality, and also for the difficulty of the economic cycle for large enterprises.

The more interesting aspect is the analysis of complementarities relation or substitution between the instrument. Also if the analysis considers only the southern regions, the two instruments are on the same LLS, in fact there are not LLS with program agreement that do not have also incentive by l.488/92.

Both instruments have the tendency to generate concentrations (in particular the program agreement, for their nature) and agglomerations (in particular the l.488/92 that can spread on the territory following a contiguity model). The interactions are positive, even if not too high: in the areas where there are program agreement, the generation coefficient of l.488/92 is higher.

It is difficult to calculate the marginal increase of the impact, because there is not the possibility to measure the impact of program agreement separated from the one Law 488/92. The estimates show that the whole effect could be equal to the sum of each single effect.

This paper indicates that Italian industrial policies have a positive employment impact and therefore they could be considered good instruments for the economic policy. This result can be enforced by a robustness exercise, that considers the sector aspects and use other econometrics techniques. These aspects will be considered in a future paper.

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