Evaluation of the effectiveness of firm subsidies in lagging-behind areas: the Italian job

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Abstract: Since the late 1990s, Italian scholars have produced numerous studies in the field of regional policy evaluation, especially ones that have investigated the impact of financial incentives aimed at supporting the accumulation of private capital in underdeveloped areas. The number and innovativeness of these studies make it possible to define the presence of an Italian school for evaluating regional policies. This paper testifies to the importance and methodological advances of this school, putting it at the frontier of policy evaluation analyses. The presentation of the studies moves in two directions, historical and methodological, identifying the main themes and techniques addressed in recent years: the evaluation of Law 488 and negotiated programming policies, on the one hand, the advance in policy evaluation techniques in the presence of interactions and continuous treatment, on the other. The paper does not claim to be an exhaustive review; rather, it should be considered an overview of the historical path and the future prospects of what we call 'the Italian school of regional policy evaluation'.

1. Introduction

Policy evaluation is burgeoning, both in the development of evaluation methods and in the volume of published studies. This is primarily due to the need in recent years to increase the effectiveness of economic policies in response to increasingly scarce resources. Indeed, in the past twenty years, the endowment of the financial means available for public interventions in the economy has drastically diminished, in Italy as in Europe, following the onset of stricter budget policies and in some countries, for example Italy, the spending constraints linked to the Monetary Union process. This has required

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greater caution in public spending, including that related to policies supporting businesses and underdeveloped areas, with increasing attention to the causal impacts of public spending in the economy. As Pellegrini and Carlucci (2001: 2) point out, "until recently, most policymakers were only concerned with how much was spent; however, nowadays they want to know how public money was spent and what effects they engendered". It has also become increasingly necessary to integrate policy evaluation into the policy process systematically, since it provides feedback on its operation and allows for correction of its procedures and scope. A further factor that has contributed to spreading the culture of evaluation is the presence of shared policies at different geographical levels (e.g. European funding for national policies or national funding for regional policies) which has involved the preparation of guarantees and feedback, to be established through the evaluation and monitoring of policies and their effects. In this regard, reference is often made to the assessment activity linked to the use of the EU Structural and Cohesion Funds (EUF). However, it should not be forgotten that the regionalization of numerous aid policies, following the decentralization of functions to the regions, has made the central authorities previously accountable for the management of such policies responsible for the verification and evaluation of regional measures. Finally, the increased awareness of the inevitable distorting effects of many public interventions in the economy has led to a flourishing of evaluative analyses to measure whether or not the benefits of the action are greater than the reductions in efficiency that it produces in the markets.

This has been accompanied by a more general theme which in recent years has increasingly attracted the attention of scholars and policymakers. It concerns the growth of inequality among people in industrialized countries as a result of the impact of globalization and polarization processes of human capital, technology and service supplies. This, in turn, has translated into strong levels of inequality among areas and regions, even within the same country. Many studies suggest that persistent territorial inequalities could lead to the growth of populist/nationalist parties with strong territorial, rather than social, foundations (Rodríguez-Pose, 2018). On this issue, there is increased awareness that place-based policies can be the best option for confronting the economic decline, weak human resources, and low employment opportunities, since they have a positive impact not only on local development but also on social and political stability. For instance, Fabrizio Barca argues that place-based policies are the best way to tackle the "persistent underutilization of potential and reducing persistent social exclusion" in all areas of Europe (Barca, 2009: 7). A similar view is put forward in Iammarino et al. (2019: 290), where a "place-sensitive distributed development policy" is proposed to maximize the development potential of each area, creating greater opportunities for the resident population. Also in the US, Austin et al. (2018: 3-4) indicate that "the most compelling case for place-based policies is that one-size-fits-all interventions are woefully inappropriate for regional economies

as diverse as Appalachia and Silicon Valley" and "subsidizing job creation may be easier at the place level than at the person level". They show that the "results are far from definitive, but they do support the perfectly unsurprising view that you can reduce nonemployment more in places where nonemployment is currently high".

Compared to many other European countries, Italy has long experience of place-based policies oriented to tackling the historical divide between northern and southern regions (Mezzogiorno), which is rather exceptional in the international framework (see Iuzzolino et al., 2013). This makes Italy a dual country with high-income citizens and more productive companies mainly concentrated in northern regions, while low-income citizens and less productive companies are mainly located in the South. These policies typically provide under-developed regions with infrastructure investment, incentives to increase labor market participation and skills, and subsidies to firms to move to or remain in deprived areas as well as to innovate and reduce environmental impact. This has consequently stimulated, both in Italy and elsewhere, a considerable amount of studies evaluating the effects of place-based policies. Empirical evaluations are crucial in a field where some economic theories predict that place-based policies are useless and often harmful, since they distort the allocation of resources on the territory, preventing the achievement of greater efficiency. This argument is well-explained in Kline and Moretti (2014: 276): "a fundamental concern is that spatially targeted policies may simply shift economic activity from one locality to another, with little impact on the aggregate level of output". It is therefore not surprising that in recent years there has been a particular effort in the development of evaluation techniques capable of evaluating the effectiveness of these policies (see, among others, Neumark and Simpson, 2015; Cerqua and Pellegrini, 2019).

Our study aims to give an account of the numerous advances produced by Italian researchers in the field of regional policy evaluation, especially those that have investigated the impact of aid and subsidies to firms to support growth in areas whose development is falling behind. This category is much broader than it might seem. It includes financial incentives which concern contributions related to capital investments, R&D expenditure, management and the debt position of the company, tax incentives, work incentives which provide subsidies or reliefs by type of employee, and subsidies distributed in the form of direct interventions by the public administration, such as technical assistance and training, or even the direct participation in the company's venture capital. Of all these types of policies, we have chosen to focus on measures regarding financial incentives aimed at supporting the accumulation of private capital. This choice is only apparently limiting: at the end of 1999, a period in which the Italian policy evaluation school began developing, this category comprised 57% of the total aid to companies in Italy. The research activity of Italian scholars has

resulted in a considerable amount of evaluation studies based on the counterfactual approach relating to business support policies. In a recent meta-analysis of the evaluation work on this type of intervention, Caloffi et al. (2016) detected and analyzed, for the period 2003-2015, as many as 43 counterfactual evaluation studies, which also includes policy instruments such as support for R&D and credit, which are not analyzed here.

The development of evaluation studies regarding incentives for private companies has been particularly intense in Italy, not only because many policies have been put in place to support local development in recent decades, but also because the public administration opened to researchers its administrative archives relating to the subsidy assignment process. The availability of administrative archives started in the 1990s with the opening of the Italian Law 488/1992 (henceforth L488) archives, until the construction of the Opencoesione dataset, an archive containing detailed information on all projects financed by regional and European policies since 2007. This has increased the availability of data on social and economic policies at a detailed geographical level, allowing researchers to accurately estimate the impact of regional and industrial policies. This has been accompanied by intense work evaluating policy effectiveness. From this perspective, Italian research is at the frontier in the evaluation of place-based policies, and in particular those relating to business support. This evolution has been captured and supported by the Italian Regional Science Association (AISRE), which has reported evaluation studies on both methodological and empirical analysis issues in many of its publications, also with a counterfactual approach, as reported in Capello and Resmini (2019). This theme has also been the subject of several articles in the *Italian Journal of Regional Science*, which has proposed special issues on these topics. The most recent studies include the special issue published by Fabio Mazzola (2015) on the ex-post evaluation of company incentives and, more recently, a special issue edited by Marco Mariani (2019) which collected contributions relating to the counterfactual analysis of regional policies.

In recent years, interest in the evaluation of state aid policies has expanded, dramatically increasing the number of studies produced. In our paper, therefore, we have chosen to limit ourselves to three dimensions. First, we have decided to include only research that evaluates the effects of regional policies through a counterfactual approach, as we are convinced that we need a causal model in order to identify the effects of a policy, and the counterfactual approach is the most widely used and convincing approach in this field.[1] Typical of program evaluation literature, the counterfactual approach attempts to compare what happened with what would have happened in the absence of the

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[1] There are also other evaluation approaches, for which we refer, for instance, to Holmes and Sieg (2015). For a broader analysis that includes international literature, see Cerqua and Pellegrini (2019). Furthermore, see Andini et al. (2019) on the targeting of firms that are both financially constrained and creditworthy via machine learning predictive tools.

treatment, using the potential outcomes framework developed by Rubin (see Rubin, 1974). The counterfactual scenario is typically estimated using units that are not exposed to the treatment, and the analysis compares treated units with distinct untreated units (see Holland, 1986). The potential outcomes framework has several advantages over a framework based on realized outcomes: i) causal effects are identified before specifying the assignment mechanism, and without making functional form or distributional assumptions; ii) the method is based on probabilistic assumptions in terms of potentially observable variables, rather than on unobserved components; iii) the modeling of the potential outcomes is separated from the modeling of the assignment mechanism. The simplest case for analysis is the random assignment of the treatment, which ensures that there are no systematic differences between the treatment and control groups before treatment assignment. This implies that any observed differences in outcomes following the treatment can therefore be attributed to the treatment itself, rather than to selection bias. However, randomized experiments have been used in some areas in economics but scarcely ever in regional economics, and therefore our paper is based on observational studies.

A second limiting aspect is the field of interventions: the analysis concerns only national place-based policies, in some cases applied regionally, even if they use national, EU or regional funds. This choice has the advantage of making the proposed works more comparable and therefore allowing some meta-evaluations of the results. This excludes a significant part of the policies, in particular those aimed at supporting R&D, which, given the volume of the research, warrant a specific study. Furthermore, we do not consider the contribution of Italian scholars in evaluating capital subsidy policies abroad (e.g., Criscuolo et al., 2019).

Lastly, we have chosen to consider only the works that concern specific ("micro") intervention tools, not including macro-type analyses, which consider the overall effects of complex regional policy interventions. For this reason, we do not consider evaluation exercises of regional policies also based on counterfactual exercises with "macro" econometric models, such as those presented in Casini et al. (2003) or more recently in Capello et al. (2017).

The evaluation analysis of business support policies presents distinctive features. Among the many, we indicate two main ones: the fact that these policies act on specific territories makes the geographic aspect of the intervention a fundamental ingredient of the evaluation; and the strong endogeneity of the intervention, which stems from the fact that it is aimed at reducing existing territorial disparities, so that the treated areas are different from the untreated ones in many respects. The way in which the different evaluation methodologies treat space, and therefore the possible contiguity, interference and spillovers between treated and untreated units, and the endogeneity issue, i.e. the presence of

confounding factors relating to the effects of policies, distinguishes and categorizes the types of evaluation techniques presented here.

The presentation of the studies moves in two directions, namely historical and methodological, identifying the main themes and techniques developed in the studies of the Italian evaluation school. This choice is intertwined with the analysis by policy instruments, in which a summary of the results achieved is taken into account. We present only a few studies that are considered of particular importance. Our study does not claim to be exhaustive: from this viewpoint, it should not be considered a complete review, but an indication of the historical path and future prospects of what we call 'the Italian evaluation school', and we apologize in advance for any omissions, whether voluntary or involuntary. The work is organized as follows: in Section 2 we present the birth of the Italian school of evaluation with respect to the topics examined, techniques and data used. In Section 3, we analyze the results relating to two regional intervention tools, L488 and national programming policies. Section 4 highlights some methodological progress on issues such as endogeneity, the presence of spatial interference and treatment intensity. The work concludes with some reflections on the prospects of evaluative research on regional intervention tools for companies in Italy.

2. The origin

It is not easy to identify a specific period, even less a date, which marks the birth of the Italian school of evaluation. As regards the evaluation of policies in Italy, there was an event that certainly acted as a watershed. Following Italian Law 266/1997 article 1 and Legislative Decree n. 123/1998 articles 10 and 11, the Ministry of Industry, in agreement with the Ministries of the Treasury and University and Scientific Research, were tasked with drafting an annual report aimed at evaluating the effectiveness and compliance of the incentives for economic and productive activities. This report was to be attached to the government's economic and financial planning document. The primary purpose of the report was to provide information on the facilitating measures, the state of implementation, the main economic figures influenced by them, and the relative direct financial flows to the companies. The choice made by the Directorate General of the Coordination for State Aid of the Ministry of Industry, at the time directed by Carlo Sappino and Salvatore Mignano, who was in charge of the report, meant that the report was characterized by two features: on the one hand, a detailed account of economic, financial and administrative aspects of the aid schemes, previously non-existent; on the other hand, a monographic section devoted to evaluation of the effectiveness of individual aid schemes.

For this reason, the Directorate General appointed a group of experts to analyze and support the preparation of the report itself. Since 2000, this report has also included counterfactual studies concerning L488, Italian Law 46, i.e., programming contracts and others. In our opinion, two fundamental elements created a divide. On the one hand, data are collected on subsidized as well as on non-subsidized companies, i.e., those which applied for but have not received the funds. With some precautions, these data were then made available to researchers. This enabled the rapid development of many evaluation studies based on microdata and on the most updated techniques that were developed in those years in various international studies (see, for example, Bondonio, 1998; Blundell and Costas Dias, 2000). On the other hand, there is a strong signal that counterfactual assessments, previously reserved for academia, could be used in an evaluation-based regional policy. This consideration raises the scientific level of the analysis and encourages researchers to use the best policy instruments available, stimulating evaluative research.

This led to a rapid response by many Italian researchers: numerous studies were published from the late 1990s to the early 2000s. Some came directly from the study group that worked with the Ministry of Industry (e.g. Chiri et al., 1998, Pellegrini, 1999; Carlucci et al., 2001, Pellegrini and Carlucci, 2001; 2003), others related to incentive tools for new businesses, such as the evaluation of the effects of Italian Law 44 (Battistin et al., 2001), or also the evaluation of the effects of different types of incentives on the real and financial characteristics of businesses (Bagella and Becchetti, 1998 and its bibliography).

Also in the international field, Italian researchers specialized in the evaluation of regional policies made an appreciated contribution, such as Daniele Bondonio in the sector of policy evaluations for limited areas (in his case the Enterprise Zone Programs in the US; see Bondonio, 1998; 2000; Bondonio and Engberg, 2000).

The objective of the evaluation was the additional effects of the policy, in particular concerning the additional employment generated, although in some studies, as will be highlighted later, the focus was on the additional effects on capital investments. In the works produced in the annual report and then later by the various scholars, several types of interventions were considered, in particular those deriving from L488, the most important policy for companies, but also others such as the tax credit, programming contracts, PIA, and Italian Law 46 (incentives for innovation).

These studies defined the topics that would then be the main focus of evaluation research in this field. First was the issue of additionality, referring to the behavior of companies as well as to the impact on the targeted territories in the absence of public intervention. In the latter case, the concept of additionality also includes any spillover of policies in the area. In these works, the theme of spillovers

was described simply, and consistent models that considered such interference would be elaborated only later. Furthermore, the close link that connects the concept of additionality to that of counterfactual evaluation was not yet fully perceived, and additionality was given a definition linked to the entrepreneur's willingness or otherwise to undertake the investment even in the absence of the subsidy (e.g., Pellegrini and Carlucci, 2001). The problem of the additionality of the state aid, therefore, was likened to the reduction of the deadweight loss, and traced back to the presence of asymmetric information between the central government and entrepreneurs: if the policymaker knew the minimum incentive necessary to activate any investment (or move to a specific location), the deadweight loss would be negligible. One aspect of interest is the discussion regarding the possibility of extracting this information from entrepreneurs, for example by using a system of indicators such as that envisaged for L488 (Scalera and Zazzaro, 2000; Potestio, 2000; Parascandalo and Pellegrini, 2001). The analysis focuses on the mechanisms that lead the entrepreneur to change his/her investment decisions due to an incentive. This mainly depends on the entrepreneur's degree of certainty of the amount of the subsidy, the costs to be faced, and the delivery times. The emphasis is therefore on the procedural aspects. Finally, the discussion that highlights the trade-off between the amount of the incentive and the selection of the projects is interesting: the more the incentive is automatic and has a reduced selection, the higher the possibility of deadweight loss, which in these cases suggests reducing the amount of the subsidy.

The main policy evaluation methods used in that period were the difference-in-differences estimator (DiD), also sometimes with Heckman's correction (e.g., Pellegrini and Carlucci, 2003) or with an analysis of growth trends rather than levels, i.e., by adopting the random growth model. Matching techniques were also used (e.g. Bondonio, 2000; Battistin et al., 2001; Carlucci and Pellegrini, 2005) and there was a first attempt to exploit the discontinuity in the rankings that was created for L488, to implement the regression discontinuity design (RDD) (Bronzini and de Blasio, 2006).

In this period, therefore, the foundations were laid for the development of an Italian evaluation school. This was due to EU regulations, the provision of information on policies, and the interest of policymakers in understanding the effects of the policy instruments. The limitation is that these studies, many reported in the Annual Report to Parliament, were not taken into real consideration when the policy needed to be reformed. Therefore, although the production of evaluation studies has been copious and also of high quality, as evidenced by the many publications in national and international journals, this has not supported or characterized the development of subsidy programs, which are more subject to a political rather than a methodological debate.

3. Evaluation of the main policy instruments

3.1 Italian Law 488/1992 (L488)

The influence of evaluation studies by Italian scholars can be further analyzed by observing the contribution to the analysis of some specific policies, such as L488, which is the subsidy program by far the most studied and evaluated by Italian scholars. This is for three reasons: (i) the significant impact, in terms of subsidized projects and the amount of financial resources committed, which made it the most important and used policy instrument until the mid-2000s; (ii) certain features of the assignment procedures, in particular the selection system, which stimulated the use of sophisticated evaluation techniques; (iii) the availability of administrative data, which were easily accessible by researchers.

The evaluation studies of L488 can be divided into two broad categories: (i) the ex-ante evaluation studies, which focused on the characteristics and effects of the selection system; (ii) the ex-post evaluation studies, in which the assessment was carried out with respect to the effects on businesses (micro assessment) as well as the effects on the targeted territories (macro assessment).

In the ex-post evaluation, the main issue that evaluators sought to resolve was how to analyze both the existence of additional effects of the instrument and the performances of the companies and areas subject to the policy intervention. The additionality concerns the ability of the intervention to generate investments (and therefore employment and production) above those foreseen by the market; the assessment of performances is relative to the changes in the characteristics of the companies and territories caused by the policy. In the former case, the comparison must be made with respect to similar companies that did not receive the subsidy, simulating what the market would have determined in the absence of intervention; in the latter case, there are two possible approaches, proposing the comparison with non-subsidized companies that did not invest in the absence of subsidization or invested regardless. The first approach was applied in almost all the studies analyzed.[2] The interesting aspect of the policy instrument, whose selection is based on rankings, is that it is possible to build the control group on the basis of the companies that participated in the tender but were not among the winners. This is a group that has many unobservable characteristics similar to those of the treated firms, namely managerial and technical skills for investing, market prospects that favor investments, a valid project but which, due to the financial constraints of the policy, did not receive the

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[2] To the best of our knowledge, the only study which adopted the second approach was that by the Ministry of Industry (2000).

subsidy. The literature underlines that the use of this group of companies makes the empirical analysis more robust (Bernini and Pellegrini, 2011).

The study of L488 is particularly interesting from the point of view of the evaluation of additionality. A selection mechanism for inducing the entrepreneurs to reveal such information is the auction system: in the presence of a financial constraint, it may be appropriate to link the request for a reduction in benefit to the probability of obtaining it. This is the case of L488, which selected valid projects also on the basis of an auction system, in which the probability of obtaining the subsidy increased as the amount of aid requested decreased.[3]

The evaluation studies, some of them pioneering, mainly based on an ex-ante analysis of the subsidized companies compared to the non-subsidized ones and on the effects of the indicators, are Chiri and Pellegrini (1993, 1995), Del Monte and Giannola (1997), Chiri et al. (1998), Pellegrini (1999), Potestio (2000), Scalera and Zazzaro (2000), Parascandolo and Pellegrini (2001).

The first ex-post impact assessment studies carried out with a pre-post comparison between subsidized and non-subsidized companies were those by the Ministry of Industry (2000), Pellegrini and Carlucci (2003), Losurdo (2004), Vadalà (2005), Carlucci and Pellegrini (2005), De Castris and Pellegrini (2005). More recent analyses have been carried out by Bronzini and de Blasio (2006), Adorno et al. (2007), Bernini and Pellegrini (2011), Bernini and Pellegrini (2013), Cerqua and Pellegrini (2014), Biagi et al. (2015), Pellegrini and Muccigrosso (2017), Bernini et al. (2017). Bondonio and Martini (2019) proposed a comparative approach. Ex-post impact studies focusing on the territorial approach, carried out by exploiting the trend of pre-post employment in subsidized and non-subsidized areas, have been conducted by the Ministry of Productive Activities (2003), De Castris and Pellegrini (2005, 2012), Cerqua and Pellegrini (2017).

In this strand of the literature, the main dependent variable was generally the employment created by the subsidized investment, but also the investments related to capital stock, as in Bronzini and De Blasio (2006). In the studies by the Ministry of Industry (2000) and Bronzini and De Blasio (2006) some results on alternative dependent variables are also presented (e.g. profitability, turnover, weight of financial charges), which were then also analyzed in the subsequent literature (as in Bernini and Pellegrini, 2011 and Cerqua and Pellegrini, 2014).

In summary, many of the analyses that studied the additional effects of L488 agreed, using different methodologies and analysis techniques, in identifying a positive and significant effect of the policy. For

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[3] For an analysis of the auction mechanism and the possibility of likening the L488 mechanism to an auction for incentives, see Chiri and Pellegrini (1995) and Chiri et al. (1998).

example, Bernini and Pellegrini (2011) furnished evidence of higher growth in output, employment and fixed assets in subsidized firms but a less significant increase in Total Factor Productivity than in unsubsidized firms, while Adorno et al. (2007) highlighted a positive but inverted-U relationship between the intensity of subsidies and production. Opposite findings were reported by Bronzini and de Blasio (2006), who investigated the presence of cross-sectional substitution (subsidized companies may receive some of the investment opportunities that non-subsidized companies would otherwise have had in the absence of the incentives), and intertemporal substitution (companies may have brought forward investment projects originally planned for the post-intervention period in order to take advantage of the incentives). Indeed, Bronzini and de Blasio find evidence in favor of the substitution effect and argue that L488 had a limited impact, and that incentives would have induced above all effects of anticipation of investment decisions.

By contrast, a more recent study by Cerqua and Pellegrini (2014) takes full advantage of the discontinuity created by the presence of several rankings in each targeted region. The method used therefore has a high internal validity; that is, it approaches the optimal benchmark of the randomized experiment, near the threshold. The results show an increase in investment in subsidized companies from 17% to 20%: an effect that is anything but modest. Another issue concerns intertemporal substitution. As said above, the presence of this effect is asserted by Bronzini and de Blasio because after a three-year investment period, in the following two-year period, the accumulation rate of the companies supported by L488 was lower than that of the non-subsidized ones. However, this result tells us little about intertemporal substitution: it is clear that subsidized companies cannot continue to invest in new plants or in a restructuring of the previous ones every year. What matters is whether the stock of (material) capital continues to be greater over time than in the non-subsidized companies. This is exactly what is demonstrated in Cerqua and Pellegrini (2014): the difference in the accumulated investment stock grows over the years of investment and then remains almost constant. This allows the authors to reject the hypothesis of intertemporal substitution.

The conclusion of the most recent studies is that the main policy instrument for companies in southern Italy in the decade 1996-2006 actually supported the growth of investments and employment in subsidized companies, which at the end of the year period substantially doubled their capital (considering the median) compared to non-subsidized companies, without significant intertemporal substitution effects. Interviews with entrepreneurs confirmed this result: the incentives of L488 enabled small and medium-sized enterprises to upgrade technology through the purchase of technologically advanced capital. As southern Italian companies tend to have very modest R&D activity, this technological upgrading was practically the only way for them to maintain reasonable

levels of competitiveness. Overall, this analysis suggests that this was one of the reasons why southern companies substantially kept pace with businesses in the rest of Italy during that period, and that perhaps its end during the Great Recession contributed to widening the gap between the two parts of the country.

3.2 Evaluation of negotiated programming policies

A close link between place-based and industrial policies for supporting firms is found in negotiated programming, i.e., the policies that have tried to combine a bottom-up approach, the creation of "territorial" coalitions, funds for infrastructures and incentives, and finally an equal negotiation between local and national authorities.

The legal source of negotiated programming is established by article 2, paragraph 203, of Italian Law 662/1996. This regulation introduced five new forms of institutional agreement:

1) Intesa Istituzionale di Programma ('Institutional Protocol of Understanding'), an agreement between the state and the regions on implementing forms of effective decentralization of decision-making and on supplying a core program-framework for regional territorial interventions;

2) Accordo di Programma Quadro ('Framework Programming Agreement'), an agreement among the state, the regions and local entities (or other public and private actors) the definition of an executive program of measures of common interest;

3) Patto Territoriale ('Territorial Pact'), establishes an agreement between public and private actors concerning the implementation of a program of actions intended to promote local development;

4) Contratto di Programma ('Programming Contract') establishes a procedure that regulates the relationships between the public actor and large businesses, or consortia of small and medium-sized businesses, for the implementation of industrial-development measures in depressed areas;

5) Contratto d'Area ('Area-based Contract'), an agreement among local administrations, employers and union representatives for the implementation of actions intended to accelerate development and create new jobs in circumscribed territories characterized by serious employment crises (Governa and Salone, 2005).

The first two policies mainly concern agreements between national and local institutions, while the latter three policies include a significant part of state aid to businesses. All of them imply institutional decisions and financial resources to be borne by state administrations and local public authorities.

The assessment of these policy instruments is not an easy task, since it should consider the economic impact of the programs and the ability to create networks and 'contracts' at the local level. However, evaluation studies focused mainly on the first aspect.

Many of these studies were carried out by researchers from the Bank of Italy, which conducted several evaluations on the effectiveness of negotiated programming policies. A few examples are the following: Accetturo and de Blasio (2012) for the evaluation of the Territorial Pacts, Andini and De Blasio (2016) for the Programming Contracts, Accetturo et al. (2018) for the evaluation of Area-based Contracts. Many other scholars evaluated the impact of such policies, for example Giunta and Florio (2002), Giunta (2010), Giunta and Mantuano (2010), Pierleoni (2012), Dallara and Rizzi (2013), Cusimano and Mazzola (2014), Mazzola (2015), Cusimano et al. (2015). Bianchi et al. (2008) report the results of an evaluation study on Programming Contracts which combined a counterfactual analysis and a field analysis. Additionally, an attempt was made to objectively measure the results on the basis of the ex-ante declared aims underlying many policies, a strategy that was also subjected to evaluation (Barone et al., 2019).

The overall judgment is not clear. In the works of the Bank of Italy scholars, a strong skepticism about the usefulness of the measures prevails (Accetturo and de Blasio, 2019). In particular, the policy instruments that sought more than others to develop a "bottom-up planning" of policies, such as Territorial Pacts and Area-based Contracts, do not appear to have had a significant additional impact. A partially different opinion in regard to a similar intervention, the Territorial Integrated Projects, in more positive terms, is expressed by Cusimano and Mazzola (2014), who however report in a subsequent study the presence of a possible selection bias that could have influenced these results (Cusimano et al., 2015). However, it should be noted that not present as an analysis objective in the evaluation analysis is the construction of local networks, which in the medium-long term can be an important factor in local development.

As regards the effectiveness of programming contracts, the judgment is mixed. The study by Andini and De Blasio (2016) indicates a modest positive effect on employees and number of plants which, however, takes place at the expense of neighboring areas. The authors therefore argue that this policy basically only had a redistributive effect across areas. Giunta and Mantuano (2010) show that despite some difficulties in the implementation and monitoring procedure, the contracts signed with the large companies produced additional investments in the areas trailing behind, with investments that would have been carried out elsewhere without the policy. On the other hand, the authors find that the programming contracts with business consortia had much fewer positive effects. Positive but statistically insignificant effects on employment, especially in areas targeted by other territorial

policies, are also found in De Castris and Pellegrini (2005). Pierleoni (2012) suggests that the aid policy had a positive effect on the economic activity of the companies that benefited from it (especially those located in the Centre and North), also in terms of efficiency. Also in this case, however, it is important to evaluate what the short and long-term effects of the intervention are. From this point of view, the work of Bianchi et al. (2008), although not based on a counterfactual analysis, indicates how the areas in which programming contracts were imported experienced the persistence of human capital, which in longer periods has led to a flourishing of initiatives even of high technological content.

Overall, most studies indicate that the effects of these place-based policies are at least uncertain, if not negligible. This may depend on the way in which the incentives were allocated, e.g. following a poor selection process, or on the ambitious aim of pursuing multiple objectives, in which state aid to businesses was only part of a more composite intervention which also concerned the construction of public infrastructure and the creation of a network "from below". This multiplicity of objectives has made identification of the relevant outcome indicators more complex and in many respects, vaguer, thus rendering counterfactual techniques less applicable.

4. Methodological innovations

What we have called the 'Italian evaluation school' has not only produced many empirical analyses; it has also developed methodological innovations at the frontier of policy evaluation. In our opinion, there are two areas where the contribution of Italian scholars has been particularly fruitful: (i) the analysis of causality in the presence of interactions or interference among units, relaxing (the second proposition) the Stable Unit Treatment Value Assumption (SUTVA); (ii) the identification of the effects in the presence of continuous treatment, which also concerns a relaxation (of the first proposition) of the SUTVA.

4.1 Policy evaluation techniques in the presence of interactions

An important methodological aspect for policy evaluation analyses concerns the treatment of the presence of interference (spillovers) among units, both treated and untreated. In the Rubin causal model, the SUTVA formalizes the absence of interference among units, as it postulates that the outcome of one unit is not affected by the treatment status of other units.[4] This implies that spillover

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[4] Another assumption of the Rubin causal model is that only one version of the treatment exists (see Section 4.2).

effects are ruled out by this assumption. Cerqua and Pellegrini (2019) highlight that "although many public policies can be credibly evaluated under the SUTVA, this is rarely valid for the evaluation of regional policies, as we should expect them to engender spillover effects". Only in the case of the absence of interference are the non-treated subjects, whether people or geographical areas, valid control samples, or the counterfactual of what would have happened to the treated without treatment. Indeed, intentionally or not, nonparticipants can be affected by programs, and these spillover effects should be taken into account when conducting an impact evaluation. Failure to perform such evaluations results in biased estimates of program impacts, leading to inappropriate policy recommendations and the incorrect understanding of data-generating models.

However, this hypothesis, which is often difficult to verify in the field of policies, appears in many cases completely unrealistic in the evaluation of territorial policies, which often have the purpose of generating spillovers, or interference, between treated and untreated subjects to create local development. A typical case is industrial and R&D place-based policies oriented to the growth of underdeveloped regions that are designed to generate positive spatial externalities by promoting local aggregations of companies (De Castris and Pellegrini, 2012). Other typical examples are immunization campaigns lowering the likelihood of contagion, or interventions for urban decoration to attract new tourists.

In most cases, researchers justify the adoption of the SUTVA by selecting a control group that is thought to be negligibly affected by the policy, so that the direct effects of the regional policy can be retrieved without bias. An alternative approach consists in adopting an evaluation model that explicitly allows for the presence of interference, assumed through the presence of spatial or network links. The problem is that in the presence of interference, potential outcomes of a unit depend on its treatment as well as on the treatments of other units, such as its neighbors. In observational studies, this implies that the unconfoundedness assumption must be extended to include the treatment of neighbors, and individual and neighborhood covariates to guarantee identification and valid inference.

Concerning the latter approach, the Italian evaluation school has made several contributions. For instance, on the methodological side, Forastiere et al. (2016) present a framework which enables correct estimation of the impact of public policies in the presence of interference under sufficiently general assumptions. This study extends the unconfoundedness assumption that accounts for interference, and a new covariate-adjustment method that leads to valid estimates of treatment and interference effects in observational studies on networks. The novel estimator is based on a

generalized propensity score that balances individual and neighborhood covariates across units under different levels of individual treatment and exposure to neighbors' treatment.

Other approaches have been developed with a specific focus on empirical applications. De Castris and Pellegrini (2012) implement an evaluation strategy based on a spatial econometric model which allows evaluation of the net spatial effects of capital subsidies. Under certain assumptions, such an approach disentangles spillovers engendered by the policy from those that cannot be attributed to the intervention. They find a modest spatial crowding-out process whereby subsidized regions attract employment and investment from neighboring areas. Arpino and Mattei (2016) use the proportion of treated units within a group as a measure of interaction among units, and adopt this type of approach to evaluate the effects of state aid to companies in the presence of interference. Concerning business incentive programs, Cerqua and Pellegrini (2017) consider the presence of interference among companies by assuming that spillovers are possible only within the same economic sector and within a certain geographic distance. They show that treated firms benefit from a large increase in employment, but this increase is partially determined to the detriment of the untreated firms. A different approach, based on the extension of a DiD estimator to the case of interference among units, is proposed by Di Gennaro and Pellegrini (2016).

If the presence of interference is assumed to depend directly on distance - geographical but also economic or reliant on a network - it is possible to use more complex types of restriction which constrain the effects of spillover to follow a certain spatial pattern. This approach is at the basis of spatial econometric models which use a spatial weight matrix to model the interactions between units. This has an impact on how results are assessed, distinguishing among direct, indirect and total effects, as proposed by Arbia et al. (2020), yielding, therefore, a more comprehensive measure of the impact of the policy.

There is considerable intellectual ferment on this topic and it is possible to develop innovative methodologies, for example by adapting the RDD and the Synthetic Control Method to the case of interference. From this point of view, the contribution of Italian researchers appears to be particularly innovative.

4.2 Continuous treatment

Most regional policies are evaluated using a binary treatment: that is, each unit is considered treated or untreated independently of the intensity of the treatment. However, regional policies usually allocate different resources to treated units, that is, they use continuous treatment instead of binary

treatment. An evaluation method that can be applied to the case of continuous treatment is generalized propensity score (GPS) (Hirano and Imbens, 2004). Generalized propensity score is a method to estimate treatment effects which are conditional on observable determinants of treatment intensity. Conditioning on the GPS, which represents the conditional density of the actual treatment given the observed covariates, and the actual treatment levels, it is possible to estimate the average value of the dependent variable at different levels of the treatment and the GPS. This then allows the researcher to estimate the dose-response function after averaging such estimates of the average value of the dependent variable over the covariates, while keeping the treatment level fixed.

GPS has been adopted by regional policy evaluators in several circumstances. Bia and Mattei (2012) use it to estimate the dose-response function of capital subsidies, while Bocci and Mariani (2015) adopt GPS to estimate the effects of R&D subsidy programs, where little is known about the proper size of subsidies or private investments to be subsidized. Analyzing a program for SMEs implemented in Tuscany, they find that the relationship between subsidy and future investment in R&D, represented by the dose-response function, assumes an inverted-U shape. Cerqua and Pellegrini (2018) propose an alternative approach to estimate the heterogeneity of the impact with respect to treatment intensity. The authors propose extending the RDD framework to the case of continuous treatment by exploiting the presence of sharp or fuzzy discontinuities as a source of local randomness in the assignment of continuous treatment. Therefore, this approach allows estimation of the average effect among units treated at different levels around the discontinuity. The main assumption behind this approach is that, after conditioning on the observable variables affecting treatment assignment and the intensity of treatment, treatment assignment is as if randomized for those units near the policy assignment threshold. An alternative approach is developed in Adorno et al. (2007) who propose a two-step estimator, which compares treated and untreated companies for potential and current levels of treatment.

Overall, many of these studies find that the relationship between dose (treatment) and response (outcome) is generally nonlinear, which often presents a maximum. In this case it is possible to identify the amount of intensity of the policy that maximizes the outcome (Cerqua and Pellegrini, 2018).

5. Conclusions

This paper testifies to the importance and innovativeness of the Italian school for evaluating regional policies, and among these, especially those aimed at supporting capital investment. We surveyed methodological and empirical publications, highlighting the novelties of the evaluation approaches which put the Italian school at the cutting edge of policy evaluation analyses. In our opinion this is due to two main factors: (i) the long experience of regional policies in Italy, which have tried to bridge the historical, economic and social gap between the regions of the South and the rest of the country; (ii) the foresight of at least part of the Administration, which has provided researchers with access to the administrative archives that has allowed the conduct of numerous high-quality evaluations.

Unfortunately, many policymakers are not aware of this vast production of evaluation studies and complain about the lack of adequate evaluation of the policy instruments. The real problem is that evaluation studies often furnish evidence that some policies have not delivered what they promised, and this is something policymakers do not like to emphasize. On many occasions, important and high-quality studies have been hushed up, and above all, they have not been used for the implementation of the new policies, as if past experience is not sufficiently important to influence policymaking processes. As reported by Mariani (2019), the spread of an evaluation culture is also particularly important in regional science: "evaluation studies are not just about making judgments on whether public money is well spent; they may also provide insights into how the design of public interventions can be improved in the future" (Mariani, 2019: 166). With this paper, we have also aimed to promote what has been done and in some cases report, albeit briefly, the results of counterfactual evaluations carried out following the scientific basis of this approach.

An important issue concerns the availability of data for evaluation. As previously highlighted, the development of studies and evaluation techniques in Italy has also been possible thanks to the access to the archives made possible since the pioneering "Direzione Aiuti alle imprese" experience of the OpenCoesione project. Unfortunately, in several instances there has been some backpedaling on this matter, also within the Ministries that do not want to share their information. The activity of the Italian Data Protection Authority has also had an influence, as it does not favor the integration of microeconomic archives, and therefore limits the possibility of research. Only the push of the European Commission, which binds the use of the Structural Funds to an evaluation plan, still supports these analyses. This is an aspect to which researchers and their associations will continue to pay particular attention in the future.

Our study shows the presence of considerable heterogeneity in the evaluation methods adopted and in the results obtained. There is no single opinion on the effectiveness of regional policies, especially

those aimed at businesses. For example, in a recent pamphlet that collects the results of many studies produced by at least one of the two authors, Accetturo and De Blasio (2019) argue that the empirical evidence for the positive effects of state aid, especially in the South, is very scarce, and that under certain conditions it may also have had negative effects. By contrast, as indicated above, an evidence-based evaluation of place-based policies, considering the recent literature, would conclude that in many cases, perhaps in the most important ones, the policies have enhanced economic growth. This does not mean that any place-based policy has worked, and the analysis of this heterogeneity is an important matter requiring more in-depth analysis. We expect that the Italian evaluation school will contribute importantly to continuing along this path in the near future.

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