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BOULEVARD OF BROKEN DREAMS. THE END OF EU FUNDING (1997: ABRUZZI, ITALY)

by Guglielmo Barone,[♠] Francesco David[♦] and Guido de Blasio[♥]

Abstract

EU regional policies aim to lead regions onto a path of self-sustaining growth. Successful intervention would imply a higher growth rate, not only during the "treatment" (when the region benefits from the transfers), but also after the expiry of the program (when the financing ends). We investigate to what extent this has happened in the case of Italy's Abruzzi region, which entered the Objective 1 (Convergence) program in 1989 and exited it in 1996 (without a transitional regime). More specifically we focus on the post-expiry period by implementing a synthetic control approach. Our findings indicate that the end of the program had a negative effect on regional per-capita GDP growth. Our paper confirms widespread evidence that EU regional policies help boost the economic performance of the treated regions during their implementation. However, additional evidence suggests that the permanent effect of the treatment is negligible: the policies fail to shift the treated regions to a permanently higher path of GDP growth.

JEL Classification: R11, O47.
Keywords: EU cohesion policy, regional growth, synthetic control method.

Contents

[♠] Bank of Italy, Economic Research Unit, Florence Branch and RCEA.
[♦] Bank of Italy, Economic Research Unit, Palermo Branch.
[♥] Bank of Italy, Directorate General for Economics, Statistics and Research.

1. Introduction[♣]

EU regional policies are a prominent example of place-based (or location-based) policies, policies targeted to specific areas and aimed at enhancing their economic performance. Whether these policies should be put in place is a topic that has been receiving increasing attention in the last few years among policy makers (see, for instance, OECD, 2009a and 2009b, World Bank, 2009). By and large, economists seem to be mostly puzzled (Glaeser and Gottlieb, 2008; Neumark and Simpson, 2014). Yet, supportive arguments have also been proposed (Barca, McCann, Rodrìguez-Pose, 2012). Most importantly, and irrespectively of the economists' reservations, policy makers all around the world do implement these policies, spending considerable amounts of public money.

EU regional policies, financed via the so-called Structural funds, mainly target disadvantaged areas and use a significant portion of the EU budget (277 billion euros, 27 percent of the budget, in the programming period 2007-2013). Expenditures under the structural funds include both investments (transport or telecommunications infrastructures, outlays for innovation, energy, the environment) and labor market programs (aimed at reducing unemployment and increasing skills and social integration). The bulk of Structural fund expenditures (213 billion in 2007-2013) flows to Objective 1 regions (renamed Convergence in the 2007-2013 programming period), which are EU NUTS II regions whose GDP per capita is less than 75 percent of the EU average. The aim of Structural funds is to increase the long-term growth of the lagging-behind regions.

Recently, credible causal estimates have pointed out the efficacy of the Objective 1 program to spur GDP growth in the European regions (Becker et al., 2010, and Pellegrini et al., 2013), even though a high regional heterogeneity prevails (Becker et al., 2012 and 2013). Giua (2014) confirms this positive result for the Italian case (that we study in this paper) with respect to employment growth. While these findings are very relevant and not obvious on an a priori ground, one can argue that it is not sufficient for supporting EU Cohesion policy: EU transfers may have positive short-run effects on regional economies, without triggering a self-sustaining faster growing path. Our study goes precisely in this direction, trying to assess if the Objective 1 policy enables treated regions to exit poverty traps and/or to trigger endogenous growth mechanisms. On the other hand, the short-run positive effect of the program on growth is not fully unexpected. For instance, back-of the-envelope calculations in Becker et al. (2010) suggest that the multiplier of the program is about 1.2. This figure is broadly consistent with current prevailing estimates on local fiscal multipliers: Acconcia et al. (2014) use Italian data and estimate that the contemporaneous output multiplier of spending contractions is as high as 1.5; Nakamura and Steinsson (2014) estimate multipliers in the range 1.4–1.9 for US regions. Hence, we interpret the positive causal effect of the Objective 1 program as evidence of a *necessary* condition in favor of the policy. The key second-step question is: does the intervention deliver a *self-sustaining* growth? This is the question we address in this paper, and the answer will complete the information needed for an overall assessment of the Objective 1 program.[1]

[♣] The views expressed in this paper are those of the authors and do not necessarily correspond to those of the Institution they are affiliated with. We thank Tiziana Arista, Vincenzo Calvisi, Enrico Rettore, Paolo Sestito, the seminar participants at the Bank of Italy and two anonymous referees. The published version of this paper is available at http://www.sciencedirect.com/science/article/pii/S0166046216300357.

[1] Needless to say, evaluating Structural funds also entails distributive and equity considerations that we do not discuss here.

Our research question, besides being interesting from an academic perspective, is also high on the policy agenda. For instance, the World Bank recently underlined this issue by distinguishing between *treatment* and *cure*: "A treatment is an instance of treating someone, say, medically. A cure ends a problem. Sometimes, the treatment is a cure. Other times, it just keeps the problem under control without curing it: if you remove the treatment, the problem comes back" (Ozler, 2014). In this respect, our paper analyzes what happens when the treatment is removed. Therefore, it evaluates whether the program represents a case in which, using Ozler's (2014) words, *the treatment is the cure*. We do so by analyzing what happens when the program vanishes. We study the unique case of the Italian southern region of Abruzzi that is the only EU region which after being treated for a period of time (1989-1996) exited the program (in 1997) *without* transitional support (what is now known as phasing-out).

In particular, we compare the GDP per capita in Abruzzi after the funds associated with the Objective 1 program lapsed with those which would have been observed had the treatment continued. The counterfactual pattern is estimated with the synthetic control method proposed by Abadie and Gardeazabal (2003) and Abadie et al. (2010) for comparative case studies. The donor pool includes the other treated Southern Italian regions for which the intervention was not interrupted. The within-country perspective largely mitigates the role of unobserved confounding factors and makes treated and control units much more comparable to each other than in a cross-country framework.[2]

According to our results, after the end of the program the GDP per capita in Abruzzi showed a weaker growth pattern: 7 years after the end of the program, the GDP per capita in Abruzzi was more than 6% lower than the counterfactual, while the difference equaled 0.7% before the funds were withdrawn. This finding is statistically significant (as far as the synthetic control approach mimics confidence intervals) and robust to a number of sensitivity checks. However, this result might not be enough to state that the policy has not generated endogenous growth: if the intervention implies both a contemporaneous impact and an endogenous (or permanent) growth effect, our exercise sheds light only on the former because the latter is shared by both Abruzzi and the donors. A straightforward answer would be comparing Abruzzi with never-treated regions before and after entering the program. Unfortunately, this is not possible because before 1989 Abruzzi benefited from another large-scale financial support scheme (see Section 2). However, we can disentangle anyway the two components by proposing two additional simple pieces of evidence. First, we show that our estimated effect for the end of the treatment is of the same order of magnitude as those estimated in the literature on the *overall* (i.e. contemporaneous impact + permanent component) effect of the policy, thus indicating that the reversal is likely to be complete. Second, we show that after exiting the program, GDP per capita in Abruzzi does not follow a steeper path with respect to comparable control regions, as might have been the case if the Objective 1 policy had triggered endogenous growth mechanisms. All in all, we conclude that *the treatment has not been the cure*.

This study follows the strand of literature that addresses the counterfactual evaluation of place based policies, using the EU Cohesion policy as a case study. As stated above, a general consensus has emerged over the effectiveness of the Objective 1 program as a means to promote economic growth. We

[2] In the Appendix we show that our results are confirmed if we enlarge the donor pool to all European regions in the Objective 1 program.

complement such evidence by examining what happens to a treated region after the treatment ends. To the best of our knowledge in the European context this research question has not been answered yet.[3]

The paper is structured as follows. The next section gives some institutional details on EU Structural funds and describes the case of Abruzzi. Section 3 illustrates the main features of the synthetic control method, while Section 4 presents the baseline results and an extensive robustness analysis. Some concluding thoughts are provided in Section 5.

2. Institutional setting

As stated in the EU Treaties, the European Union promotes a harmonious development by pursuing the goal of economic, social and territorial cohesion among its member states. In this setting the Union takes actions aimed at reducing disparities between the most developed regions and the lagging ones. The European regional policy is financed mainly via the so-called Structural funds: they include the European regional development fund and the European social fund. The first one addresses major regional imbalances mainly through infrastructural investment and firm incentives; the European social fund pertains to education, training and employment policies.

The European regional (or cohesion) policy has been in operation, in its current form, starting from the reform of the Structural funds in 1988. Since then the policy has been organized in multi-annual cycles and the investment priorities (the so-called "Objectives") are set up according to European regulations. Financial resources have grown up across programming periods – reflecting also the Union's enlargement – currently absorbing more than one fourth of the EU budget. Objective 1 (renamed Objective Convergence in the 2007-2013 cycle) has represented the core of the European regional policy: it aims at supporting the development of NUTS II regions whose per capita GDP is less than 75% of the EU average. Other regional objectives are Objective 2, which concentrates on areas facing industrial decline and Objective 5b, which refers to rural areas (starting from the programming period 2000-2006, Objective 5b has been included in Objective 2). As described in Table 1, in all the programming periods, and in particular in those more relevant for our analysis (1994-1999 and 2000-2006: see Panel B), Objective 1 regions received on a per capita basis from 4 to 5 times the financial support transferred to Objective 2 areas.

In Italy, the EU regional policy has mainly addressed the Southern regions (the so-called *Mezzogiorno*). In the first cycle (1989-1993) all the eight Southern regions[4] belonged in Objective 1. During the 1994-1999 programming period, one Southern region, Abruzzi, whose per capita GDP slightly exceeded the 75% threshold before the cycle started, was assigned to Objective 1 only for the sub-period 1994-1996, as a form of compensation for the absence of any transitional support.[5] After 1996, Abruzzi lost EU support until the new cycle (2000-2006) started. In the 2000-2006 cycle, while the rest of the *Mezzogiorno* remained in Objective 1, Abruzzi was included among the Objective 2 regions together with Central-

[3] Kline and Moretti (2014) have a similar research question. They examine the long-run effect of the Tennessee Valley Authority and show that gains in agricultural employment were eventually reversed after the program terminated while, in the manufacturing industries the positive effect of the policy persisted. See also von Ehrlich and Seidel (2015) for the German case.

[4] Abruzzi, Basilicata, Calabria, Campania, Molise, Apulia, Sardinia and Sicily.

[5] Starting from the 2000-2006 cycle, the compensation has taken the form of the so called phasing-out regime.

Northern Italian regions. By moving from Objective 1 to Objective 2, Abruzzi faced a large drop in EU financial support: according to our estimates, the endowments (as a percentage of GDP) more than halved. On top of that, national public resources (the so-called co-financing), also dropped by a similar degree.[6] As to our empirical exercise, it is important to note that the causal effect we will estimate has to be interpreted as the difference between being in Objective 1 versus receiving the less generous treatment implied by Objective 2.

As a rule, the financial endowment received from the EU must be spent within two years from the end of a programming cycle (*n+2 rule*), e.g. for the 1994-1999 cycle funds must be completely spent by 31st December 2001; the unspent part would be automatically recalled by the EU. During the 1994-1999 cycle, Abruzzi showed a significant delay in the usage of European resources, mainly due to the appointment of a new regional government in 1995 (Regione Abruzzo, 2001). Since Abruzzi was in Objective 1 for the period 1994-1996, the rule required the endowment to be entirely spent by the end of 1998. At the end of 1997 the region had spent only one fourth of its financial endowment; following the application of the *n*+2 rule, Abruzzi had only one year in which to spend the rest of the money. On an exceptional basis, the European Commission allowed Abruzzi an extension from 1998 to 2000; in this period the region spent the remaining 75% of its endowment.

A last remark on the institutional setting regards the location-based policy funded by national (rather than EU) sources. Italy has a long tradition in regional policy, at least since the fifties. Long before the start of the European cohesion policy, the *Mezzogiorno* regions were addressed through a major cohesion policy (the so-called "Intervento straordinario") pursued by a special public institution (the "Cassa per il Mezzogiorno") whose activities lasted from 1951 to 1992. In the subsequent years a number of different, less generous, nationally-funded programs took place. For our purpose two points are to be noted. First, the existence of the "Intervento straordinario" does not allow us to provide evidence about the effects of entering the Objective 1 program in 1989 because the EU program basically substituted the generous national one. Second, after 1996 the EU support to Abruzzi dropped drastically but the pattern of the national ones remained smooth (as for regions in the donor pool); hence national policies are not a confounding factor that could harm the identification.

3. Empirical methodology

In the light of the institutional setting highlighted in the previous Section, we want to evaluate whether in the Abruzzi case exiting the Objective 1 program in 1997 had an impact on GDP per capita growth in subsequent years. To do so, we compare the GDP per capita pattern for Abruzzi with that of a control group of unaffected regions, namely the other Italian *Mezzogiorno* regions. To build a credible control group we follow the synthetic control method for comparative case studies proposed by Abadie and Gardeazabal (2003) and Abadie et al. (2010)[7], and compare Abruzzi with a weighted combination of other regions that replicates the pre-treatment pattern of the outcome variable and the initial conditions for growth at the treatment date.

[6] Besides the large decrease in funds, moving from Objective 1 to Objective 2 also implied an indirect reduction in funds to businesses because under Objective 1 the EU ban for State aid to firms is less stringent.

[7] See, for example, Barone and Mocetti (2014) and Pinotti (2015) for applications to the Italian case with CRENoS data (see Subsection 3.2).

3.1 The synthetic control approach

In this subsection we briefly recall the synthetic control approach strictly following Abadie and Gardeazabal, 2003, and Abadie et al., 2010. Suppose we observe $J + 1$ regions, with the first one – without loss of generality – exposed to the intervention of interest (in our case "loosing Objective 1 support"). Let Y_{it}^1 be the potential outcome of region i $(i = 1, \dots, J + 1)$ at time t $(t = 1, \dots, T)$ if the region is exposed to the intervention (*treated*) and Y_{it}^0 if the region is not exposed (*control*). Let T_0 be the number of pre-intervention periods (i.e. the number of years in which region *i* is in Objective 1). The causal effect of the intervention is $\alpha_{it} = Y_{it}^1 - Y_{it}^0$. For each region we observe

$$Y_t = Y_{it}^0 + \alpha_{it} D_{it}$$

with $D_{it} = 0$ in all regions in all periods up to T_0 as well as in the unaffected regions from $T_0 + 1$ onward and $D_{it} = 1$ for region $i = 1$ from $T_0 + 1$ onward. The synthetic control estimator compares the observed outcome of the treated region with a weighted average of units in the control group:

$$\hat{\alpha}_t = Y_{1t} - w_j \sum_{j=2}^{J+1} Y_{jt} \ , \qquad for\ t > T_0$$

where w_j is the weight assigned to each region in the control group. Turning to the choice of the weights, we adopt a two-step procedure. Firstly, let X_1 be a $(kx1)$ vector of pre-treatment characteristics of region 1, X_0 be a (kxJ) matrix that contains the same variables for the *J* possible control regions and V a positive definite diagonal matrix. Conditional on V, the vector of weights, $W^*(V)$, must solve:

$$\min(X_1 - X_0 W)' V (X_1 - X_0 W)$$

subject to $w_j \geq 0$ and $\sum w_j = 1,\ \forall j = 2, \dots, J + 1$, meaning that it minimizes the difference between the treated region and the synthetic control with respect to a set of characteristics. Finally, V is chosen in such a way that the resulting synthetic control region approximates the trajectory of the outcome variable of interest of the treated region in the pre-treatment period, that is

$$V^* = \text{argmin}(Z_1 - Z_0 W^*(V))'(Z_1 - Z_0 W^*(V))$$

where Z_1 is the vector containing the outcome variable values for region 1 up to T_0 and Z_0 is the corresponding matrix for the untreated J regions. Alternatively, if the number of pre-treatment periods is large enough, one can divide them into a training period and a validation period, computing $W^*(V)$ using data from the training period, then choosing V to minimize the mean squared prediction error produced by the weights $W^*(V)$ during the validation period.

3.2 Implementation

Abruzzi is the unit exposed to the treatment ("loosing Objective 1 support") while the other *Mezzogiorno* regions represent the donor pool. The pre-treatment period runs from 1980 to 2000 where both Abruzzi and the rest of the *Mezzogiorno* were included in the same policy regime (i.e. no-Objective 1 in 1980-1989, Objective 1 in 1989-1996); 2001 is the year of the treatment while the post-treatment period extends

until 2008.[8] The outcome variable of interest is an index of GDP per-capita in real terms set equal to 100 in 1995.[9] As for the choice of the control variables (the *Xs*) we followed the prevailing approach and included the main predictors of economic growth identified in the literature: the initial level of GDP per-capita, the past GDP per-capita growth rate, the investment-to-GDP ratio, human capital, population density, trade openness (export over GDP) and the sectorial composition of value added (agriculture, industry, market services, non-market services), all measured at the regional level. These variables are averaged for the 3 years before the intervention, except for the GDP per-capita growth rate and the investment-to-GDP ratio that are more volatile and then are averaged for the 10 years before the intervention.[10]

Most of regional level time series data used comes from the CRENoS research center. Specifically, these data include GDP, population, labor units, investment and value added by sector (agriculture, manufacturing, energy, construction, market and non-market services). They cover the 1970-2004 period and have been updated up to 2008 by using official figures provided by the National Institute of Statistics (Istat). Data on human capital derive from population censuses conducted by Istat each decade, with inter-census data obtained through interpolation; data on regional territorial surface (needed to calculate population density) are provided by Istat; data on trade openness, available since 1980, come from Prometeia.

4. Results

4.1 Baseline results

The synthetic control approach delivers positive weights for Molise (0.641), Campania (0.200) and Calabria (0.159). In the first 3 columns of Table 2 we compare the pre-treatment characteristics of Abruzzi to those of the synthetic control and also to those of a population-weighted average of the other *Mezzogiorno* regions in the donor pool.

Overall Table 2 shows that the synthetic Abruzzi provides a much better counterfactual for Abruzzi than the average of the rest of the *Mezzogiorno*. The most notable difference between Abruzzi and its synthetic control is that the former displays a higher GDP per capita than the latter. This might be a concern if a catching-up effect is at work: the slower growth in Abruzzi (see below) would be at least partially driven by the catching-up mechanism and not because of losing the financial support. However, the very satisfying match between Abruzzi and its synthetic control in the pre-treatment period (see figure 1), at the beginning of which GDP per capita in Abruzzi was again higher, strongly suggests that no catching-up is at work. Other differences regard the industrialization level and the degree of trade openness.

[8] We consider the 2001 as the year of the treatment because funds were spent until 2000 (see Section 2) and limit our analysis to years before 2009 because in that year Abruzzi was hit by a large earthquake whose impact on GDP would bias our estimates.

[9] This choice is less common than using the level of the target variable as outcome and has two reasons. First, we are interested in growth and the index well represent differences in growth; second, Abruzzi has a GDP per capita that is higher than those of any other region in the donor pool so it would be unfeasible to match the level of per capita GDP with the synthetic control.

[10] See also Kaul et al. (2015) on the choice of predictors in the synthetic control method.

Figure 1 compares the dynamic of GDP per-capita of Abruzzi for the period 1980-2008 with that of its synthetic counterpart. The synthetic control traces almost exactly the economic performance of our region of interest in the pre-treatment period. From 2001 onward the two lines diverge, with our treated region growing at a slower pace than its counterfactual. In 2000, the last year of the program from a financial viewpoint, the GDP per capita in the treated unit was 0.7% less than that in the synthetic control; in 2008, at the end of the estimation period, the difference exceeded 6%: Abruzzi experienced a 5.5% drop in the outcome variable because of losing the Objective 1 support.

4.2 Robustness checks

We now run a number of robustness checks. We start by testing whether our core result is robust to the donors the algorithm selected. For example, the donors are the geographically nearest regions to Abruzzi (Molise is adjacent): if there are spatial spillovers our result on the negative effect of exiting the program would be biased downward. So we rerun the model by iteratively excluding those regions (*leave-one-out* test). Figure 2 shows that results are quite robust to excluding Molise, Campania and Calabria from the donor pool.

To corroborate the credibility of our results, we also conduct a placebo study by virtually reassigning the treatment to regions unaffected by it (see Abadie et al., 2010). In our setup, this amounts to estimating a synthetic control for unaffected regions (those in the *Mezzogiorno* that did not leave Objective 1 and the Central-Northern regions that never received the Objective 1 support), calculating the difference between each region per capita GDP and its synthetic control and comparing them with the same figure computed for Abruzzi. As Figure 3 shows the GDP per capita loss in the Abruzzi case (bold black line) is by far larger with respect to all of the placebo cases. The pseudo p-value implied in this exercise is below 1%.

Figure 3 also shows that for some regions the synthetic control method does not find an appropriate counterfactual in the pre-treatment period. Hence another way to assess the validity of our placebo test is to look at the ratio of post/pre-treatment root mean squared prediction error (RMSPE), i.e. the average of the squared difference between GDP per capita of a region and its synthetic counterpart before and after the treatment. A sizeable post-treatment RMSPE is not indicative of a significant effect of the intervention if the synthetic control does not closely reproduce the outcome of interest prior to the intervention (Abadie et al., 2015). Hence if Abruzzi stands out as one of the regions with a high RMSPE ratio, we can conclude that the estimated effect is significant with respect to placebos. As figure 4 shows, Abruzzi is the region with the first highest ratio: again, the implied pseudo p-value is lower than 1%.

As a last robustness check, we run a number of in-time placebo tests, in which the donor pool remains fixed, the treated unit is always Abruzzi, but the treatment year is changed. The fake treatment years are 1988, 1990 and 1992, chosen in the center of the 1980-2001 interval. Figure 5 shows that no divergence is observed before 2001, thus further corroborating our claim on the negative effect of the end of the EU funding in the case of Abruzzi.[11]

[11] Another possible concern about our identification strategy might stem from the fact that Abruzzi is an industry-heavy, export-oriented region with respect to the synthetic control (see Table 2) and that the slowdown of the Italian economy in the early 2000s hit disproportionally the industrial sector (on the supply side) and the exports (on the demand side). This fact might be a local confounding factor that would be problematic for our inference. However, this does not seem the case: in

4.3 Interpreting the result

Our estimate points out that the loss of EU financial support carried with it a GDP per-capita loss that is quantified in 5.5% when measured in 2008. Can we interpret such a result as evidence against an endogenous growth effect of the policy? In this subsection we answer this question affirmatively by providing additional evidence.

The test we carried-out thus far, even if very suggestive, is not fully conclusive. In fact, one can assume that the policy has two effects: a contemporaneous one (that vanishes if funds are withdrawn) and a permanent one (that remains even without financial aid). As an illustrative example, consider an investment in a new road that increases the value added for the same year it is built and at the same time permanently improves mobility. By definition our empirical exercise estimates only the former effect because the donor pool is made up of regions that continue to receive the treatment: the possible permanent effect is shared by treated and donor regions.

First, we point out that the literature regarding the effect of the Objective 1 intervention, comparing treated and untreated regions, estimates the sum of the two effects. Hence, by comparing our estimate with those that regard the whole effect we can make a supposition as to the permanent effect of the policy. Our 5.5% estimate corresponds to a 0.8% gain on an annual basis. In Becker et al. (2010) the preferred estimate for the whole effect, measured as EU average, is 1.6%. Pellegrini et al (2013) propose the same exercise and calculate an EU average point estimate ranging in the 0.6%-0.9% interval. Those measured impacts are, however, likely to be an overestimation of the effect of EU money in the case of Abruzzi. As explained in Becker et al. (2013), the heterogeneity of the impact is likely to be very high. In particular, they show that only about 30 percent and 21 percent of the EU regions - those with sufficient human capital and fairly good institutions - are able to turn transfers into faster per capita income growth. Given that the regions of the South of Italy score low both in terms of human capital and quality of the institutions (European Commission, 2013) it seems safe to largely downsize the estimate for the *Mezzogiorno* regions. This is also consistent with Figure 5 in Becker et al (2012) that shows that the transfer multiplier in the treated Italian regions is less than 1 and with Becker et al (2013) who estimate that for no Italian regions the policy had a positive treatment effect. Overall it seems that the whole effect estimated by others and the (reversal of the) contemporaneous effect largely overlap, thus suggesting that the permanent effect is negligible: the reversal of that impact that we quantify erodes all the previous gains.

In order to further support our argument against the permanent effect of the program we propose a second test. Namely, we compare Abruzzi with comparable Italian Central-Northern regions that have never been treated. Since we cannot implement the synthetic control method because the treatment needs to occur *after* a given date but in our case the treatment occurs *before* a given date, we resort to a simple difference-in-differences estimation. The growth rate of GDP per capita is regressed against year- and region- fixed effects as well as a dummy variable that equals 1 for Abruzzi after 2000 and 0 otherwise. If a permanent effect of the policy is at work, it should spur growth with respect to a never treated region even after the policy terminates. The control group includes all Italian Central-Northern regions or only Central ones; and the estimation period is 1980-2008. The estimated parameter for the dummy variable of interest turns out to be 0.189 (standard error = 0.700) with the larger sample or

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the early 2000s, the Abruzzi economy shows a worse performance in all main sectors, thus suggesting no composition effect; on the demand side, the worse performance regarded the investment component, consistently with the end of public funds.

0.0814 (standard error = 0.783) with the smaller one: after exiting the program Abruzzi is not on a steeper growth path with respect to never treated regions thus further supporting the view that the program had no permanent effect on growth.

5. Conclusions

EU regional policies are one of the most important programs in the world trying to stimulate catching up in lagging areas. Rigorous and credible counterfactual studies point to the efficacy of these policies to increase GDP per capita growth. We argue that such evidence has to be interpreted as a necessary but not sufficient condition for the desirability of the policies. The estimated growth- enhancing effects are broadly consistent with the prevailing estimates on the fiscal multiplier. In a policy's perspective, one needs to know whether the program, besides increasing GDP per capita, enables the treated local economy to grow faster autonomously so that aid can be temporary. This is the case, for example, if the local economy lies in a poverty trap and/or if the financial support triggers endogenous growth mechanisms. To answer this question we study the case of the Italian region Abruzzi, which is the only EU region that exited the Objective 1 program without a smooth transitional regime. We compare Abruzzi with other Italian Southern regions that do not exit the program through the synthetic control method. We find that losing the large EU financial support has resulted in a 5.5% cumulative drop in GDP per capita over 7 years. This result proves robust to a number of robustness checks. After discussing the core result, our policy implication is that the Objective 1 is a remedy for economic underdevelopment on condition that the funding does not end. That means that the program is supported more from a social cohesion point of view than by the idea that it will stimulate endogenous growth.

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Tables and figures

Table 1

Eligible population and annual per capita allocation among programming periods (1)

Panel A: Comparing the first and the second programming period

Objectives	Annual per capita allocation 1989-1993 (ECU)	Annual per capita allocation 1994-1999 (ECU)
	Italy	
Objective 1	82	117
Objective 2	21	39
Objective 5b	25	31
	EU average (2)	
Objective 1	123	170
Objective 2	21	42
Objective 5b	30	35

Panel B: Comparing the second and the third programming period

Objectives	Annual per capita allocation 1994-1999 (Euro)	Annual per capita allocation 2000-2006 (Euro)
	Italy	
Objective 1	137	162
Objective 2 (3)	43	41
	EU average (2)	
Objective 1	187	220
Objective 2 (3)	46	41

Source: Panel A: European Commission (1996); Panel B: European Commission (2001).
(1) In order to overcome the problem of exchange rate among ECU and euro in different time periods we decided to compare contiguous programming periods. – (2) EUR-12 for the 1989-1993 period, EUR-15 otherwise. – (3) Includes Objective 5b for 1994-1999.

Table 2

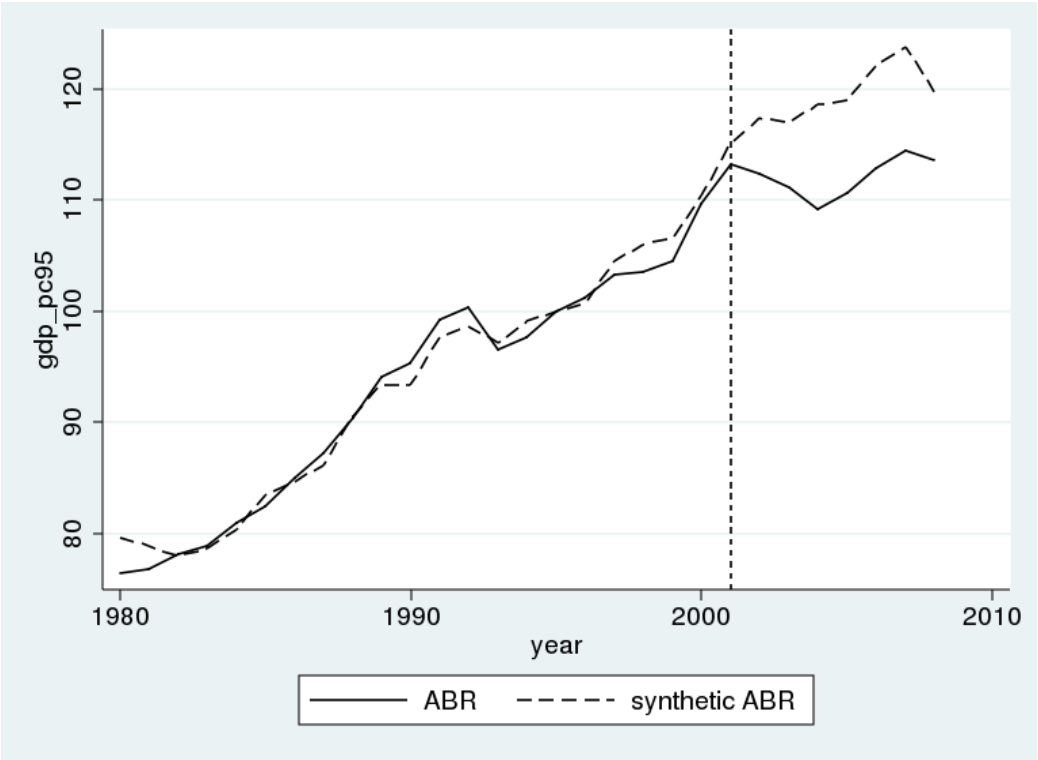
Economic growth predictor means in the pre-treatment period
(Euro, percentages and inhabitants per km^2)

Variables	Abruzzi	Synthetic Abruzzi	*Mezzogiorno* sample	*Central* sample	*Central-Northern* sample
GDP per capita	14,749	12,451	11,377	18,453	20,314
Annual GDP per capita growth rate	1.4	1.7	1.5	1.6	1.6
Investment-to-GDP ratio	21.5	23.1	21.9	17.8	18.6
Share of graduates	6.6	5.9	5.5	6.3	5.9
Population density	118.0	153.4	242.8	221.8	249.0
Trade openness	19.5	8.0	7.4	15.2	22.6
Agriculture share of value added	4.5	5.2	5.3	2.2	2.6
Industry share of value added	29.9	23.3	20.2	24.9	31.4
Market services share of value added	45.3	45.6	48.6	51.6	49.5

Notes: GDP per capita, share of graduates, population density, trade openness and the share composition of value added are averaged for the 1998-2000 period; annual GDP per capita growth rate and investment-to-GDP ratio are averaged for the 1990-2000 period. The last 3 columns report a population-weighted average of the 7 *Mezzogiorno* regions in the donor pool and for the 4 *Central* and the 12 *Central-Northern* regions.

Figure 1

Baseline result: GDP per capita 1980-2008
(index 1995=100)

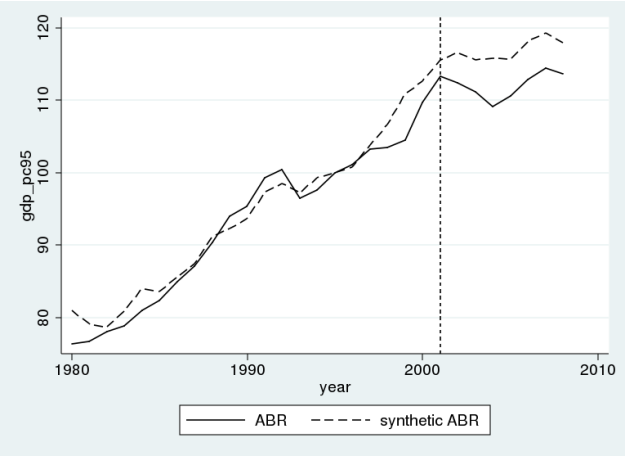


The graph reports the GDP per capita in real terms (1995=100) of the treated region (Abruzzi) and of the synthetic control. The weights used to build the synthetic controls are 0.641 (Molise), 0.200 (Campania) and 0.159 (Calabria).

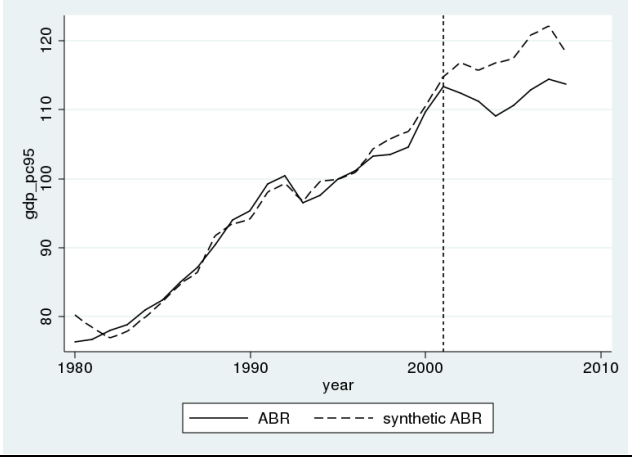
Figure 2

Robustness checks: leave-one-out test

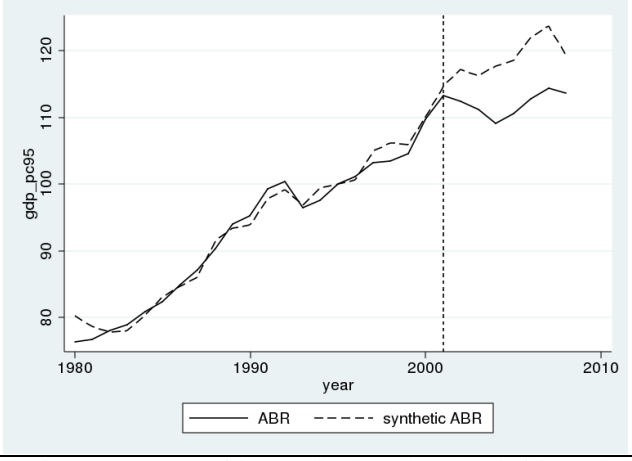
Panel A: No Molise



Panel B: No Campania



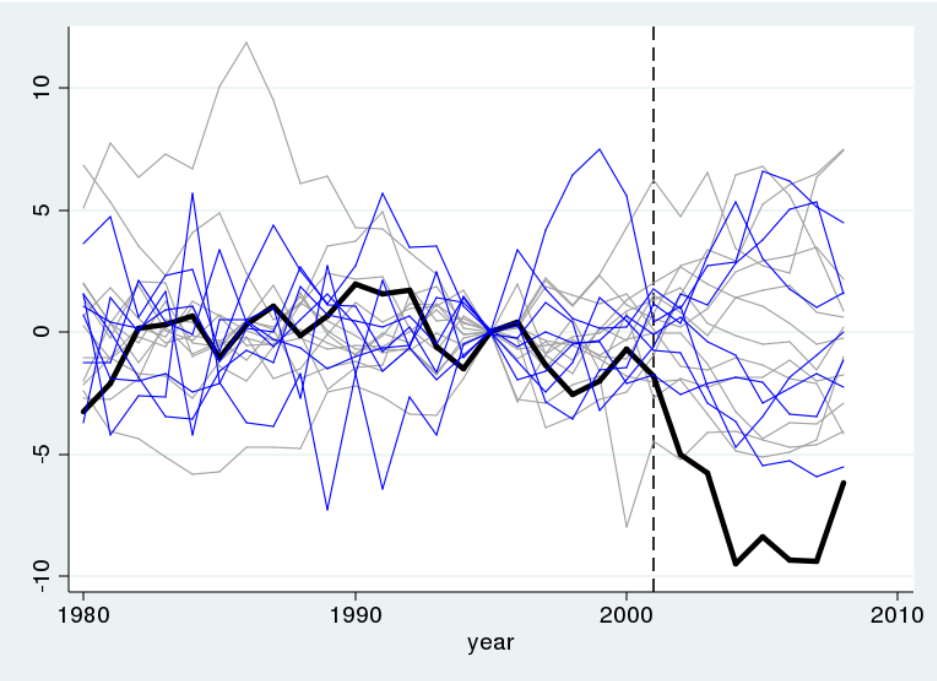
Panel C: No Calabria



The graph reports the GDP per capita in real terms (1995=100) of the treated region (Abruzzi) and of the synthetic control. The weights used to build the synthetic controls are 0.502 (Apulia), 0.265 (Sardinia) and 0.233 (Basilicata) in Panel A; 0.674 (Molise), 0.303 (Apulia) and 0.022 (Sicily) in Panel B; 0.806 (Molise), 0.180 (Campania) and 0.014 (Apulia) in Panel C.

Figure 3

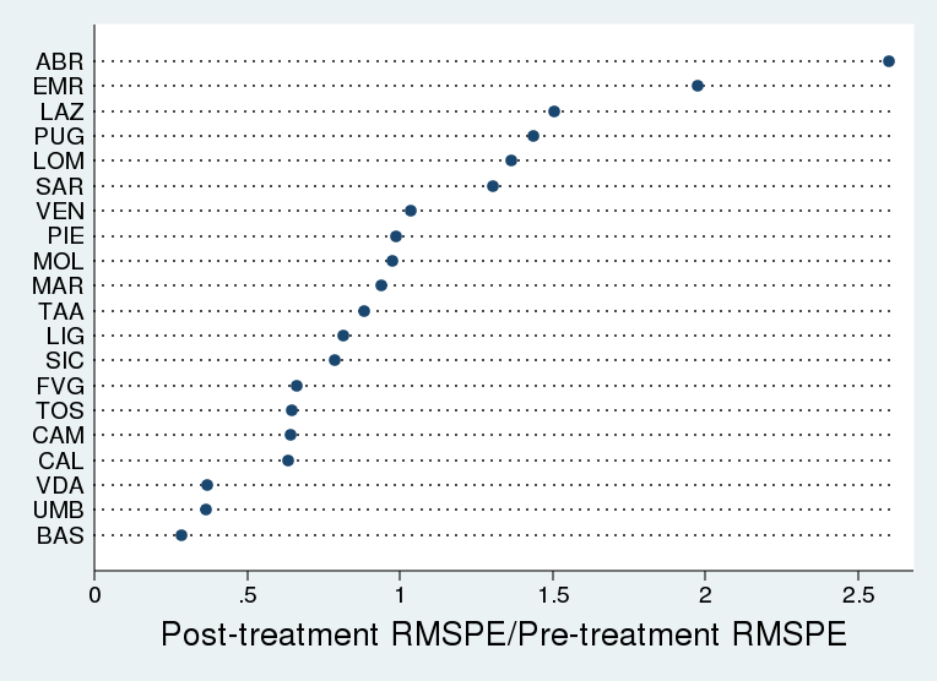
Robustness checks: placebo treated regions vs Abruzzi



The graph reports the differences, in terms of GDP per capita (1995=100), between the treated region (Abruzzi) and its synthetic control (black thick line), as well as the same differences for all other 19 Italian regions (placebos in blue lines for Southern regions, gray otherwise).

Figure 4

Robustness checks: ratio of post-treatment RMSPE to pre-treatment RMSPE

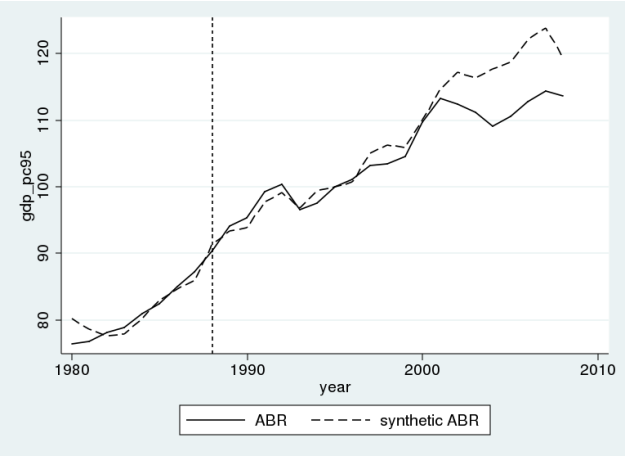


Ratio of post-treatment RMSPE and pre-treatment RMSPE: Abruzzi (ABR) and 19 placebo Italian regions.

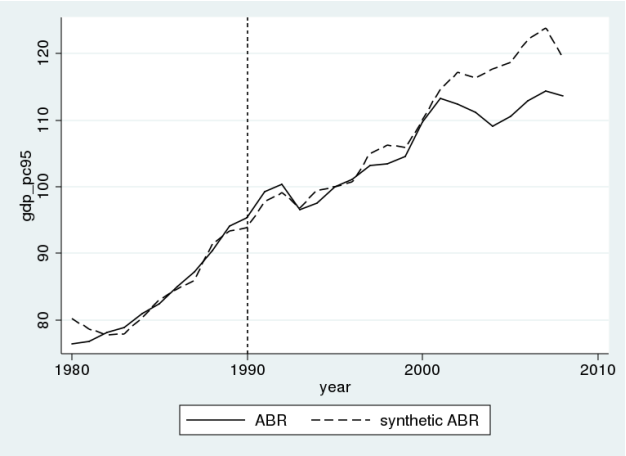
Figure 5

Robustness checks: in-time placebo

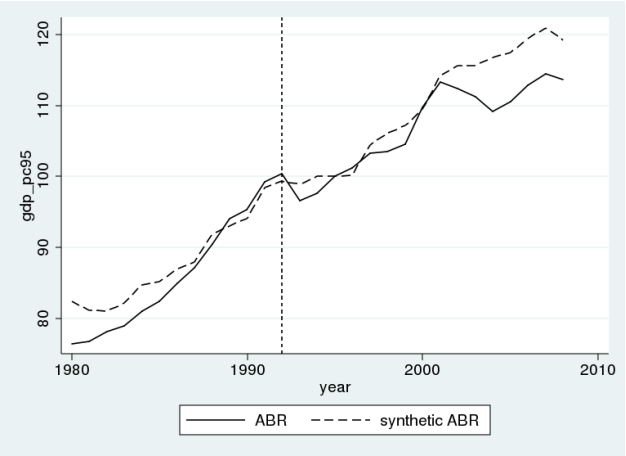
Panel A: treatment year = 1988



Panel B: treatment year = 1990



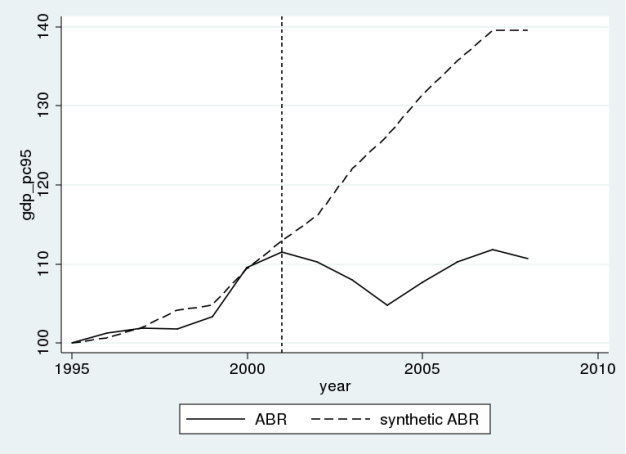
Panel C: treatment year = 1992



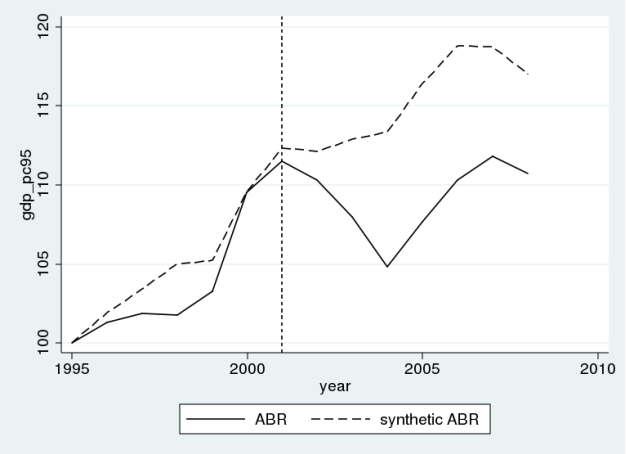
The graph reports the GDP per capita in real terms (1995=100) of the treated region (Abruzzi) and of the synthetic control. The weights used to build the synthetic controls are 0.834 (Molise) and 0.166 (Campania) in Panel A; 0.828 (Molise) and 0.172 (Campania) in Panel B; 0.688 (Sardinia), 0.278 (Molise) and 0.034 (Campania) in Panel C.

Appendix

As stated in the Introduction we compare Abruzzi only with other Italian regions because we think that equalizing many unobserved characteristics is crucial and this can be better achieved in a within country perspective. However, our exercise can also be run using regions from all EU countries as potential donors even if available data are less detailed than those available only for Italy. Here we run this exercise that further corroborates our findings. To this aim, we assembled a dataset with all the Objective 1 European regions in the 1994-2008 period plus Abruzzi. Apart from Italy, they belong to Germany, Greece, Ireland, Portugal, UK and Spain. Data comes from OECD and Eurostat and the set of predictors includes GDP per-capita, average GDP per-capita growth rate before the intervention, value added share of Agriculture, Mining and Manufacturing, Construction, population density and human capital. Because of data availability the estimation period is 1995-2008. The donors are Central Greece (0.462) and Attica (0.538). Again, exiting the program has a negative effect on GDP per capita growth, as the figure below shows.



The negative effect of exiting the program is confirmed even if we exclude Greek regions from the donor pool. Donors are then Sicily (0.941) and Asturias (0.059):



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