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Working Paper N. 03/2015

DISEI, Università degli Studi di Firenze
Via delle Pandette 9, 50127 Firenze, Italia
www.disei.unifi.it

No blessing, no curse? On the benefits of being a resource-rich southern region of Italy

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Abstract

The aim of this research is to examine the aggregate economic effects of large-scale oil extraction in Basilicata, a southern region of Italy. This paper is the first empirical attempt to test for a regional resource curse by constructing a comparison unit using synthetic control techniques. The comparison unit captures how Basilicata's economic activities would have evolved in the absence of the oil extraction industry. The negligible differences between economic parameters in Basilicata and in its comparison unit suggest that a large amount of oil extraction has had no detectable effect on Basilicata's economy. Results indicate that achieving economic development in resource-rich regions requires targeted economic policies in support of the resource exploitation, in order to effectively impact the local economy.

JEL Codes N54, O13, Q32, R15, R58.

Keywords Natural resources; Oil royalties; Regional development; Synthetic Control Method; Basilicata.

Acknowledgements. I am grateful to Benedetto Rocchi who suggested the inclusion of this paper in the DISEI Working Paper Series - Economics. I am grateful for comments and suggestions from Egil Matsen, Ragnar Torvik, Rune Skarstein, Frikk Hugo Bø Nesje, Simon Søbstad Bensnes, Erling Vårdal, Jorge Hernan Garcia-Lopez, an anonymous referee, and seminar participants at NTNU in Trondheim, at the Bergen Economics of Energy and Environment Research Conference (BEEER) 2014 held at the Norwegian School of Economics (NHH) in Bergen and at the IAERE Third Annual Conference held at the University of Padova. I am especially grateful to Torben K.

Mideksa for discussions that inspired this work and for providing support on technical issues. All remaining mistakes or omissions are mine.

1. Introduction

"Call your men back, let them return from wherever they migrated to, and tell them that finally there will be jobs for them, here."[1] These optimistic words were pronounced by a euphoric Enrico Mattei, an Italian public administrator and industrialist who developed the Italian fossil fuels company Ente Nazionale Idrocarburi (ENI) into a multinational company, when the first oil drilling activities were starting during the 1960*s* in the southern Italian region of Basilicata[2]. At that time, the regional economy of Basilicata relied on traditional activities such as agriculture and low-skilled, labour-intensive manufacturing industries[3]. In some sense, Mattei's enthusiasm was justified. The size of the endowment and its economic value are enormous. Today, the main oil fields of Val D'Agri and Tempa Rossa are estimated to be the largest onshore fields in continental Europe (ENI, 2012), with extraction of approximately $90,000$ barrels of oil per day (around 50 barrels per year per regional inhabitant). It is natural that policy-makers and the local population regarded the exploitation of the newly found oil reserves as an opportunity for economic development that should not be missed.

The main objective of this research is to investigate whether the exploitation of those oil fields, which has expanded at an unprecedented rate since the end of the 1990s, has on aggregate boosted economic development in Basilicata as compared to neighboring southern regions of Italy. Estimating the impact requires us to answer the counterfactual question: how would the economic indicators of Basilicata have evolved in the absence of oil discovery and extraction? This is interesting partly because none of the existing stud-

[1] This is a direct translation, by the author, of Enrico Mattei's last speech in the small town of Gagliano Castelferrato on 27.10.1962, as reported in the local newspaper SUD.

[2] A socio-economic and political inquiry into the Basilicata region during the post-war period is provided in Banfield (1958).

[3] Basilicata, together with other southern regions of Italy, is labeled by the EU as an "Objective 1" region and receives substantial support for economic development and investment in infrastructure. In addition, the EU has a policy of promoting the use of indigenous natural resources. In 2000, the European Investment Bank approved a loan of 200 million Euros to ENI for the development of two large on-shore fields in the region of Basilicata.

ies answer this question, and partly because the economic impacts of such resources are often hard to predict beforehand.

Common sense would suggest thinking about the direct and indirect mechanisms that might be useful in making qualitative predictions. On the one hand, the oil adventure could generate economic development through its direct impact on the volume of the regional economy. The magnitude of this impact can be estimated, for example, through the effects on regional per capita income and employment rates, as well as physical investment of firms. On the other hand, the imposition of royalties on the value of resource production generates revenues for local authorities; these revenues could indirectly impact the regional economy by financing a broad spectrum of economic policies.

Most of the economics literature of natural resources, summarized by van der Ploeg (2011), conveys that for a country with suitable institutions (property rights, rule of law, tax collection), the benefits of a natural resource gift should be positive and substantial. Nevertheless, this literature has also documented a number of cases in which exploitation of natural resources is associated with adverse economic effects for general economic welfare. The adverse effects can work through the so-called Dutch Disease, institutional corruption, or conflicts, among other channels. As a consequence, it is hard to predict the economic effect of large-scale oil extraction in Basilicata based on theory or experience from other countries. Thus, the goal of this paper is to examine whether the exploitation of the resource has had a detectable effect on broad and aggregate economic indicators, focusing on Basilicata[4].

The most relevant literature is the growing research base that deals with management of non-renewable natural resources at the sub-national level. Caselli and Michaels (2013), Papyrakis and Gerlagh (2007), Papyrakis and Raveh (2014), James and Aadland (2011), Kan et al. (2014), Borge et al. (2013), Percoco (2012), and Rocchi et al. (2015) focus on economic effects of natural resources on different sub-national entities (i.e., federal states, regions, provinces, municipalities).

Caselli and Michaels (2013) closely study a case from Latin America. Their focus is the effect of natural resource revenues on public services at the smallest administrative entity in Brazil - the municipality. They examine

[4]For a methodological discussion clarifying the meaning and explaining the utility of the comparative case study method, see Gerring (2004).

whether the royalties from oil revenues have affected the spending decisions of local authorities, the provision of public services, and benefits in terms of income and welfare for the local community. Their results suggest that, despite reporting large changes in expenditures on urban infrastructure, education and health services, no corresponding change resulted in the economic and social outcomes that the spending was meant to improve.

Similarly, Papyrakis and Gerlagh (2007), Papyrakis and Raveh (2014) and James and Aadland (2011) examine specific cases from North America. Papyrakis and Gerlagh (2007) tested the resource curse hypothesis by focusing on the U.S. and showing that the curse is also present at the state level in a federal system. They claim that resource-rich states perform comparatively worse in terms of economic growth compared to resource-poor states. Papyrakis and Raveh (2014) focus on Canadian provinces in order to investigate the existence of a regional Dutch Disease. They find that some of the standard Dutch Disease mechanisms are indeed present at the cross-provincial level. James and Aadland (2011) examine outcomes in U.S. counties and test whether the resource curse is present at the county level. They claim that natural resource earnings have had a statistically significant negative effect on economic growth for counties.

Kan et al. (2014) push the literature one step further by studying a case from Asia. They focus on a cross-province sample within China, using two different measures of resource abundance. Unlike the cases from North and Latin America, Kan et al. (2014)'s results suggest that resource abundance might have a positive effect on economic growth, depending on institutional quality. Surprisingly, the positive effects appeared to be stronger for provinces with poorer institutional quality.

Borge et al. (2013) advance the literature by adding a case from Europe. They focus on Norwegian municipalities' endowment of hydroelectric power potential and find supporting evidence for the claim that higher natural resource revenues retard efficiency in the provision of public goods, although no more than revenues derived from other sources.

To the best of my knowledge, the research that is closest to this work is that of Percoco (2012), who also focuses on the economic effects of oil on Basilicata's economy. His empirical work provides within-region estimates of the per capita number of new enterprises that were created in the municipalities in which oil fields were physically established (the treatment group) as compared to the rest of the region's municipalities (the untreated group). His results suggest that enterprise creation was slightly higher than the average

in the areas of oil extraction activity. Although enterprise creation might have increased, it is not clear whether the new enterprises have shifted from other areas of Basilicata or are entirely new; the latter case would mean additional returns for the overall economy. Complementary to Percoco (2012), this paper asks whether the extra enterprise creation in the oil-extracting areas has had any payoff at the aggregate level for Basilicata[5].

This paper advances the literature in two ways. First, it offers new subnational evidence from Italy about the resource curse and expands the coverage of the literature from Brazil, USA, Canada, China and Norway. Second, it represents the first empirical attempt to test for a regional resource curse using a quantitative comparative case study. In other words, this paper addresses the problem associated with the appropriate choice of comparison unit that plagues many of the existing studies[6] by employing state-of-the-art techniques to obtain better estimates of the economic effects of natural resources. This approach helps address key econometric problems, such as institutional differences, that plague cross-country studies. In addition, this work aims to capture general equilibrium effects that are often missing in case studies of the resource curse where comparison units have been generated by quasi-natural experiments.

Furthermore, the results of this paper help answer the question of whether income is the most binding constraint for the regional economic development of Basilicata; and whether targeted economic policies (i.e., more effective distribution of resource revenues, financing of ad-hoc industrial policies) needs to accompany the allocation of resource revenues to depressed regions.

More generally, the findings can illuminate whether the poor economic

[5]Using an input-output approach (a Social Accounting Matrix or SAM), Rocchi et al. (2015) examine the socioeconomic impacts of royalty revenues on the development of different economic sectors in Basilicata. To this end, they build a multi-sectoral model of the regional economy and explore the impact of resource revenue shocks during a given period of time. They suggest that royalty revenues had a negligible overall economic impact whenever channeled through the regional government. Unlike Rocchi et al. (2015), who make ex-ante assumptions about functional forms, the current paper approaches the problem econometrically, i.e., it examines whether the observed data demonstrate a strong and positive effect of natural resources on the economy of the Basilicata region. I believe that this approach is better suited to estimate the dynamic multiplicative effects that the oil adventure might have had on Basilicata's economic performance over time.

[6]See Mideksa (2013) for a detailed discussion of similar econometric problems with the existing resource curse literature.

performance of regions in southern Italy is driven or not by lack of productive resources, and whether the EU's goals for economic development in targeted regions (Objective 1) can be achieved by simply channeling more resources into the regions.

The rest of the paper is organized as follows: section 2 introduces the economic shock whose effect the paper focuses on and describes the empirical strategy aimed at estimating the counterfactual; section 3 presents the empirical results; section 4 discusses alternative explanations of the results; and section 5 concludes the paper.

2. The Strategy of Estimating the Counterfactual

Let us start by introducing the magnitude of the oil adventure for Basilicata. Notwithstanding the intense exploration activities in the 1970s, the amount of total oil extraction by the early 1980s and 1990s was still limited. Figure 1 plots the per capita extraction of barrels of oil in Basilicata since 1980 (source: UNMIG; further details in Data Appendix B). As can be seen from Figure 1, extraction volume begins rising substantially at the end of the 1990s until it reaches the noteworthy level of 50 barrels of oil per capita per year in the mid-2000s at the peak of extraction:

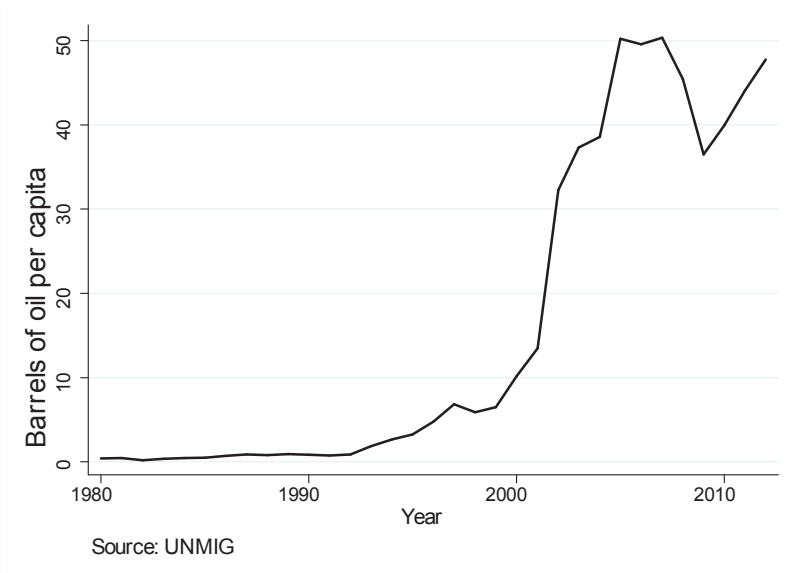


Fig. 1 - Oil extraction in the Basilicata region

In other words, Figure 1 indicates that the end of the 1990s qualifies as the correct treatment choice, since it creates a clear discontinuity in the magnitude of the extraction activity taking place before and after that period. In order to formulate the scope of this work in a concise way, I propose the following testable hypothesis:

H: *All else being equal, intensive exploitation of oil fields and greater resource revenues have led to a higher degree of regional economic development in Basilicata, expressed by private investment, employment and real GDP per capita.*

The implicit assumption underlying this null hypothesis is that the amount of oil extraction is significant and thus it is natural to expect some positive effects on gross fixed investments, employment rates and real GDP per capita of the regional economy.

2.1. Royalties and regional revenues

A closer look at institutions in Basilicata and their relationship with the Italian state is provided here. A possible objection could be raised about the validity of the current study: it is common knowledge that the fraction of resource revenues directly accruing to sub-national institutions crucially depends on the specific terms of the institutional agreements in place with the state. In other words, the agreement that the region of Basilicata stipulates directly with the Italian state and indirectly with extractive oil companies plays a decisive role for the research question of this paper. In a state with a low overall degree of fiscal federalism, as in Italy, the bargaining power of the regions is limited and therefore the impact of royalty resource revenues on the regional government budget might also be limited. According to the current legislation for royalties charged on mineral extraction activity in Italy, the general institutional framework operates as follows:

Variable	**Location**	**Net value based royalties**
Oil production	*Onshore*	7%
	Offshore	4%
Gas production	*Onshore*	7%
	Offshore	7%
Revenue's benefiter		State (30%); Region (70%)

(1)

The basic rule described in (1) prescribes that a royalty tax of 7% is charged by Italian authorities on the value of *onshore* oil extraction activities

(the case of Basilicata). The state holds 30% of the subsequent revenues and transfers 70% to the regions in which the extraction activity has taken place[7].

What is decisive for the scope of the current study is a subsequent piece of legislation (Law 140/1999) which provides that, in the case of the southern regions of Italy, the 30% originally destined for the state has to be transferred to the regions. This implies that the 100% of the 7% of oil production value in Basilicata has actually accrued to the regional government of Basilicata from 1999 onward. In other words, this law creates a substantial discontinuity in the fraction of royalty revenues accruing to the region of Basilicata, before and after 1999. Hence, 1999 qualifies as the correct choice for the treatment year both from an empirical point of view (as seen in Figure 1), and from the point of view of the institutional agreement governing the allocation of royalty revenues.

This subsection confirms the validity of the research question, in the sense that the economic impact of the royalty allowance on the regional economy can be investigated regardless of further reference to redistribution schemes between regions and the Italian state. According to the author's estimations, the total value of the resource revenue for the regional government in the period $1999 - 2009$ is approximately 590 million Euros.

2.2. On the choice of the best comparison unit

The task of estimating impact involves figuring out the right counterfactual that would describe the evolution of the treated unit in the absence of the treatment. Ideally, the outcome in the counterfactual scenario is estimated using a research design that randomly assigns treatment between the treatment and control groups. Unfortunately, the data generating process of natural resource endowment, discovery and extraction does not often happen in a way that satisfies the necessary conditions for sound statistical estimation. By definition, such interventions in an economy are never driven by an ex-ante research design that lends itself to proper causal impact evaluation. As a result, estimating the economic impact requires a compelling counterfactual or the best comparison unit.

[7] Although this piece of legislation, in place since 2009 (Law 23/07/2009 n.99), has replaced the previous laws from 1996 and 2002 (Law 25/11/96 n.625 and 23/08/04 n.239), the royalty tax to be paid to the authorities for onshore oil extraction has been constant at the 7% level.

The issue of choosing the right comparison unit has been a central challenge to the literature of program evaluation in general and comparative case studies in particular. In the absence of best comparison units by research design, the path-breaking research by Card (1990) focuses on the labor market impacts in Miami of the Mariel boat lift of Cuban immigrants. Card (1990) proposed a comparison unit consisting of the average outcome of a group of units similar to the treatment unit but without the treatment, i.e., five southern cities with labor market outcomes similar to those of Miami before the arrival of Mariel boat lift immigrants. The key insight is that, even if the intervention of immigration was not randomly assigned to Miami relative to other cities, a comparison unit based on the average outcomes of similar cities can do a better job of functioning as the right comparison unit than a unit based on heterogeneous cities. Once similar comparison units are chosen, one can estimate the differential impact of the shock on Miami's labor market using the Differences-in-Differences estimator (DiD, hereafter).

Abadie et al. (2014) argue that the choice of the comparison units and average outcome in Card (1990) is to some extent subjective; they suggest that, by generalizing the DiD estimator using matching estimators, one can obtain the best comparison unit in a more rigorous way. This strategy has been labeled the Synthetic Control Method (SCM, hereafter). They argue that the comparison unit generated in this way often does a better job of replicating the outcomes of the treatment unit in the absence of the treatment and avoiding the extrapolation bias that plagues the standard regression-based estimators. Abadie et al. (2014) systematize this issue by developing an algorithm that constructs a best comparison unit based on a *donor pool* of potential comparison units, using a data-driven approach. The comparison unit in the SCM is therefore selected as a weighted average of the potential comparison units that have characteristics similar to the treated unit before the introduction of the treatment. Once the synthetic comparison unit has been constructed, the effect of the treatment can be estimated by comparing the time path of the treated unit to its counterfactual generated through the SCM.

2.3. Empirical strategy

The methodology chosen to estimate the aggregate effect of oil extraction activity on the treated regional economy is comparing Basilicata with a control group of southern Italian regions. The choice of a comparative case study at the level of regions is meant to avoid controlling for cross-country

differences that usually contaminate empirical analyses at country levels. I collected macroeconomic data on real GDP per capita and its conventional determinants such as indicators of capital stock, education level, employment, population size and value-added shares of different economic sectors[8]. The intervention is defined as the large-scale extraction of oil in the southern Italian region of Basilicata, from 1999 onward. The dataset $1980-2009$ is therefore divided into a pre-treatment period, $1980-1998$, and a post-treatment period, $1999-2009$, in order to estimate the treatment effect on post-treatment regional macroeconomic outcomes.

The 5 southern Italian regions of Molise, Campania, Calabria, Apulia, and Sardinia[9] make up the donor pool of potential comparison units. The $5+1$ (including Basilicata) southern Italian regions are often referred to in Italian public debate as part of the "Mezzogiorno"[10] and share the same structural economic problems, compared to the more developed regions of the center-northern part of the country[11].

The identification problem faced by the current study is that the effect of the treatment depends on the outcomes in both the actual Basilicata and a hypothetical, unobservable Basilicata in which susbtantial increase in oil extraction activity has not taken place. The identifying assumption adopted to overcome this limitation exploits the fact that, throughout the period of analysis, Basilicata produced the largest fraction of all the oil extracted in the $5+1$ regions. More precisely, the share of oil extracted in Basilicata oscillates between 60% and 99% of the total production of crude oil in the $5+1$ southern regions, as plotted in the following Figure 2:

[8] The choice of these macroeconomic variables is based on economic growth literature as summarized in Barro and Sala-i-Martin (2004).

[9] The southern region of Sicily has been dropped due to the identifying assumption explained later on in this section. Figure 11 in Appendix C shows the geographical location of the 6 southern Italian regions of interest.

[10] Trigilia (2012) analyses in depth the reasons behind the chronic economic backwardness of the Italian Mezzogiorno, despite decades of considerable investments by the state.

[11] Abadie et al. (2014) advises selecting the group of potential comparison units by including those units that are driven by the same structural characteristics but are not contaminated by the structural shocks caused by the intervention.

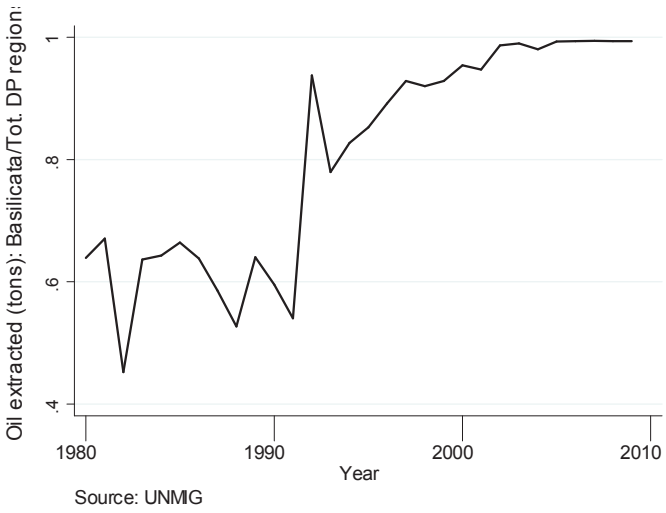


Fig.2 - Fraction of oil extracted in Basilicata

The choice of the donor pool is also informed by a methodological note by the Bank of Italy (2012) about regional economic outlooks, in which 88 European regions were divided into 4 clusters to ensure within-group homogeneity in terms of citizens' purchasing power, employment rates, shares of value added in agriculture and industry, and number of employees working in sectors with medium-high and high technological progress with respect to the total number of regional employees. The cluster that includes regions with lower employment rates, lower purchasing power and relatively higher value-added shares in low-technology sectors comprises 5 Spanish, 3 French and 7 southern Italian regions. With the exception of Sicily, 6 out of these 7 southern Italian regions constitute the group of interest.

To begin, consider the case in which the dependent variable is real GDP per capita (base year 1980). Conventional determinants of GDP per capita mentioned above are employed as predictors. The algorithm of the SCM

assigned the following weights to the comparison units of the donor pool[12]:

Region	**Synthetic control weights**
Campania	0
Molise	.354
Apulia	.106
Sardinia	0
Calabria	.54

(2)

As is shown in (2), the best comparison unit based on the SCM appears to be a convex combination of some of the regions of the donor pool, with the exception of Campania and Sardinia. The SCM delivered positive weights for Molise (0.354), Apulia (0.106), and Calabria (0.54). In the next section, results of the application of the SCM are presented.

3. The effect of the treatment

Once the synthetic comparison unit has been rigorously generated, the next task is to compare the time path of income per capita of the treated Basilicata with the income per capita of the synthetic control unit. The implicit assumption is that the economic shock described by Figure 1 in the previous section is significant and can in theory affect the per capita income of residents in Basilicata.

In order to investigate the impact of the treatment, Figure 3 presents the trajectory of real per capita GDP for Basilicata and its synthetic control unit before and after treatment:

[12]Further details about implementation of the algorithm of the Synthetic Control Method are described in Appendix A. Dataset and do-files are available from the author on request. Statistical software package developed by Abadie et al. (2011, 2014) is available online at *http://stanford.edu/~jhain/software.htm#Synth*

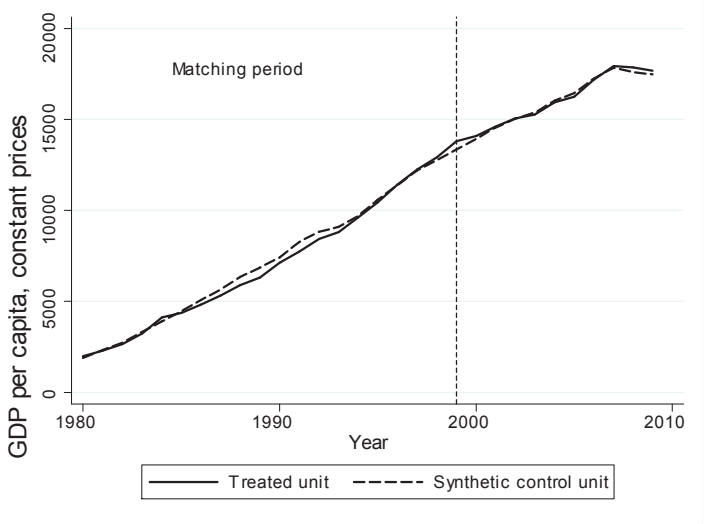


Fig. 3 - The effect of oil on real GDP per capita

The solid line indicates the real per capita GDP with treatment (the actual Basilicata) whereas the dotted line represents real per capita GDP in the synthetic control unit. The pre-treatment difference between the treated unit and the control unit is successfully minimized by the SCM. In other words, the SCM does a satisfactory job in constructing a synthetic control unit that closely replicates the outcome of interest for the treated unit in the matching period.

More interestingly, there appears to be no perceptible difference between the real GDP per capita of Basilicata and its synthetic control unit in the post-treatment period. Thus, the effect of oil extraction as described by Figure 1 appears to be practically insignificant. In addition to evaluating the effects on per capita GDP as seen above, I also examined whether the resource had affected other important variables such as private investment or employment in the region. Figures 4 and 5 present the employment rate and the gross fixed investment (constant 1980 prices) in Basilicata as compared to those of the synthetic control unit[13].

[13]For all three dependent variables - real GDP per capita, employment rate and gross fixed investment - the synthetic control weights and economic growth predictors for both the treated and the synthetic unit are given in Appendix C.

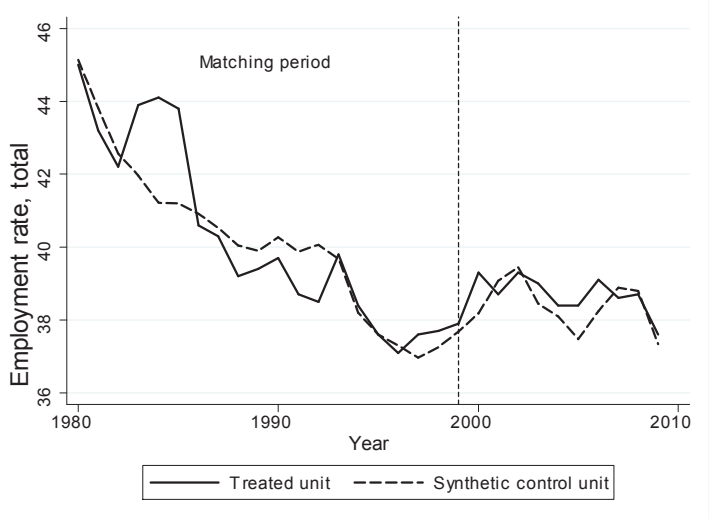


Fig. 4 - The effect of oil on employment rate

Although Figure 4 shows differences (both positive and negative) in the matching period between the synthetic control and the treated unit, the synthetic unit still predicts fairly good the change, from a decreasing employment rate up to 1996−1997, to a stable rate in the subsequent years. This evidence excludes the possibility that the change in the employment rate constitutes a causal effect of the increased oil extraction activity in Basilicata.

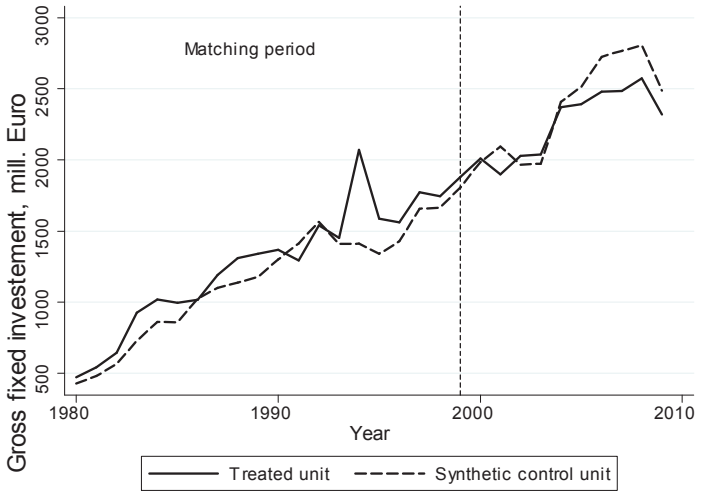


Fig. 5 - The effect of oil on gross fixed investment

Again, similar to the result for per capita GDP and employment, the effect of the treatment on investment is practically insignificant. The null hypothesis of positive causal effect of oil extraction on the regional macroeconomy of Basilicata is therefore rejected on the basis of the empirical analysis.

In order to make better sense of these results, let us provide a back-of-the-envelope calculation of the potential impact that royalty revenues could have had on the regional economy of Basilicata. In other words, I set aside for a moment the potential direct effect on macroeconomic variables and concentrate exclusively on royalty revenues. For this purpose, I rely on my own calculations based on macroeconomic data obtained from the Italian Statistics Institute (ISTAT) and on oil extraction and royalties data from the Italian Ministry of Economic Development, General Directorate for Energy and Mineral Resources (UNMIG) (further details on these time series are in Data Appendix B). The estimation of the value of resource production shows that the value of oil produced increased from 107 Euros per capita in 1999 to 2,898 Euros per capita in 2008 (in constant prices). To demonstrate the scale, the ratio of the value of oil production per capita to total regional per capita GDP increased from 1 % in 1999 to 16 % in 2008.

It is also important to verify that regional income from royalties was not undone by offsetting changes in other regional taxation income sources. In order to do so, Figure 6 plots the relative magnitude of regional royalty revenues with respect to aggregate regional tax revenues (net of royalties), both in real terms:

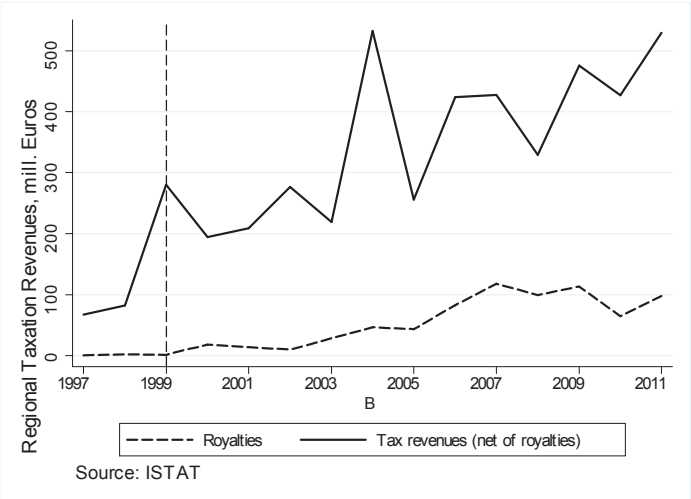


Fig. 6 - Regional Taxation Revenues

The evidence from Figure 6 that aggregate regional tax revenues (net of royalties) for Basilicata increased throughout the post-treatment period seems to exclude the hypothesis that the regional government exploited greater revenues from royalties in order to decrease fiscal pressure. Note that total taxation revenues, although net of royalties, include tax revenues from labour income employed in the oil extraction activity as well as tax revenues from companies providing support and services to the extractive companies.

3.1. Robustness

Abadie et al. (2014) point out the importance of placebo studies in order to verify the robustness of the treatment effect estimated by the SCM. Although the current study rejects the null hypothesis of a sizeable effect of oil on the regional economy of Basilicata, it is still relevant to conduct these tests in order to evaluate the quality of the results obtained. Placebo tests were conducted by reassigning the treatment to a period *before* the large increased in oil extraction activity actually took place in Basilicata. In order to do so, 1992 was selected as the treatment year rather than 1999. A possible consequence of a shorter pre-treatment period is that, since predictors are averaged over a shorter period, the power of the synthetic unit to match the treated unit in the post-treatment period could decrease. In practice, this did not happen in the current study, demonstrating the robustness of the results obtained through the SCM. Figures 8, 9 and 10 in Appendix C shows that a shorter pre-treatment period did not provide with different results from those of Figures 3, 4 and 5, in which the main results were plotted. No significant changes in the synthetic weights occurred either.

In order to provide additional robustness checks, a traditional Difference-in-Differences (DiD, hereafter) exercise was conducted, estimating the following regressions:

$$Y_{i,t} = \alpha_0 + \alpha_1 \cdot Treat_{i,t} + \alpha_2 \cdot After_{i,t} + \alpha_3 \cdot (Treat_{i,t} \cdot After_{i,t}) + \epsilon_{i,t} \quad (3)$$

where $Y_{i,t}$ stands for the value of the outcome of interest, i.e., the dependent variables real GDP per capita, employment rate and gross fixed investment; $Treat_{i,t}$ is a dummy which equals one when the region under observation is the treated region (i.e., Basilicata); and $After_{i,t}$ is a dummy which equals one if the time of observation is within the post-intervention period. The OLS estimate of the coefficient α_3 on the interaction $(Treat_{i,t} \cdot After_{i,t})$

will represent the DiD estimator of the treatment effect. Results in Appendix C Table 2 shows that a null treatment effect is estimated for the dependent variables real GDP per capita and employment rate, fully confirming the results obtained with the SCM. On the contrary, Table 2 indicates that a significant and negative OLS coefficient α_3 is estimated for the case of gross fixed investment, indicating less strong capital stock creation in the region of Basilicata in the post-treatment period with respect to the untreated regions. This result indicates that, for the case of gross fixed investment, the results obtained through the SCM should be further investigated. A closer look at Figure 5 indeed confirms that the performance of the SCM appears relatively poorer than for the cases of real GDP per capita and employment rates. Gross fixed investment in the region of Basilicata does seem to increase, from about 1995 onward, although not as much as for the synthetic control unit. In any case, either relying on the SCM result in Figure 5 or on the DiD estimator of Table 2, it can be stated that increased oil extraction activity did not boost capital creation in the region of Basilicata, thereby confirming the overall result of "no blessing" from resource exploitation.

Although the main purpose of this paper is to provide empirical evidence of the treatment effect, I next provide a brief discussion of various issues that contextualize the story and illustrate some of the possible factors driving the results.

4. Discussion: the mystery of vanishing benefits

The empirical strategy implemented in the previous sections has shown that exploitation of oil fields has not (yet) brought widespread growth to Basilicata. Regardless of whether the empirical result of the current paper was to be expected based on simple observations of employment rates and economic activity indicators, it provides additional evidence of the poor performance of the regional authorities in turning Basilicata's oil adventure into a success story. The results presented up to now are silent, however, about the mechanisms that contributed to them. Mehlum, Moene and Torvik (2006) have claimed that the main explanation for poor growth performance of resource-rich countries is the quality of the institutions in place. In other words, institutions play a decisive role in how natural resources affect growth performance. The empirical part of their work concludes that a resource curse appears only for countries with inferior or grabber-friendly institutions (say, Nigeria), whilst no indication of the curse is found for countries with

producer-friendly institutions (say, Norway). In an intermediate range on the axis between bad institutions and good ones, the core result of neither blessing nor curse of the current paper is open to different interpretations. Let us therefore discuss some of the possible factors that contributed to the results of the empirical analysis.

4.1. Control rights structure

Brunnschweiler and Valente (2013) empirically investigate the effects on GDP levels of different regimes of ownership of oil extraction activity. Their analysis is carried out on a panel of 68 countries, which are divided up based on having a regime of the type Domestic Control, Foreign Control or International Partnership. They conclude that, on the aggregate level, Partnership tends to perform relatively better than the two other control rights structures.

In their panel dataset, Italy was classified as having a Foreign Control ownership regime from $1930 - 1956$ and from 1995 onward, with an International Partnership in between. Under this classification, ownership over oil extraction activity was of the Foreign Control type throughout the post-treatment period of this paper $(1999 - 2009)$[14]. Thus, the control rights structure in place in Italy throughout the post-treatment period is not the International Partnership type that performs best in terms of economic development, according to Brunnschweiler and Valente (2013).

This raises the question of to what extent Brunnschweiler and Valente (2013)'s characterization of institutions for Italy as a whole can serve as a valid approximation for Basilicata. It is likely that oil extraction control structures in Basilicata are typical of Italy as a whole because Basilicata accounts for a very large fraction of yearly aggregate Italian oil production (74% in 2009, according to UNMIG). Therefore, the negligible aggregate effect of oil extraction on the regional economy appears to be in line with Brunnschweiler and Valente (2013)'s inference that a regime switch from Foreign Control to International Partnership could have benefited Italian GDP in the last two decades.

[14]Foreign Control is defined by the authors as a regime in which a foreign company owns more than 50% of the shares in the domestic oil sector.

4.2. On the plague of organized crime

The socioeconomic context of the southern regions of Italy has been continuously influenced and infiltrated by organized crime, basically since the country's unification in 1861. Economic development of these regions has consequently been inevitably interconnected with the development of criminal organizations. Pinotti (2012) provides a detailed historical overview of how Basilicata has suffered from organized crime, relative to other regions of Italy. In the 1960s and 1970s, Basilicata belonged to the group of regions enjoying steady economic growth and was catching up with the more industrialized parts of the country. However, the region suffered from a clear increase in organized crime starting in the mid-1970s. Pinotti (2012) explains this by the unfortunate geographic proximity to the historical centers of organized crime (Sicily, Campania and Calabria). He concludes that, due to crime, since the mid-1970s Basilicata has moved down to an inferior growth path that has determined its slower growth performance throughout the last decades. Pinotti (2012) examines in more detail the channels that could have contributed to decreased economic activity in Basilicata. He argues that sluggish economic performance seems to have been triggered mainly by a decrease in private investment, possibly due to lack of confidence after the escalating presence of organized crime in the region.

Let us now elaborate on how the empirical evidence from Pinotti (2012) relates to the current work. As mentioned above, Pinotti (2012) assumes that, starting from the mid-1970s, a sudden eruption of criminal activity caused a deterioration of Basilicata's growth performance relative to a control group of regions that were not affected by organized crime. Even if Basilicata has moved to a slower growth path since the 1970s, this does not in principle interfere with the empirical analysis of this paper, which begins in 1980, after the effect of organized crime was in place.

Finally, Pinotti (2012) observes that, over the period $1970 - 1994$, the advent of organized crime in Basilicata (and Apulia) coincided with clear evidence of substitution of private for public capital. The documented low productivity of public investment in Italy (Bonaglia et al. (2000)) then offers an interpretation for the low growth rates in the last decades of his sample period. Pointing out that public funds have traditionally represented a lucrative opportunity for criminal organizations in Italy, the author ends up with an additional channel for explaining the poor growth performance of Basilicata since the 1970s. If Pinotti (2012)'s story is valid, I cannot rule out the hypothesis that organized crime has to some unknown extent influenced

the allocation process of the public royalty revenues in Basilicata since the late 1990s and thereby determined its poor growth performance.

4.3. Sectoral effects and the spectrum of Dutch Disease

The classic story of the Dutch Disease might contribute to explaining the puzzle of vanishing benefits from oil windfalls in Basilicata. Let us figure out how we can test for the hypothesis of Dutch Disease in the current paper. Papyrakis and Raveh (2014), Borge et al. (2013) and the seminal work by Paldam (1997) constitute good examples for claiming that empirical studies of the Dutch Disease should not be confined to country analysis and thereby to currency-related issues. Paldam (1997) studied the boom in the fishing industry that supposedly determined reduced competitiveness in the Far Øer islands and Greenland, thereby focusing on the effects on the real exchange rate rather than the nominal one (both countries use the Danish krone as a currency for international trade).

Another strand of the literature suggests that a dynamic version of the Dutch Disease model can generate a negative correlation between resource abundance and the pace of economic growth. The argument is that, among the different sectors that operate in the economy, some are relatively more growth-enhancing than others. Imagine that the growth-enhancing sector of the economy was represented by manufacturing: a resource-boom crowding out production inputs from manufacturing would have negative consequences not only for the level of income, but also for the growth rate of the economy. This is the contribution by Van Wijnbergen (1984), Krugman (1987) and Matsuyama (1992) - amongst others - who argue that de-industrialization effects reduce income growth by weakening technological progress externalities.

Now, recall that the empirical results indicate that the impact of intensive oil extraction on Basilicata's regional economy was basically negligible. However, a null aggregate effect does not imply that value-added shares of GDP for different sectors remained constant. Similarly to the dynamic Dutch Disease literature, if oil extraction implied lower value-added shares for the industrial manufacturing sector, and assuming this to be the most innovative sector of the economy, the pace of technological progress might slow down and depress economic development in Basilicata in the longer run. Let us therefore investigate the impact of the exploitation of natural resources on value-added shares of GDP for different sectors of the regional economy. I

estimated the Difference-in-Differences estimator through the following regression:

$$VA_{i,t} = \beta_0 + \beta_1 \cdot Treat_{i,t} + \beta_2 \cdot After_{i,t} + \beta_3 \cdot (Treat_{i,t} \cdot After_{i,t}) + \epsilon_{i,t} \quad (4)$$

where $VA_{i,t}$ stands for the value-added share of GDP of, in turn, agriculture and fishery, industry, construction, tourism transport and communication, financial intermediation and other services; $Treat_{i,t}$ is a dummy which equals one when the region under observation is the treated region (i.e., Basilicata); and $After_{i,t}$ is a dummy which equals one if the time of observation is within the post-intervention period. The OLS estimate of the coefficient β_3 on the interaction $(Treat_{i,t} \cdot After_{i,t})$ will represent the DiD estimator of the treatment effect.

Results in Appendix C Table 1 indicate that the treatment effect is positive and significant for the value-added share of GDP of the industrial sector, whilst it appears to be negative and significant for construction and other service sectors. No significant effects were found for the sectors of agriculture and fishery, tourism transport and communication, or financial intermediation[15]. To the extent that these results provide us with an accurate picture of sectoral effects, we can infer that oil extraction increased the value-added share of industry in the regional GDP whilst crowding out the shares of construction and other service sectors. This result calls for a couple of considerations. On the one hand, evidence of the increasing relative importance of the manufacturing industrial sector prevents an issuance of a warning of dynamic Dutch Disease. On the other hand, the long-run growth effects of a relatively more robust industrial sector for the economy of Basilicata cannot be observed within the scope of the current study, which shows the need for future research on the topic.

4.4. The issue of labor migration

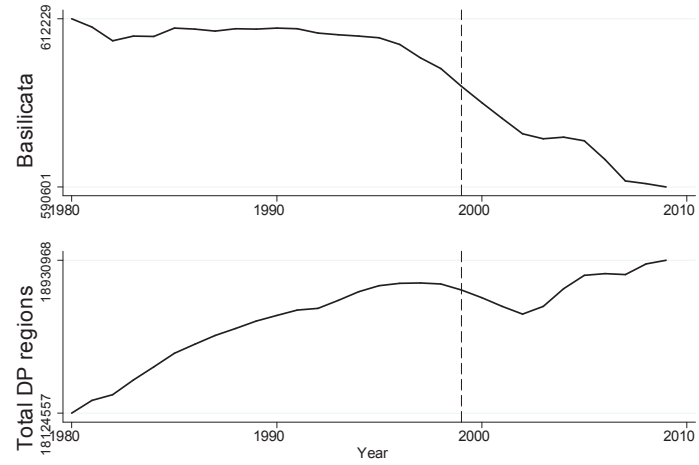
This subsection investigates an important aspect that might have hidden the effect of oil extraction on real GDP per capita and employment rates in Basilicata when these outcomes are compared to the other southern regions

[15]Standard errors are adjusted for clusters. For a discussion of the inconsistency of standard errors in Differences-in-Differences estimation studies, see Bertrand, Duflo and Mullainathan (2004).

of Italy. This aspect is labor migration between the treated region of Basilicata and the donor pool regions. In order to migrate from one region of Italy to another, the basic requirement for each citizen is to register her migratory movement at the local population register (Anagrafe Nazionale della Popolazione Residente, ANPR) in the new region of residence. In other words, this can be thought of as a perfect labor mobility case.

Assume now that oil extraction creates higher labor demand and increases wages exclusively in the region of Basilicata in which this production activity has taken place. Based on pure economic reasoning, one would expect then to observe a flow of labor migration out of donor pool regions, directed toward the resource-rich region of Basilicata, until per capita incomes are eventually equalized. If this were the case, the relative per capita income between Basilicata and the regions of the donor pool (from which I have constructed the synthetic control unit) would not change. In other words, searching for the potential favorable impact of oil exclusively in the treated resource-rich region might be a misleading approach in case oil extraction activity has had a positive aggregate effect on a group of southern regions of Italy.

This crucial concern can be properly addressed by looking at regional resident population and internal migration data for Basilicata and the other southern regions of Italy, both in the pre- and post-treatment period, as done in Figure 7:



Source: ISTAT

Fig. 7 - Regional population dynamics

Generally speaking, the descriptive empirical evidence from Figure 7 seems to rule out a significant migration movement from neighboring regions toward Basilicata in correspondence with the oil extraction activity.

The upper graph of Figure 7 shows the monotonically decreasing dynamics of resident population for Basilicata, indicating a slight but constant negative regional migration rate throughout the period of analysis. The picture documented in Banfield (1958) of Basilicata as a region with a long emigration story (to the more industrialized northern Italian regions as well as to North and South America) is therefore confirmed here, regardless of the structural changes implied by the transformation to a resource-rich region.

The lower graph of Figure 7 shows instead the dynamics of resident population for the whole set of donor pool regions. The evidence of a generally stagnating population in donor pool regions from the mid-1990s onward, combined with the above-mentioned shrinking population for Basilicata, implies that no significant migration outflows can be inferred from donor pool regions, at least not toward the resource-rich but otherwise economically depressed region of Basilicata. In conclusion, we cannot infer from the issue of regional labor migration that the vanishing effect of oil on the GDP per capita and employment rates in Basilicata is due to a mistaken choice of the outcome of interest.

5. Concluding remarks

The issue of channeling resource revenues to sub-national entities in order to boost local economic development is analyzed empirically in this paper through a quantitative comparative case study. The aim of this study is to contribute to the empirical literature on the resource curse in two ways.

The first contribution is to add the case of Basilicata (and hence Italy) to the existing evidence from Brazil, USA, Canada, China and Norway. To do so, the paper tested whether exploitation of oil fields in the region of Basilicata led to a higher degree of regional economic development, in terms of several macroeconomic indicators. Results from the empirical analysis showed that the null hypothesis of positive economic effects was rejected and that the local economic development model in place has to a large extent failed to produce remarkable results from resource exploitation. Most of the literature on the natural resource curse conveys that for a country with suitable institutions (property rights, rule of law, tax collection), the benefits of a natural resource gift should be positive and substantial. This paper's

result of vanishing benefits from oil extraction activity for the region of a country with "good" institutions such as Italy, creates therefore a policy-relevant discontinuity in the literature. Broadly speaking, the poor growth performance for the southern Italian region of Basilicata indicates that reallocating resource revenues to depressed regions needs to be accompanied by targeted economic policies in order to effectively and positively impact the local economy.

The second contribution is implementing a quantitative comparative case study using the Synthetic Control Method in order to test for the hypothesis of resource curse. The SCM, arguably, enables a better estimation than other methods of the effect of natural resources. One of the salient features of the SCM is that the comparison unit is drawn from a donor pool of untreated units with characteristics similar to the treated unit - namely, southern Italian regions which closely resemble the treated region of Basilicata, without being affected by the treatment. The empirical strategy exploits the fact that Basilicata produced a fraction close to unity of the entire volume of oil extracted in the neighboring southern regions of Italy.

In addition to the core result of the paper, some of the possible mechanisms that might have played a role in determining the current situation in Basilicata were presented. This was done by discussing the potential effects of four factors: the structure in place for the control of oil rights; the role of organized crime; the hypothesis of regional Dutch Disease; and the issue of regional labor migration. Although the research question of this paper aims exclusively to estimate the aggregate economic effects of oil on the regional economy, additional environmental and sustainability considerations would be required in order to obtain a thorough socioeconomic evaluation of the impact of the oil adventure in Basilicata.

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A. On the Synthetic Control Method and its implementation

This section draws heavily on Abadie et al. (2011, 2014). The synthetic control method (SCM) estimator compares the actual outcome in the treated unit of interest with a synthetic comparison unit based on a weighted average of units of the control group. This section explains how the SCM was implemented in the current study.

At first, a wide range of macroeconomic regional data were collected (further details about data are provided in the Data Appendix B) for a sample of $J+1$ southern Italian regions indexed by j, where $j = 1$ is the region of Basilicata (the so-called treated unit) and units $j = 2$ to $j = J+1$ are the rest of the potential comparison units (the so-called donor pool). The units are observed throughout the same time period $t = 1, ..., T$ which goes from 1980 to 2009 and they therefore constitute a balanced panel. The entire time period is subsequently divided into a pre-treatment $T^-[1980-1998]$ and a post-treatment period $T^+[1999-2009]$, with $T = T^- + T^+$, in order to estimate the effect of treatment on post-treatment regional macroeconomic outcomes. Define now X_1 as the $(k \times 1)$ matrix containing the pre-treatment $T^-[1980-1998]$ values of the k macroeconomic variables of the treated unit that we aim to match as close as possible. Let then X_0 be the $(k \times J)$ matrix collecting the *predictors*: the values of the same k variables over the pre-treatment period T^- for all of the J potential comparison units. The synthetic control unit will be given by the $(J \times 1)$ vector of weights $W^* = (w_2, ..., w_{J+1})$ with $0 \leq w_j \leq 1$ for $j = 2, ..., J+1$ and $w_2 + ... + w_{J+1} = 1$ chosen as the value of W that minimizes

$$\sum_{m=1}^{k} v_m (X_{1m} - X_{0m}W)^2 \tag{5}$$

in which v_m are the weights given to each predictor. In order to select the weights v_m, the cross-validation technique mentioned in Abadie et al. (2014) has been implemented by default. This technique divides the pre-treatment period $T^-[1980-1998]$ into a training and a validation period, it assigns a sequence of weights v_m to each predictor in the training period, such that the synthetic control minimizes the root mean square prediction error (RMSPE) over the validation period.

Once the synthetic control $W^* = (w_2, ..., w_{J+1})$ has been selected, we can proceed by estimating the treatment effect by comparing the actual post-treatment macroeconomic outcomes of treated Basilicata with the outcomes

of the synthetic control unit which is by definition not exposed to the treatment. In order to do this, let Y_{jt} be the value of a specific macroeconomic outcome of region j at time t. Proceeding in a similar manner as above, define now Y_1 as the $(T^+ \times 1)$ matrix containing the post-treatment value of the macroeconomic outcome for the treated unit, whilst Y_0 will now represent the $(T^+ \times J)$ matrix where column j contains the post-treatment values of the outcome for the region $j+1$. The synthetic control estimator of the effect of treatment will be finally given by the difference between the post-treatment outcome for the treated unit and the outcome for the synthetic control:

$$Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt} \tag{6}$$

B. Data Appendix

- **GDP per capita.** Gross domestic product per capita at current prices $1980-2009$. Data were collected from the Italian Statistic Bureau (ISTAT) in millions of Euros (subsequently converted at constant 1980 prices using GDP deflator). Available both at *http://dati.istat.it/* under the directory: National Accounts / Regional Accounts / Per capita values territorial data (Euro) and *http://istat.it/it/archivio/11519*. Data were downloaded on 6/3/2013.

- **Population.** Resident population in Basilicata and the other regions of the donor pool, $1980-2009$. Data from ISTAT and the Italian Historical Statistical Repository, online at *http://timeseries.istat.it/* under the directory: Population / Resident population and demographic balance / Resident population at the 1st of january and average by region and geographical area $1952-2009$. Data were downloaded on 6/3/2013.

- **GDP deflator.** National GDP deflator $1980-2009$. Data are available online at *http://timeseries.istat.it/* under the directory: Prices / Percentage changes in the National Index of Consumer Prices for the Whole Nation 1955-2011. Data were downloaded on 6/10/2013.

- **Gross Fixed Investment.** Gross fixed capital formation $1980-2009$. Data on gross fixed capital formation in millions of Euros (extracted at current prices and subsequently converted into 1980 constant prices values using GDP deflator) are available at *http://istat.it/it/archivio/75111* and *http://istat.it/it/archivio/11519*. Data downloaded on 6/10/2013.

- **Employment rates.** Employment rates are included in the dataset as % of both active labor force ($15-64$ yrs) and of total regional population, for the period $1980-2009$. Data are available at the Italian Historical Statistical Repository, online at *http://timeseries.istat.it/* under the directory: Labor market / Labor force / Employment rates, unemployment rates and activity rates by age group, gender and geographical area $1977-2011$. Data were donwloaded on 7/7/2013.

- **Labor force**. Data provides the regional labor force (+15 yrs) in thousands, for the period $1980-2009$. Data are available at the Italian Historical Statistical Repository, online at *http://timeseries.istat.it/* under the directory: Labor market / Labor force / Resident population aged

15 and over by professional status, age group, gender and geographical area - Italy 1977 – 2011. Data were donwloaded on 7/7/2013.

- **Population shares by education level.** Data on fractions of population by education attainment includes the fraction of (+6 yrs) population which fulfilled up to primary, secondary and tertiary level education. Data are from ISTAT and available at the Italian Historical Statistical Repository, online at *http://timeseries.istat.it/* under the directory: Education / Education in census of population / Resident population aged 6 and over by educational attainment, region and geographic division at census year 1951 – 2001 population censuses. Data were donwloaded on 10/7/2013.

- **Shares of regional value added by industry.** Data includes shares of regional value added for the period 1980 – 2009 in agriculture and fishery, industry, construction, tourism, transport and communication financial intermediation and other services. Data are from ISTAT and available online at *http://dati.istat.it/* under the directory: National Accounts / Regional Accounts / Territorial accounts detailed breakdown by industry (Nace rev.1.1), millions of Euros / Gross Value Added / Editions prior to February 2012. Data were downloaded on 6/3/2013.

- **Oil production.** Crude oil production in Basilicata 1980 – 2012. Data on production of crude oil in are provided by UNMIG (Italian Ministry of Economic Development, General Direction for Energy and Mineral resources), and are available at *http://unmig.sviluppoeconomico.gov.it/*. Data were donwloaded on 1/7/2013. The production data in tons have been subsequently converted into barrels using the conversion unit (barrels of crude oil per metric ton) provided by the International Energy Statistics of the EIA (*http://eia.gov*). Europe Brent Spot Price FOB ($ per barrel) 1987 – 2012, available as well at *http://eia.gov,* was subsequently used to estimate the value of regional crude oil production. Data were downloaded on 18/6/2013.

- **Royalties.** Royalties transfers received by the state and the regions for the period 1997 – 2012 were provided by the Basilicata region and by UNMIG (Italian Ministry of Economic Development, General Directorate for Energy and Mineral Resources) and are available online at

http://unmig.sviluppoeconomico.gov.it/. These data were downloaded on 18/6/2013.

- **Regional government budget**. Data of financial flows regarding regional government budget, precisely regional total expenses and regional total revenues (and fraction of these revenues given by tax income) for the period $1996 - 2011$ were provided by DPS (Ministry for Economic Development, Department for Development and Economic Cohesion) and are available at *http://www.dps.tesoro.it/*. Data were downloaded on 2/1/2014.

C. Tables and Figures

(a) Recall the main case (Fig. 3) in which real GDP per capita is the dependent variable. The synthetic control weights were given already in Section 2 and are presented here again:

Region	**Synthetic control weights**
Campania	0
Molise	.354
Apulia	.106
Sardinia	0
Calabria	.54
Note: See section II for details.	

(7)

Economic Growth Predictor Means before treatment for Treated and Synthetic Unit:

Predictor	**Treated**	**Synthetic**
GDP per capita, constant prices	6830.101	6906.578
Gross Fixed Investment, constant prices	1255.715	2699.618
Primary school	54.294	55.743
Secondary school	12.942	13.312
Tertiary school	2.278	2.986
Employment rate 15-64yrs	47.868	46.887
Employment rate total	40.357	39.315
Agriculture and fishery	7.819	7.454
Industry	16.195	14.099
Construction	11.666	9.247
Tourism Transport and Communications	19.024	22.912
Financial intermediation	17.089	18.319
Other services	28.205	27.967
Note: predictors are averaged for the $1980 - 1998$ period.		

(8)

(b) Recall the case (Fig. 4) in which dependent variable is total employment rate. The Synthetic control weights are:

Region	**Synthetic control weights**
Campania	0
Molise	.139
Apulia	.657
Sardinia	.204
Calabria	0
Note: See section III for details.	

(9)

Economic Growth Predictor Means before treatment for Treated and Synthetic Unit:

Predictor	**Treated**	**Synthetic**
GDP per capita, constant prices	6830.101	7272.883
Gross Fixed Investment, constant prices	1255.715	4439.22
Primary school	54.294	59.801
Secondary school	12.942	12.048
Tertiary school	2.278	2.612
Employment rate, total	40.357	40.237
Employment rate, 15-64 yrs	47.868	46.772
Agriculture and fishery	7.819	7.711
Industry	16.195	18.303
Construction	11.666	8.22
Tourism Transport and Communications	19.024	22.324
Financial intermediation	17.089	18.794
Other services	28.205	24.644
Note: predictors are averaged for the $1980 - 1998$ period.		

(10)

(c) Recall the case (Fig. 5) in which dependent variable is Gross Fixed Investment at constant prices (millions Euro). The Synthetic control weights are:

Region	**Synthetic control weights**
Campania	0
Molise	.83
Apulia	0
Sardinia	.009
Calabria	.161
Note: See section III for details.	

(11)

Economic Growth Predictor Means before treatment for Treated and Synthetic Unit:

Predictor	**Treated**	**Synthetic**
GDP per capita, constant prices	6830.101	7642.773
Gross Fixed Investment, constant prices	1255.715	1135.094
Population	610082.1	620969.5
Primary school	54.294	55.851
Secondary school	12.942	13.185
Tertiary school	2.278	2.907
Employment rate 15-64yrs	47.868	50.758
Employment rate total	40.357	41.783
Labour force +15yrs thousands	238.804	234.912
Agriculture and fishery	7.819	6.902
Industry	16.195	16.769
Construction	11.666	9.539
Tourism Transport and Communications	19.024	21.488
Financial intermediation	17.089	18.129
Other services	28.205	27.169
Note: predictors are averaged for the $1980 - 1998$ period.		

(12)

Table 1 Shares of Value Added	(1) **Agric. and fishery**	(2) **Tourism, Transport and comm.**	(3) **Financial Intermed.**	(4) **Industry**	(5) **Construc.**	(6) **Other services**
Treat	1.039*	-3.818***	-1.810*	0.286	2.918***	1.385***
	(0.563)	(0.274)	(0.922)	(0.540)	(0.648)	(0.516)
After	-2.541***	-0.536**	6.170***	-2.446***	-2.394***	1.860***
	(0.232)	(0.259)	(0.395)	(0.483)	(0.224)	(0.372)
DiD	0.00839	0.866	-1.823*	**4.740*** **	**-1.631** **	**-2.472*** **
	(0.622)	(0.687)	(1.022)	(0.942)	(0.758)	(0.641)
Const.	6.780***	22.84***	18.90***	15.91***	8.749***	26.82***
	(0.196)	(0.137)	(0.364)	(0.307)	(0.203)	(0.206)
Obs.	210	210	210	210	210	210
R^2	0.342	0.393	0.476	0.170	0.407	0.129

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Note: standard errors adjusted for clusters.

Table 2	(1) **GDP per capita constant prices**	(2) **Employment rate, total**	(3) **Gross fixed inv. constant prices**
Treat	-339.2	2.036***	-3,960***
	(833.9)	(0.647)	(364.0)
After	8,748***	0.954	4,911***
	(405.8)	(0.589)	(813.7)
DiD	389.0	0.323	**-3,942*** **
	(976.9)	(0.834)	(822.8)
Const.	7,169***	45.83***	5,216***
	(318.4)	(0.349)	(350.9)
Obs.	210	210	210
R^2	0.678	0.060	0.313

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Note: standard errors adjusted for clusters.

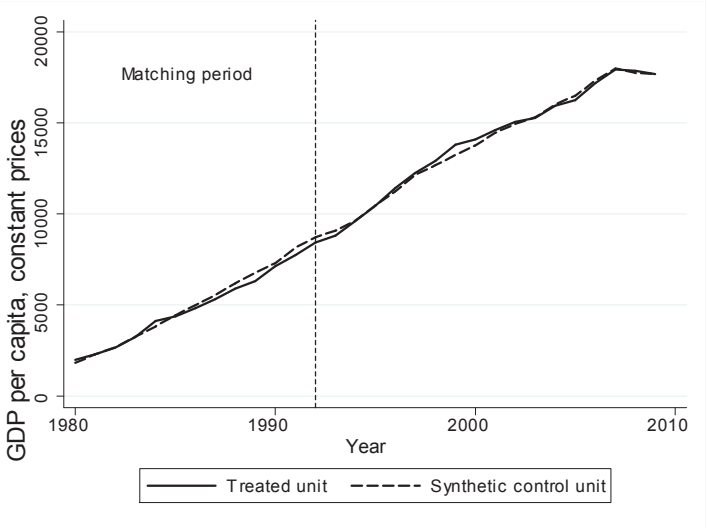

Fig.8 - GDP per capita: Placebo treatment 1992

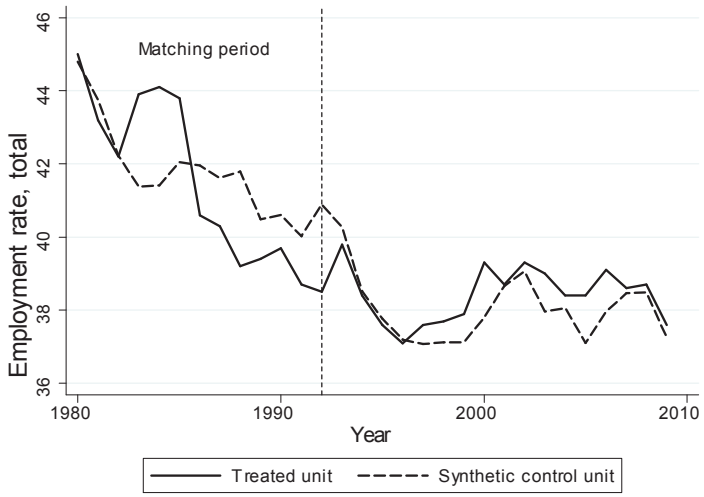

Fig. 9 - Employment rate: Placebo treatment 1992

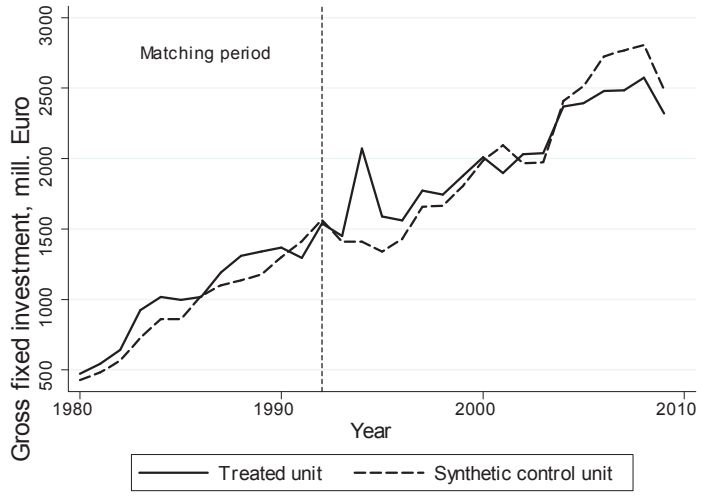

Fig. 10 - Gross fixed investment: Placebo treatment 1992

Fig. 11 - Basilicata and the rest of the donor pool. Note: Basilicata (green), Donor Pool regions (red), Rest of Italy (white).