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Research Institute for the Evaluation of Public Policies
Bruno Kessler Foundation
Via S. Croce 77, 38122 Trento (Italy)

Phone: (+39) 0461.314209
Fax: (+39) 0461.314240

E-mail: info@irvapp.it
Website: http://irvapp.fbk.eu

The Economic Impact of the Friuli-Venezia Giulia Autonomy. A Synthetic Control Analysis of Asymmetric Italian Federalism[*]

Federico Podestà [†]

May 2015

Abstract

Given that the existing literature on the relationship between fiscal federalism and economic development has given scant consideration to asymmetric federalism, this article illustrates a case study on the economic impact of autonomy of one of the five Italian special-statute regions, namely Friuli-Venezia Giulia (FVG). The study has been performed in the counterfactual framework of causal inference, applying the synthetic control method. For this purpose, a suitable synthetic FVG has been constructed to contrast the evolution of FVG's real per capita GDP, observed over the post-autonomy period, with the corresponding evolution of the same aggregate for the synthetic counterpart. This comparison reveals that, if FVG were not an autonomous region, its per capita GDP would be significantly lower than that effectively observed.

Keywords: Regional autonomy; Asymmetric Italian Federalism; Economic development; policy evaluation; Synthetic control method

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[†] FBK-IRVAPP, podesta@irvapp.it.

1. Introduction

Since World War II, both developed and developing countries have experienced several decentralization processes because, in many cases, authority and responsibility for public functions have been transferred from the central government to subnational and/or subordinate organizations (Manor, 1999).[1] These processes have been generally intended to improve the delivery of public services and to adapt government structures so that they suit the needs of the citizens better.

As a consequence, a growing body of literature has investigated the relationship between economic development and fiscal federalism, i.e. the allocation across different (vertical) layers of the administration of competencies (expenditure side) and fiscal instruments (revenue side). More precisely, following the theoretical insight on the better targeting of growth-enhancing services and infrastructural investments, a large number of empirical studies have been carried out to analyze the association between fiscal federalism and economic growth. In many cases, quantitative cross-national analyses have been performed to test whether decentralized countries are able to achieve better economic output dynamics than more centralized nations. Nonetheless, most of these efforts have remained in the cross-country framework, without attempts to establish if, within the same country, subnational entities with higher levels of autonomy are able to attain better economic performances than the other subnational agencies/territories. In other words, the existing national cases of asymmetric decentralization, where autonomy is not equally distributed across subnational governments, have been under-investigated to understand the mechanisms underlying the different processes of local economic development. Moreover, the existing literature has almost exclusively adopted the regression method, neglecting the counterfactual framework of causal inference. In particular, no attempts – to the best of my knowledge – have been made to quantify the economic development of a nation or of a region if that country has not been decentralized or that region has not been autonomous.

In order partially to fill these two gaps, I exploits the asymmetric Italian decentralization to evaluate the economic impact of the autonomy of one of the five Italian *regioni a statuto speciale* (special-statute regions), namely Friuli-Venezia Giulia (FVG). More precisely, exploiting the delayed creation of that region, the synthetic control method (Abadie and Gardeazabal, 2003; Abadie et al. 2010; 2014) has been adopted to construct a pertinent synthetic FVG to best approximate the counterfactual of what would be observed for the economic output of this region in the absence of its statutory autonomy. Then, the trajectories of per capita GDP, respectively observed in the presence and in the absence of the FVG autonomy, have been contrasted in order to estimate the economic effect of the regional prerogatives. This comparison reveals that, if FVG were not an autonomous region, its per capita GDP would be significantly lower than that effectively observed.

The rest of the paper is organized as follows. Section 2 provides a brief overview of the existing literature and provides more detailed information about the case study. Section 3 describes the institutional architecture of the Italian asymmetric federalism, while section 4 delineates the potential channels of the FVG autonomy impact. Section 5 presents the data

[1] The term 'subnational' collectively stands for levels of government below the national government: both lower-level governments (municipalities, communes or local councils) and intermediate tiers (regions, states, provinces, counties, territories or districts).

and empirical strategy. Section 6 discusses the results, while section 7 draws some conclusions.

2. Literature and motivations

Abundant theoretical and empirical efforts have been made to understand how the different forms of decentralization may (or may not) promote economic development. As Oates (2005) observes, the theoretical framework has been inspired by the seminal works of Arrow, Musgrave and Samuelson. The implicit assumption behind these theoretical arguments had to do with the role of the public sector in relation to market failures. Seeking to maximize social welfare, government agencies should (and presumably would) correct various forms of market failure via appropriate public policies. At national level, central governments are engaged in establishing an equitable distribution of income and in stabilizing the economic cycle. At the local level, the governments have their *raison d'etre* in the provision of goods and services whose consumption is limited to their own jurisdictions. Specifically, because subnational agencies are closer to people than the central government, they have better information about the preferences of local populations and, consequently, are better able to respond to demand for those goods and services. This means that, by tailoring outputs of such goods and services to the particular preferences and circumstances of their constituencies, decentralized governments are theoretically able to increase social welfare to an extent greater than that which would result from the more uniform levels of such services that are likely under national provision (Oates 1972; 1999; Azfar et al. 1999, Freille et al. 2007).

In empirical research, a great number of quantitative cross-national analyses have been carried out to test whether economic growth is faster in decentralized states than in centralized ones. Accordingly, a great number of regressions have been estimated on cross-sectional or panel data. Basically, the real GDP (measured in annual changes) is usually regressed against some fiscal and/or political-administrative decentralization indicators and a set of control variables. Nevertheless, the results deriving from these studies are often conflicting. Some works, in fact, find a positive statistically significant relationship between decentralization and economic growth (Oates, 1993; Iimi, 2005; Thiefen, 2003; Yilmaz, 1999). In contrast, other analyses have not found a positive significant effect (Rodriguez-Pose and Bwire, 2004; Thornton, 2007; Davoodi and Zou, 1998; Woller and Philips, 1998; Baskaran and Feld, 2009; Rodrıguez-Pose and Ezcurra, 2010).

Therefore, this body of studies appears unable to close the debate because of the scant robustness of "regression methods": results are generally affected by the set of regressors, variable measurement, as well as the country sample (Martinez-Vazquez and McNab, 2005; Bodman, Heaton and Hodge, 2009). Moreover, the cross-country approach is essentially intended to test propositions derived from general theories, neglecting within-country processes. In other words, the empirical debate on the economic effects of fiscal federalism is currently based on the variable-oriented strategy, and it largely ignores the case-oriented approach aimed at identifying particular institutional conditions that produce specific patterns of economic development (Ragin, 1987). Put differently, the quantitative research has primarily focused on the synchronic relationship between decentralization and growth, for the most part disregarding the potential for time-wise causality (Martinez-Vazquez and McNab, 2003). On the other hand, although the case-oriented approach necessarily implies a substantial decrease in the generalizability of findings, its adoption

may yield better understanding of how particular decentralizing processes have impacted on the development trajectories of certain territories. This is because, in line with Mill's method of difference, such an approach may be used to select a small number of national cases that are as similar as possible on the important control variables and have different degrees of decentralization. Accordingly, their economic paths can be compared in order to establish whether decentralization matters for national development. Analogously, a small number of sub-national cases can be selected that are as similar as possible on the important control variables and have different levels of autonomy. By so doing, the research objective is not to examine whether federal states grow faster than unitary states, but to investigate whether, within a single country, territories with more degrees of autonomy are able to achieve better economic performances.

Understandably, such a research design must be applied to those countries in which legislative power, administrative competences, and/or fiscal arrangements are unequally distributed across subnational governments. Accordingly, comparative case studies may be carried out on the existing systems of asymmetric federalism, such as Italy, Spain, UK, Belgium and Canada – to mention just some developed countries.[2] The case-oriented approach can therefore result useful for investigating an institutional architecture little considered by the literature on the economic effects of fiscal federalism, namely asymmetric federalism. In fact, the few works on this topic have almost exclusively investigated the irregular allocation of autonomy as an outcome of specific domestic political processes. On the one hand, unequal bargaining power has been recognized as a source of national agreements that allocate different degrees of authority to different state and local governments (Congleton, 2006). On the other hand, asymmetric federalism has been considered a means to obtain political stability and territorial integrity in politically and ethnically fragmented societies (Bird 2001; 2005). Moreover, the unequal distribution of power among local agencies has been regarded as the consequence of greater administrative efficiency. In particular, if some regions have – as a result of their historical experience with autonomy – greater capacities to provide public goods and services, as well as to run governments, than other regions, it may be more efficient to devolve more authority to them (Garcia-Milà and Mc-Gire, 2002).

Nevertheless, there have been – to the best of my knowledge – no prior attempts to select specific national cases of asymmetric federalism to evaluate if subnational areas characterized by an higher degree of autonomy have been able to achieve higher levels of development compared to those with less autonomy.

For this reason, the present study concerns one of the above-mentioned national cases of asymmetric federalism, namely Italy, and investigates the economic consequences of the FVG's autonomy. The reason why the study deals with only one of the five Italian autonomous regions will be clarified in the next section. Here, however, it must be explained why the analysis has been conducted using the synthetic control method, instead of the traditional comparative case study approach.

Explaining the economic impact of FVG's autonomy necessarily entails comparison of its development trajectory with the corresponding trajectories of similar, but non-autonomous, Italian regions. Nevertheless, such a comparison strategy cannot be rigorously performed via the traditional comparative case study approach (Abadie,

[2] Asymmetric federalism is properly related to a federation or confederation, although many unitary states have a structure of government that resembles that found in an asymmetric federation (e.g. Italy, Spain, and UK).

Diamond and Hainmueller 2014; King, Keohane, and Verba, 1994; Geddes 2003; Collier and Mahoney 1996). This is essentially because serious doubts about the case selection may arise when using one or few non-autonomous regions as similar as possible on the important control variables. In particular, If the control regions are not sufficiently similar to FVG, then any difference in outcomes between these units may be a mere reflection of the disparities in their characteristics. Accordingly, Abadie and Gardeazabal (2003) and Abadie, Diamond and Hainmueller (2010; 2014) suggest using the synthetic control method, which is based on the idea that a combination of unaffected units often provides a more appropriate comparison than any single unaffected unit alone. Accordingly, the synthetic control methodology seeks to formalize the selection of the comparison units using a data driven procedure. As a consequence, the synthetic FVG has been constructed as a weighted average of available non-autonomous Italian regions that approximates its most relevant characteristics prior to the policy-intervention period, namely prior to FVG's autonomy (for more details, see section 4).

3. The Italian asymmetric federalism and FVG autonomy

Like other European countries (Spain, France, and the UK), Italy can be categorised as a decentralized unitary state, since power is transferred to lower levels of government, but sovereignty rests solely with the central government (Loughlin, 2000). Nevertheless, at the end of World War II, some competences were unequally transferred to regions (i.e. the first-level administrative divisions of the state) and, consequently, Italy was the first country to experiment with decentralized asymmetry (Bilancia, Palermo, and Porchia, 2010).

Besides of common prescription of twenty regions to the Democratic Constitution (Art. 131 Const.), five regions were regulated in a different way. In particular, Trentino-Alto Adige (Trentino-South Tyrol), Valle d'Aosta (Aosta Valley), FVG (three relatively small alpine regions with substantial populations of ethnic minorities), Sicilia (Sicily) and Sardegna (Sardinia) (the country's two main islands, both with economic and social problems) received a higher degree of autonomy as a consequence of either their linguistic or geographical peculiarities.

These five regions were formally created at different times: Valle d'Aosta and Sicilia in 1945, Trentino-Alto Adige and Sardegna in 1948, and FVG in 1963. On the other hand, for complex political reasons, the other fifteen regions (Abruzzo, Basilicata, Calabria, Campania, Emilia Romagna, Lazio, Liguria, Lombardia, Marche, Molise, Piemonte, Puglia, Toscana, Umbria, and Veneto) were formally instituted only in 1970 with a much lesser degree of autonomy.

The fundamental difference between the two types of regions concerns their statute. The above-mentioned five autonomous regions are called *regioni a statuto speciale* (special-statute regions), since each has its own statute (regional basic law), approved as a constitutional law of the state (Art. 116 Const.). Conversely, the other 15 regions are termed *regioni a statuto ordinario* (ordinary-statute regions) because they have less ability to develop autonomous statutes: they fall formally under the ordinary law of the state, and all have very similar if not identical governmental structures (for more details on the two types of regions, see the next section).

On the basis of this concise institutional overview, one might think that the impact evaluation design described in the previous section could be applied to all five *regioni a*

statuto speciale. In fact, all these regions can be considered as the treated units, that is, the units exposed to the special autonomy allocation policy; while the remaining 15 *regioni a statuto ordinario* can be labelled as the untreated units and, consequently, considered as the reservoir of potential comparison units. Clearly, such a distinction would imply that a counterfactual analysis – via synthetic control method – should be performed for each *regione a statuto speciale*. Nevertheless, if the history of asymmetric Italian federalism is set in relation to the logic of the synthetic control method, this opportunity is *de facto* prevented. This is essentially because, while the synthetic control units must be constructed in order to best reproduce the characteristics of the treated units during the pre-treatment period (Abadie and Gardeazabal 2003; Abadie, Diamond, and Hainmueller 2010; 2014), a pre-intervention period is not reliably observable for all five *regioni a statuto speciale*. In fact, as mentioned above, four of these regions, Sardegna, Sicilia, Trentino-Alto Adige and Valle d'Aosta, were formally created immediately after World War II. This means that the pre-intervention period for these regions concerns a phase characterized by momentous historical changes (Italy underwent the Fascist regime and the war period) and by a severe lack of data. On the other hand, since the FVG statute was approved in 1963 and implemented in 1965, via apposite national laws (i.e. *Norme di attuazione*), the corresponding pre-intervention period can be more straightforwardly reconstructed. In fact, it can be more realistically limited to the period from 1945 to 1965. Accordingly, the only *regione a statuto speciale* practically analyzable via the synthetic control method, is FVG. Moreover, throughout the entire pre-intervention period, both FVG and the 15 non-autonomous regions shared the same institutional condition: before 1965, all these regions were still unfounded (see above).

4. The potential channels of the FVG autonomy impact

On the basis of this setting, appropriate arguments must be developed about the potential channels through which FVG's autonomy would have impacted on the region's economic development. Since the existing literature explains economic performances in relation to different allocations of legislative, administrative and fiscal competencies across subnational organizations (section 2), some details must be first provided on the differences between FVG and the ordinary regions with respect to such dimensions. On the basis of such differences, a specific testable hypothesis will be then formulated.

While the ordinary regions enjoy only limited legislative power in specific fields identified in the national constitution (Art. 117 Const.), FVG, like the other four autonomous regions, has considerably more legislative power and the ability to negotiate its by-laws directly with the national government, by-passing the national parliament. In addition, FVG, as a *regione a statuto speciale*, enjoys administrative as well as financial power not available to the 15 ordinary regions. This is because it was given competencies in specific administrative fields and tax collection. In particular, a number of quotas (from 4/10 to 9/10, Art. 4 FVG Special Statute) of state tax revenues, collected within the regional territory, are directly assigned to FVG so that it can manage the administrative competences prescribed by its own statutes. Specifically, although FVG's administrative competences are fewer than those attributed to the other autonomous regions, they regard important economic fields (Cerea, 2012). In conformity with the constraints of national and international law, the region has legislative and administrative power on all productive sectors, public works, and city planning (Art. 4 and 8, FVG Special Statute).

The FVG's prerogatives are to some extent reflected in the regional and national accounting. If one compares FVG's total per capita expenditures with those of an average ordinary region via figures reported in regional budgets, the ratio is largely in favor of the former. As Table 1 indicates, FVG's figures are around twice those of the non-autonomous regions.

Table 1 - Per capita total expenditures of FVG and the ordinary regions. Values in millions of current lire. Year 1980-2011.

	1980	1990	2000	2011
FVG	1,155,044	2,918,277	5,435,445	9,227,186
Ordinary regions (on average)	449,993	1,861,200	3,157,462	4,938,054
Percentage ratio	256.6	156.7	172.1	186.9

Source: my calculations on data from National Institute of Statistics yearbook (various years).

However, a comparison based on regional accounts is misleading from an equity point of view. As Cerea (2013) observes, two regions with the same needs but with different degrees of autonomy must receive an equal amount of the central government expenditures distributed among regions. Theoretically, the only difference must concern the distribution of direct interventions by central government and devolutions/transfers to regional governments. While FVG and the other special regions should receive more devolutions to manage their statutory competences (see above), ordinary regions should benefit from more direct interventions by central government since the latter is, in this case, in charge the majority of duties. But this equity principle has not been implemented in recent decades. Although few annual estimates are available, the regional distribution of the Italian central government expenditures shows a significant surplus in favor of the five autonomous regions. In 1978, the public resources allocated to the *regioni a statuto speciale* were 10 percentage points higher than those assigned to the *regioni a statuto ordinario*. In 1986, the gap between autonomous and non-autonomous regions was around 30 percentage points, while the difference between FVG and the ordinary regions was 33% (Cerea, 2013).

To sum up, FVG had, and continues to have, legislative, administrative and financial prerogatives in areas of public intervention that are the duty of the central government in the 15 ordinary regions. Accordingly, one may intuitively argue that FVG has year by year exploited such prerogatives to achieve an economic development higher than that attainable in the absence of its autonomy. Therefore, one may hypothesize that FVG's long-run economic growth would have been less than that actually experienced if the region had been an ordinary one.

Clearly, this hypothesis is grounded on some assumptions about the channels through which autonomy may involve economic development. Firstly, hypothesising that FVG's autonomy would have produced greater economic development means assuming that the region's administrative and financial prerogatives have been historically targeted on enhancing growth. More precisely, following Oates (1993), one must postulate that FVG's prerogatives can be considered a 'static' advantage which has been converted into a 'dynamic' advantage. In other words, it is likely that the above-mentioned administrative and financial competences have been more effective in increasing economic efficiency than the policies implemented by the central government in the non-autonomous regions. This reasoning must rest on a second assumption: that regional governments are better at

discerning the preferences and needs of their constituencies and can more easily adapt their expenditure policies to fulfill them (Martinez-Vazquez and McNab, 2003). Accordingly, the regional competences prescribed by the FVG's statute (see above) must be considered as conditions ensuring infrastructures and/or public expenditures better suited to the local economic system than those that would have been guaranteed by the central government in the absence of the region's autonomy. This means that the hypothesis formulated above implies that a certain amount of money spent in FVG should be more growth-enhancing than the same amount spent in an ordinary region. In other words, the public policies implemented over time in FVG have been on average associated with a multiplier higher than that related to the policies implemented in the ordinary regions. More precisely, since it is hypothesized here that FVG's autonomy has produced a long-run effect on the region's economic output, one must in turn assume that the above-mentioned FVG competencies on productive sectors, public works, and city planning have involved the implementation of policies with long-run local multiplier effects greater than those undertaken in ordinary regions.

5. Empirical strategy and data

In a counterfactual framework, testing the hypothesis formulated in the previous section requires comparison between FVG's economic development, in the presence of the region's autonomy (i.e. the policy-intervention under investigation) and FVG's economic development in the absence of regional autonomy. To this end, I use real per capita GDP as an outcome variable. More precisely, two outcomes have to be defined: Y1, referring to real per capita GDP in the presence of FVG autonomy, and Y0, denoting real per capita GDP in the absence of FVG autonomy. Accordingly, the yearly gap between Y1 and Y0 during the treatment period, namely the period from 1966 onward (see the previous section), corresponds to the economic impact of the region's autonomy. Hence, if the yearly gap proves to be systematically positive (Y1>Y0), one may conclude that FVG's autonomy has produced a remarkable economic development. Specifically, if Y1 is progressively higher than Y0, the public programs adopted in FVG have effectively generated greater long-run economic growth than that achievable via public programs adoptable in the absence of the region's autonomy.

Nevertheless, since Y0 is obviously not observable, the counterfactual of FVG in the absence of the region's autonomy must be reproduced. As anticipated, the synthetic control method has been employed for this objective. In particular, the synthetic FVG has been reproduced as a weighted average of the available control Italian regions that approximates the main characteristics of FVG prior to 1966. To this end, the 15 *regioni a statuto ordinario* have formed the donor pool, i.e. the set of units which were not exposed to the treatment (i.e. the region's autonomy) and which, consequently, have constituted the reservoir of potential comparison units. On the other hand, the remaining four autonomous regions have been excluded from the donor pool because they were treated before of FVG (see section 3). In more formal terms, the synthetic FVG has been constructed by employing the following statistics:

(1) a set of observed covariates to use as predictors of real per capita GDP;

(2) some linear combinations of the pre-intervention outcome to control for unobserved common factors whose effects vary over time. Basically, these may correspond to the average of the outcome variable computed for a portion or the entire pre-intervention period. Alternatively, single time points of the outcome pre-intervention period can be used as predictors;

(3) a set of weights chosen to be positive and sum to one. Each weight then represents one particular weighted average of the control units and therefore one potential synthetic control unit. Consequently, the resulting synthetic FVG coincides with the weighted average of those regions selected from the donor pool because they are associated with positive weights.

Mathematically, the weights W* are chosen so that the resulting synthetic control unit best approximates the unit exposed to the intervention with respect to the outcome predictors and the linear combinations of the pre-intervention outcome. More precisely, if X1 is defined as a vector of pre-treatment variables for the units treated, and X0 is defined as the corresponding matrix of these variables for the possible control units, the weight matrix W is chosen to minimize

$$\sqrt{(X1 - X0W)' V (X1 - X0W)}$$

where V is a diagonal matrix introduced to allow different weights of the variables in X0 and X1 depending on their predictive power on the outcome (for more details, see Abadie and Gardeazabal, 2003; Abadie, Diamond and Hainmueller 2010; 2014).
Whilst the weights utilized to construct the synthetic FVG are presented in the next section, some details must be provided here about points (1) and (2). In regard to point (1), the literature on economic growth suggests that GDP increases in the long run as a consequence of many variables, such as investment behavior, general capital accumulation, human capital, technological development, productivity, and so on (Barro and Sala-i-Martin, 2004). Accordingly, the set of observed covariates used as predictors of real per capita GDP are the following[3]:

1) The percentage of workers in agriculture;
2) The percentage of workers in market services;
3) The percentage of workers in non-market services;
4) Labor productivity in industry;
5) Labor productivity in market services;
6) Gross domestic investment (% GDP);
7) Number of students enrolled at high school (% of population).

However, using such predictors does not make it possible to control for unobserved confounders. In fact, during the sample period examined here, many if not all non-autonomous regions experienced economic shocks and/or policy changes. Obviously, if not controlled for, these confounders may bias the estimation. However, this complication can

[3] Since in this exercise the outcome variable is the same as used in other synthetic control analyses, the selected predictors have been chosen by referring to the same literature, and they are very similar to those used in those works (Abadie and Gardeazabal 2003; Abadie, Diamond, and Hainmueller 2014; Barone and Mocetti, 2014).

be addressed by using some linear combinations of the pre-intervention outcome or single time points of the outcome pre-intervention period as predictors (see point (2) above). Accordingly, the per capita GDP values referring to 1951, 1957 and 1964 have been used as predictors. Furthermore, additional exercises (here unreported) have been performed by using other per capita GDP predictors (e.g. the percentage of workers in industry, labor productivity in agriculture, and labor productivity in non-market services) and other pre-treatment outcome values, but the results do not change substantively.

Data for both the outcome variable and the selected predictors have been taken from CRENoS (Paci and Saba 1997)[4], a panel dataset which includes homogeneous time series on several variables of regional economic accounts and other economic variables for the twenty Italian regions over the period 1951-1993[5]. Yearly data on GDP and population are available since 1951, while the time series for the other variables start in 1960. In consequence of this data availability, the pre-intervention period covers the 1951-1965 phase, while the post-intervention period lasts from 1966 to 1993. Indeed, the time series could be updated to more recent years by merging CRENoS data with the official figures provided by the National Institute of Statistics (ISTAT). Nevertheless, this option has been discarded since the pre-intervention period replicated here is not long enough to allow reliable reconstruction of the post-intervention period for a large number of time points (see Abadie et al. 2014).

Turning to the results validation, three issues must be addressed. The first regards the extent to which the results are driven by any particular control unit. Consequently, a robustness test has been performed iteratively to re-estimate the baseline model to construct further synthetic FVGs omitting in each iteration one or more of the regions that received a positive weight (Abadie et al. 2014).

The issue has to do with statistical inference. Since the aggregate dataset used here is not a sample in the usual sense, so that standard statistical inference is not applicable (Western and Jackman, 1994), an alternative approach must be adopted to address the uncertainty of our results. Accordingly, Abadie and Gardeazabal (2003) and Abadie et al. (2010; 2014) propose using placebo techniques based on the principle of permutation inference. This means that the synthetic control procedure must be iteratively applied to every potential control unit included in the donor pool. Therefore, implementation of FVG's autonomy has been iteratively reassigned to each of the 15 ordinary regions. This has enabled calculation of a placebo effect for each untreated units and, consequently, yielded a distribution of estimated yearly gaps for the actually untreated regions. By so doing, it has been possible to establish if the effect estimated for FVG is substantially larger than that estimated for a region chosen at random. In particular, since the placebo distribution is, in this case, constructed using the 15 non-autonomous regions, the probability of estimating a gap of the magnitude of the gap for FVG under a random permutation of the intervention is around 7% (1/15).

The third result validation procedure concerns comparison between the estimated gap for FVG's per capita GDP and the surplus enjoyed by FVG in terms of public resources distributed by the central government among the Italian regions. As mentioned in the previous section, FVG, like the other four autonomous regions, has benefited from central government expenditures higher than those allocated to ordinary regions.

[4] See http://crenos.unica.it/crenos/databases for details on the database.

[5] Specifically, GDP, population, and units of labour are available for 1951-1993 period, while the series of Value Added for the four main economic sectors (agriculture, industry, private and public services) are available for the period 1960-1993.

Accordingly, in order to evaluate whether FVG's autonomy has effectively produced a significant effect on the regional long-run economic growth, the yearly estimated gap for per capita GDP has necessarily to be greater than the above-mentioned public spending surplus. Otherwise, the economic impact of FVG's autonomy must be interpreted as a mere accounting effect. In fact, the 'extra central government expenditures' allocated to FVG contribute – like other GDP components – to additively generating the regional economic output.

To conclude this methodological section, some notes are necessary on the trajectory actually observed for the real per capita GDP after 1976. This is because a severe earthquake occurred in FVG in that year. More precisely, the economic consequences of that event must be taken into account in order to assess to what extent the regional GDP was affected by that natural disaster and, thus, whether the impact evaluation of the FVG autonomy is biased. Indeed, there is evidence that that shock did not produce a significant effect on our outcome variable in the 1976-1993 period. Specifically, performing a synthetic control analysis on the FVG earthquake, Barone and Mocetti (2014) argue that in those years the FVG real per capita GDP was not *de facto* altered. This is essentially because, although the natural disaster caused the instantaneous destruction of capital stock, a huge amount of public resources were for several years transferred from the Italian central government to the FVG region, compensating any depressing effect. Nevertheless, since Barone and Mocetti (2014) did not consider that in 1976 FVG had been an autonomous region for 10 years, a further synthetic control analysis of the FVG earthquake's economic impact has been carried out by myself. It has been performed by including in the donor pool the remaining four autonomous regions only and by using the same per capita predictors selected to construct a synthetic FVG in the absence of regional autonomy (see above).[6] As Figure 1 shows, the exercise confirms Barone and Mocetti's results: from 1977 to 1993 the actual and the synthetic line almost overlap. They slightly diverge only in the last years. Moreover, as in Barone and Mocetti's analysis, the yearly distance between the two lines does not prove significant in relation to the pertinent placebo test (see Figure 2). In consequences of these findings, the FVG real per capita GDP actually observed for the 1976-1993 period – and more in general for the 1966-1993 period – can be reasonably used as an outcome variable to estimate the economic impact of FVG's autonomy.

[6] The fact that the donor pool contains, in this case, only 4 regions should not be seen as a problem. As Abadie et al (2010: 497) argue, the synthetic control method does not require a large number of comparison units in the donor pool.

Figure 1 - Trends in real per capita GDP: treated FVG vs. synthetic FVG. The synthetic FVG has been constructed assuming the absence of the earthquake of 1976. Values in millions of lire.

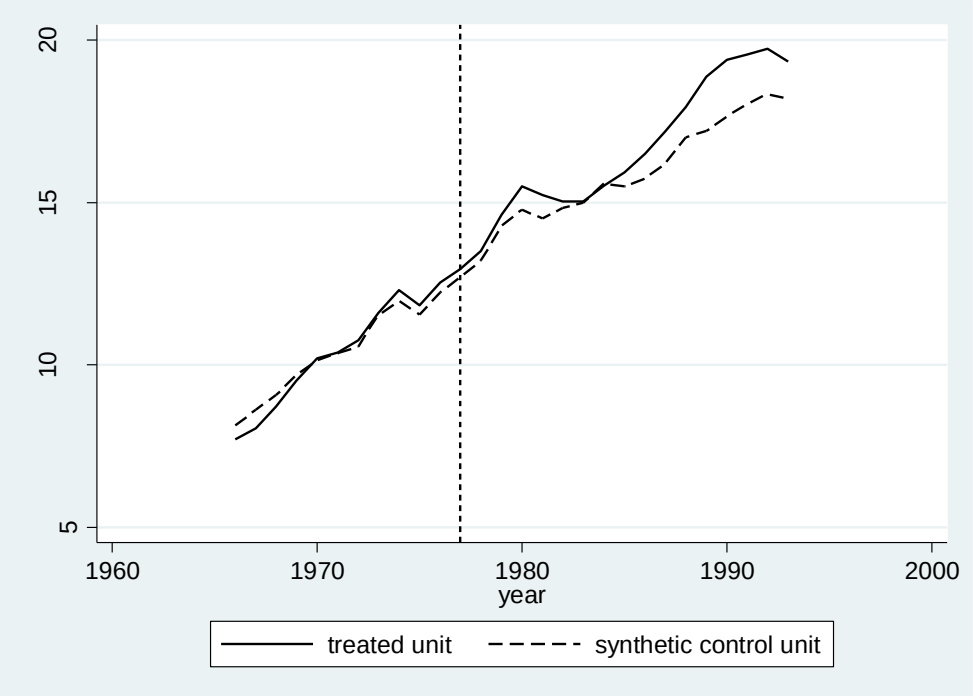
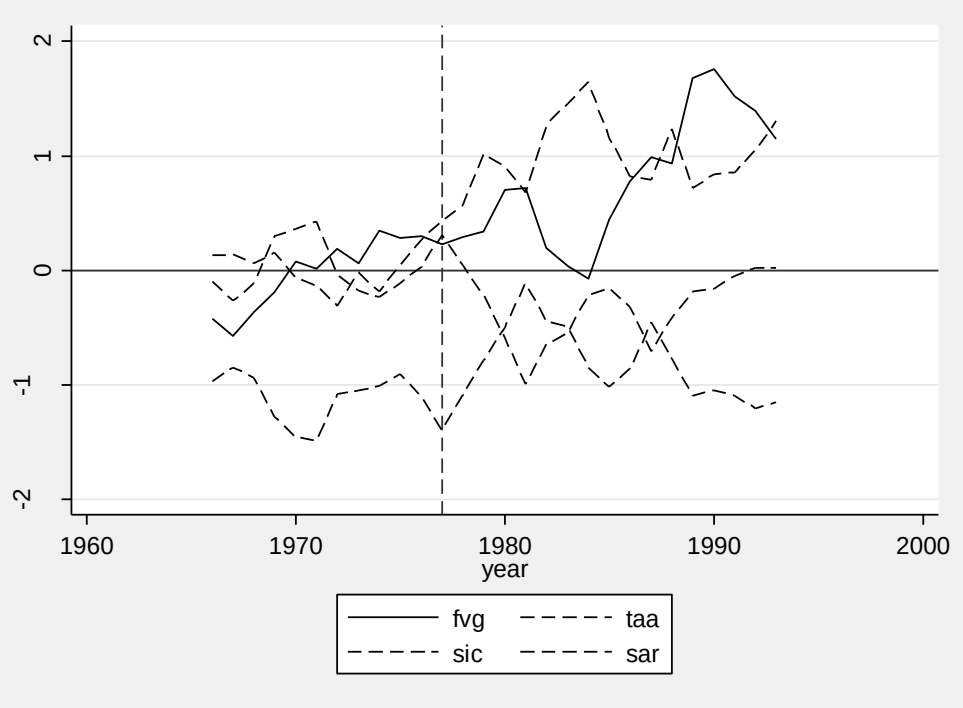


Figure 2 – Placebo test performed using placebos the four autonomous regions in relation to the occurrence of the FVG earthquake of 1976.



Notes: Valle d'Aosta has been excluded from this placebo test as a consequence of its bad fitting in the pre-treatment period.

6. Results

Table 2 shows the weights obtained for each region included in the donor pool by applying the procedure described in the previous section. Campania, Toscana, Piemonte, Liguria, and Umbria are the regions with positive weights – here ordered from the highest to the lowest. All remaining regions are unutilized because they are associated with zero weights.

Table 2 – Region weights in the synthetic units for FVG.

Region	Weight
Piemonte	0.161
Lombardia	0
Veneto	0
Liguria	0.142
Emilia Romagna	0
Toscana	0.225
Umbria	0.07
Marche	0
Lazio	0
Abruzzo	0
Molise	0
Campania	0.403
Puglia	0
Basilicata	0
Calabria	0

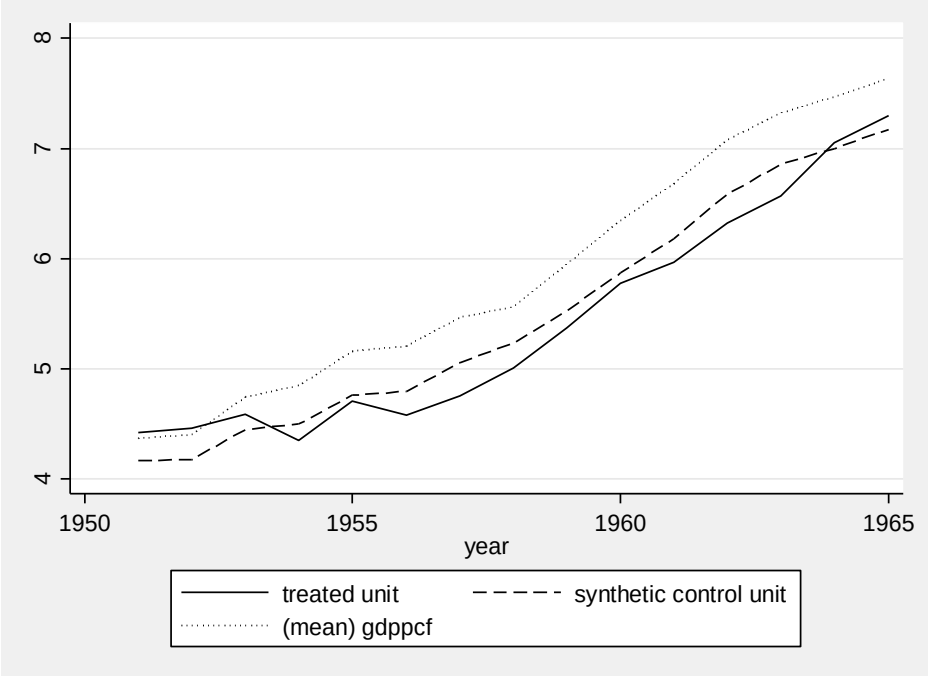
The regional weights have been used to construct a synthetic FVG which best reproduces the values of the predictors of per capita GDP in the pre-1965 period. Accordingly, Table 3 reports the real per capita predictor means computed for the actual FVG, the synthetic FVG as well as for a population-weighted average of the 15 non-autonomous regions. Indeed, these figures indicate that the synthetic FVG and the population-weighted average of the 15 non-autonomous regions are approximately equivalent in appropriately reproducing the characteristics of the actual FVG. More precisely, the distance between the values computed for workers' distribution among productive sectors, sectoral labour productivity, gross domestic investment, human capital conditions, and per capita GDP for the treated unit and those computed for the synthetic unit are almost equal to the corresponding distance between the values computed for the treated case and the population-weighted average of the regions in the donor pool. This may mean that both procedures (the synthetic control method and the population-weighted average) are *de facto* equivalent in mimicking the real FVG. Nevertheless, if real per capita GDP is observed for the entire pre-treatment period, the synthetic control approach performs better than the simple weighted-average of all untreated regions. Figure 3 shows that the synthetic line runs closer than the population-weighted average line to the actual line. This demonstrates that the synthetic procedure is better to control for unobserved confounders. In fact, only units that are alike in both observed and unobserved determinants of the outcome variable, as well as in the effect of those determinants on the outcome variable, should produce similar trajectories of the outcome variable over extended periods of time (Abadie et al. 2014).

Table 3 – Real per capita predictor means

	Treated unit	Synthetic unit	Donor pool
Workers in agriculture	31.7	32.7	33.9
Workers in market services	24.8	24.4	23.1
Workers in non-market services	12.6	10.9	10.6
Labour productivity in industry	14.6	16.3	15.7
Labour productivity in market services	24.7	25.1	26.7
Gross domestic investment	36.2	40.9	38.4
Students enrolled at high school	1.6	1.8	1.7
Real per capita GDP (1951)	4.4	4.2	4.4
Real per capita GDP (1957)	4.8	5.1	5.5
Real per capita GDP (1964)	7.1	7.0	7.5

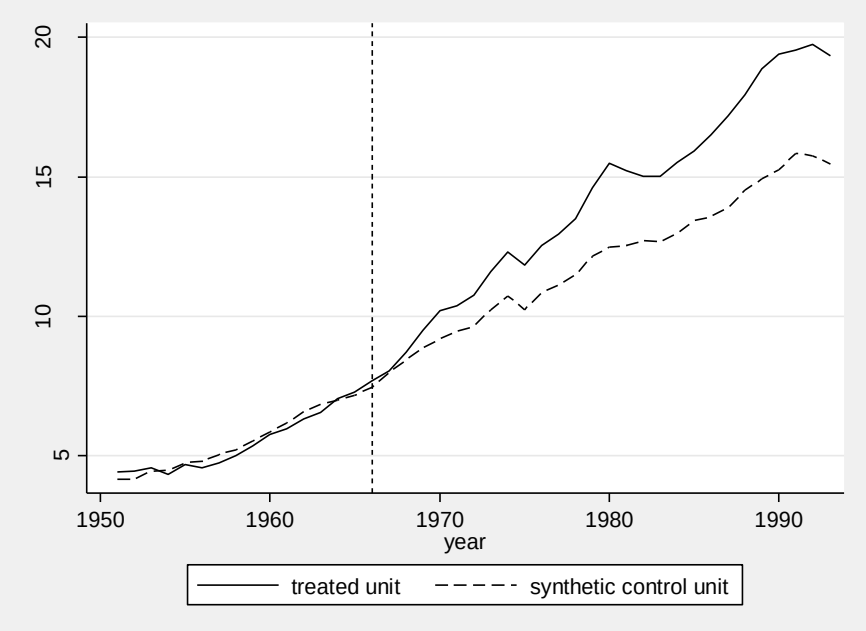
Notes: Workers in agriculture, workers in market service, and workers in non-market service are averaged for the 1951-1965 period. Labour productivity in industry and labour productivity in market services, gross domestic investment and high school attendance? are averaged for the 1960-1965 period. Years in parenthesis denote that the corresponding real per capita GDP values are entered as predictors. The 'Donor pool column' reports a population weighted average for the Italian regions included in the donor pool.

Figure 3 - Trends in real per capita GDP: Treated unit, synthetic unit and population-weighted average calculated on all units in the donor pool. Pre-intervention period (1951-1966). Values in millions of lire.



Therefore, having appropriately reconstructed the pre-autonomy FVG, the post-1965 figures have been taken into account to estimate the effect of FVG's autonomy on the regional per capita GDP. Figure 4 provides graphical evidence of this effect via the distance between the synthetic and the treated line, i.e. the yearly estimated gaps mentioned in the previous section. It is evident that, after 1965 the two lines begin to diverge and the synthetic one increasingly descends below the treated one. Clearly, this indicates that, if FVG had not been autonomous, its per capita GDP would have been lower than that effectively observed during the 1965-1993 phase. Over the entire period examined, the gap for FVG's per capita GDP increased by about 3 million lire per year on average. In 1993, at the end of the sample period, per capita GDP of the actual FVG was 19.333 million lire, while it was 14.351 million in the synthetic counterpart. This means that the region occupied fifth position in the ranking-list drawn up for the 20 Italian regions for 1993. In contrast, if FVG had not been autonomous, its would have ranked thirteenth. this is a position similar to that reached by FVG at the end of the pre-intervention period: in 1965 it occupied tenth position in the pertinent ranking-list.

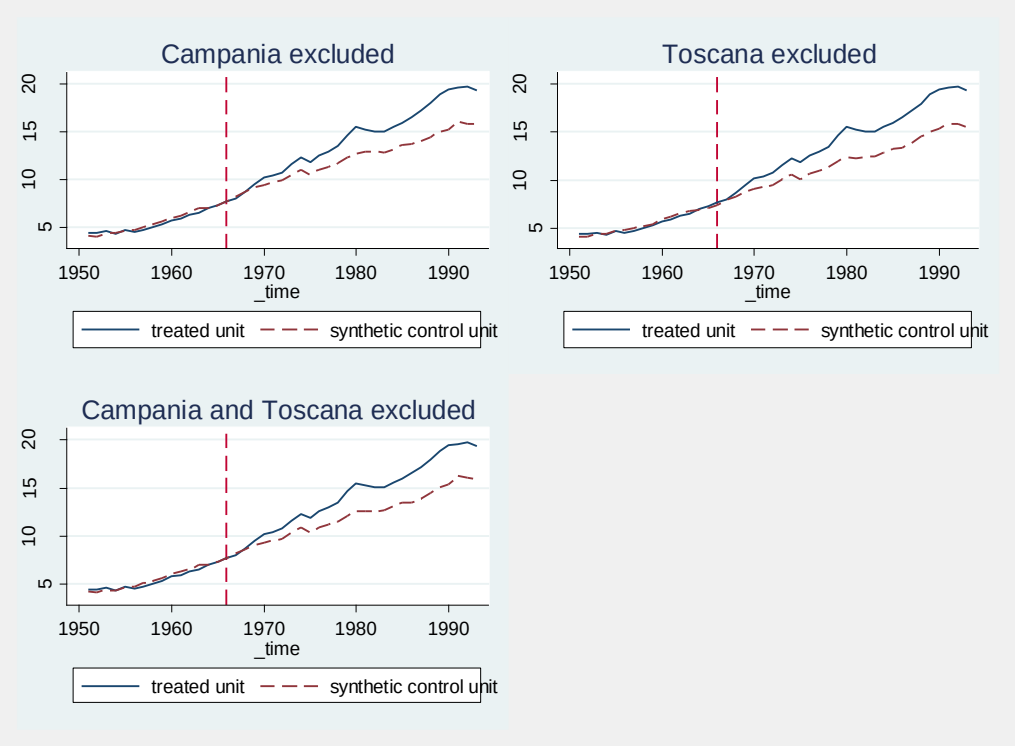
Figure 4 - Trends in real per capita GDP: FVG (treated unit) vs. synthetic (control) FVG. Values in millions of lire.



Consequently, the positive effect predicted by the hypothesis formulated in section 4 is confirmed. However, this result must be validated together with the procedures described in section 5. Regarding the robustness test, the baseline model has been re-estimated by omitting in each iteration one or more of the regions that show a positive weight in Table 2. Since Campania and Toscana receive weights which, when added, exceed 60% of the total weight, the exercise has been restricted to these two control units. In particular, the first iteration is performed omitting Campania, the second one omitting Toscana, and the third one omitting both regions. Comparing the impact reported in Figure

4 with those reported in Figure 5, it appears quite evident that the main results are not significantly driven by any particular control region.

Figure 5 – Robustness check to test the results' sensitivity to changes in the region weights.



Concerning the placebo test, Figure 5 shows the real per capita GDP yearly gaps estimated for FVG (i.e. the solid line) and for all control units. It is evident that the estimated gap for FVG during the 1966-1993 period is unusually large compared with all the other estimated gaps (see the lines above the zero gap line). Moreover, although it is not clearly visible, the estimated gap of interest is in absolute terms also larger than all negative estimated gaps. Therefore, this test does not invalidate the effect estimated for FVG autonomy. Nevertheless, since the previous placebo distribution may have been affected by bad-fitting placebo runs, Abadie, Diamond and Hainmueller (2010) suggest evaluating the estimated gap for the cases under examination in relation to the gaps obtained for each potential control unit via another distribution: this concerns the ratios of post/pre-treatment RMSPE (i.e. the root mean squared prediction error). Accordingly, Figure 6 reports the distribution of the post/pre-1985 ratios of the RMSPEs for FVG and the 15 ordinary regions. In this case, FVG is the first region in the ranking-list, although it is immediately followed by Abruzzo. Therefore, the probability that the impact estimated for FVG autonomy is invalidated remains quite low.

Figure 6 - Placebo test performed using as placebos the 15 non-autonomous regions in relation to the implementation of the FVG autonomy of 1965.

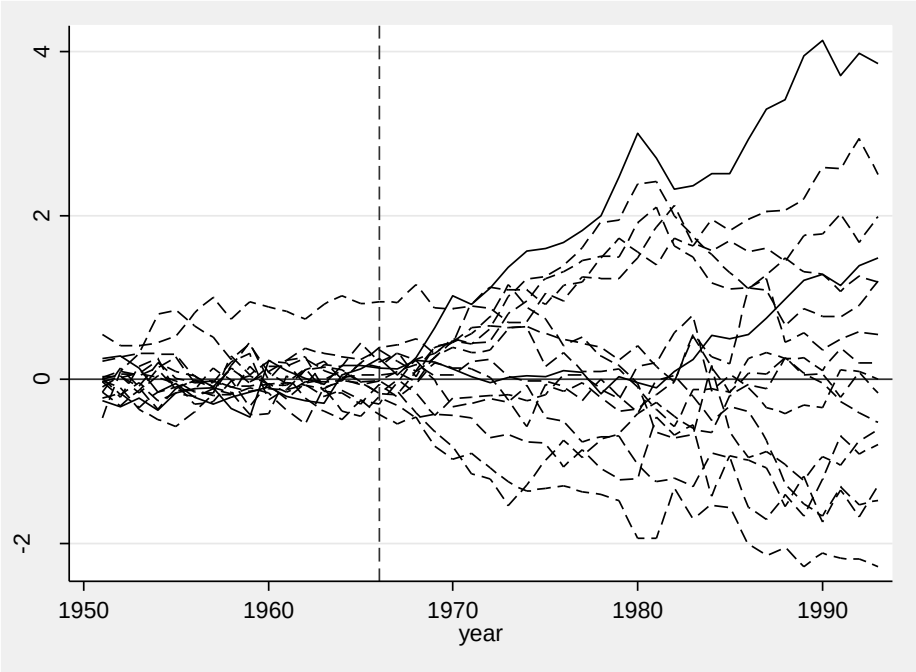
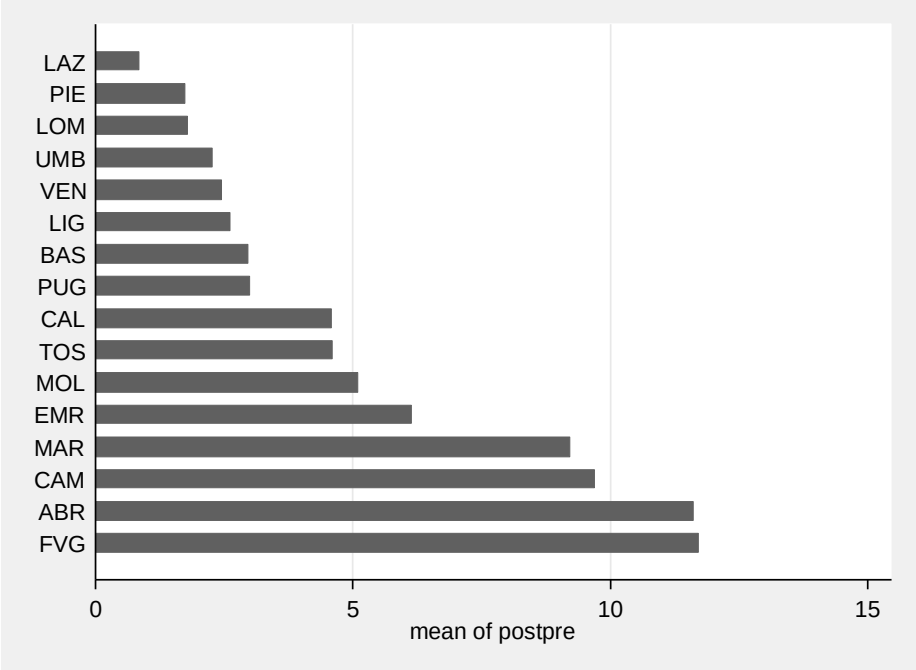


Figure 7 – Ratio between post-1965 RMSPE and pre-1965 MSPE: FVG and all the control units included in the donor pool.



Turning to the third procedure used to evaluate the validity of the economic effect estimated for the FVG autonomy, it should be borne in mind that in 1986 the public expenditure devolved by the central government to FVG was about 1.8 million lire more than that allocated on average to the ordinary regions which show a positive weight in

Table 2.[7] On the other hand, the 1986 gap estimated for the FVG per capita GDP was more than 4 million lire.[8] Although such a comparison is feasible for a single year only (see section 4), the large difference between the two values seems to indicate that the economic impact estimated for FVG's autonomy cannot be interpreted as a mere accounting effect (see previous section). Rather, this discrepancy seems to confirm that the greater economic development achieved by FVG is the consequence of its autonomy.

7. Conclusion

Given that the recent literature on the relationship between decentralisation and economic development has paid scant attention to asymmetric federalism, this article has investigated the economic effect of the unequal distribution of powers among the 20 Italian regions. More precisely, since five Italian regions enjoy a greater degree of autonomy in legislative power, administrative competence and fiscal arrangements than the other fifteen Italian regions, a case study was carried out to estimate the economic impact of the special autonomy of one of these five regions, namely FVG. The study was performed in the counterfactual framework of causal inference, applying the synthetic control method. For this purpose, a synthetic FVG was constructed as a weighted average of some non-autonomous regions. Then, the evolution of FVG's real per capita GDP, observed over the post-autonomy phase, was contrasted with the corresponding evolution of the same aggregate for the synthetic counterpart. From this comparison it emerged that, if FVG had not been an autonomous region, its per capita GDP would have been significantly lower than that effectively observed during the 1965-1993 period. This seems to confirm the hypothesis that the region's administrative and financial prerogatives have been historically targeted on the enhancement of growth.

Clearly, differently from the findings of cross-national analyses on the association between economic growth and fiscal federalism, the results of this exercise have limited extendibility. Specifically, the results obtained for FVG cannot be generalized to the four other Italian special-statute regions, and even less to autonomous subnational entities of other countries. Nevertheless, by exploiting the irregular allocation of power among Italian regions, this study may contribute to the current debate by providing a rigorous analysis on how a specific autonomy allocation policy may cause the development trajectory of a particular territory. Similar studies could be thus be carried out to estimate the economic consequences of the autonomy enjoyed by certain areas of other national asymmetrically decentralized systems.

[7] If all the non-autonomous regions are considered, the gap is 1.2 million lire.
[8] The 1986 gap in real GDP, shown in Figure 4, has been converted into current values in order to make it comparable with central government figures.

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