

## The Economic Impact of the LEADER Program in the Rural Communities of Romania

Ana-Maria Opria\*<sup>ID</sup>, Lucian Roșu\*\*<sup>ID</sup>, Corneliu Iațu\*\*\*<sup>ID</sup>

**Abstract:** The sustainable development of rural areas is one of the European Union's objectives. LEADER program contributes to its fulfillment by offering financial support to disadvantaged rural areas. The purpose of this paper is to assess the LEADER program's economic impact in the Romanian rural communities. Econometric methods of impact assessment were used to analyze the evolution of economic indicators in the beneficiary communities. Propensity Score Matching and Difference in Differences were the methods applied in order to meet the objectives of the paper: analysis of the spatial distribution of projects submitted and funds allocated to LAGs (1), and of the economic evolution of LAG and non-LAG communities, before and after LEADER funding (2). The results indicate a stronger economic growth for the beneficiary rural communities, confirming in all cases the initial hypothesis. LEADER seems to have acted in these directions: the creation of new jobs and increasing the local businesses performance. However, the contribution made was minimal and insignificant. Conclusions of the study highlight that the contribution of the LEADER program to the economic development of rural communities can be at most one of supporting the current level of development, but not of reaching a much higher level. LEADER can be considered, from a quantitative point of view, only an instrument with a positive effect on rural areas, but not an instrument of impact. This is because LEADER did not bring significant changes and didn't ensure that critical mass that could trigger the economic development of rural communities.

**Keywords:** LEADER funds; rural communities; economic impact; economic development; Difference in Differences method.

**JEL classification:** O18; O47; R15; R51.

\* Department of Geography, Faculty of Geography and Geology, Alexandru Ioan Cuza University of Iasi, Romania; e-mail: [opriaanamarial@yahoo.com](mailto:opriaanamarial@yahoo.com) (corresponding author).

\*\* Department of Geography, Faculty of Geography and Geology, Alexandru Ioan Cuza University of Iasi, Romania; e-mail: [lucian.rosu@uaic.ro](mailto:lucian.rosu@uaic.ro).

\*\*\* Department of Geography, Faculty of Geography and Geology, Alexandru Ioan Cuza University of Iasi, Romania; e-mail: [ciatu@uaic.ro](mailto:ciatu@uaic.ro).

**Article history:** Received 13 March 2023 | Accepted 12 June 2023 | Published online 29 June 2023

**To cite this article:** Opria, A.-M., Roșu, L., Iațu, C. (2023). The Economic Impact of the LEADER Program in the Rural Communities of Romania. *Scientific Annals of Economics and Business*, 70(3), 399-420. <https://doi.org/10.47743/saeb-2023-0026>.

### Copyright



This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

## 1. INTRODUCTION

The LEADER program is a European financial instrument offering support to disadvantaged rural communities. Through the projects implemented and funds granted the objective envisaged by LEADER is that of making changes for the better in the rural communities, changes regarding the local governance (by stimulating collaboration between stakeholders), but also the local economy (by stimulating entrepreneurship and SMEs), changes that contribute to a sustainable development. Thus, LEADER program has the capacity to bring both a social and an economic impact at the level of the beneficiary communities. Most of the studies conducted so far focused on appreciating the social impact of the program, the economic contribution being less investigated. However, economic development remains an important component of sustainable development insofar as it ensures the material well-being of communities that has a direct impact on populations quality of life. As stated by [Feldman \*et al.\* \(2016\)](#), economic development is essential because it creates the conditions necessary for the sustainable development of communities. Taking these into consideration, the present paper argues that LEADER has the potential of leading disadvantaged rural communities to a sustainable development not only through its specific approach (bottom-up), but also through the financial support granted that can have a significant impact on the local economy. LEADER can contribute through its actions to reducing development disparities and making the transition from economic development to sustainable development. Thus, LEADER is a tool for economic development because it brings innovation, change that are necessary to achieve the goal of economic development and, in the end, the sustainable development of rural communities.

The present study focuses on appreciating the LEADER program's contribution in the economic development of the beneficiary communities, contribution seen as economic impact. The main question of this paper is whether the investments made through the LEADER program have been sufficiently effective to lead to a significant and properly invested economic growth that could subsequently generate economic development. This study will assess if the financial support provided by LEADER ensures that critical mass that could trigger the economic development of the Romanian rural communities. In this regard, two objectives were pursued: the analysis of the spatial distribution of projects submitted and funds allocated to LAGs (1), and the comparative analysis of the economic evolution of LAG and non-LAG communities, before and after LEADER funding (2). The hypothesis to be tested is that the LEADER beneficiary territories registered a more accentuated positive evolution of the economic indicators compared to other similar rural communities, but which did not benefit from the financial support of the LEADER program.

Evaluating the economic impact of development programs, such as LEADER, is a topic of great importance. This is because impact assessment studies can provide a much clearer picture of the effectiveness of financing programs, their weaknesses and aspects that need improvement ([Gertler \*et al.\*, 2011](#)). Thus, they can provide essential information to decision makers and concrete answers to questions about the aspects that need to be changed. When it comes to the LEADER program, measuring its economic impact can reveal whether this is indeed the desired change that could lead disadvantaged rural communities to economic development and then to sustainable development – one of the main objectives pursued at European level.

The assessment of the economic impact of the LEADER program has been a subject rather secondarily approached in scientific research. Most of research papers focus on appreciating the social impact because of the LEADER program's focus on making changes in the local governance system through the bottom-up approach. However, we must consider also that LEADER remains a financial tool who gives support to rural communities for their economic development by supporting SMEs and stimulating local entrepreneurship. Thus, changes in the local economy can be one of its results. When it comes to the economic impact, both in Romania and in other European beneficiary countries, the impact studies consist mostly on a basic analysis of the overall evolution of certain quantitative economic indicators (e.g. new enterprises, job creation), in a limited number of beneficiary communities, but without a special focus on appreciating the differences brought in the local economy. Compared to previous research studies, the present paper brings a contribution by analyzing the impact of LEADER program on new economic directions such as turnover, no. of employees and per capita income at the level of the LEADER beneficiary communities. These indicators will help create a broad picture on the economic results of the program. Moreover, the effects of LEADER and the contribution made to the development of communities differ from one region to another and therefore the conclusions obtained from conducting case studies (that predominate in previous research studies) cannot be generalized (Jalalian et al., 2021). To overcome this shortcoming, this study will apply econometric methods of impact assessment that allow more robust conclusions to be drawn, and the larger scale of analysis than previous studies will ensure a high degree of confidence in the results obtained.

Section 2 of the paper presents the main findings in the literature regarding the LEADER program's economic impact and underlines the present paper's contribution to the existing knowledge on the subject. Subsequently, the data used and methods applied (e.g. propensity score matching, difference in differences) for the evaluation of the economic impact are presented in detail in Section 3. Results and discussions follow, Section 4 being divided in two parts, each of which corresponds to the objectives of the present study: analysis of the LEADER projects and funds spatial distribution (1) and comparative analysis of the economic evolution of LEADER and non-LEADER communities. The paper concludes by highlighting the main findings of this study and relating them to previous research. Section 5 also proposes future research directions.

## 2. LITERATURE REVIEW

As presented in the introduction, the debate of this study is that the LEADER program can lead to the sustainable development of rural communities not only through its qualitative contribution (social impact) but also through its financial, quantitative contribution (economic impact). The literature is rich in the analysis of the qualitative results of the LEADER program, especially in the appreciation of its contribution in stimulating collaboration between local actors and improving local governance through the new type of bottom-up approach introduced in the beneficiary communities. In terms of its quantitative contribution, the assessment of economic results is less addressed. It is often superficially analyzed in papers that focus mainly on qualitative issues. However, the few studies that refer also to quantitative results highlight the capacity of the LEADER program to generate effects in the local economy. Neto *et al.* (2014) show that LEADER has played a positive role by increasing the number of job-generating projects from one funding period to another. Also, Krievina *et*

*al.* (2015) demonstrate that LEADER projects had an impact on the development of economic activity of the beneficiary communities and Jalalian *et al.* (2021) appreciate that best results of LEADER are on the economic dimension. These studies, while giving a glimpse on the contribution LEADER has made to the local economy, fail to capture the true economic impact of the program. In order to address this need, more in-depth studies are needed, studies that apply specific impact analysis methodologies.

Why is it necessary to assess the economic impact of the LEADER program? Why is it important to know its contribution to the economic development of communities? Economic development, that can be stimulated through the support of European funding programs, is part of sustainable development (Onofrei *et al.*, 2023) and LEADER is a funding instrument for disadvantaged rural communities which aims through its actions at the sustainable development of the beneficiary territories. Sustainable development involves 3 dimensions: economic, social and environmental (Mihai *et al.*, 2019). The objective of sustainable development is to ensure the long-term stability of the economy and the environment, the interdependence between the two being the foundation of sustainable development (Emas, 2015). Thus, the economic dimension is one of the pillars of rural development that LEADER seeks, alongside education, health, culture and environment (Kim & Yang, 2016; Mihai *et al.*, 2019).

Economic development represents a fundamental transformation of an economy (Schumpeter, 1961) involving major structural changes (Nafziger, 2012) targeting infrastructure, production, labor qualification, etc., changes that ultimately lead to an improvement in the population's quality of life, way of living and mentality. These structural changes bring both quantitative and qualitative results, facilitating economic growth and improvement in social conditions as a result of a prosperous economic activity (Hammer & Pivo, 2017). Traditionally, economic development outcomes are appreciated by reference to quantitative indicators such as jobs, per capita income and gross domestic product (Blakely & Bradshaw, 2002; Koven & Lyons, 2010 as cited in Hammer & Pivo, 2017), economic development being seen as a process of wealth creation. However, economic development aims to introduce qualitative improvements also through innovation, entrepreneurship, changes able to put a territory's economy on an upward and lasting trend (Schumpeter, 1934; Feldman *et al.*, 2016). The changes made concern the improvement of the material condition of the lower social stratum of the population, the reduction of the share of agriculture in the economy and a focus on the service sector in the formation of GNP, investment in technology, education and in the training of the labor force. Thus, an economically developed community is a community able to cope and adapt easily to change (Nafziger, 2012).

The LEADER program contributes to the economic development of rural communities through the nature and diversity of projects funded (Biczkowski, 2020). These projects aim to achieve objectives such as diversifying economic activities (Alonso & Masot, 2020), stimulating entrepreneurship, creating jobs, modernizing businesses by introducing new equipment/technologies, improving the economic performance of businesses, etc. Revitalizing rural areas through economic diversification is mentioned as a basic objective of the CLLD approach that underlies the LEADER program (Ruiz Pulpón & Cañizares Ruiz, 2020). The research carried out so far underlines the success of the financial instrument in this direction, of diversifying economic activities by stimulating tourism and supporting mainly tertiary sector projects to the detriment of agricultural activities that have been predominant in rural areas so far (Alonso & Masot, 2020; Olar & Jitea, 2021). The contribution made by LEADER to the economic development of rural communities consists also in stimulating

entrepreneurship through these projects (Chmieliński *et al.*, 2018), which often results in the emergence of new SMEs or the development of existing ones. The results of projects implemented in the local economy are reflected in the number of new jobs created, increased quality of services offered, better conditions for investments and new sources of non-agricultural income (Biczkowski, 2020). All this indicates that LEADER investments are directed towards activities capable of exploiting local economic potential (Biczkowski, 2020).

The first years of the LEADER program's implementation were characterized by a predominant focus on achieving quantitative results. An example of this is the 2007-2013 funding period which was dominated by "classic" projects focusing on tourism, agriculture, economy among others (Stoustrup, 2022). Studies show that between 2007-2013 some LAGs were obliged to favor those projects that generate higher economic results - e.g. projects that stimulate the creation of new jobs (Chmieliński *et al.*, 2018). Some authors consider the primary role of LEADER to be that of creating new jobs with the help of the implemented projects that envisage the improvement of production processes, access to innovation and diversification of economic activities (Cañete *et al.*, 2018). Thus, the contribution of the LEADER program to the economic development of the beneficiary territories is seen as considerable. Currently, however, the focus is more on achieving qualitative results with the LEADER program, such as improving collaboration between local actors or increasing their involvement in local governance with the specific LEADER bottom-up approach. However, many LAGs find it difficult to implement the bottom-up approach because of the reluctance of local actors to get involved. In these situations, central public authorities tend to compensate for the absence of the private sector and local people in the decision-making process and dominate it. In such cases the public sector often favors the funding of LEADER projects with a higher economic contribution (Stoustrup, 2022). In other words, the failure of LAGs to achieve their qualitative objectives leads to a higher LEADER contribution on the side of local economic development. This is often the case for LAGs in Romania, where many of the measures adopted by LEADER associations fall under the EU's priority 6 (Olar & Jitea, 2021), which concerns, among other things, the economic development of communities. This makes the potential of LEADER to bring a significant economic impact to beneficiary territories to be higher.

According to Alonso and Masot (2020), there is a clear need to evaluate the quantitative results of the LEADER program giving that at its core are sufficient objectives and funding measures focused on the development of the local economy of the beneficiary communities. LEADER finances a high proportion of quantitative projects, which makes it necessary to assess its success in terms of its economic results. Thus, LEADER success is a mixture of both sphere: qualitative and quantitative (Marquez *et al.*, 2005 as cited in Alonso & Masot, 2020). Moreover, there is a major gap in the literature on the assessment of the LEADER program's quantitative results. There is a need to objectively assess the quantitative impact by comparing LEADER beneficiary and non-beneficiary areas (Esparcia Perez, 2000). This study aims to fill this gap by assessing the economic impact of the LEADER program using counterfactual methods which allow the two types of territories: beneficiary and non-beneficiary, to be mirrored. These counterfactual methods also provide a higher degree of accuracy in estimating the contribution made to the local economy, ultimately leading to robust conclusions on the subject.

### 3. MATERIALS AND METHODS

#### 3.1 Study area

This study focuses on appreciating the LEADER program's economic impact in the beneficiary communities in Romania, an EU Member State since 2007. As a level of economic development, Romania is below the European average in terms of GDP per capita according to Eurostat data (Opria *et al.*, 2021) – see Figure no. 1. Regarding the development level of the rural communities, Romania faces pronounced territorial disparities (Dachin, 2008). In the western half are located the more developed rural settlements, and in the eastern and southwestern part of the country are concentrated most of the severely disadvantaged rural communities (Nişescu, 2014; Mitrică *et al.*, 2020). At European level, in 2010 Romania was among the countries with the strongest agricultural fragmentation, subsistence agriculture being prevalent (Dachin, 2008; Nişescu, 2014). Most of the active rural population is employed in the agricultural sector which faces low economic efficiency (Chivu *et al.*, 2020). This, together with the rural population low standard of living, the lack of rural entrepreneurs, the low interest for innovation, are just some of the problems facing Romanian rural communities that explain the need for external financial support in the form of European development programs. Currently, LEADER operates in Romania through 239 LAGs that occupy 88.9% of the Romanian territory, most of the rural communities being included in one of the LEADER associations.

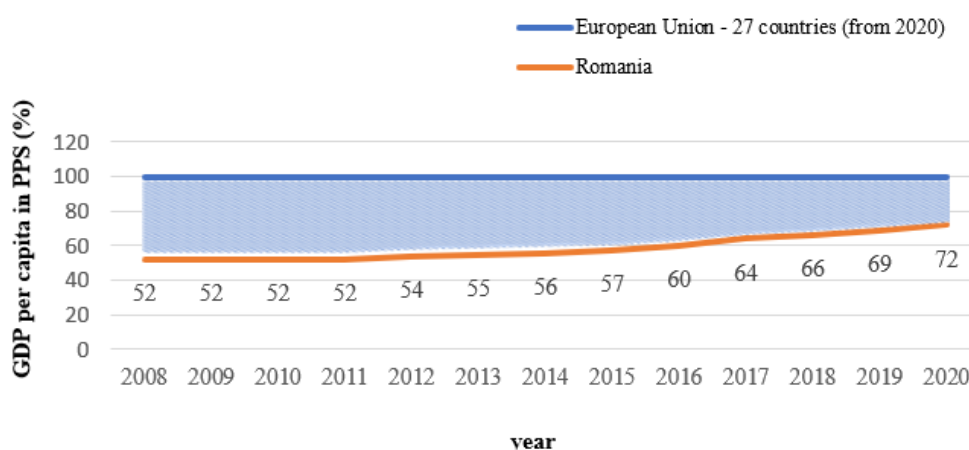


Figure no. 1 – Evolution of GDP per capita in Romania between 2008-2020 compared to the European Union average

#### 3.2 Data and methods

In order to assess the initial development level of the rural communities and to appreciate the LEADER program's impact, an analysis was carried out on 3 economic indicators: turnover, number of employees and per capita income. The economic impact was assessed by reference to the dynamics of the 3 indicators at commune level between two benchmarks. These were the year 2011, which marked the establishment of the first Romanian LAG, and

the year 2018, 7 years after the effective implementation of the LEADER program in Romania. For the first objective - the analysis of the spatial distribution of the submitted projects and funds allocated through LEADER - the data were analyzed and mapped at the level of the Romanian LAGs. Regarding the economic impact assessment, the reference scale was the local scale (commune), the contribution brought by LEADER being determined by making a comparison between the rural communities benefiting from LEADER and those not included in the program.

**Step one:** the first step consisted in processing the database comprising details about the implemented LEADER projects and the funds allocated at the level of each Romanian LAG during the years 2011-2018 and mapping the information in question. This contributed to shaping an overview of the LEADER program's results in Romania and especially to the achievement of the first objective of the paper: the analysis of the spatial distribution of projects submitted and funds allocated to LAGs.

**Step two:** In order to test the hypothesis of the study and, implicitly, to respond to the second objective of the paper, econometric methods of impact assessment were applied. These were as follows:

- **Propensity Score Matching (PSM)**

The first step was to create pairs of rural communities included and not included in the LEADER program. For this, the *Propensity Score Matching* method was used, a counterfactual method developed by Rosenbaum and Rubin (1983) which consists in creating pairs of individuals different in terms of access to a particular intervention, but similar in terms of their internal composition, thus resulting a control group (non-beneficiary rural communities) and an experimental group (LEADER beneficiary rural communities). The covariates considered for the creation of community pairs were the level of development (LHDI<sup>1</sup> values), the population's material well-being (income / inhabitant) and the community size (population density). Starting from these three covariates, the propensity score was calculated based on the multiple logistic regression model (see Eq. 1):

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \quad (1)$$

where

$\ln\left(\frac{P}{1-P}\right)$  = log odds ratio ('logit')

$\beta_0$  = intercept

$\beta_1, \beta_2 \dots \beta_k$  = regression coefficient

$X_1, X_2 \dots X_k$  = covariates

Subsequently, the resulting propensity score was used to create pairs of different individuals in terms of access to treatment, but with similar propensity score values. The method approached in creating the pairs was *Nearest Neighbor Matching* which aims to minimize the absolute difference between the propensity scores of the two groups (control and experimental) (see Eq. 2). Individuals are randomly ordered, and the first individual in the experimental group is matched with an individual in the control group very similar in terms propensity score value (Thavaneswaran & Lix, 2008).

$$C(P_i) = \min_j |P_i - P_j| \quad (2)$$

where:

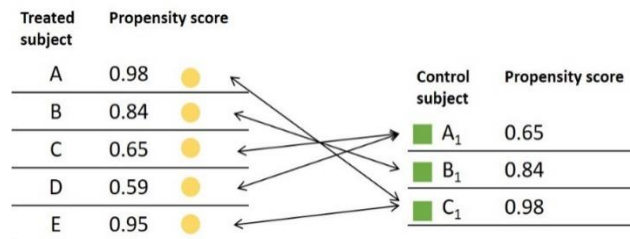
$C(P_i)$  = the group of control subjects  $j$  matched to treated subjects  $i$

$P_i$  = estimated propensity score for the treated subjects

$P_j$  = estimated propensity score for the control subjects

Source: [Thavaneswaran and Lix \(2008\)](#)

The application of this counterfactual method (*Propensity Score Matching*) resulted in a control group of 164 communes and an experimental group of 2,021 communes. In the creation of the pairs, the matching with replacement method was chosen so that the individuals from the control group could be matched with more than one individual from the experimental group (see [Figure no. 2](#)). This is due to the small number of communes in the control group. Considering that 88.9% of the Romanian territory is currently covered with LAGs, only 324 rural communes could be taken into account in the construction of the control group, these representing 10% of the total Romanian rural communes. However, out of these 324 communes, only 164 proved to be very similar to the communes that received LEADER funding from the perspective of the 3 covariates on the basis of which the propensity score was calculated. Regarding the experimental group, 2,021 communes were included in it, representing 63% of the Romanian communes, and 71% of the total communes included in LAGs.



**Figure no. 2 – Nearest neighbour matching (with replacement)**

Subsequently, in order to appreciate the quality of matching, the balance was assessed by constructing the summary of matched data, eCDF plots, QQ plots and the covariate balance plot. Also, in order to assess whether the individuals from the control group are comparable, as an evolution of the analyzed economic indicators, with those from the experimental group, the parallel trends hypothesis was verified. The existence of these parallel trends is a condition for the *Difference in Differences* method, approached in this paper to assess the impact, to be implemented and to generate reliable results. Thus, in order to test the parallel trends hypothesis, the average of the logarithmic values was calculated for each of the 3 economic indicators for each of the two groups at the level of 2003 - 2018 period. In addition to the 2011-2018 period, based on which the assessment of the LEADER impact was made, the comparative evolution of the indicators in the 2003-2011 period was also considered. This is to ensure that the two groups are similar not only in general features (LHDI, income / inhabitant, population density), but also as dynamics of the 3 indicators in the period before the introduction of the intervention (LEADER program in this case).



- *Difference in Differences (DID)*

The last step was the application of the *Difference in Differences* method, a counterfactual method. This allows the assessment of the impact by performing a double analysis, before and after the intervention and comparative between the two groups created. Thus, in order to assess the LEADER program's impact at the level of the beneficiary communities, the difference between the averages before (2011) and after (2018) intervention at the level of each group (control and experimental) was calculated for each of the 3 economic indicators analyzed (see Eq. 3). Thereafter, the impact assessment was made by calculating the level at which the experimental group would have been in the absence of treatment if the difference between the two groups had remained constant over time. The difference between the calculated theoretical level and the actual level at which the post-intervention experimental group was located represents the LEADER program's actual impact. Thus, the calculation of the impact was done by the formula:

$$DD = AT - BT - (AC - BC) \quad (3)$$

where:

- $DD$  = impact
- $AT$  = average of treated group after the intervention
- $BT$  = average of treated group before the intervention
- $AC$  = average of control group after the intervention
- $BC$  = average of control group before the intervention

This method provides high accuracy in assessing the quantitative impact of an intervention, in this case the LEADER program's economic impact. The results indicate the level at which the individuals in the experimental group would have been in the absence of treatment based on the evolution of the individuals in the control group. The impact analysis is based on the similarity of the two groups in terms of general features, the only difference between them being their access to the LEADER program. Thus, the *Difference in Differences* method highlights the direction (positive or negative) in which the intervention influenced the experimental group and what was the magnitude of the impact on the beneficiary communities.

The two methods used in this study, PSM and DID, ensure reliable results on the economic impact of the LEADER programme. PSM is a widely applied method in studies in various fields (e.g. medicine, education, economics) to assess the overall effect of an intervention (Caliendo & Kopeinig, 2008; Pufahl & Weiss, 2009). This is because it reduces the risk of selection bias by making the control group very similar to the experimental group, and the comparative analysis performed on the two groups can be reliable (Caliendo & Kopeinig, 2008). As Staffa and Zurakowski (2018) state, PSM "may create an "apples to apples" comparison while reducing bias due to confounding" and can improve and diversify research opportunities in a variety of fields. Compared to other methods of analysis, PSM is more attractive in that it provides more detailed analyses of the two groups being compared: experimental and control. The results thus obtained are stronger, generalizable, increasing the degree of confidence in the conclusions of the scientific study conducted (Staffa & Zurakowski, 2018). When it comes to assessing the effects generated by certain programs on groups of special interest, PSM is a very good method to apply (Bryson *et al.*, 2002; Pufahl & Weiss, 2009), this being the case of the present study.

In order to obtain a clear picture on the economic impact, PSM is frequently used in combination with DID, another counterfactual method addressed in the present study. As for DID, it is a very common quasi-experimental research design highly applied in a variety of studies - eg. local governments policy changes, natural disasters strike across seasons, firms laying off workers (Goodman-Bacon, 2021). This is because it is a powerful analytical tool able to address the problem of confounding in observational studies (Ryan *et al.*, 2015). Its popularity has grown over the years in impact evaluation studies (St. Clair & Cook, 2015; Roth *et al.*, 2023) due to the high credibility of the results obtained and the ease of implementation and estimation (Angrist & Pischke, 2010). As Dimick and Ryan (2014) state, DID is a very good option for impact studies based on comparative analysis of two groups because it allows to control for background changes in outcomes that occur with time.

The data used in this study were obtained from the Agency for the Financing of Rural Investments (AFIR), the National Institute of Statistics (INS), the General Directorate of Public Finance (DGFP) and the National Trade Register Office (ONRC).

As previously mentioned, the methods used in the impact assessment were *Propensity Score Matching (PSM)* and *Difference in Differences (DID)*, counterfactual methods applied through the R Studio program. Statistical data processing was done in the Excel program of the Microsoft Office package and the results were mapped using the ArcMap program.

#### 4. RESULTS AND DISCUSSIONS

##### *Step 1: Analysis of the submitted projects spatial distribution and the funds allocated at the level of the Romanian LAGs*

As presented in the methodology section, the first step of the study consisted in analyzing the spatial distribution of projects submitted and funds allocated to LAGs in order to respond to the first objective of the paper.

2007 marked the LEADER program's introduction in Romania following the accession to the European Union, as well as the beginning of the fourth LEADER funding period at European level, but the first in Romania. The LEADER program's quantitative results in Romania since its implementation and until now consist in the establishment of 239 territorial associations, called Local Action Groups (LAGs). Within them 13,820 projects were implemented, according to the official data published online by AFIR until 27.05.2020. The spatial distribution of LEADER projects is relatively a uniform one, with a slightly higher frequency of projects to the center and northwestern part of the country where the interest in accessing LEADER seems to have been higher (see Figure no. 3). However, the differences between LAGs as number of projects per 1000 inhabitants are small, the values ranging only from 0.23 to 6.24.

The LEADER funds absorbed in Romania, as a result of the implementation of the projects, reached a value of 786,139,533.9 €. As in the case of the projects, the funds also have a relatively uniform spatial distribution between the 239 LAGs, with no significant gaps between the associations in terms of their ability to absorb LEADER funds (see Figure no. 4). This is confirmed by the small difference between LAGs as LEADER funds absorbed per inhabitant. The spatial distribution of funds per inhabitant highlights a greater concentration of LEADER financial support to the center and west, generally in the same LAGs that have implemented a larger number of LEADER projects.

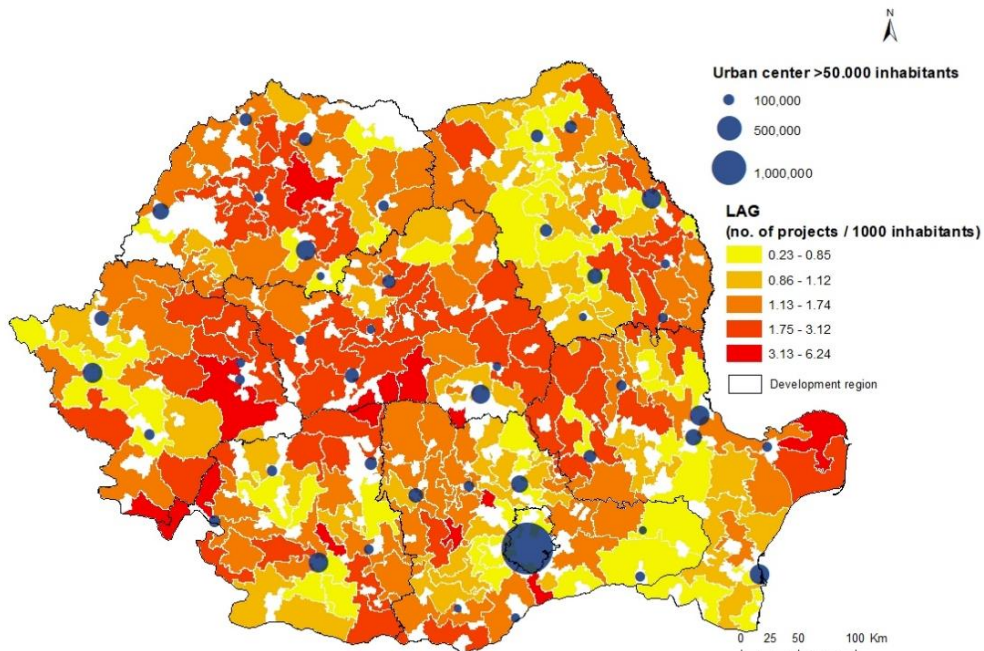


Figure no. 3 – Spatial distribution of LEADER projects implemented in Romania until 27.05.2020

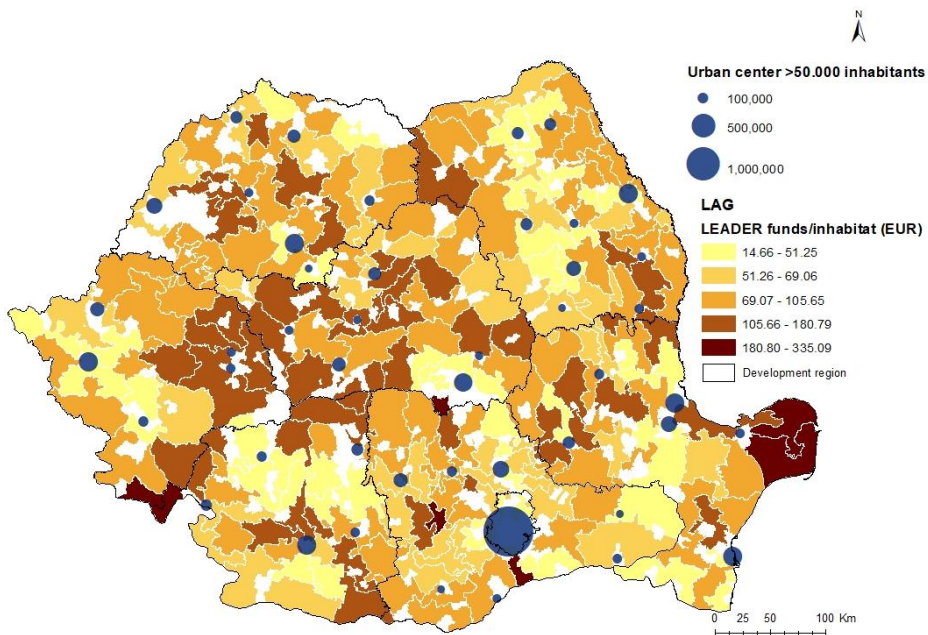
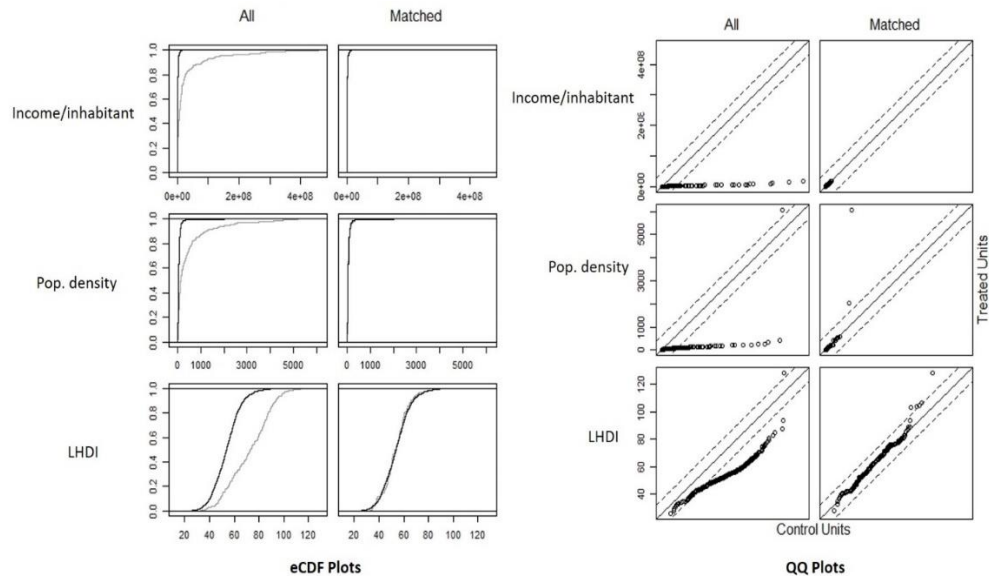


Figure no. 4 – Spatial distribution of LEADER funds in Romania until 27.05.2020

**Step 2: Comparative analysis of the economic evolution of LAG and non-LAG communities, before and after LEADER funding**

**Creating the control and the experimental group**

In order to assess the LEADER program's economic impact, the first task was to identify the beneficiary communes and those not included in the LEADER program that have similarities in terms of their internal composition. For this, the *Propensity Score Matching* method was applied, which allowed the construction of the control group (communes not included in LAGs) and the experimental one (communes included in LAGs). A detailed presentation of the method and its applicability can be consulted in the methodology section of the present paper. Following the propensity score calculation and the creation of pairs of individuals by the *Nearest Neighbor Matching* method, a control group of 164 communes and an experimental group of 2,021 communes resulted. The two groups are very similar in terms of the values of the 3 covariates used, as confirmed by the standardized mean differences (SMD) between treated and untreated units of less than 0.5 and the variance ratios between 0.95 and 0.97. Also, the covariate balance plot highlights that the level of similarity between the two groups has improved after matching, all the SMD values being within a threshold of .1 (see Figure no. 5). The eCDF plots before and after matching indicate good balance, the lines overlapping after matching, as well as the QQ plots, all the values falling on a 45-degree line (see Figure no. 6). Thus, the high similarity between the groups increases the probability that the results of the LEADER impact assessment analysis will reflect the reality.



**Figure no. 5 – Empirical Cumulative Distribution Function (eCDF) and Quantile-Quantile plots**

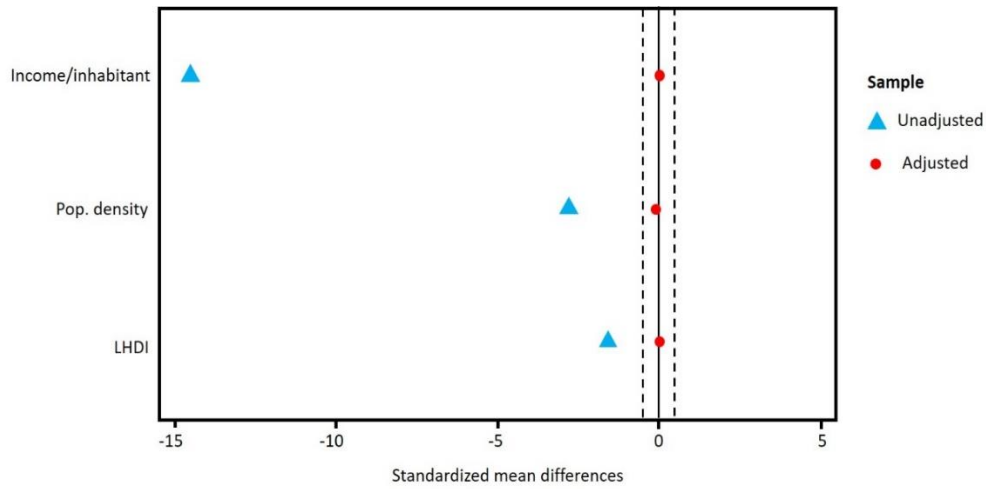


Figure no. 6 – Covariate balance plot

**Testing the parallel trends hypothesis**

Following the creation of the control group and the experimental group, the parallel trends hypothesis was tested. The parallel evolution of the two groups is a *sine-qua-non* condition for the application of the *Difference in Differences* (DID) method in order to assess the economic impact (see methodology section for a detailed presentation of DID). In this sense, the evolution of the 3 economic indicators between 2003-2011, the period preceding the LEADER program’s implementation, but also between 2011-2018, post-implementation of the program, was analyzed.

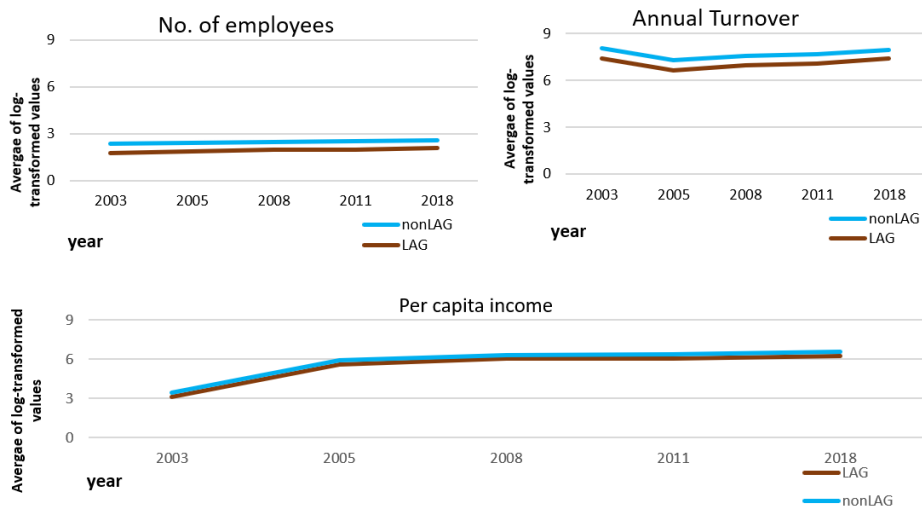
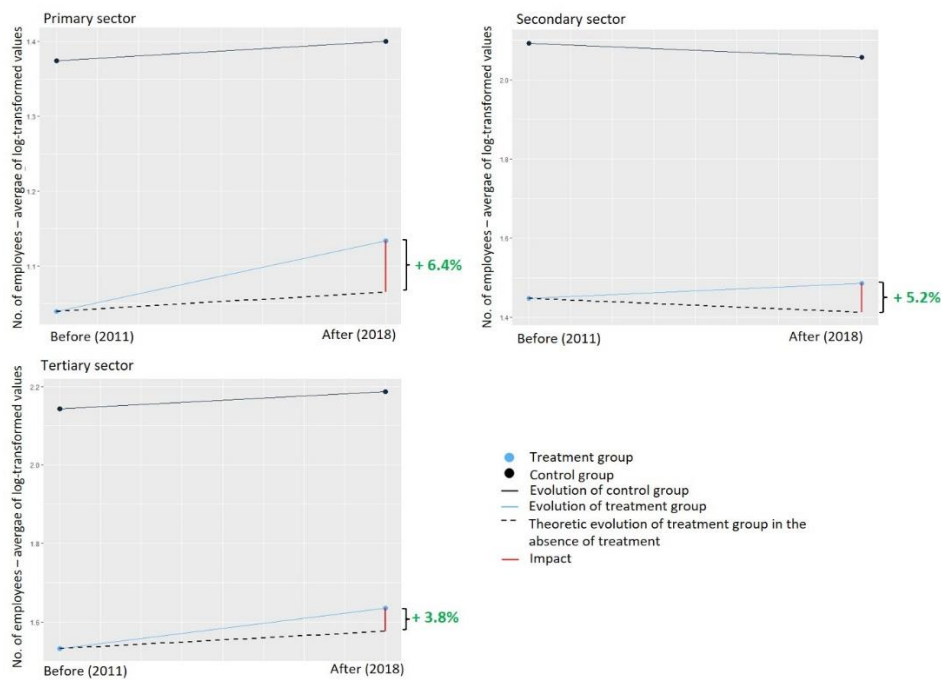


Figure no. 7 – The evolution of the 3 economic indicators between 2003 - 2018

The results show a predominantly upward trend in values, the differences between the two groups being quite small. In the case of the annual turnover the control group and the experimental group showed a similar dynamic, with an initial decline between 2003-2005 followed by a return to 2018 (see Figure no. 7). Regarding the number of employees, the values remain almost constant on the entire interval, with a very slight upward trend towards 2018. The third indicator, per capita income, recorded an upward evolution of values both in the case of the control group and in the experimental one, the difference between the groups remaining, generally, constant in time.

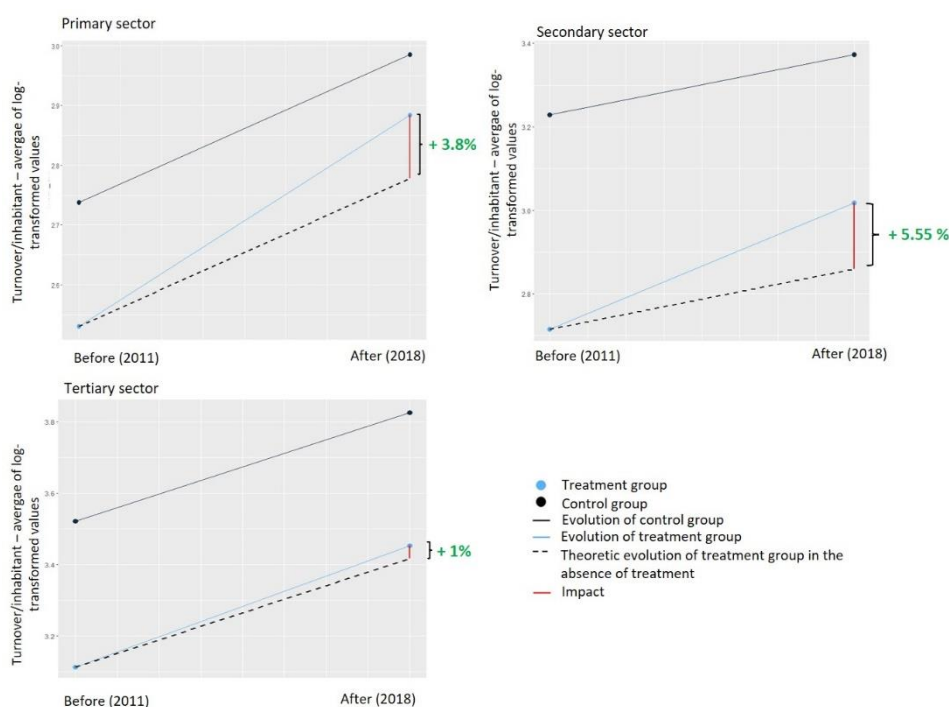
#### *Calculating the economic impact using the Difference in Differences method*

In order to assess the economic impact, the period 2011-2018 was analyzed more closely. The *Difference in Differences* method applied for the LEADER impact assessment at the level of the turnover per inhabitant highlights the higher contribution brought in the case of the secondary sector compared to the other two economic sectors. Thus, the secondary sector registered a 5.55% higher increase in the experimental group than the level at which it would have been in the absence of treatment, in contrast to the primary and tertiary sectors which increased by 3.8% and 1% respectively (see Figure no. 8). All these three percentages are statistically insignificant, as suggested by the p value, which in all cases exceeds the threshold of 0.05: primary = 0.3; secondary = 0.1; tertiary = 0.6. This means that the null hypothesis, which states that LEADER did not contribute to the evolution of turnover per inhabitant, cannot be rejected. Thus, the LEADER's impact remains far too small to make a significant difference.



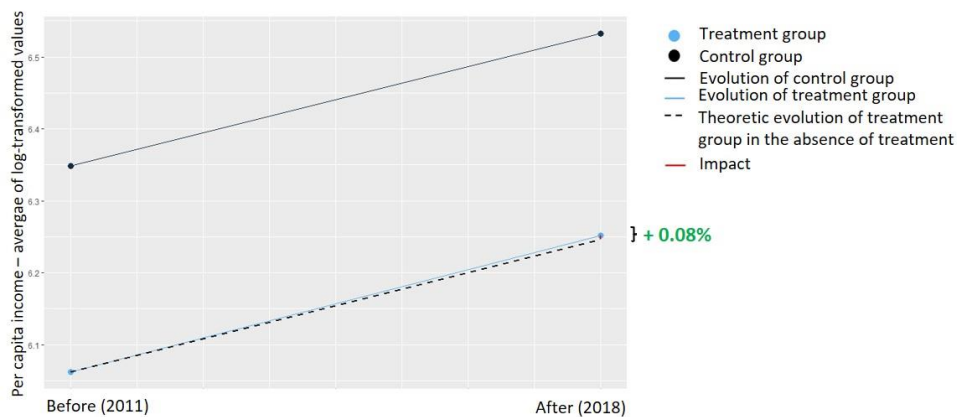
**Figure no. 8 – The LEADER program's impact reflected in the evolution of the number of employees**

In the case of the number of employees, the results indicate a higher increase for the primary sector than the other two economic sectors, an increase of 6.4% for the experimental group (see Figure no. 9). The number of employees positive evolution is also found in the case of the secondary sector, the experimental group being 5.2% above the theoretical level at which it would have been in the absence of treatment. The tertiary sector is the one that recorded the lowest growth, this being of only 3.8%. Thus, the LEADER program’s contribution proves to have been the largest in the direction of increasing the number of employees in the agricultural sector. Although in all three situations the evolution of the values for the experimental group was a positive one, these increases are once more not statistically significant, p values exceeding the threshold of 0.05.



**Figure no. 9 – The impact of the LEADER program reflected in the evolution of the turnover/inhabitant**

The LEADER program’s impact has proved to be the lowest in terms of per capita income. Thus, the contribution brought in the sense of increasing the income / inhabitant among the population from the beneficiary territories was of only 0.08%, (see Figure no. 10). The p value is also statistically insignificant in this case, exceeding the threshold of 0.05, proving again that these upward trends are not strong enough to be considered a result of the LEADER program’s introduction.



**Figure no. 10 – The LEADER program’s impact reflected in the evolution of per capita income**

Analyzing the impact of LEADER on the three dimensions (turnover, number of employees and per capita income), some of the LEADER program's contributions brought to the economy of the beneficiary communities can be highlighted. The fact that LEADER has made a greater contribution in the secondary sector in terms of turnover shows that the program was successful in stimulating the activity of businesses, making them more dynamic and performant. At the same time, it contributes to the diversification of economic activities by stimulating the secondary sector in a context where the rural economy is dominated by the primary sector. However, its contribution is minimal and fails to generate substantial change at local level. Thus, the program is successful in that it succeeds in achieving its objectives. However, the inability to generate significant change highlights the need for more funding. In terms of the number of employees, it is worth noting that all three economic sectors have recorded an increase, higher in those municipalities benefiting from LEADER. Thus, this time too, the program is proving to have made its contribution to the development of the local economy because the increase in the number of employees means an increase in the attractiveness of housing in those communities to the extent that the local population has employment opportunities in the area of origin, and the temptation to emigrate decreases. The result will surely be seen in time through the gradual slowing down of the depopulation process currently faced by rural areas in Romania. As far as per capita income is concerned, the results underline the fact that LEADER fails to bring gross financial benefits to the inhabitants of rural communities. This is because the financial resources of the program are too limited, but also because this type of results appear after longer periods of time after the implementation of the projects, when the supported initiatives reach maturity.

## 5. CONCLUSIONS

Developmental disparities in Romania represent an issue of actuality, an issue that has been questioned and highlighted many times in scientific research (Dachin, 2008; Goschin *et al.*, 2008; Sandu, 2011; Bran *et al.*, 2018). Romania is a territory conducive to the LEADER program’s implementation because of these development disparities. They can be diminished by introducing tools, such as the LEADER program, aimed at supporting less favored



territories. Through the financial support provided under the LEADER program, the European Union aims at the economic development of disadvantaged rural areas, the improvement of the rural communities living standards and, finally, their sustainable development (Turek Rahoveanu & Turek Rahoveanu, 2013).

The hypothesis of the study was that the LEADER communities registered a more accelerated positive evolution of the economic indicators compared to other similar rural communities, but which did not benefit from the LEADER program. The results obtained indeed indicate a stronger economic growth for the beneficiary rural communities, confirming in all cases the initial hypothesis. Of all the 3 economic indicators analyzed, the turnover/inhabitant in the secondary sector and the number of employees in the primary and secondary sectors registered the highest growth. This highlights the LEADER program's high potential to stimulate job creation (Neto *et al.*, 2014), which can only be auspicious given the high unemployment rates and mass emigration of young population that a high part of rural settlements face (Badea *et al.*, 2015). Also, LEADER proved to bring a high contribution in increasing the performance and dynamics of enterprises, as shown by the high impact in the turnover per inhabitant in the secondary sector. LEADER seems to have acted in these directions: the creation of new jobs and increasing the local businesses performance. However, the contribution made was minimal and insignificant in all cases. Despite the openness of rural communities to take advantage of the opportunities provided through the LEADER program, the European instrument has not proved to be an important contribution to the economic growth of the beneficiary rural communities (Badea *et al.*, 2015). Although the general trend in the evolution of all the analyzed economic indicators is an ascending one, it cannot be attributed to the LEADER program, the results obtained not being statistically significant. Thus, the contribution of the program to the economic development of rural communities can be at most one of supporting the current level of development, but not of reaching a much higher level.

Most likely, the main cause of this insignificant economic impact are the small funds available to rural communities through the LEADER program in relation to the needs of the beneficiary territories. As stated by Feldman *et al.* (2016), economic development requires substantial financial resources to enable large-scale investments. From this perspective, LEADER cannot be considered a sufficiently strong financial instrument, as the funds made available are undoubtedly helpful to rural communities, but not sufficient to be able to bring significant changes. The financial support provided by LEADER and the projects implemented under its umbrella have provided new development opportunities to the beneficiary rural communities which over time will prove to have contributed to achieving the European goal of sustainable development. For the time being, however, LEADER can be considered, from a quantitative point of view, only an instrument with a positive effect on rural areas, but not an instrument of impact. This can also be attributed to the short implementation time of the program in Romania, compared to other European countries. Thus, LEADER-funded projects have not yet reached maturity in order to be integrated into a structural network, in a production chain, so that they can bring a significant contribution to the economy. It takes time to see if this effect will eventually turn into an impact. As White (2010) points out in one of his papers, the difference between impact and effect lies in the ability of an intervention to change things significantly. Viewed from this perspective, LEADER did not bring significant changes and didn't ensure that critical mass that could trigger the economic development of rural communities, as we saw in the impact analysis.

Therefore, for the moment in Romania LEADER cannot be considered an impact instrument at the level of the rural territory.

Another explanation for the insignificant economic impact may be the relatively short period that has passed since the introduction of the program in Romania until present. It should be kept in mind that the LEADER program started to work concretely in Romania quite late, the first project being implemented only in 2011, 2012, unlike other Western European countries where LEADER was introduced in 1991 and which already have 30 years of experience in its implementation. The relatively short time that has passed since the implementation of the first project in Romania and until now can explain why LEADER is only a tool with a positive effect, but not an impact tool (Feldman *et al.*, 2016). Therefore, it is imperative that this impact assessment be resumed at a time when LEADER will be a mature financial tool in Romania. This maturity should be understood as number of years of implementation, as communities experience in managing the European instrument. The resumption of the impact assessment and the recalculation of the economic contribution made by taking in consideration a longer time period could highlight whether this currently observed positive effect has turned over time into the expected economic impact.

As stated in the literature review section, the subject of the LEADER program's economic impact is to little approached in the specialized literature. In most of the cases, studies that manage to highlight aspects related to the LEADER program's economic impact have other objectives in the foreground, and the capture of the economic impact is rather a transversal, indirect result of the research. Compared to other studies that have been conducted so far on the LEADER program and its economic impact, the scientific value – added of this study consists in conducting a larger quantitative analysis and with a higher level of accuracy. Thus, the evaluation was made based on 3 economic indicators, in order to capture LEADER's contribution on multiple levels. Also, the national scale analysis allowed even more accurate identification of the contribution brought to the economy and drawing solid conclusions about the economic impact. At the same time, the methodology approached in the present study is a much more complex and solid one, offering the certainty of obtaining exact and reliable results. The econometric methods approached in this paper are dedicated to quantitative impact assessment, having the ability to highlight the contribution of an intervention in making a positive or negative change. Although these methods are frequently approached in economic studies, the analyses carried out so far on the LEADER program's subject have not resorted to them, the present study being a pioneer in this regard. The results obtained support the ideas stated in previous studies, in the sense that the LEADER program's economic impact has proved to be insignificant in Romania as well. If in previous research this was more of a passing statement, in this paper it has become a certainty and has taken the form of a solid conclusion. Also, this insignificant impact was calculated at the level of 3 different indicators, on each economic sector, thus offering a much clearer, more detailed perspective on the LEADER results and on the levels on which it acts more. In other words, this study can be considered preliminary and represents a serious starting point for next studies that will try to complete the analyzes from multiple points of view and to contribute, in the end, to the construction of an integrative, overall view upon the LEADER program.

The results obtained in the present study are highly applicable taking into consideration the scale of analysis and the methods used. The study was constructed starting from the entire population (representing all LEADER beneficiary communities in Romania) and this together with the counterfactual methods used ensured reliable results. Thus, the effects observed

reflect the real situation at national level when it comes to the LEADER program's quantitative outcomes. These findings highlight that LEADER has the potential to make a quantitative contribution to help communities achieve sustainable development. As seen in the introduction, sustainable development includes both qualitative and quantitative changes (economic development). However, although LEADER has the potential to bring about quantitative changes (through the objectives underlying the program), it fails to really achieve them, to generate real impact at the level of the beneficiary communities. This is due to insufficient funding. As [Feldman et al. \(2016\)](#) state, large-scale investments with long time horizons are required for economic development to happen. However, when it comes to the LEADER program this is a real problem taking into account that LEADER receives less funding than other programs do ([Alonso & Masot, 2020](#); [Olar & Jitea, 2021](#)). Thus, the main recommendations for policymakers that emerge from the present study consist in increasing the financial support offered and directing it mainly to the least developed communities. LEADER funding needs to be consistent in order to see concrete results in terms of economic development. More over, larger funds would make it possible to have better qualitative results along with the quantitative ones mentioned above. This is because larger funds would motivate local actors to be more involved in the decision-making process, in the LAG's activity, lack of interest being a problem often mentioned in qualitative research because of the too little financial support granted by LEADER.

The present study brings a contribution by constructing a broad and clear image on the LEADER program's success in fulfilling its quantitative objectives. The paper provides concrete results on the economic impact of the program, and these results can be used both in the objective evaluation of the LEADER program, but especially in determining future directions of intervention (changes to be made at program level by decision-makers) to achieve better results. As stated above, the main recommendations for policymakers that emerge from the present study consist in increasing the financial support offered and targeting it predominantly to the least developed communities in order to have a real impact on the economic development of the beneficiary communities. Regarding the limitations, the lack of a longer time span evaluation of the results can be mentioned here. It takes time for the economic impact of a policy or intervention (LEADER program in this case) to be visible. Thus, there is a need to reevaluate the LEADER program's quantitative contribution at a time when LEADER will be a mature financial tool in Romania. This maturity should be understood as number of years of implementation, as communities experience in managing the European instrument. Future studies could concentrate on this and on evaluating the qualitative impact of LEADER also by appreciating the program's contribution to the improvement of the collaboration relations at local level, the creation of new partnerships, the development of networking between the local actors, all these being the base of a good governance and to an overall higher level of development.

**Funding:** Authors are thankful to Romanian Ministry of Research, Innovation and Digitization, within Program 1 – Development of the national RD system, Subprogram 1.2 – Institutional Performance – RDI excellence funding projects, Contract no.11PFE/30.12.2021, for financial support.

**Data Availability Statement:** Raw data were obtained from the Agency for the Financing of Rural Investments (AFIR), the National Institute of Statistics (INS), the General Directorate of Public Finance (DGFP) and the National Trade Register Office (ONRC). Derived data supporting the findings of this study are available from the corresponding author on request.

**Author Contributions:** Conceptualization, A.M.O.; methodology, A.M.O.; software, A.M.O.; validation, A.M.O., L.R. and C.O.; formal analysis, A.M.O., L.R. and C.O.; investigation, A.M.O.; resources, A.M.O., L.R. and C.O.; data curation, A.M.O.; writing original draft preparation, A.M.O.; writing review and editing, A.M.O., L.R. and C.O.; visualization, A.M.O. and C.O.; supervision, L.R. and C.O.; project administration, A.M.O.; All authors have read and agreed to the published version of the manuscript.

## ORCID

Ana-Maria Opria  <https://orcid.org/0000-0002-1055-8310>

Lucian Roşu  <https://orcid.org/0000-0002-9804-9990>

Corneliu Iaţu  <https://orcid.org/0000-0002-7106-6627>

## References

- Alonso, G. C., & Masot, A. N. (2020). Rural Space Governance in Extremadura (SW Spain). Analysis of the Leader Approach. *European Countryside*, 12(4), 448-468. <http://dx.doi.org/10.2478/euco-2020-0024>
- Angrist, J. D., & Pischke, J. S. (2010). The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics. *The Journal of Economic Perspectives*, 24(2), 3-30. <http://dx.doi.org/10.1257/jep.24.2.3>
- Badea, A., Fintineru, A., & Baciuc, G. A. (2015). The rural development program in Romania and the place of LEADER program within its *Agrarian Economy And Rural Development Realities And Perspectives for Romania – the* (6th ed. ed., pp. 368-372): The Research Institute for Agriculture Economy and Rural Development.
- Biczkowski, M. (2020). LEADER as a mechanism of neo-endogenous development of rural areas: The case of Poland. *Miscellanea Geographica*, 24(4), 232-244. <http://dx.doi.org/10.2478/mgrsd-2020-0041>
- Bran, F., Alpopi, C., & Burlacu, S. (2018). Territorial Development - Disparities between the Developed and the least Developed Areas of Romania. In C. Năţase (Ed.), *Strategies and Development Policies of Territories. International, Country Region, City Location Challenges* (pp. 146-155): Lumen. <http://dx.doi.org/10.18662/lumproc.69>
- Bryson, A., Dorsett, R., & Purdon, S. (2002). *The use of propensity score matching in the evaluation of active labour market policies*: Dept. of Work and Pensions.
- Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, 22(1), 31-72. <http://dx.doi.org/10.1111/j.1467-6419.2007.00527.x>
- Cañete, J. A., Navarro, F., & Cejudo, E. (2018). Territorially unequal rural development: The cases of the LEADER Initiative and the PRODER Programme in Andalusia (Spain). *European Planning Studies*, 26(4), 726-744. <http://dx.doi.org/10.1080/09654313.2018.1424118>
- Chivu, L., Andrei, J. V., Zaharia, M., & Gogonea, R. M. (2020). A regional agricultural efficiency convergence assessment in Romania – Appraising differences and understanding potentials. *Land Use Policy*, 99, 104838. <http://dx.doi.org/10.1016/j.landusepol.2020.104838>
- Chmieliński, P., Faccilongo, N., Fiore, M., & La Sala, P. (2018). Design and implementation of the Local Development Strategy: A case study of Polish and Italian Local Action Groups in 2007-2013. *Studies in Agricultural Economics (Budapest)*, 120(1), 25-31. <http://dx.doi.org/10.7896/j.1726>
- Dachin, A. (2008). Rural development – a basic condition for narrowing regional disparities in Romania. *Romanian Journal of Regional Science*, 2(2), 106-117.

- Dimick, J. B., & Ryan, A. M. (2014). Methods for evaluating changes in health care policy: The difference-in-differences approach. *Journal of the American Medical Association*, 312(22), 2401-2402. <http://dx.doi.org/10.1001/jama.2014.16153>
- Emas, R. (2015). The Concept of Sustainable Development Definition and Defining Principles Retrieved from [https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015\\_SD\\_concept\\_definiton\\_rev.pdf](https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015_SD_concept_definiton_rev.pdf)
- Esparcia Perez, J. (2000). The leader Programme and the Rise of Rural Development in Spain. *Sociologia Ruralis*, 40(2), 200-207. <http://dx.doi.org/10.1111/1467-9523.00142>
- Feldman, M., Hadjimichael, T., Lanahan, L., & Kemeny, T. (2016). The logic of economic development: A definition and model for investment. *Environment and Planning. C, Government & Policy*, 34(1), 5-21. <http://dx.doi.org/10.1177/0263774X15614653>
- Gertler, P., Martinez, S., Premand, P., Rawlings, L., & Vermeersch, C. (2011). *Impact Evaluation in Practice*: The World Bank.
- Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2), 254-277. <http://dx.doi.org/10.1016/j.jeconom.2021.03.014>
- Goschin, Z., Constantin, D., Roman, M., & Ileanu, B. (2008). The current state and dynamics of regional disparities in Romania. *Romanian Journal of Regional Science*, 2(2), 80-105.
- Hammer, J., & Pivo, G. (2017). The Triple Bottom Line and Sustainable Economic Development Theory and Practice. *Economic Development Quarterly*, 31(1), 25-36. <http://dx.doi.org/10.1177/0891242416674808>
- Jalalian, H., Naimabadi, N., & Brunori, G. L. (2021). An Overview on Success of the LEADER Approach in European Countries. *Journal of Research and Rural Planning*, 10(1), 63-79. <http://dx.doi.org/10.22067/JRRP.V10I1.88362>
- Kim, T. H., & Yang, S. R. (2016). Construction of The Rural Development Index: The Case Of Vietnam. *Journal of Rural Development*, 39, 113-142.
- Krievina, A., Leimane, I., & Melece, L. (2015). *Analysis of economic aspects of LEADER projects in Latvia*. Proceedings of the 2015 International Conference “Economic Science for Rural Development.
- Mihai, C., Ulman, S. R., & David, M. (2019). New Assessment of Development Status among the People Living in Rural Areas: An Alternative Approach for Rural Vitality. *Scientific Annals of Economics and Business*, 66(2), 167-192. <http://dx.doi.org/10.47743/saeb-2019-0013>
- Mitrică, B., Șerban, P., Mocanu, I., Grigorescu, I., Damian, N., & Dumitrașcu, M. (2020). Social Development and Regional Disparities in the Rural Areas of Romania: Focus on the Social Disadvantaged Areas. *Social Indicators Research*, 152(1), 67-89. <http://dx.doi.org/10.1007/s11205-020-02415-7>
- Nafziger, W. (2012). What Is Economic Development? In E. W. Nafziger (Ed.), *Economic Development* (5 ed., pp. 14-48). Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9781139028295.003>
- Neto, P., Santos, A., & Serrano, M. M. (2014). Public policies supporting local networks for entrepreneurship and innovation: Effectiveness and added value analysis of LEADER program in the Alentejo region of Portugal. *International Journal of Entrepreneurship and Small Business*, 21(3), 406-435. <http://dx.doi.org/10.1504/IJESB.2014.060900>
- Nițescu, A. (2014). Aspects of rural development in Romania. *Annals of the University of Petrosani. Economics*, 14(1), 251-258.
- Olar, A., & Jitea, M. I. (2021). Counterbalancing the Development Territorial Disparities in the Implementation of the Community-Led Local Development EU Approach in Romania. *Land (Basel)*, 10(9), 970. <http://dx.doi.org/10.3390/land10090970>
- Onofrei, M., Siriteanu, A.-A., & Doacă, E.-M. (2023). The Impact of Environmental Effects of Sustainable Development on Direct Investments. *Scientific Annals of Economics and Business*, 70(SI), 33-42. <http://dx.doi.org/10.47743/saeb-2023-0017>

- Opria, A. M., Roșu, L., & Iașu, C. (2021). LEADER Program—An Inclusive or Selective Instrument for the Development of Rural Space in Romania? *Sustainability (Basel)*, *13*(21), 12187. <http://dx.doi.org/10.3390/su132112187>
- Pufahl, A., & Weiss, C. R. (2009). Evaluating the effects of farm programmes: Results from propensity score matching. *European Review of Agriculture Economics*, *36*(1), 79-101. <http://dx.doi.org/10.1093/erae/jbp001>
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*(1), 41-55.
- Roth, J., Sant'Anna, P. H. C., Bilinski, A., & Poe, J. (2023). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. *Journal of Econometrics*, *235*(2), 2218-2244. <http://dx.doi.org/10.1016/j.jeconom.2023.03.008>
- Ruiz Pulpón, Á. R., & Cañizares Ruiz, M. D. C. (2020). Enhancing the Territorial Heritage of Declining Rural Areas in Spain: Towards Integrating Top-Down and Bottom-Up Approaches. *Land (Basel)*, *9*(7), 216. <http://dx.doi.org/10.3390/land9070216>
- Ryan, A. M., Burgess, J. F., & Dimick, J. B. (2015). Why We Should Not Be Indifferent to Specification Choices for Difference-in-Differences. *Health Services Research*, *50*(4), 1211-1235. <http://dx.doi.org/10.1111/1475-6773.12270>
- Sandu, D. (2011). Social Disparities in the Regional Development and Policies of Romania. *International Review of Social Research*, *1*(1), 1-30. <http://dx.doi.org/10.1515/irsr-2011-0001>
- Schumpeter, J. A. (1934). *The Theory of Economic Development: An Inquiry Into Profits, Capital, Credit, Interest, and the Business Cycle*: Harvard University Press.
- Schumpeter, J. A. (1961). *The Theory of Economic Development: An Inquiry Into Profits, Capital, Credit, Interest, and the Business Cycle*: Oxford University Press.
- St. Clair, T., & Cook, T. D. (2015). Difference-in-differences methods in public finance. *National Tax Journal*, *68*(2), 319-338. <http://dx.doi.org/10.17310/ntj.2015.2.04>
- Staffa, S. J., & Zurkowski, D. (2018). Five Steps to Successfully Implement and Evaluate Propensity Score Matching in Clinical Research Studies. *Anesthesia and Analgesia*, *127*(4), 1066-1073. <http://dx.doi.org/10.1213/ANE.0000000000002787>
- Stoustrup, S. W. (2022). Assessing the Potential of Social Innovation and Local Agenda-Setting within Rural Development Programmes: Insights from Austrian Leader Regions. *European Countryside*, *14*(4), 638-657. <http://dx.doi.org/10.2478/euco-2022-0032>
- Thavaneswaran, A., & Lix, L. (2008). Propensity Score Matching in Observational Studies. Retrieved from [https://www.umanitoba.ca/faculties/health\\_sciences/medicine/units/chs/departamental\\_units/mchp/protocol/media/propensity\\_score\\_matching.pdf?fbclid=IwAR1d3Ue2CBTriUn4tqAOuUlJLWl5eiEnMNpXKsX1TPsRiJsg3DI\\_-pnZsLI](https://www.umanitoba.ca/faculties/health_sciences/medicine/units/chs/departamental_units/mchp/protocol/media/propensity_score_matching.pdf?fbclid=IwAR1d3Ue2CBTriUn4tqAOuUlJLWl5eiEnMNpXKsX1TPsRiJsg3DI_-pnZsLI)
- Turek Rahoveanu, A., & Turek Rahoveanu, M. M. (2013). Socio-economic development prospects of rural areas in the context of application of LEADER program in Romania. *Scientific Papers. Series Management, Economic, Engineering in Agriculture and Rural Development*, *13*(4), 295-302.
- White, H. (2010). A Contribution to Current Debates in Impact Evaluation. *Evaluation*, *16*(2), 153-164. <http://dx.doi.org/10.1177/1356389010361562>

## Notes

<sup>1</sup> LHDI – local human development index computed by sociologist Dumitru Sandu. The index measures the level of development for each of the communes in Romania and is calculated based on the human, health, vital and material capital of localities (Sandu, 2020).