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PhD THESIS

Public investments in basic infrastructure and local economic development in the communes from the North-Western Region of Romania from 2002 to 2014

- SUMARY -

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Key words: public investments, infrastructure, economic growth, local economic development, indexes of local economic development, non-refundable programmes/grants, rural area, counterfactual research, rank of communities, community size, direct access to European and national roads, education level, water, sewage, and local roads network.

Abstract

The thesis endeavors to be an empirical investigation of the relation between the local economic development of the communes from the North-Western Region of Romania and a series of factors considered to be determinants of this development, among which special attention was paid to investments in local basic infrastructure. Starting from the assumption that public investments in infrastructure stimulate economic development, the thesis tries to prove the extent up to which the economic development of the communes from the North-Western Region was influenced, among others, by the investments in local basic infrastructure. The financing took place through a non-refundable programme/grant financed from EU money (pre-adhesion funds) (Measure 2.1 of the SAPARD program) and a national program having almost similar objectives as Measure 2.1, namely GO no. 7/2006.

Using quantitative methods, the thesis offers proofs and some novelty elements with regard to the impact of basic infrastructure investments (water, sewage, and road networks) as well as of other determining factors for local economic development – location, size, level of population's education, connection to main transportation networks, upon the local economic development of the communes from one of the regions of Romania.

Studies show that there is a causal relation between infrastructure investments and economic development; however, in addition to the mutual character of the causality, the impact of these investments depends on a series of factors such as existing infrastructure, type of financing and management of investments programs, the network character of infrastructure elements, coordination between regions and states, legal framework, corruption level, etc. With regard to the relation between infrastructure investments and local economic development, studies show that these investments play an essential role in development, but also with regard to the increase of the quality of life. In the rural area, these investments are prerequisites for access to basic public services, access to markets for distribution and purchasing of production factors.

The findings show, among others, which the main indicators for measuring local economic development of communes are and how these indicators can be aggregated into indexes of local economic development used for assessing and comparing the impact of investments programs in basic infrastructure from the rural are. Among the objectives of these programs we can also find the stimulation of economic development. Main findings also show which the type of infrastructure is most likely to significantly influence local economic development. Finally, the findings show other factors which are considered determinants of local economic development. The thesis offers some useful elements for justifying infrastructure investment decisions within the rural area and the prioritization of infrastructure investments in this space. However, the main findings need to be understood also in the context of the limitations of the research, which concern the character and the specificity of the data used, the assumptions underlying the research techniques, the number and robustness of the built indicators, the lack of qualitative analysis, etc.

Context of research

Within the context of the economic crisis which started in 2008, the topic regarding the role of public investments in supporting economic growth occurred on the public agenda. The debate among economists regarding this topic was rekindled, important economist (Krugman, 2008, Feldstein, 2008) arguing for increasing the level of public investments as a means for ending the crisis.

Even though Romania has been significantly affected by the economic crisis, the ratio of capital investments in GDP was higher in the period 2009-2012 compared to 2007. Thus, among the states which entered EU in 2004 and 2007, for the period 2007-2014, Romania had the biggest budgetary allocations as percentage of GDP for infrastructure investments. Despite this, Romania still faces even today a significant infrastructure deficit. The infrastructure stock gained after the fall of the communism is small, even though the value of the capital investments is relatively high. The majority of the infrastructure spending during this period was targeted towards the maintenance and repairing of the existing infrastructure and less towards the development of new infrastructure networks. No matter the type of infrastructure (new objectives or maintenance of the old ones) we are referring to, a significant problems is represented by the relatively high cost per unit of infrastructure (km, m^2 and ml, etc.) compared to the cost of raw materials and of labor force in Romania. Some measures were taken in order to mitigate this problem by establishing costs standards starting with 2010.

Another critical problem regarding the situation of infrastructure in Romania is the lack of a clear vision and of a global approach regarding the development of the infrastructure networks. The electoral cycle and the change of governments implies that priorities in the area of infrastructure change as well. There are many examples in the area of transport infrastructure – railroads, highways, which proves that whatever was built so fur was not part of a coherent national development program for infrastructure, but rather it represented dreams and ambitions of decision-makers from ministries such as Ministry of Transportation, Ministry of Regional Development, and Ministry for Big Projects, etc. This explains why certain big projects were initiated, then they were stopped and other projects were initiated and so on. Lack of impact studies of the potential

impact of started projects is an explanation regarding hesitations and continuous changes in terms of objectives from one minister to the other.

If at national level the infrastructure deficit is obvious, in the rural area, it is huge. In 2011, only 7% of the local roads were modernized and 29% of them were dirt roads. In 2015, 52% of the rural population was not connected to a network for potable water and in 2014 only 5% of rural households had sewage (3 out of 5 houses from rural area do not have a toilet indoor – INS, end of 2015), only 52% of the population benefits from garbage collection services in 2015, and 663 of rural communities were connected to a network for gas distribution in 2015. The data mentioned provide a relatively accurate picture of the rural communities from the standpoint of infrastructure endowment. Most rural communities encounter in addition other structural challenges: the need to change the traditional way of production (traditional household), the need to make more efficient and diverse the economic activities, competition with other markets from the European Union, demographic decline due to emigration and to negative birth rates, aging of population, increase of the demand for services for elderly, decrease of activity rate and of participation in the labor market, decrease of the tax base, inability to cover operational expenses, incapacity to build and/or maintain local infrastructure.

Problem definition

In order to help rural communities deal with some of the challenges described above (underdevelopment, low quality of life), the state and the European Union have developed policies and programs meant to revitalize this space. Some of these programs concerned basic infrastructure, the main argument being that such investments in infrastructure (water, sewage, local roads, bridges, etc. will stimulate local economic development as well as production activities, commerce, tourism and will also contribute to improving the quality of life. As a matter of fact these goals were included among the objectives (main or secondary) of the EU cohesion programs. In order to assess the extent up to which such programs have contributed to local economic development and have reached their objectives, our research tries to estimate the impact of two financing programs for local infrastructure in the communes from the North-Western Region. The two programs are: Measure 2.1 of the SAPARD program implemented during 2002-

2009 and GO no.7/2006 – allocations from 2006 to 2011.

One of the general objectives of Measure 2.1 of the SAPARD program was „the improvement of the current status of infrastructure in rural areas, enhancement of the living conditions and of the working standards and maintaining of the population in rural areas". Going more in-depth, two of the specific objectives of Measure 2.1 are: „ support of the economic, commercial and touristic activities through the development of basic infrastructure" and „improvement of the sanitary conditions in accordance with current standards of the inhabitants and of the productive activities undertaken". In the case of the Development program for infrastructure and sports facilities in rural areas (GO no. 7/2006), its main goal is „improvement of the social, economic, cultural and sportive situation of the inhabitants from rural areas by means of increasing the agricultural market, local investments, public services and the reduction of school drop outs".

Even though the goals and objectives of these programs were clearly set, up to now none of the entities/agencies responsible for their implementation and management (Agency for Payments for rural Development and Fishing, turned into Agency for the financing of rural investments or the Ministry of Agriculture and Rural Development under Measure 2.1 of the SAPARD program; Chancellery of the Prime minister and then Ministry of Regional Development and Tourism or Ministry of Regional Development and of the interior under GO no. 7/2006) did not conducted an evaluation of the impact of infrastructure investments by reference to their goals, namely stimulation of the local communities which benefited from these financing schemes. All these developments are taking place in the context in which, at national level, the value of investments done through Measure 2.1 of the SAPARD program amounted for 600,300,647.49 lei and had more than 743 beneficiaries (communities), while the value of investments done through GO no. 7/2006, during the period 2006-2011, amounted for 3,394,040,000 lei and had over 1739 communities benefiting from it.

For our study we selected for assessment the communes from the North-Western Region, given the fact that we are mostly familiar with it and this would facilitate data collection and processing. The assessment period is 2002-2014. Thus, in the North-Western Region, 67 communes received financing under Measure 2.1 of the SAPARD Program – 29 communes received investments for roads, 24 for water infrastructure, 12 for sewage infrastructure, and 2 for

flooding prevention infrastructure. 31.34% of the projects have been completed until the end of 2006 and 68.65% during the period 2007-2009. Through GO no.7/2006 funds amounting up to 486,289,000 lei were allocated during the period 2006-2011. A total of 224 rural communes have beneficiated from these funds while 179 out of the 403 from the region did not receive any financing). 121 communes developed potable water infrastructure, 44 communes developed sewage infrastructure, while other 59 communes built bridges for pedestrians. With regard to these projects there are no data available for year 2011 regarding their status – we do not know if they were completed or not, the available information concerns the allocated sums and the objective of the investment.

In assessing the impact of these programs we took into consideration other determining factors of local economic as well, such as the location or position of the commune, direct access to a European road, direct access to a national road, and education level of population.

Thus, in order to increase the level of comparativeness of the analysis of the economic development of the communes, we chose to group the communes from the region into six categories/ranks, based on their location/the influence cities have upon them. We chose this grouping modality in order to make the analysis more nuanced, by taking into consideration a determining factor for development, according to the growth pole theory, which is proximity to big urban centers. This grouping allows us to conduct an analysis which compares communes which are somewhat similar, at least with respect to proximity to cities, as well as some exogenous factors of local economic development. From the standpoint of comparing the communes, we feel it is wrong to compare a community with a large population, located next to a big city with a commune with a small population, and isolated from cities (for examples communes Apahida, Baciu from Cluj County and communes Beliș, Săcuieu from the same county).

With regard to the monitored period (2002-2014) I have conducted three complementary studies, each of them covering a slightly different period of time: one study for 2007-2014 period, another study for the 2002-2014 period, and a third one for the 2002-2011 period. With regard to the base year (2002 or 2007) we will explain the reasons for this choice later one. With regard to year 2014, the reason for choosing this period is because as argued in the studies presented in chapters 2 and 3, investments in infrastructure do not produce significant impacts immediately but rather on the medium and long term (more than 3 years).

As already mentioned, starting from the premise that not only infrastructure investments but also access to infrastructure (national, European – roads, airports, etc.) stimulate local economic development, in our study we also tried to see if there is a correlation between local economic development of the communes and their direct access to a European or national road, given the fact that these types of roads represent key infrastructure elements in ensuring connectivity, access to resources, use of local resources, and competition enhancement of those communities.

Finally, due to the fact that education level was considered a key factor for local development, in the last study conducted we assessed the way in which the ratio of population with a higher education degree out of the total population, together with other relevant factors (location of the commune, direct access to a national or European road, completion of a local infrastructure project, type of infrastructure built) influence the development of the local economy.

Goal of thesis

The goal of this research was to establish if there is a relationship between basic infrastructure investments from the rural communities (investments made out of non-refundable programme) and local economic development of the communes from North-Western Region. Starting from the description of the problem (please see above) and following the main research goal, our research intends to offer answers to the following general questions:

- How realistic are the objectives of programs aiming at the financing of infrastructure in rural communities from the standpoint of local economic development?
- Are there any differences with regard to local economic development among communities based on the existence of local basic infrastructure investments, the source of funding (EU structural funds versus national financing), location of the communes, connection with the main European and national transportation networks, education level of population, etc.?
- Should there be different financing criteria for rural communities with respect to infrastructure investments, determined based on several factors which are important in light of local economic development of rural communities?

Reaching the research goal and offering some answers to these general questions implies setting up some specific objectives and identifying ways to reach them. The Concrete manner in which objectives can be reached is given by providing answers for the research questions. The specific objectives of the research as well as the research questions are presented in the Table below:

Table 1: Research objectives and questions

Specific research objectives	Specific research questions
1. Development and testing of an instrument (index) for measuring the level of local economic development of communes from the North-Western Region which could be used at national level as well as the development of a ranking of communities based on the mentioned index	1. Which are the most significant indicators of local economic development for the Romanian communes and which should be monitored after the implementation of projects by the entities which manage the programs for the non-reimbursable financing of infrastructure investments?
	2. Which is the optimal manner for the aggregation of significant variables for local economic development in order to calculate an index for local economic development?
2. Identification and empirical exploration of possible connections between local economic development of the communes from the North-Western Region and infrastructure investments financed from non-refundable programme.	3. Is there any difference regarding the local economic development (measured with multiple instruments) of communes from the North-Western Region which implemented infrastructure investments projects financed through Measure 2.1 of SAPARD Program and those which did not implement such projects? 4. Is there any difference regarding the population evolution of communes from the North-Western Region which implemented infrastructure investments projects financed through Measure 2.1 of SAPARD Program and those which did not implement such projects? 5. Is there any difference regarding the local economic development (measured with multiple instruments) of communes from the North-Western Region which implemented infrastructure investments projects financed through Measure 2.1 of SAPARD Program, based on the different types of investments made (water, sewage, roads)?

	6. Is there any difference regarding the local economic development (measured with multiple instruments) of communes from the North-Western Region which implemented infrastructure investments projects financed through GO no. 7/2006 and those which did not implement such projects? 7. Is there any difference regarding the local economic development (measured with multiple instruments) of communes from the North-Western Region which implemented infrastructure investments projects financed through GO no. 7/2006, based on the different types of investments made (water, sewage, roads)? 8. Is there any difference regarding the local economic development (measured with multiple instruments) of communes from the North-Western Region which implemented infrastructure investments projects financed through GO no. 7/2006 and those which implemented projects financed through Measure 2.1 of SAPARD Program?
3. Identification and empirical exploration of possible connections between local economic development of the communes from the North-Western Region, location (influence of cities), direct connection to the national and European road transport infrastructure and the educational level of the population.	9. What type of infrastructure investments (water, sewage, roads) offers best results (measured using DEL) and under which circumstances (rank of community, access to a European or national road, size of commune, level of education of population)? 10. Which communes developed the most and the least? Which are the characteristics of the former and which are the factors which have influenced the most the local economic development of the communes from the North-Western Region?

In order to offer an answer to these questions and to meet the goal of the research, I have conducted three complementary studies:

- A study which measures and assesses the average rhythm of local economic development (DEL) for the period 2007-2014 for 398 communes from the North-Western Region, based on an index composed of 12 indicators;
- A study which assesses the evolution of 398 communes from the North-Western Region for the period 2002-2011 based on an index regarding local development

that was already tested at national level - Local Human Development Index LHDI);

- A study which measures and compares an index of local economy (EL) composed of six indicators regarding local economy and its efficiency over a longer period of time, 2002-2015, for 356 communes from the North-Western Region.

For completing the three studies I used several quantitative methods, using Excel and SPSS software. For the study concerning the average rhythm of DEL during the period 2007-2014, I used multivariate analysis, correlation, regression and factorial analysis. For the second study regarding local development measured using IDUL for the period of 2002-2012, I used multivariate analysis and the technique difference-in-differences, then tests measuring the significance of differences and regression tests. For the last study I used factorial analysis, difference-in-differences, significance tests, correlation and regression. If univariate and multivariate analysis, as well as correlation, regression and factorial analysis are well known and used techniques in social sciences, difference-in-differences is a technique used mainly for assessing the impact of policies and programs.

Thesis relevance

The study of the causal relationships between the local economic development of the communes from the North-Western Region and a set of factors which are considered as determinants for development offers a broader perspective for the justification of public policies targeting the economic development of the rural areas from Romania. This topic is highly important in the context of the structural challenges the rural areas face and when 46% of the Romanian population lives in this space.

Enhancing the quality of life of residents from rural areas is closely linked to economic development, and both of them are linked to a series of factors such as the location of the commune, size of population, level of education and qualification, access to utilities, connectivity, etc.

The causality of the relationship between economic development, quality of life on the one hand and the factors mentioned above is acknowledged by political decision-makers and public authorities, the proof being the programs developed in this direction. The problem is that, despite numerous communes have benefited from programs and policies, the outcomes are lacking and no

studies measuring the effectiveness of these policies were made. Thus, the thesis brings a novelty element by evaluating the causal relationships between a series of factors considered determinants of local economic development and local economic development itself. The thesis strives to assess the way in which non-reimbursable programs for basic infrastructure in the rural areas have contributed to the local economic development of the communes, however in the same time taking into consideration other determinants of economic development. The findings of the research can be used to justify policies and programs which target local economic development, and subsequently the enhancement of quality of life and revitalization of the rural space from Romania.

Finally, through the identification and selection of appropriate indicators for the measurement of local economic development of communes from Romania as well as the determining of the optimal manner for the aggregation of the indicators into indexes of local economic development, the thesis contributes to the development of the specialized literature in an area which is little explored at international level and at all at national level.

Thesis structure

The thesis is structured in **seven chapters**. **The first chapter** is an introductory one, offering a series of preliminary data mostly on the context around the main topic of the thesis, the choosing of the topic, main research objectives, relevance for the field and the actual structure of the research.

The second chapter starts with an introduction on public investment, dealing with types of investments and then focusing on public investments in infrastructure and the characteristics of public infrastructure in general. A comparison between public investment and private investment is made in order to highlight the guiding principles of the former. The chapter continues with a detailed analysis of the existing typologies of public investments in the context of globalization and the knowledge society, with the purpose of clarifying the differences between soft and hard investments. Furthermore a reference is made on the important role and impact that both soft public investments (investments in education, research and development, increasing access of skilled individuals to the labor market etc.) and hard public investments (mostly public infrastructure) have on society. Moving on to hard investments, both a definition and a classification is made regarding the concept of infrastructure. In this section the thesis tackles issues on classifying and measuring

infrastructure capital and the challenges brought up by doing such evaluations, especially in a comparative multi-country perspective.

The third chapter deals with the complex relation between public investment in infrastructure and economic development and indirect (positive effects) like poverty reduction, inequality reduction. A comprehensive literature review on this topic highlights the macroeconomic impact of such measures, the main factors that can have an influence on the impact of such investments, the reciprocal nature of the relation between public investment in infrastructure and economic development, and the contribution to the inequality and poverty reduction. The effects of such investments are analyzed both at macro and micro economic level, with a focus on macroeconomic effects, specifically how investments in infrastructure impact national and regional economic development, using general GDP growth and GDP per capita as a proxy variable for economic development.

Chapter four continues the discussion regarding the link between infrastructure investment and economic development, but moves from the macroeconomic perspective to the local one. At local level however, GDP has little relevance as indicator for development and thus new variables should be used. This chapter is focused exactly on this: defining and explaining the particularities of local economic development especially in rural areas and the way in which, in this specific (local) context, infrastructure can be a major contributing factor to development. Based on an ample literature review multiple indicators, specific for local economic development, are identified, explained and aggregated into bigger dimensions of measurement, which will be used in the research.

Chapter five highlights the main financial programs (non-refundable programmes) that have been implemented for public infrastructure investments, in Romania in the rural areas, between 2002 and 2014. A short analysis on the specifics of rural communities in Romania is done in order to better understand the context, research objectives and hypothesis and the link with the state programs. Romania benefited from 4 major non-refundable programmes for infrastructure development in the rural areas: two of them are based on European Funds – Measure 2.1 from SAPARD and Measure 3.2.2 from the National Plan for Rural Development (PNDR 2007-2014) and two nationally funded programs – Program for Rural Infrastructure Development (OG no. 7/2007) and the National Plan for Local Development (PNDL).

Chapter six includes the empirical research of the thesis. I chose two out of the four programs, for this particular analysis: Measure 2.1 from the SAPARD program and OG no. 7/2006. The chapter contains a detailed description of research objectives and assumptions, methodology and finally 3 specific empirical studies all meant to evaluate the impact of the two aforementioned programs on local economic development by including another 3 factors of influence – specifically localization/position of the commune, access to transportation infrastructure (European, national roads) and educational stock. For the actual impact evaluation I sued both self-constructed measuring instruments along with already made and tested indices for local economic development (empirically tested and validated in the research literature).

Chapter seven puts forward the main conclusions of the study, in relation with the overall research objectives and the initial assumptions. Direct reference is made on the contribution this works bring to the field along with the limits of this research and further or potential follow up research.

Conclusions and future research directions

As mentioned earlier, 3 empirical research studies were included in this thesis. I will put forward the main results and conclusions from these studies.

The first study regarding the average growth rate of LED (local economic development) highlights the main characteristics of the indicators that were identified as relevant for economic development. They were aggregated for the purpose of measuring the average LED growth rate. Besides this, the analysis also focused on the relation between the aforementioned indicators and other variables considered to be relevant for LED, including investments made in the local infrastructure though non-refundable programmes. The methods used for aggregating the indicators *highlighted the methodological superiority of factor analysis* based on the principal component analysis which offered the possibility to eliminate the indicators with low or no relevance. *The results of this study, concerning the average LED growth rate in rural areas, indicated a significant but weak causal relationship between average LED growth rate of the analyzed communes and the investments in local basic infrastructure made through OG 7/2006.* Furthermore, the results of this research confirm that investments made in the water and sewage infrastructure (financed through OG no. 7/2006) are a good predictor for LED. **However, the main**

predictor for the average rate of LED growth is the rank of the commune – in other words the influence that nearby larger cities have over the communes.

The second study, done by using the IDUL values, focused on identifying a causal relation between the five factors considered as relevant for LED and the actual local development measured through the IDUL scores for 2011 and 2012. The study results point to a relation that is not statistically significant, between the communes that did investments made in infrastructure through the M2.1 SAPARD program and those that didn't. With regards to the nature of these investments, *the results of the study point (in this case) to a statistically significant relationship – meaning a statistically significant difference* – between communes that invested in water and sewage infrastructure (through the M2.1 SAPARD program) and those that didn't. These differences, although they are decreasing (with 0.80644) in 2011, remain statistically significant. With regards to investments made through OG 7/2006, the results of the study confirm the existence of *a statistically significant relation with regards to differences in IDUL values between communes that made investments in local infrastructure, through OG no. 7/2006 and those that didn't*. Furthermore, looking at the type of investment, according to our study results, the communes that invested in water and sewage infrastructure, have evolved (statistically) much better compared to those that did not invest in this particular type of infrastructure.

The third study, which uses factor analysis, is based on a self-constructed index of local economic development, which has 6 main indicators, index that was then measured throughout the 2002-2014 period. The results confirm the existence of very limited (not statistically significant) differences between communes that benefited from the M2.1 SAPARD funding and those that didn't (a similar result with the second study). Furthermore, this study points to much larger, statistically significant differences, regarding the local economic development, between communes that benefited from public investments through OG no. 7/2006 and those that didn't (similar to the results of the second study). We found the same results (as in study 2) when looking at the nature or type of infrastructure investment – the communes who invested specifically in water and sewage infrastructure performed significantly better – these relations being tested through a regression, which also highlighted the importance of rank, investments through OG no. 7/2007 and direct access to European roads along with investments in the sewage infrastructure (through M2.1 SAPARD) and investments in the water access infrastructure (through OG no. 6/2007) as the main

predictors of LED. Finally the results of the third study confirm the causal relation between the existing educational stock of the local population (especially the percentage of the higher education population) and local economic development. I tested this again through a regression model which confirmed that adding this (educational stock) as an explanatory variable increases the explanatory power of the model.

In relation to the initial research hypothesis, I conclude that 4 out of 5 initial assumptions have been confirmed totally or partially (1, 3, 4 and 5) while one (2) has been infirmed (see table below).

Table 2: Research hypothesis and results

Hypothesis	Test	Comments
1. The communes that implemented public infrastructure investments through non-refundable financial programs witnessed a higher rate of local economic development (LED) compared to those that did not do such investments.	**Partially confirmed**	The communes that did public infrastructure investments through non-refundable financial programs, did indeed have a higher rate of LED. However, these differences are dependent (between LED rate) are dependent on the nature of financing, the period in which the monitoring was done, type of infrastructure invested in, type of index used for economic development measurements, rank or location of the commune, size of the commune.
2. Investments in the local infrastructure made through national funds have a lower influence/impact on LED compared to projects financed through EU grants.	**Infirmed**	Surprisingly, investments made through national governmental funds have a significantly bigger (positive) influence on LED. Results are even more surprising when taking into consideration the actual amount of funds, with non-refundable European funds (M2.1 SAPARD) being 1.77 more (in actual amount (compared to nationally financed projects in infrastructure (OG 7/2006), with the observation that for projects financed through national funds, we have no information whether they were finalized. Going forward with this, it is interesting to see that the period of implementation for nationally financed projects was shorter, compared to European funded ones and this goes counter the argument that the effects of such investments will be seen only in medium to long term. Finally, the results (positive impact of projects financed through national funds OG no. 7/2006) are surprising given the negative reputation these types of

		projects have (compared to the European funded projects which are seen in a more positive light). The general press, the Account Court and NGOs have signaled repeatedly the problems related to the management of projects through these funds: lack of transparency, discretionary decisions and allocation of funds, cronyism, corruption, uncompetitive projects and so on.
3. Local economic development (LED) is dependent on the nature of infrastructure investment (water, sewage, local roads, bridges, walking alleys) made.	**Validated (in great deal)**	Investments made in water access infrastructure but especially in sewage infrastructure have a greater impact than other types of infrastructure investment (road, walking alleys, and bridges). From a pure economic point of view this type of investments are fully justified. A functional water supply and sewage network is essential for any type of business, especially for production industries where there is a condition for respecting the environmental protection regulations. The production process cannot be imagined without a functional water supply and sewage network to evacuate any disposable residues. While not having access to proper roads may be a hindrance for business not having access to water supply and sewage makes any kind of business activity impossible.
4. The communes located in the influence zone of bigger cities, with a larger population and access to transportation infrastructure, have a higher rate of LED compared to those that are further away and don't have access to this type of infrastructure.	**Validated (in great deal)**	We observed a direct link between rank of the commune (or location), the positioning near a big city and the growth rate of LED. In other words, the communes that are closer to big cities have evolved or grow fastest (compared to communes that are further away and outside the influence zone of cities). Also, the bigger the actual communes are, the faster the LED rate. Finally the communes with direct access too road infrastructure in the form of European Roads have a faster LED growth rate (access to national roads were found to be not statistically significant in this issue).
5. The educational	**Validated**	The educational stock of the population of the

level of the commune's population is a factor of influence in LED.		commune, especially individuals with higher education, has a positive and statistically significant influence on LED.

Contributions to the field

This thesis can contribute to the field of local economic development with several elements:

(1) The identification and selection of indicators relevant for measuring LED, especially its economic dimension, is done and these indicators can be used in future research on evaluating the impact of different programs or policies that have LED as an objective.

(2) The method used for aggregating the indicators is empirically tested and offers the possibility to eliminate those indicators that are not relevant in a specific context. With regards to both the indicators and the way in which they were aggregated can be optimized and improved, the current study being one of the first in the field to use this methodology in measuring LED in rural area of Romania.

(3) Identifying a series of causal relations between investments in local infrastructure and local economic development in rural areas of Romania, represents an element of novelty and has high relevance for the field, especially given the well-known problems of the Romanian rural space (low levels of economic development), problems that are directly related to poor local infrastructure. Furthermore, the fact that, through this study, we demonstrate that investments in local water and sewage infrastructure are strong predictors of LED and not investments in roads/transportation infrastructure, is a very relevant piece of information for local decision makers, especially in establishing their investment priorities. A further development of this study at national level would vastly improve the capacity to understand what drives LED in rural areas in Romania and use this information in policy decisions.

(4) The introduction into the model of the rank of the community/commune, aces to road infrastructure (European roads and national roads), and community size of and educational stock, as predictors for LED, also represents an element of novelty in the field. Following up on this research by moving from regional to national level, and using an even more comprehensive set of indicators would lead to results that prove to be extremely relevant when deciding national strategies for development either at national, regional or local level.

(5) The causal relations (demonstrated through this study) between local economic development and investments in local infrastructure, type of infrastructure, rank of community, access to European and national roads, community/commune size, are of high relevance for central decision makers shaping the strategies for rural development. The results of this research confirm, in line with the recommendations made by the WB in 2015, that investments in local infrastructure need to be prioritized based on type of infrastructure: local roads, social infrastructure, sewage and water supply, county roads, and for each type of infrastructure the criteria for evaluation need to be defined in accordance with relevant local variables like size of local population, rate of ageing, financial sustainability, position of the commune and so on. I feel that the results of this research are highly relevant for local decision makers as they can be used in order to prioritize appropriately any investments in local infrastructure so that it has the biggest (positive) impact in time. By demonstrating the importance of investments in water supply and sewage infrastructure, because of their positive impact upon LED, this study can be used for evidence based decision making at local level (both regarding methodology of evaluation and criteria used)

Limits of the research

The main limits of the research are invariably linked to the nature of the data used. In the case of projects financed through OG no. 7/2006, there are several issues. First, one limit refers to the lack of information regarding the actual outcomes of these projects – whether they were finalized or not until the official deadline which was 2011 – for such a project the first condition of effectiveness is that the project is finalized and the infrastructure is in place. For a better and objective comparison, ideally we should have projects from the same period (meaning until 2009) from both categories – OG no. 7/2006 and M2.1 SAPARD – but this was evidently not possible as the programs ran in slightly different time periods.

Another limit is given by the assumptions on which the difference-in --differences (DD) technique, used in this study, referring to the evolution in time of treated and untreated groups. Furthermore, the fact that projects included I in the study, financed through any of the two financial programs, did not end in the same year, but rather projects financed through M2.1 SAPARD cover the 2004-2009 period while projects financed through OG 7/2006 cover the 2000-2011 period, is

also a technical limit, ideally we should have projects with an identical time span.

The quality of research can be influenced by the reduced number of indicators and the actual dimensions created through aggregation and reflected in either the LED index or the EL index. Although a more comprehensive approach would be ideal, this was not possible because of the scarcity of existing data regarding the communes from Romania. Ideally a single index for LED should be constructed for each year in the period studied, 2002-2014, using the difference-in-differences techniques.

Finally, the lack of a qualitative component of this research is another limit, a series of interviews with key stakeholders and decision makers at local level from the communes included in the study could bring up important and relevant information regarding the studied phenomenon which a quantitative approach does not offer.

Future research directions

The main direction of research, starting from the results of this study would be: using propensity score matching (PSM) to evaluate the evolution of the EL index in the region. Furthermore, testing other ways of aggregating the indicators for EL and LED, would be a welcomed path of research.

Testing the robustness of the indicators used in constructing the two indexes (EL, LED) is also something that could be done in the future along with identifying potential ways to improve the accuracy by introducing other variables in the index. This could be followed by extending the analysis to national level, to have a better picture for the entire country on local economic development in rural areas.

The development of the LED index, by introducing other relevant indicators and using it to measure the impact of Measure 322 from PNDR 2007-2014, both at regional and national level, **should be the main research focus in this field**.

Finally, measuring the costs associated with local infrastructure investments projects, in relation to average costs or standard costs comparison with other countries) would offer valuable information regarding the effectiveness of such projects.

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Rapoarte, ghiduri, acte normative:

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