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**R E V I E W**

**of doctoral thesis entitled: *Dynamics and Spatial Polarisation of Rural Regions in Europe.***

***An Economic Investigation*, written by Barrai Hennebry MEconSc,**

**in the Department of Economic Geogrpaphy, Faculty of Human Geography and**

**Planning, Adam Mickiewicz University in Poznań,**

**under supervision of Prof. Tadeusz Stryjakiewicz and Prof. Maria Ferreiro,**

**Poznań 2021, pp. 127.**

The dissertation submitted for review has been assessed in terms of the methodological, content and formal criteria.

## 1. Assessment of the methodological aspect of the dissertation

The topic selection for the dissertation can be considered appropriate. As the Author rightly notes, the literature on regional and local development is largely dominated by problems of cities and urban areas. Rural areas, on the other hand, are more extensively researched by sociologists, geographers and social planners rather than by economists. Economic models generally treat rural areas as homogeneous. To explain the processes occurring in such areas, some academics attempt to adjust the existing economic development theories or create new ones. However, there is a lack of empirical studies that identify the factors differentiating structurally strong rural areas from those structurally weak. The academic work presented by the Author is part of the aforementioned research gap.

The dissertation aims to:
1) understand the extent to which polarisation of rural regions exists,
2) determine what factors lead to polarisation,

3) establish how shocks (such as the financial crisis of 2008) contribute to this polarisation (how resilient rural regions are).

The title of the dissertation is problem-oriented. Together with research purposes, it points to the subject matter of the dissertation. The time span covers the period between 2000 and 2017, while the spatial scope of the dissertation, in a wider sense, concerns European rural regions, whereas in its narrower sense, which includes in-depth analyses, it pertains to the selected European countries of Austria, Germany, Greece, Ireland and Portugal.

The data used for the analysis are secondary and come from Eurostat, OECD, regional databases and national statistics offices. The dissertation employs a number of research methods, such as simple descriptive statistics, $\beta$-convergence testing, creation of a composite index, creation of a sensitivity and econometric regression analysis.

The layout of contents is also problem-oriented. The dissertation consists of six chapters (the introduction serves as Chapter 1, whereas conclusions and recommendations as Chapter 6), divided into 27 subchapters (additionally, in Chapter 2 and Chapter 4 there are 11 subsections in three subchapters), bibliography, appendix (made up of two tables), list of tables, list of figures, and research activity of the Author, i.e. his seven publications and seven conference presentations. A rather extensive bibliography includes 111 items that are adequate for the chosen research problem.

The order of the chapters is logical and their structure is balanced. In Chapter 1, which is a preface to this doctoral dissertation, the Author defines the research objectives with their justification (also in the context of the RurAction Project, which the dissertation is part of), research questions, as well as source materials, data, research methods, spatial and temporal scopes, along with basic notion, terminology and definitions used in the dissertation (including the concept of total regions in accordance with the European Commission's criteria). Chapter 2 is a literature review, divided into three parts. The first one critically analyses regional growth theories, i.e. Neo-classical Economics, Endogenous Growth Model, New Economic Geography, Stages of Economic Growth and Regional Inequalities, Growth Poles, with reference to rural areas. The second part discusses Neo-endogenous Rural Development, whereas the third one is devoted to Regional Economic Resilience.

The following three chapters (Chapter 3, 4, and 5) are of a more empirical nature, referring more to the respective fragments of Chapter 2. The first of them (Chapter 3) is related to issue of convergence of the researched European rural regions, the second one of them (Chapter 4) concerns structural strength, while the third (Chapter 5) looks at economic

resilience. Chapter 6 contains conclusions form the conducted study and recommendations for further research on rural regions.

To sum up, the topic selection for the dissertation and its justification, the objectives, the material, time-related and spatial scopes, the research methods and data sources used, as well as the layout of the content do not give raise to any objection.

## 2. Assessment of the content aspect of the dissertation

Meeting the dissertation objectives requires the formulation of research questions. The Author divides them into three groups:

1) What are the regional disparities among rural regions in Europe? What is the trend over time and what are the determinants of economic growth in rural regions?

2) What is the structural strength of rural regions and how did it change over time and what socio-economic characteristics influence the structural strength of the rural regions?

3) What is the economic resilience of rural regions – how have they responded to the 2008 crisis? What are the socio-economic characteristics contributing to the resilience and will resilience to the 2008 financial crisis be a predictor of resilience to the COVID-19 downturn?

In Chapter 2, the Author reviews the literature that is important for answering the abovementioned questions. Regarding the first group of questions related to convergence – within the mainstream of regional development theory, he examines five models, showing their essence and the expectations for rural regions. The models include:

- Neo-classisc growth model, assuming the flow of capital to poorer regions, which will lead to convergence between more affluent and poorer rural regions.

- Endogenous growth model, whose main idea is based on an assumption that effectiveness is driven by endogenous factors, such as technology, physical capital, human capital, geography, institutions, which for rural regions signifies a conditional convergence dependent upon endogenous factors.

- New Economic Geography model, giving an insight into the core-periphery relation with reference to transport costs, which in consequence shows a divergence between rich core regions and poor peripheral regions

- Stages of economic growth and regional inequalities model, whose initial phases exhibit income inequalities, while in the latter phases the incomes level out, hence, a divergence is followed by a convergence.
- Growth poles model, stating that growth concentrates in certain points and is then evenly distributed, which signifies an initial divergence followed by some convergence

It is noteworthy that each model is described in an evolutionary way, crediting authors for their input into their development. However, it raises a question whether this list is sufficient, since it could be expanded further, by adding at least two more models:

- A. Marshall and E. Hoover's concept of positive externalities (localisation, urbanisation and agglomeration), which in the forming of those externalities sees a factor of both growth and concentration of economic activity, thus is deemed a reason behind a divergence.
- R. Vernon and A. Markusen's product/profit cycle theory, putting forward a potential convergence despite being based on low-innovative economic activity that is transferred from well-developed regions (or countries) to underdeveloped regions (or countries)

In the remaining part of Chapter 2, the Author also focuses on:

- model of neo-endogenous rural development
- regional economic resilience

Neo-endogenous rural development is a concept derived from rural sociology. A model based on it – useful for answering the second research question – employs evolutionary game theory (EGT) in order to distinguish two player groups in rural regions, i.e. mobile and immobile populations, each of which adopts one of two strategies; the mobile population can remain in rural regions or move to urban areas, whereas the immobile population can either invest locally or abstain from investing.

Proceeding to regional economic resilience, as the Author aptly remarks, there have been many works on the subject, but the concept itself is not clearly defined. He quotes three of its meanings, i.e. the speed of return to one equilibrium point (neo-classical economics), the ability to absorb shocks before altering its structure (Keynesian economics) and the ability to adapt in anticipation of, or response to shocks (evolutionary economics). For the purpose of a further analysis, the Author chooses the definition proposed by R. Martin and P. Sunley: "the capacity of a regional and local economy to withstand or recover from market,

competitive and environmental shocks to its development growth path, if necessary by undergoing adaptive changes to its economic structure and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a fuller and more productive use of its physical, human and environmental resources."

Chapter 3 lays down a theoretical framework for empirical Chapters 3, 4, and 5. Chapter 3 aims to provide an answer to the first group of research questions on convergence. The differentiation of European rural regions is demonstrated by means of four classes, where Class 1 accounts for strong rural regions, Class 2 – relatively strong, Class 3 – relatively weak and Class 4 – weak. The criteria for this division include: GDP per capita (PPS) or employment rate, taking into account the EU's arithmetic mean and standard deviation, provided that strong regions are characterised by values that are no less than the sum of the arithmetic mean and the standard deviation, and weak regions by values less than the difference between the mean and the standard deviation. The typology conducted for the EU shows that 12% of rural regions are strong in terms of their GDP (10% in terms of employment rate), 34% (33%) are relatively strong, 35% (46%) relatively weak and 18% (10%) weak. The largest number of weak rural regions have been found among the new EU member states (accession since 2004) and Greece; the strong ones in Germany and Austria, as well as in areas surrounding those two countries.

The typology referred to the year 2015, while for the years 2000-2017 the tendencies behind the shaping of the GDP mean deviation at EU-27 level, the mean deviation of the EU rural regions' average and the coefficient of variation are shown. All these measures reflect a general trend: a decrease in variation among rural regions, as well as between rural regions and other regions, in the years 2000-2008, i.e. until the 2008 financial crisis, then an increase between 2009 and 2011, and finally a stabilisation from 2011 on.

Combining the typology of rural regions with the analysis of trends in regional inequality formation within particular classes is likely to prove interesting. This would widen the Author's research and more than through the typology only would create justifications for an in-depth analysis of the cases of German and Greek rural regions. As an alternative, the Author could also establish an EU rural area typology for the years 2000 and 2017, and subsequently point to the shift between certain classes. In this, it would be necessary to maintain the number of EU rural regions by including for the year 2000 regions in the countries which joined the European Union later, nevertheless, such a solution is already applied to Figure 3.3.

In order to confirm the tendency behind regional inequalities at the national level, the Author uses the examples of Germany and Greece. The former lies in the heart of Europe and is dominated by strong rural regions (in line with the aforementioned typology), however, after the reunification in 1990, the main axis of differentiation spreads between the west and the east of the country. The latter, on the other hand, is located in the European hinterland, is abound with weak rural regions and sees a core-periphery inequality (Athens together with the capital region of Attiki juxtaposed with the rest of the regions). Greece is also one of the countries that were hit hard in the global financial crisis. The disparities among rural regions (measured by GDP per capita) in Germany in 2000-2017 demonstrate a downward tendency. At the same time, the inequality in Greece was similar until 2010, but since 2011 have been on the rise.

Applying the β-convergence test allows for arriving at a conclusion that in the 2000-2017 period a convergence among rural regions took place, however, to a smaller extent than expected. The convergence effect was stronger in pre-crisis years and decreased significantly after the crisis. Furthermore, one can assume that weak regions were more affected by the 2008 crisis and it has taken them more time to rebound. In Germany, the rural regions are catching up with the urban and intermediate regions, however, rural regions in Greece continue to stagnate.

An OLS regression model, incorporating 14 variables (GDP per capita, Patents, Tourism, Agriculture, Industry, Construction, Retail, Finance, Public Administration, Median Age, Education, Population Density, Hospital Beds, Crime) enables the Author to state that the convergence still occurs in rural regions. It is strengthened by innovation, a considerable share of industry in total employment (though negatively impacted by a high share of trade), the number of hospital beds per population, which is a hallmark of service availability, and, most importantly, the location along with the national setting for rural regions.

Chapter 4 aims to answer the second research question. Its purpose is to fill the research gap recognised by the Author in the subject literature, which concerns the construction of the structural strength of rural regions index, also referred to as the SSRR index. The theoretical basis of the SSRR index is the neo-endogenous rural development concept, in particular M. Petrick's circle of declining rural regions. In addition, the following sub-indices were used:

- GDP per capita (PPS)
- Rate of employment = number of people employed/population (15 to 64 years)
- New Business Creation = (Births − Deaths of enterprises)/population (15 to 64 years)

- Crude rate of net migration

To create the SSRR index, the Author employed the TOPSIS method. Using the arithmetic mean and standard deviation, he distinguished four classes of rural regions: structurally strong, moderately strong, moderately weak, and structurally weak. The SSRR index was calculated for 153 rural regions in 14 EU countries (Austria, Bulgaria, the Czech Republic, Denmark, Estonia, Spain, Finland, Croatia, Hungary, Italy, Latvia, Portugal, Romania, Slovakia) for the period of 2008-2015. Regrettably, it was not possible to keep a similar area (EU27) and period (2000-2017) as the Author did in the case of the convergence of rural regions of Europe. The regression model shows that innovative regions are more often structurally strong. Tourism, as well as construction, retail and finance, seem to have little or no effect. High employment in public administration, though, negatively affects the structural strength of rural regions. In contrast, population density and hospital beds have a positive impact.

Among the regions selected for some more in-depth research, in Austria 23 rural regions were structurally strong and one moderately strong in 2015, while in Portugal - 3 structurally strong, 12 moderately weak and one structurally weak. A detailed study on the southern and south-eastern regions of Austria presents that the circle of declining rural regions can be broken by new opportunities, such as the EU enlargement, and by opening the borders to the neighbouring countries. Rural regions in Portugal cannot count on fundamental geopolitical changes and the consequent impulses, so - according to the Author - in overcoming structural weaknesses they should be supported by state and local government agencies.

Chapter V provides answers to the third group of research questions. In order to measure the resilience of rural regions, the Author uses two measures:

- the resistance index, which measures the reaction of rural regions to the initial shock
- the resistance and recovery index, which shows the effect of both stages of resilience on regional employment

The former was calculated for the years 2008 and 2013, while the latter for 2008 and 2015. The study carried out in 327 rural regions in 22 EU countries suggests that there are 193 resilient regions and 134 vulnerable regions, as per the first index. For the second index, these figures amount to 166 and 161 respectively. An OLS regression analysis indicates that variables such as innovation (patents), a developed tourism sector, and hospital beds as a measure of service availability have a positive impact on resilience, according to both

indicators. The median age of population also plays its part, since rural regions with a younger population tend to be more resilient.

The case study investigated in this chapter concerns the counties of Ireland. Ireland is a predominantly rural country, negatively affected by the financial crisis, but has experienced a strong recovery ever since. Here, the Author sets out to analyse the resilience to both the 2008 financial crisis and the 2020 COVID-19 recession, using a sensitivity index that takes into account domestic unemployment and national unemployment. It has been found that despite the existence of counties resilient to both crises and vulnerable to both crises, the conclusion is that resilience to the financial crisis is not a good indicator of resilience to the COVID-19 crisis.

Another issue addressed by the Author is the influence of a county's population distribution on resilience. With regard to the 2008 financial crisis, there appears to be no such relationship, whereas in the case of the COVID-19 crisis, counties with a higher proportion of population living in areas classified as either 'independent urban towns' or 'rural areas with moderate urban influence' are more resilient.

As far as the conclusions and recommendations are concerned, it is worth stressing that the Author has established interesting answers to all of the research questions, thus fulfilling the set objectives. Hence, the dissertation is of great cognitive value, filling the research gap linked to the process of rural development seen as a complex and multi-dimensional issue. Certainly, the selection of the rural regions for the study might raise a question whether the conclusions can be regarded as universal. Furthermore, one may wonder whether the list of variables used in the OLS regression analysis is exhaustive. In this case, it is important to remark that the availability of relevant statistical data poses a limitation.

The research methods and techniques employed in the dissertation are adequate to the research problem. The dissertation has also application qualities because the Author has formulated recommendations both for further research - within the framework of the subject matter discussed in this dissertation - and for policymakers. In the first case, those relate to:

- international comparison of measurement of accessibility to services as a part of rurality
- research on how the concept of rurality and peripherality differs across countries and how those different concepts affect the development of rural regions
- research on measuring social capital in rural regions and on how social capital impacts rural development

- use of a game theory approach to rural development as innovative tool of research
- comparison of the response of rural regions to the 2008 financial crisis and the COVID-19 recession (as more data becomes available)
- research on how the national settings (institutions, culture, history, etc.) impact the development of rural regions

On the other hand, the recommendations for policymakers are as follows:

- apply place-specific policies, since EU rural regions face unique challenges
- engage with local communities, since they better understand the challenges they are faced with and have a greater knowledge of local resources
- promote innovation, which has proved to influence economic growth, improve structural strength and build resilience of rural regions
- create a risk-taking environment for local residents to encourage them to start their own businesses

Summing up the content assessment, it has to be emphasised that the doctoral dissertation by Barrai Hannebry, MEconSc, constitutes an original, innovative and thoroughly-documented monography that revolves around valid and current problems. At the same time, it lays the groundwork for further academic discussion. Therefore, I believe the dissertation deserves to be published as a monography or a series of scholarly papers.

## 3. Formal aspect of the dissertation

The dissertation has been written using the correct language. Undoubtedly, one of the advantages of the dissertation is its set of 26 tables and 17 figures. The formal aspect does not give rise to any objections.
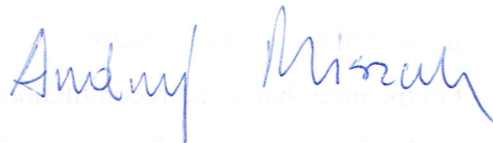
## Conclusion

Taking into account the methodological, content and formal aspects of the thesis, I hereby state that the doctoral dissertation of Barrai Hennebry MEconSc meets the requirements stipulated by Article 187 of the Act of 20 July 2018 Law on Higher Education and Science (Journal of Laws 2018, item 1668, as amended), i.e.:

- constitutes an original solution to a scientific problem
- attests to the Author's general theoretical knowledge in the field of socio-economic geography and spatial management

Additionally, the Author has demonstrated an ability to conduct independent scientific research.

Given all the above, I find the dissertation eligible for the next stage of proceedings in the doctoral degree procedure.

Lublin, 13 December 2021