



ACADEMIA ROMÂNĂ
SCOSAAR

HABILITATION THESIS

CURRENT CHALLENGES AND LIMITS OF ECONOMIC COMPLEXITY

Fundamental field: Social Sciences

Habilitation field: Economics

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Thesis presented to obtain habilitation certificate in order to coordinate doctoral activities in Economics.

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Abstract

The habilitation thesis is structured in two main parts, one dedicated to the main scientific contributions and the other to the career development plan. The first part highlights the contributions since the completion of post-doctoral programme up to present regarding the study of the European Economy and the second part covers the projects for academic activity, including future research directions.

The first part of the thesis summarizes the main scientific contributions to the research regarding current limits and challenges of economic complexity considering four themes: modelling the link between economic complexity and environment, the complexity of sustainable development, globalisation in the EU countries - as an expression of current world complexity and human capital-as contributor to economic complexity

In the field of **economic complexity and environment** the main contributions are: (1) the inclusion of economic complexity as explanatory variable in the analysis of the environmental pollution, covering the gap in the existing literature; (2) the inclusion, for the first time, of the 'economic complexity' variable in the Environmental Kuznets Curve (EKC) model. The first study concluded that more economic complexity is positively associated with greenhouse gas emissions growth in long run (this evidence is the novel contribution of the study to the existing literature) and within the group of countries with less complex products, the effect of economic complexity is stronger as in the other group more complex products' countries. For the first time, in the second study, the variable "income" was replaced in the EKC model with the economic complexity and a quadratic dependency between economic complexity and CO₂ emissions is tested within a panel of 25 EU countries. The long-run dependency between economic complexity and carbon emissions is illustrated as an inverted U-shaped curve, similarly to the EKC for income.

As regards to the **complexity of sustainable development**, I report the following contributions as a result of empirical research studies conducted with my colleagues. *Firstly*, we found a significant association between economic growth and environmental degradation (measured through a constructed index) in Romania (2000-2014). Their mutual dependence and co-evolution represent features of the sustainable development complexity. It is also revealed that economic growth has been decoupling from resource use in the last five years. Taking advantage of this decoupling, it would be possible to make the shift to products and services based on the latest, environmental-friendly technology, efficient use of material resource, reduced consumption of natural resources would lead to a competitive and inclusive economy. *Secondly*, we pointed out a positive influence of eco-innovation (measured by eco-innovation index) on the level of sustainable development (expressed by a constructed sustainability index), through a panel regression model in Eastern and Central Europe (2005-2014). Given that eco-innovation and sustainability are interrelated, the findings represent a basis for further studies using an integrated approach of them. *Thirdly*, an econometrical analysis of cross – country panel data revealed a positive correlation between employment and gross economic output in 6 bio-economy sectors within 26 European economies. It is suggested that more investments in bio-economy sectors would better support the sustainable development in the context of limited quantitative and qualitative resources, climate changes and environmental degradation.

Regarding the **globalisation in the EU - as an expression of current world complexity**, five topics were investigated. *First*, we proved that trade openness, FDI and market capitalisation had a rising effects on income inequality in Eastern and Central European countries (2000-2014). Such impact of globalisation represents one of the challenges of the current world complexity. It is also highlighted the interdependency between the two dimensions of globalisation (financial and economic), as complex phenomenon. *Secondly*, we found that the three forms of globalisation (economic, social and political) have different effects, as direction and magnitude, on economic growth in Romania (1991-2017). They represent the three systems, complexes themselves, components parts of the complex mechanism of globalisation. *Thirdly*, the analysis of the arbitrage on the Romanian stock market has revealed that the effect of global financial crisis would be much more reduced if investors have used the arbitrage option. It is suggested that the global linkage between financial markets induce a high level of risks in transactions, uncertainty and unpredictability. *Fourthly*, I revealed a validated influence of Global Competitiveness Index on annual rate of GDP in the EU countries (2008-2017). Countries are responding differently to global competitiveness, according to their economic complexity. *Fifthly*, I found that high differences in accumulation of human capital can coexist with low disparities in inclusiveness and moderate levels of global competitiveness and inclusive development can be associated with high level of human capital endowment in the EU countries (2017). These interdependencies are expressions of the globalisation complexity.

Finally, regarding the theme of **human capital - as contributor to the economic complexity**, the main contributions are summarised as follows. *Firstly*, the theories of human capital and human are reviewed and similarities and differences are outlined. The current approach of human productive capabilities evolving in the frame of economic complexity is featured through a high level of interaction in complex networks to expand, share and use the required knowledge to create more sophisticated products. *Secondly*, the concept of market value of human capital is defined and estimated for the period of 1999-2008 in some EU countries. As productive capability, the market value of human capital acts as required input for the production of complex and sophisticated goods *Thirdly*, a positive association between human capital and regional growth in Romania (2000-2017) is found and a causality relationship running from tertiary educated people and employment in knowledge-intensive sectors to regional GDP per capita, with a delay of two years is identified. This suggests that: (a) the productive knowledge generating economic complexity is embedded mainly in employed people, in their human capital and (b) the knowledge-intensive sectors, as expression of sectoral complexity, contribute to regional growth. *Fourthly*, I highlighted asymmetries of the link between human capital, R&D expenditures, gross domestic product and employment in knowledge-intensive services across the regions of the EU, taking into consideration the economic development differences between the Western and Central and Eastern part of Europe. Regions with less economic complexity (expressed by the output of knowledge-intensive sector) factors as human capital, R&D investment and economic development level could be considered as of major importance in stimulating the employment in complexes jobs specific for knowledge-intensive sectors

The second part of the thesis presents the career development plan.

In respect of the teaching directions, I intend to carefully and effectively manage my knowledge acquisitions obtained to present and build on the created basis and to develop it. Thus, I will improve my course and seminar materials on European Economy by integrating my

research results and the latest developments in the field I plan also to publish an academic course on International Economics.

My future research directions will regard the following areas: human capital-economic complexity - growth; social capabilities, inclusive development-economic complexity-globalisation; renewable energies - human capital - globalisation; economic complexity-sustainable development - green economy; renewable energy - income inequality - economic complexity - environment.