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MODELING THE REGIONAL LABOUR MARKET IN ROMANIA
- Thesis Summary -

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KEY WORDS:

- Labour market
- Labour demand
- Labour supply
- Regional models
- Econometrics models
- Input-output models
- Computable general equilibrium models
- Principal components analysis
- Correspondence factor
- analysis
- Multifactorial regression
- Panel data models
- Activity fields
- Employed population
- Activity rate
- Employment rate
- Unemployment rate
- Gross domestic product
- Gross value added
- Salary earnings
- Household income
- Dependency ratio
- Expenditures to unemployed social protection

Introduction

Within the current economic environment, the evolution of the work market is marked by changes of the employment rate. They are quite high from one country to another, but in this respect, large differences are recorded in the regions of each country. The global economic crisis has exacerbated these differences, increasing importance of analyzing the phenomena and processes that occur in the functioning of the labor market, both at a national and especially at regional level.

In Romania, the regions (NUTS II) do not have at the present moment the administrative status and the competencies needed to create and develop economic policies. However, the mobility of production factors – the labor force and the capital – the heterogeneity of local characteristics and the lack of trade barriers causes a high degree of interaction between these units.

While there are regional differences regarding the performance of the labor market, exploring the factors involved in the functioning of this structure is becoming more and more interesting. Also, the different degrees of influence on the components of certain indicators of labor market and the labor market dependence on the socio-economic, demographic and geographic characteristics of the regions were milestones in the development of numerous studies. Thus, both researchers and policy makers have shown an increased interest in recent years on the analysis and interpretation of socio-economic processes taking place at a regional level, within the labor market.

The **purpose** of this thesis is to develop econometric models regarding the demand and supply of labor force from Romania, at a regional level. These models are based on methodological foundations specific to regional modeling, that have been previously used in the literature, as well as descriptive statistical studies on socio-economic regional indicators. The development of regional models takes into account the socio-economic characteristics of each region and

its development potential. The present research assesses the literature on these topics and offers an analytical approach as regards to the existing regional models, especially those applicable in the study of the labor market.

The main research **objectives** are:

- to present and discuss the concepts regarding the labor market;

- the classification and presentation of the models employed in the study of the regional labor market;

- the descriptive statistical analysis of regional indicators of labor market mechanisms occurring in Romania;

- highlighting the socio-economic profile of each Romanian region;

- identifying the determinants of the regional labor market;

- the development of econometric models regarding the demand and supply of labor force from Romania, by taking into consideration the socio-economic characteristics of each region and its development potential;

- the estimation, statistical testing and validation of the developed regional models;

The chosen research topic combines elements of statistics, econometrics, demography, economy and regional development as well as labor economics, proving to be an interdisciplinary thesis.

As regards to the structure, the thesis is composed of 4 chapter, introduction, conclusions, bibliography, annexes, the list of figures and list of tables.

SUMMARIES of the main parts of the thesis

Chapter I, entitled **Concepts regarding the labor market**, presents the most important notions on the topic of the labor market. It introduces concepts such as the labor market, the supply and demand of labor force and the equilibrium of the labor market. Also it highlights the main characteristics and functions of the labor market. Following, the thesis introduces the specific indicators of labor market analysis, the data sources and classification for them. What is more, a number of theories were presented, theories which have provided functioning mechanisms for the labor market: the Keynesian theory, the institutionalism theory, the theory of internal labor market, the labor market segmentation theory and the human capital theory.

The **second chapter** of the thesis, ***Regional models employed in the study of the labor market***, offers, based on an analytical approach, a presentation of the most important types of regional models that are used in the study of the labor market, as well a classification for them.

The author noted that the development of regional models and especially those used in the study of the labor market, focuses on the creating economic impact analyzes, understanding the local economies, economic forecast and anticipating the behavior of a region to changes.

These models are not entirely different, some of them presenting similarities, depending on their design. Some econometric models have CGE characteristics, while others are developed to address only the needs of the economies in which they are used. Also there are some econometric models that have integrated IO models. Several CGE models are parameterized by using already estimated econometric relation, while others use industrial flows matrices from IO models, in order to determine the share of spending on goods and services and / or the use intermediate goods in production functions.

The econometric models are used primarily in economic forecasting. The equations' parameters that describe the economic behavior of a region are estimated using standard econometric methods and techniques. Within the regional labor market study, these models have proven to be effective in estimating and forecasting several indicators, such as: the employment rate, the unemployment, the output etc.

Unlike the econometric models, the input-output models are not used for long-term forecasts of economic activities. By contrast, the input-output tables have a very valuable feature, namely they allow detailed modeling of the industrial structure, highlighting the relationships between different types of industries. A major advantage of the input-output models, especially for mid-term evaluations of qualifications, is their focus on the production (or industrial) sectors highly disaggregated and the detailed description of inter-industry linkages in a given economy.

The CGE models represent significant progress in the regional economic analysis.

There are many advantages and disadvantages in all these regional models, which are primarily related to data series considered, the hypotheses on which the models are created, the equations employed and methods and techniques used for the parameters' estimation.

The presentation and critical analysis of the main types of existing models in the literature concluded that, for Romania, at a regional level, the models can be developed and used are the econometric ones.

It was also noted that a very important problem encountered in modeling regional labor market is related to the applicability area of the results. Most regional models are built according to the specificity of a single country, thus it is harder adapt to the economies of other countries.

In general the "best" model is the one that gives a very good representation of the relevant qualities and relations

existing in the real world. Therefore, the development of a regional labor market model must take into account several important issues such as the indicators considered, the data and data sources.

The third chapter, *The statistical analysis of the regional labor market in Romania after 1990*, presents a descriptive statistical analysis of the main indicators that appear in the functioning of the labor market in Romanian each region: the labor resources, the labor force, and the employment and unemployment rates.

The use of multivariate statistical methods allowed the author to underline the population structure, separated in on activity fields, for each region, as well as the regional socio-economic profiles. After studying the most recent data, a general image was done in order to present the similarities and differences between the regions, recorded for the year 2011.

The analysis revealed significant differences between the regions of our country, in terms of the evolution of both demographic and of the socio-economic indicators. As expected, the Bucharest-Ilfov region appears to be the most well developed, with the highest GDP and the lowest unemployment rate. It was also noted that the Northeast region, although it has the highest amount of labor resources in the country, has the lowest employment rate

From the economic profile's point of view, similarities are observed between the eastern regions, on the one hand, and between the western ones on the other hand. Also there are significant differences between the two groups as regards to the unemployment and employment rate, activity rates and income. The regions of the second group recorded very low levels of unemployment and high levels for the indicators, by contrast to the first group.

The fourth chapter, *Modeling the demand and supply of labor force from Romania at a regional level*, consists of a

study regarding the interdependencies between socio-economic factors that appear within the regional labor market.

Having as methodological guidelines the previous developed models depicted by the literature, we have estimated econometric equations for demand and supply of labor for Romania, equations that reflect the existing economic and social specificities of the eight regions of the country (Northeast, South-West, Centre, Bucharest-Ilfov, West, North-West, South-East).

The data series represent the most important indicators for the labor market, record annually, for the period 1995-2011. Estimated models were tested and validated statistically. This was accomplished by testing the stationarity of the data series using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) statistic tests, as well as the significance of the models' parameters. After estimating the parameters of each model, we tested the basic hypotheses of econometric modeling, namely the errors' average hypothesis, the errors' normality hypothesis, the homoscedasticity hypothesis and the errors' mismatch hypothesis.

The indicators taken into account were:
- for modeling the labor demand: the employment rate of, the unitary labor cost, the gross domestic product recorded in the main area of activity of a region, the share of the total annual household income in total gross value added and the rate of support for inactive people.
- for modeling the labor supply: the activity rate of the labor force, the average net monthly income, the regional GDP, the annual expenditures on social protection for the unemployed and the unemployment rate.

The structural shocks in the evolution of indicators were underlined by including dummy variables in the analysis.

The presentation of working hypotheses and results was done in accordance with the literature.

The estimates results can represent a support for decision-making organisms that need to devise strategies for regional growth according to the economic conditions, the social and demographic change and the potential for development in each Romanian region.

Conclusions

Within the context provided by the growing concerns regarding the major issues involved in the functioning of the labor market, the present thesis wanted to develop models for the supply and demand of labor force in Romania, at the regional level, by which to highlight the determinants of the main components of the labor market and the intensity of the links involved.

The hypotheses of the research were validated and the objectives were completed through the development of the four chapters comprising the thesis.

After presenting in the first chapter the main concepts and theories regarding the labor market, we have done a classification of the main types of regional models used in the literature. This classification allowed the identification of the conditions for their use and the advantages and disadvantages of the three types of regional models developed up to the present moment: the input-output models, the econometric models and the general equilibrium models.

The main research objectives of the analysis are to conduct a series of impact economic analyses, to identify the regional development potential and economic forecasting.

The analysis of the main regional models from the literature concluded that, for Romania, the models can be developed and used are econometric ones.

The theoretical and methodological foundation provided by existing results in the literature, presented in chapter two, and the statistical analysis carried out in the third chapter, supported the development of econometric models for the eight Romanian

regions, based on the economic specificity and the social features of each region.

The research presents a number of limitations. They are primarily related to the presence of errors in the modeling process, as well as the small size of the time series used in the analysis that may affect the predictive ability of models. What is more, the models are limited due to the lack of regional data for a number of indicators.

The future research directions aim at strengthening the regional labor market analysis and the improvement of research methodology. They target the analysis of the supply and demand of labor force within activity sectors, as well as the private and public sectors. The research can also be extended by developing models for demand and supply of labor force by age groups, levels of education and residence environments.

Another possible research concerns the use of model for predictive purposes.

Personal contributions

After studying the literature, I have made a summary of the most important models used in regional development: input-output models, econometric models and general equilibrium models. The analysis of these models allowed me to identify the model type that can be used for Romania, taking into account the data availability at a regional level.

The presentations of the most important studies done on labor market modeling allowed the identification of statistical indicators that can depict the supply and demand of labor in the regional context.

One of the main contributions of this research is the creation of a database comprising regional indicators for the supply and demand of labor in Romania. This database can be enriched with new values for the indicators, based on the extent of their publication in official data sources.

The descriptive statistical analysis performed identified the regional economic and social characteristics and outlined economic profiles of each region of Romania. These results can provide a support for the development of regional models in our country.

The models estimating the supply and demand of labor force integrated the previously identified specific regional characteristics. These models can be improved by taking into account other determinants, such as the availability of new statistical indicators for the regional labor market.

The results of modeling the regional labor market in Romania can be useful in conducting impact studies, regional forecasting and can represent an important support for the decision making processes and the regional policies.

Dissemination of research results

During research for the completion of the thesis, the most important results were published in international journals and databases or presented at national or international conferences, such:
- one article accepted for publishing in a ISI journal without impact factor;
- two scientific articles published in proceedings of conferences under ISI indexing;
- one scientific article published in a conference proceedings international databases listed;
- one article published in a scientific publication CNCSIS category B + and international databases listed;
- one scientific article published international databases.

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