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WORK HUMANISM

Model of Population Employment Estimation

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Recently population employment and unemployment issues have become especially urgent. Developing Lithuanian work market is at the junction of two processes. On the one hand there occurred the processes conditioned by economy transfer from the planned system to the market system which led to the structural changes of separate economy branches, diffusion of technical and technological advance, change of production scale and range, competition in domestic and foreign markets, etc. On the other hand the integration into the international economic system has come to the fire. These developments have caused quality and quantity parameter changes in complex work resources, the latter determining the causes of irregular population.

New ways of the solution of these problems have been presented by the integration into the European Union promoting the possibility to use the experience of other countries in modelling the development adequate to the country's social and economic growth. Consequently it is purposeful to improve models of population employment estimation, which would let to identify factors determining changing differences in the work market.

Keywords: *labour market, employment, model of employment estimation, employment development.*

Introduction

Level of problem research. Lithuanian and foreign researchers are interested in the problems of labour market. Different models to analyse situation in the labour market of different sections are found in many resources.

Most contemporary theoretical and empiric research is based on the standard *model of labour supply* (Hausman, Ruud, 1984; Berkovec, Stern, 1991; Stillman, 2000). Unemployment, as an absolute antagonism of employment became a traditional theme of economic research. Going deeper into the problems preconditioning employment changes it was noticed that the economic analysts concentrate on the *unemployment reasons and length* in the *micro-economic context*, while in the *macro-economic space* the employment structure and dynamics of unemployment level are analyzed, *identifying the changes caused by the activity cycle.* (Layard, Nickell, Jackman, 1991; Nikitina, 2000; Markauskienė, 2000; Matiušaitytė, 2004; Gruževskis, 2002; Pocius, 2003 and others). The category of employment is linked with the *dynamics of labour resources*; therefore most authors reflect the *evaluation and models of labour qualitative and quantitative parameters.* The labour demographic changes were analyzed by Krugman (1991), Olgaard (2001), Valentinaitė (2001), Gruževskis (2002, 2003). *The variety of employment structure evaluation* is presented in the works of Jugay (1994). *The variety of employment forms* is pointed out while analyzing the labour market segmentation (Piore, 1978; Doeringer, 1976). Local (regional) population employment is formed while it is affected by interior and exterior factors (Jugay, 1994; Kotler, 1993; Scarpetta, Huber, 1995), which the opportunities of population employment depend on (Layard, 1994; Kirstukas, 2000) also the level of unemployment (Bean, 1994; Scarpetta, 1995; Huber, 1995; Mur, 1994). Modelling Dynamic Interregional labour Markets: An Application to the Spanish Case (34 European Congress of Regional Science Association, Groningen). The changes of labour during recession and economic restructuring were analyzed by Valentinaitė (2001), Stankevičienė (2002), Nezabitauskas (2002). A considerable amount of research is devoted to the investigation of the behaviour of the unemployed in the process of job search. The standard job supply model is not suitable for this situation, therefore based on the job search theory special dynamic models have been derived, which allow to evaluate the behaviour of the unemployed under the conditions of indefiniteness and limited amount of information, which is supported by statistical theoretical viewpoints of the decision making consequences (Miller, 1984; Narendranathan, Nickell, 1985; Wright, 1987; Wolpin, 1987; Van den Berg, 1990; Mortensen, 1999; Pissarides, 1999).

Summarizing the results of work market researches we can maintain that researches of population employment are characterised by a large specialization, where only a part of problems are analysed. We desiderate the model of population employment analysis based on optimal counts. Many problems are being solved underestimating the features of particular country work market. Estimating the limitation of such researches we could claim that systematic features of researches are damaged, and then it is difficult to estimate the reasons of changes of population employment and its process links.

Scientific problem. Seeking the effective development of population employment it is advisable to improve the models of its estimation. Estimated the country employment the possibilities of preventive means usage are produced to form workability, adaptability to the economic and technological changes in the country and EU work market.

The subject of research: population employment.

The object of research is to estimate population employment in the country and EU context.

Research methods and data bases. *The abstract theoretical method* was applied for the analysis of scientific litera-

ture, enabling to define and base the theoretical rules of population employment and to emphasize the employment changes, which stipulate the interrelation of the factors. *The systematic comparative and logical analysis* made the presumptions to evaluate the dynamics of the Lithuanian population employment and base the local differentiation. *Mathematical statistical method* (time lines, correlation and regressive analysis, etc.) allowed to base the statistical conclusions on the practical model level. The research was based on the secondary statistical data of The Statistical Department of the Republic of Lithuania, the data of the Lithuanian Labour Market, OECD, the statistical data of Eurostat.

The analysis model of the integrated macro-economic indicator *(AMIMEI)*

Population employment is a macro-economic indicator with difficult structure features. This indicator can be characterized by economic statistical parameters and other indicators (level of employment, demographical labour resource characteristics, territorial distribution and others). Data to identify the changes of this indicator has also difficult structure. This data can be factual, optimal and hypothetical. Concerning the difficult structure of macro-economic indicator it is difficult to define it with one other indicator. Sometimes different 'development' levels are included in the whole entire. Quantitative homogenous indexes in particular conditions can become heterogeneous in other conditions. Estimating population employment in the country and EU, in the context of comparing analyse the difficulties to define and estimate labour resource characteristics appear. In different countries different labour resource dimension is used, for example, in Austria labour resource is included only of working people, in the USA, Canada, Germany – civil working people, in many EU countries – all working people, included self-depended workers and military staff.

These differences make the presumption to the limitation comparing the employment indicators of different countries.

According to these differences estimating population employment the main factors can be defined, which determine the changes of employment. The factors preconditioning the changes of employment levels are distributed into demographic, geographic, economical, social and behavioural, all of them influencing the changes in the employment level, as well as influencing each other (Figure 1).

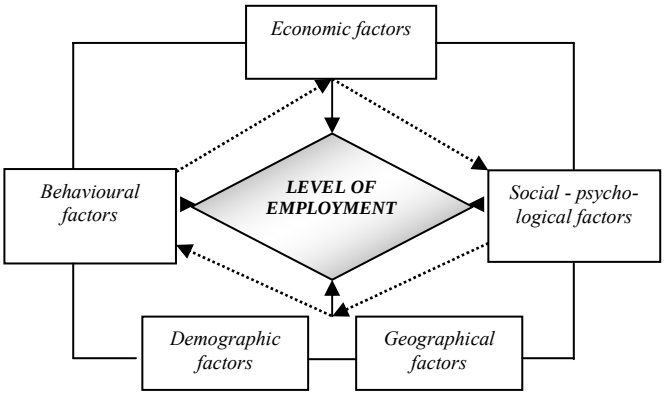

Figure 1. Factors influencing the level of population employment

Generalizing the theoretical methodological rules of structural indicator research, the analysis model of the integrated macro-economic indicator (*AMIMEI*) is proposed, substantiating the survey of the country's population.

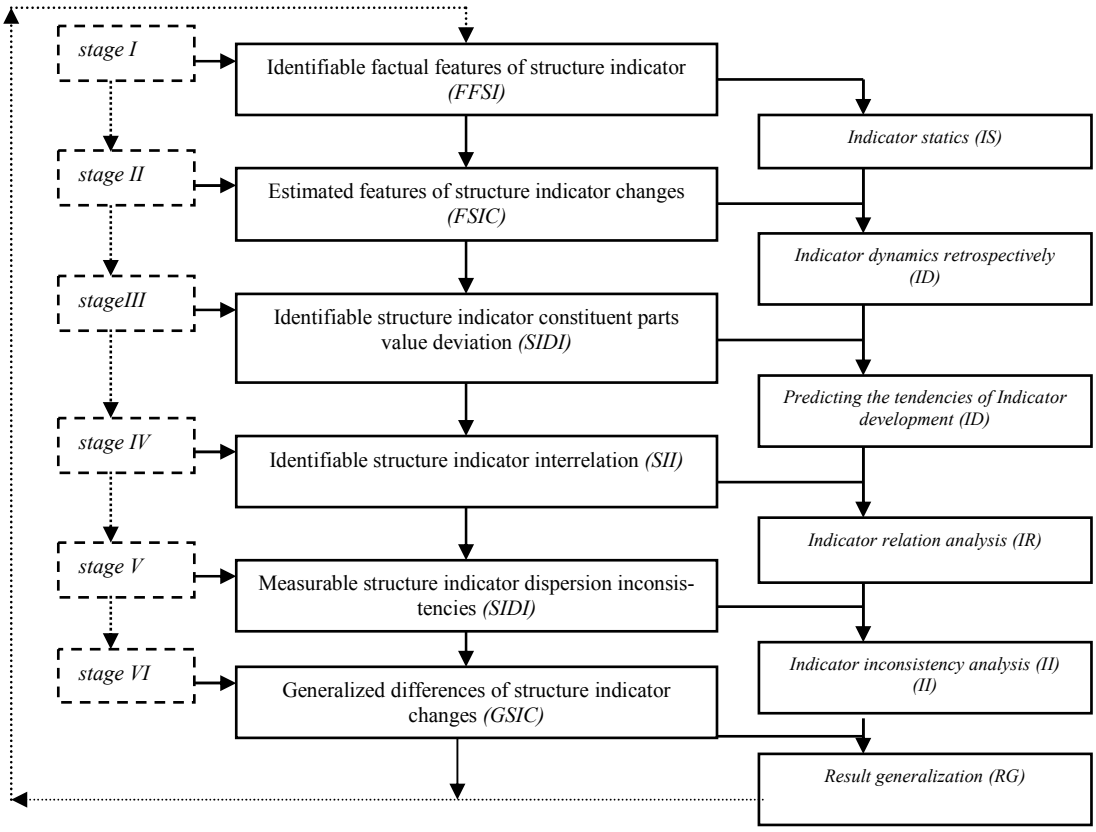

Figure 2. The analysis model of the integrated macro-economic indicator *(AMIMEI)*

It is divided into six stages. Practical realization of this model let us to estimate features of the chosen indicator (labour resource, unemployed, etc.):

- static characteristic, identifying the factual features of the structural indicator *(FFSI);*
- the retrospective of the phenomenon dynamics *(RD),* emphasizing the features of the structural indicator changes *(FSIC)*;
- the tendencies of the phenomenon development (*RD*), identifying the deviations of the structure indicators' constituent parts (DSICP);
- the correlation relationship of the phenomenon *(CR),* identifying and evaluating the correlation of the structural indicators *(CSI);*
- the concentration and non-uniformity of the phenomenon (*NUP*), measuring the unevenness of structure indicators dispersion *(USID).*

Based on the integrated macro-economic indicator the analysis model of the dissertation paper carried out the research of population employment, also made up the preconditions to evaluate and base scientifically the features of the structure indicator (employment, unemployment, dispersion of the unemployed, etc.) features, also to formulate and present conclusions for a rational formation of population employment, using the available resources effectively.

The results of population employment research with the AMIMEI model

The analysis of the demographical country's population showed that the *total number of population* between 1999 and 2004 *was decreasing*. The latter index decreased by 90500 people. The population growth rate in the given period was *Tp = -2.56 %* (decrease rate). The decrease in the number of population was pre-conditioned by the decreasing birth rate and emigration.

Analysing the *general urban and rural population distribution*, the population concentration in agglomerations and a fast decreasing number of populations in rural areas can be observed. Generalizing the dynamics of population demographic changes in the context of Lithuania, the EU and the world, it is possible to state that growing life expectancy reflects the population life quality growth, but constant labour force aging is considered an economically negative process. General aging of the society preconditions problems in the *social insurance sector* (growing of retirement payments, increasing needs for health services, etc.).

Having revealed general tendencies of population decrease, the analysis of the country's demographic factors, preconditioned an adequate general dynamics of labour and population employment. In the period between 1999 and 2004 labour quantitative parameters tended to decrease The increase of labour force in the abovementioned period decreased by 3.6 %. The number of males among the labour force decreased by 37000. The number of females among the labour force decreased less dramatically and was 25600. A lower negative dynamics of female labour force was preconditioned by the decrease of females in the country's population.

Adequately to the tendencies of labour force shifts a general *employment of the country's population* was changing. In the period between 1999 and 2004 population employment decreased by 17300% *(T_p = -1,3 %)*. The rate of *employed males* in the 6-year period decreased by 0.5 %. Having evaluated this, it is possible to state that the change of the number of employed males was considerably slower, compared with period of 1990 – 1999 (T_p = -18.8 %). The quantitative parameter of *employed females* in the analysed period also tended to decrease by 15600. The rate of the index change was T_p = -2.2 %. It is possible to state that the number of employed women in the 6-year period was decreasing more slowly that in the period of 1990 – 1999 (T_p = -21 %). Since 2001 the dynamics of the number of employed population acquired a positive growth. *The perspective analysis* in the dissertation carried out on the basis of segment function, allowed to emphasize general features of separate periods. The economic indicators of *employment, level of unemployment, the dynamics of the unemployed* are expressed by the sum of three components:

$$X(t) = f(t) + z(t) + e(t), \quad (1)$$

here: $f(t)$ – the main tendency of the variable X, i.e. trend, $z(t)$ – periodically changing seasonal component, $e(t)$ – random deviations. Predicting the *development tendencies* of the structural indicator various forecasting methods are employed, the reliability of which is evaluated by different criteria. Based on the positive changes in the employment dynamics of the recent three years, the employment growth in the coming two years is predicted up to 1614,100 employed citizens of the country. In order to prove the index of the predicted general population employment, the calculated approximation error

$\mu_{approximation}$ = 8.7 shows that the prediction results are to be trusted. Generalizing the changes of the country's employed population, it is possible to state that the decreasing speed of this index growth for both males and females have change direction since 2001, which demonstrates a generally favourable influence of the country's economic development on the processes in the labour market.

The study of the employment level in the EU countries demonstrated that the highest employment level in the beginning of 2004 could be observed in the Netherlands (73.5 %), Sweden (72.9 %), Great Britain (71.8 %). The lowest one is in Poland (51.2 %), Malta (54.6 %) and Italy (56.1 %). At the beginning of 2004 the equivalent number in Lithuania was 61.1 %, in neighbouring Latvia and Estonia 61.8 % and 62.9 %. On May 1, 2004 the labour market of the EU was supplied with approximately 1.6 m. of labour force, which accounted for 0.9 % of the total EU labour force. The average *index of employment* in the EU countries (15 member countries) is 63.6 %, while in the 25 members this number being 62.9 %. Analysing the distribution of male and female employment level, a higher male employment level could be observed in all EU countries. The most dramatic difference between the employed males and females could be observed in Malta: male employment level being 41.6 %, in Greece – 28.6 %, while in Lithuania this difference being only 5.6 %.

Clear dynamic changes could be observed in the dis-

tribution of the employed population from the viewpoint of both, *the horizontal and vertical segregation*.

The analysis of employment changes according to the population distribution in their economical activities (1999-2004) demonstrated that adequately to the general decrease of employment, the population number dissemination also decreased. In agricultural, hunting and forestry sectors the number of employed population decreased by: T_p = -8.6 %, in the industry by: T_p = -2.9 %, educational sector by: T_p = -11.3 %. The decrease in the number of employed in agriculture was preconditioned by the processes of production substitution and changes in the structure of people's needs. *The structural shifts and the decrease of those employed in the agricultural sector were influenced by the modifications of life-style and social organization modifications, which preconditioned the countryside's depopulation and urbanization. The changes in the life-style encouraged the changes of needs unfavourably to the agricultural sector.* In the dissemination of positive economical activities positive shifts have taken place in the quarrying and mining activities, in which employment grew by: T_p = 68 %, building and construction by: T_p = 16.7 %, real estate rent activities by: T_p = 29.9 %. The positive tendency of the latter indexes demonstrates that *alongside with the economic growth of the country, certain types of activities started growing as well, the dynamic changes of which pre-conditioned the growth of workers' demand in the sectors.*

Analyzing the factors pre-conditioning the general situation in the country's employment it was noticed that the latter index is settled by *various factors: demographic, geographic, economical, social, and psychological.* Because of the lack of data most factors are impossible to be investigated, therefore the relations best reflecting the country's current economical mechanism have been selected in the paper. Based on the correlation analysis the country's correlation and relation cohesion have been set.. *Positive relations between the population demographic index dynamics and employment changes have been noticed*: the less the general number of population, the lower the quantitative parameter of the employed. *The economic growth of the recent years pre-conditioned the growth of population employment in certain activity sectors only*, i.e. with the increase in general productivity of enterprises, the demand for labour in certain economical sectors is decreasing. Negative relation between the average pay and employment indicator is noticed: while increasing salaries, the enterprises tend to reduce the number of employees.

Realizing the model of *(AMIMEI)* analysis the inconsistency analysis of the country's territorial units has been carried out. The inconsistencies of structure values dissemination have been evaluated with the help of Ginny *concentration coefficient and Lorenz curve.* Ginny *concentration coefficient* has been applied, the formula of which is as follows:

$$K_L = \frac{10000 - \sum_{i=1}^{N} f_i \times \left(d_i + 2\sum_{i=1}^{i-1} d_i \right)}{10000}, \qquad (2)$$

and it demonstrates that clear differences prevail in the economic activities of different regions, as well as in the indexes of population employment. To emphasize the inconsistencies of regional economic indicators the Lorenz curve has been applied, which demonstrated the uneven distribution of employment and the created GDP in different regions. Analysing the regional differentiations of the year 2001 according to the GDP and population distribution the Ginny coefficient was as follows: K_L = *0,433*, but in 2004 the index was K_L = *0,225*. Based on Ginny coefficients of the years 2001 and 2004, the tendencies of Lithuania's region uneven development increase were revealed.

Based on the correlation analysis the paper emphasizes correlation ties and their tightness from the viewpoint of the country regions' economical indicators. The results of the research approved the theoretical presumptions of setting up the relations in the viewpoint of leader regions (Vilnius, Klaipėda, and Kaunas). The latter regions enjoy stronger correlation ties between GDP and average employment. Preconditioning the growth of productivity at the expense of decreasing employment, The GDP is also strongest among the leader regions. In order to evaluate the links between population employment and economical activities, and having performed the correlation analysis *between those employed in economic activities and a corresponding activity in the GDP value*, significant results have come up. The strongest correlation tie can be observed between the *employed* in the educational sector and the GDP, R^2 = *0.8806* and the correlation coefficient *r = 0.9384 (y = 33.695x + 2843.3)* demonstrates that the development of educational sector is preconditioned by the GDP growth, which enables to form and forecast the perspectives of the country's educational system.

A strong negative interdependence between *the employed in industries and GDP*, R^2 = *0.813*, the correlation coefficient *r = 0.9016 (y = -103.94x + 39341)*, allowed to state that *the growth of gross national product is not preconditioned by only the human labour results*.

Analysing the changes of unemployment level it was defined that in the period between 1999 and 2004 the index decreased by 2.2 %, and at the beginning of 2005 it was 10.2 %. Analysing the interrelations of the factors preconditioning the level of unemployment it was defined that *the level of unemployment correlates with* GDP (*r = -0.6967), GDP per capita (r = -0.784), industry products sold* (*r = -0.6217), number of small and medium size enterprises per 1000 of population* (*r = -0.7317) the balance of citizens migration)* - (*r = 0.6542), crime rate (r = -0.8514).*

Having evaluated the growth of the number of unemployed, their participation level at the active performances, also the scope of financing the employment programmes, it was noticed that the latter indexes change differently. In the period analysed, the general number of unemployed grew most of all, the growth of which reached T_p = 37.1 %, while the index of employment programme finance grew by: T_p = 16.1 %. The analysis the latter indexes demonstrated The strongest correlation tie can be observed between the *employed* in the educational sector and the GDP, R^2 = *0.8806* and the correlation coefficient *r = 0.9384 (y = 33.695x + 2843.3)* demonstrates that the development of educational sector is preconditioned by the GDP growth, which enables to form and forecast the perspectives of the

country's educational system. The scope of programme financing partially is effected by the number of participants in those programmes. The correlation of programme financing and participation in these programmes demonstrated that there is a significantly negative correlation link between these two indexes: correlation coefficient $r = -0.58138$ ($y = -11.84x + 23659$). It means that if the scope of financing is decreasing, the real opportunity to participate in the employment programmes is also decreasing, although the obvious negative correlation tie makes the presumption that the part of finance for *maintaining the skills of the unemployed are used ineffectively.*

Conclusions

The results of population employment research with the *AMIMEI* model in the country and EU work market let us to conclude:

1. Demographical factors determined changes of population employment highlighted the main decreasing of population in the country as well in the most of EU countries. Although increasing average lifetime shows the increasing life quality of the population, but steady work resource ageing process is negative in the economical aspect. Lower activity, weaker motivation of the alternative pensionary state, preferences of employers determine the position of aged people. Limited integrating possibilities of aged people determine problems in the social security system.
2. Population employment, decreasing from 1990 to 2001, has changed its direction, but its growing rate is not very high. Country population employment was determined by economy structure transformation, changes of possession forms, technical technological growth, investment flow, preparation to the integration into EU. In the end of 2003 employment was 61,1 per cent, EU (15) – 64,3 per cent, and EU (25) – 62,9 per cent, which showed untapped employment potential.
3. Changes of employment according to the activity sectors during the investigative period were determined by production substitution process, economic conditions, changes of population needs. It was defined that number of employees in agriculture, hunting and forestry during the investigative period was decreased to 14,5 per cent, EU (15) – 6 per cent, EU (10) – 12 per cent). Employment rate in industry was 20,6 per cent, (EU (15) – 25 per cent, EU (10) – 28 per cent), in service was 53,9 per cent (EU (15) – 69 per cent, EU (10) – 60 per cent).
4. Formation of professional employment structure was determined by economical, social – psychological, geographical factors, influenced publishers, executive officers and principals decreasing, but thus has developed the needs of junior specialists and technical profession groups in the labour market. The similar situation is in many EU countries, where women dominate in health service (76,2 per cent), education system (66,3 per cent), hotel and restaurant service (52,5 per cent) and other services. Men are seen in construction fields (91,6 per cent), mining (89,6 per cent), energetic and water supply service (86,2 per cent).
5. Correlation analysis of identifying structure indicators showed that the general population employment positively correlate with the general country economy growth (r = 0,976), but the growth of economy, determined by general industry efficiency, has negative influence on population employment. In this way the growth of efficiency reduce the needs of employees. Unemployment rate is directly proportional to crime growth (r = 0,876), but negatively correlate with general country's economy growth (r = 0,696). Evaluated the growth of number of unemployed people, their activity in different employment means and financial possibilities of employment programs, we could notice negative correlation (r = -0,581). The less financial possibilities have these programmes, the less possibilities unemployed have to take part in. But this negative correlation tie makes us think that part of financial recourse for unemployed is used inefficiently.
6. Concluding the results of unequal indicator spread in the regions of the country (regional BVP and employment rate), we can claim that the differences of economy activities are constantly growing (2004 $\text{Ginny}_{coefficient} = 0{,}225$).

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Gyventojų užimtumo vertinimo modelis

Santrauka

Gyventojų užimtumo ir nedarbo problemoms pastaruoju metu skiriama daug dėmesio, kurį inicijuoja besiformuojanti Lietuvos darbo rinka. Integracija į Europos Sąjungą šioms problemoms spręsti suteikė naujos erdvės ir galimybių pasinaudoti ES šalių patirtimi modeliuojant gyventojų užimtumo plėtrą, adekvačią šalies socialinei ekonominei raidai. Teoriniuose šaltiniuose esama įvairių modelių, kuriais remiantis analizuojama situacija darbo rinkoje įvairiais pjūviais, tačiau šiuose darbuose nepakankamai dėmesio skiriama gyventojų užimtumo vertinimo metodikai. Dėl plačios tyrimų specializacijos dažnai sunku kompleksiškai įvertinti šalies užimtumą bei pagrįsti jo plėtrą.

Šiame darbe aptariamas įvairių autorių sukurtų darbo rinkos vertinimo modelių ribotumas bei pasiūlytas integruotas gyventojų užimtumo kaip makroekonomikos indikatoriaus vertinimo modelis *(IMIA)*. Taikant šį tyrimo modelį, darbe pateikti rezultatai atskleidė veiksnius, sąlygojusius šalies gyventojų užimtumo pokyčius 1999–2004 metais.

Daugelis šiuolaikinių teorinių bei empirinių darbo rinkos tyrimų paremti standartiniu *darbo pasiūlos modeliu* (Hausman, Ruud, 1984; Berkovec, Stern 1995; Stillman, 2000). Nedarbas, kaip visiško užimtumo kategorijos antagonizmas, tapo tradicine ekonominių tyrimų tema. Gilinantis į užimtumo pokyčius sąlygojančias problemas, pastebėta, kad ekonomikos analitikai *mikroekonomikos kontekste* susitelkia į *nedarbo priežastis bei trukmę*, tuo tarpu *makroekonominėje erdvėje* analizuojama *užimtumo struktūra bei nedarbo lygio dinamika, identifikuojant veiklos ciklo sąlygotus pokyčius* (Layard, Nickell, Jackman, 1991; Nikitina, 2000; Markauskienė, 2000; Matiušaitytė, 2004; Gruževskis, 2002; ir kt.). Užimtumo kategorija *siejama su darbo išteklių dinamika*, todėl daugelio autorių darbuose atsispindi *darbo jėgos kokybinių bei kiekybinių parametrų vertinimai* bei modeliavimas. Darbo jėgos demografinius pokyčius analizavo Krugman (1991), Olgaard (Olgaard, 2001), Valentinaitė (2001), Gruževskis (2002, 2003). *Užimtumo struktūros vertinimo įvairovė* atsispindi Jugay darbuose (1994). *Užimtumo formų įvairovė* išryškinama analizuojant darbo rinkos segmentuotę (Piore, 1978; Doeringer, 1976). Lokalinis (regioninis) gyventojų užimtumas formuojasi veikiamas tiek vidinių, tiek išorinių regiono veiksnių (Jugay, 1994; Kotler, 1993; Scarpetta, Huber, 1995), nuo kurių priklauso gyventojų užimtumo galimybės (Layard, 1994; Kirstukas, 2000) bei nedarbo lygis (Bean, 1994; Scarpetta, 1995; Huber, 1995; Mur, 1994). Darbo jėgos pokyčius šalies nuosmukio ir ūkio restruktūrizacijos laikotarpiais analizavo Valentinaitė (2001), Stankevičienė (2002), Nezabitauskas (2002).

Nemažai dėmesio mokslinėje literatūroje skiriama *bedarbių elgsenos* tyrimams darbo paieškos procese. Standartinis darbo pasiūlos modelis šioje situacijoje nėra tinkamas, todėl darbo paieškos teorijos (*job search theory*) pagrindu buvo sukurta specialių dinaminių modelių, leidžiančių įvertinti bedarbių elgesį neapibrėžtumo bei nepakankamos informacijos sąlygomis, kurie paremti sprendimų priėmimo pasekmių statistinėmis nuostatomis (Miller, 1984; Narendranathan, Nickell, 1985; Wright, 1987; Wolpin, 1987; Van den Berg, 1990; Mortensen, Pissarides, 1999). Apibendrinant atliktų darbo rinkos tyrimų rezultatus, galima teigti, kad gyventojų užimtumo tyrimai pasižymi didele specializacija, juose daugiau dėmesio skiriama tik tam tikrų problemų analizei, bet pasigendama optimaliais apskaičiavimų metodais pagrįsto gyventojų užimtumo analizės modelio, daugelis problemų sprendžiama neįvertinant konkrečios šalies darbo rinkos savybių. Įvertinus pastarųjų tyrimų ribotumą, pažymėtina, kad nukenčia tyrimų sistemiškumas, sunku nustatyti gyventojų užimtumo pokyčius sąlygojančias priežastis ir su tuo susijusių procesų ryšius.

Integruotas makroekonomikos indikatoriaus analizės modelis *(IMIA)*

Gyventojų užimtumas – makroekonomikos rodiklis, pasižymintis sudėtingos struktūros požymiais. Šį rodiklį aprašo ekonominiai statistiniai matai, indikatoriai (užimtumo lygis, demografinės darbo jėgos charakteristikos, teritorinis pasiskirstymas ir pan.). Rodiklio pokyčiams identifikuoti naudojami duomenys taip pat sudėtingos struktūros. Jie gali būti faktiški, optimalūs ir hipotetiniai. Be abejonės, ir duomenų struktūra gali būti faktiška, optimali ar hipotetinė. Dėl sudėtingos struktūros makroekonomikos rodiklį sunku apibendrinti vienu indikatoriumi. Kartais tiriamą visumą sudaro skirtingo „išsivystymo“ laipsnio dariniai. Kiekybiškai vienarūšiai dariniai vienomis aplinkybėmis, dažnai tampa ne vienarūšiai kitomis. Dėl šių priežasčių kompleksiškai įvertinti užimtumą gana sudėtinga. Be to, vertinant užimtumo situaciją šalyje bei ES, lyginamosios analizės kontekste iškyla sunkumų dėl skirtingai apibrėžiamų ir išmatuojamų darbo jėgos charakteristikų. Skirtingose šalyse nevienodai nustatomas darbo jėgos dydis. Šie skirtumai sudaro prielaidas tam tikro pobūdžio apribojimams lyginant kai kurių šalių nedarbo lygio kaip neišnaudotų užimtumo galimybių rodiklius. Vis dėlto, atsižvelgiant į šiuos skirtumus, kompleksiškai vertinant gyventojų užimtumą galima išskirti bendro pobūdžio veiksnius, sąlygojančius užimtumo pokyčius. Šie veiksniai skirstomi į demografinius, geografinius, ekonominius, socialinius bei elgsenos, kurie veikia tiek paties užimtumo lygio pokyčius, tiek sąveikauja tarpusavyje.

Atsižvelgiant į sudėtingą, daugialypę gyventojų užimtumo kaip makroekonomikos rodiklio struktūrą, darbe siūlomas integruotas makroekonomikos indikatoriaus analizės modelis *(IMIA)* išskaidytas į šešių etapų procedūrą. Praktinis *(IMIA)* modelio realizavimas *leidžia įvertinti* pasirinkto indikatoriaus (darbo jėgos, bedarbių ir kt.):

- *statines charakteristikas (RS),* identifikuojant faktinius struktūros indikatoriaus bruožus *(FSIB);*
- *reiškinio dinamikos retrospektyvą (RD),* išryškinant struktūros indikatoriaus pokyčių bruožus *(SIPB)*;
- *reiškinio vystymosi ir plėtros tendencijas (RP)*, identifikuojant struktūros indikatorių sudėtinių dalių nuokrypius *(SINM);*
- *koreliacinius reiškinio ryšius (RR),* identifikuojant ir vertinant struktūros indikatorių tarpusavio koreliacijas *(SITR);*
- *reiškinio koncentraciją bei netolygumus (RN)*, išmatuojant struktūros indikatorių sklaidos netolygumus *(SISN).*

Šie tyrimo žingsniai realizuojami matematinės statistikos metodais.

(IMIA) modeliu atlikto gyventojų užimtumo tyrimo rezultatai šalies ir ES darbo rinkose leidžia daryti šias išvadas:

1. Gyventojų užimtumo pokyčius lemiantys *demografiniai veiksniai* išryškino bendrą gyventojų skaičiaus mažėjimą ne tik šalies, bet ir daugelio ES šalių teritorijose. Nors ailgėjanti vidutinė gyvenimo trukmė rodo visuomenės gyvenimo kokybės augimą, tačiau nuolatinis darbo jėgos senėjimo procesas ekonominiu požiūriu vertinamas neigiamai. Pagyvenusių asmenų padėtį darbo rinkoje lemia žemesnis aktyvumo lygis, silpnesnė motyvacija dėl turimo alternatyvaus pensininko vaidmens, darbdavių preferencijos. Pagyvenusių asmenų ribotos integracinės galimybės sąlygoja socialinio draudimo problemas.
2. Gyventojų užimtumas, mažėjęs nuo 1990 metų, 2001 metais pozityviai pakeitė judėjimo kryptį, tačiau augimo tempai nebuvo dideli. Tiriamuoju laikotarpiu šalies užimtumo pokyčius lėmė ūkio struktūros transformacijos, nuosavybės formų kaita, techninė technologinė plėtra, investicijų srautai, pasirengimas integracijai į ES.
3. Užimtumo pokyčius pagal veiklos sektorius lėmė tiriamuoju laikotarpiu sąlygoti produkcijos substitucijos procesai, ekonominių sąlygų, žmonių poreikių struktūros pokyčiai. Paslaugų sferos plėtra lėmė užimtų gyventojų skaičiaus šioje veiklos sferoje gausėjimą. Nustatyta, kad žemės ūkyje, medžioklėje ir miškininkystės sferoje užimtųjų skaičius tiriamuoju laikotarpiu sumažėjo iki 14,5 proc., (ES (15) – 6 proc., ES (10) –12 proc.). Užimtumo rodiklis pramonėje siekė 20,6 proc., (ES (15) – 25 proc., ES (10) – 28 proc.), paslaugų sferoje – 53,9 proc. (ES (15) – 69 proc., ES (10) – 60 proc.).
4. Profesinės užimtumo struktūros formavimąsi tiriamuoju laikotarpiu lėmė ekonominiai, socialiniai-psichologiniai, geografiniai veiksniai, sąlygoję *leidėjų, vyresniųjų pareigūnų bei vykdytojų* kategorijai atstovaujančių asmenų grupės mažėjimą užimtųjų skaičiuje, tačiau išryškinę *jaunesniųjų specialistų ir technikų profesinės* grupės poreikį darbo rinkoje. Panaši situacija būdinga visose ES šalyse, kuriose moterys dominuoja socialinės ir sveikatos apsaugos (76,2 proc.), mokymo ir auklėjimo (66,3 proc.), viešbučių ir restoranų veikloje (52,5 proc.) bei įvairių paslaugų sektoriuose. Vyrai pasiskirstę taip: statybų sferoje 91,6 proc., kalnakasyboje 89,6 proc., energetikos ir vandens tiekimo sferose 86,2 proc.
5. Identifikuotų struktūros indikatorių tarpusavio koreliacinė analizė parodė, kad bendras gyventojų užimtumas teigiamai koreliuoja su bendru šalies ūkio augimu (BVP) (*r = 0,976*), tačiau ekonomikos plėtra sąlygota bendro įmonių produktyvumo gyventojų užimtumo rodikliui turi neigiamą įtaką, t. y. produktyvumo augimas mažina dirbančių asmenų poreikį. Nedarbo lygio rodiklis tiesiogiai proporcingas nusikaltimų augimui (*r = 0,876)*, tačiau neigiamai koreliuoja su bendru šalies ūkio augimu (*r = 0,696).* Įvertinus bedarbių skaičiaus augimą, jų dalyvavimo apimtis aktyviose užimtumo priemonėse bei užimtumo programų finansavimo apimtis, pastebėta neigiama koreliacija (*r = -0,581)*: mažėjant finansavimo apimtims, realiai mažėja galimybė dalyvauti užimtumo programose, tačiau pastebimai neigiamas koreliacinis ryšys sudaro prielaidas manyti, kad dalis lėšų, skirtų bedarbių gebėjimams palaikyti ir vystyti, panaudojamos neefektyviai.
6. Remiantis išmatuotais sklaidos netolygumų rezultatais tarp šalies regionų indikatorių reikšmių (regionų sukurtas BVP ir gyventojų užimtumo rodiklis) nustatyta, kad didėja šalies ekonominės veiklos regioniniai skirtumai (2004 m. $Džini_{koeficientas} = 0,225$).

Raktažodžiai: *darbo rinka, gyventojų užimtumas, užimtumo įvertinimo modelis, užimtumo plėtra.*

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