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Labour Migration from Romania to the EU Point of Weakness in the Romanian Economy

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ABSTRACT

The effects of the integration process on the labour market may spring, on the one hand, from the adjustments of the production factors market, produced by the free circulation of goods and, on the other hand from the workforce movement from one country to another. The mobility of workforce depends on differences in wages and in the occupancy /unemployment rate. The workforce mobility may be regarded as the best indicator for the functioning of an integrated workforce market. Theoretically, the more integrated the national workforce markets are, the greater will be the workforce influxes from regions with low GDP/ per capita and increased unemployment rate to regions with higher income and low unemployment rate. Romania has been a country exporting workforce for years, mainly for economic reasons. The international migration can be considered one the sources for the problems on the labour market, but can be also regarded as one of the solutions.

1. Introduction

People mobility is the process by which people change their residential, professional or social status by acquiring a new status. One can classify mobility in spatial (territorial or geographic), professional and social. *In extenso*, it can also apply to the change in marital or educational status. For the professional and social mobility, the movements refer to two consecutive generations, in classical Sociology: socio-professional status of parents and their children, social status of parents and their children, therefore, from a inter-generations approach.

Spatial mobility is the process comprising the total of population spatial movements produced by varied reasons, on smaller or larger distances, accompanied or not by the permanent change in legal or habitual residence.

People migration - form of spatial or geographic mobility accompanied by the change of habitual residence between two territorial-administrative units clearly defined. It is also known as *residential migration*, as the persons involved in such movement change their *residential status*.

With regard to the official boundaries of a country, the migration may be: *internal migration* – the total of departures and permanent change of habitual residence within a country, between territorial-administrative units; *international (external) migration* – the total of departures and permanent change of habitual residence between two countries.

Period (migration time span) – the period of migration, determined by records, may be: *fixed period or interval*, defined by the beginning or length of the period; *migration during the lifetime* – usually recorded in censuses, representing the time span between the date of birth (at the place of origin) and the date of record (at the place of destination), irrespective of the number of travels.

For an accurate description and statistical analysis, the following items are treated separately: *migration* or *movement* from one place to another, this representing the demographic event, by analogy with the birth or death event, and *migrant* (migrating person) – the person who has migrated once or more times.

The migration or mobility status is defined in accordance with the classification of data collected in people's census in the following categories: A. non-migrant population; B. immigrant population within the country (villages, including suburbs, towns – including cities and counties); C. immigrant population outside the country (external immigration). *The place of origin (departure)* – the place from where the migrant person begins the departure, usually noted with index *i*. *The place of destination (arrival)* – the place where the migrant's movement ends, noted with *j*. Considering the two fundamental migration types, the following set phrases are recommendable:

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- *departures and arrivals*, as events in the internal migration, as recorded in the papers of the National Institute of Statistics; accordingly, these persons are considered *departed* (from the place of origin) and *arrived* (at the place of destination);

- *immigrations and emigrations*, as events of the international migration; accordingly, these persons are considered *emigrated* (from a country) and *immigrated* (to a country).

By noting with ***I*** the number of the persons arrived (immigrated) and with ***E*** the number of persons departed (emigrated), we reach the following concepts:

Net migration or migration growth is the ratio between arrived (immigrants) and departed (emigrants):

$$\Delta M = I - E \tag{1}$$

Net immigration – migration in which the number of immigrants is higher than the number of emigrants: $I > E$.

Net emigration – migration in which the number of emigrants is higher than the number of immigrants: $E > I$.

Usually, the terms growth, exceedance, or migrating balance are used, with corresponding + or – signs. As previously stated, the *net migration* is the second component of the total population movement or demographical growth. The total population growth is:

$$P_{t+1} - P_t = (N - M) + (I - E) \tag{2}$$

and is made of natural growth *(N – M)* and migrating growth *(I – E)*.

In the research of the migration phenomenon, the perspectives of experts from various fields have been considered – demographers, geographers, economists, psychologists, jurists, etc.From the sociological point of view, it is emphasised that the definition of migration is based on social, cultural and economic factors. A.G. Johnson defines migration as: *the physical movement of people within and between social systems.* This movement is highly influential upon the social composition of the population, altering the racial, ethnic and class relationships and representing, at the same time, an important source of growth for the urban population[1].

The migration process is not only physical, sighting a change in the natural environment, but a complex one, with specific social effects. A classical definition for migration belongs to the sociologist Jan Szczepanski, who defines social mobility as *the series of phenomena residing in the individuals or groups movements from one place to another in the social space[2]*. Equally up to date are the approaches considering migration a *life strategy* which represents *a perspective of the long term relationship between assumed ends and means [...] They are rational structures of action, substantial at the level of the adopting agent[3]* or as a form of protest *against the changes and abandonment of a society in which they can not find the place they desire.*

The geographical studies on migration stress the actual territorial movement, either individually or in groups of more individuals and the changes at the level of the environment resulted from this movement. The social aspect (professional, educational, cultural) is considered to a lesser extent, but not completely ignored.

Under the new social-economic circumstances, a rational approach to migration is necessary, as *econometrical cost-benefit patterns[4]* are in view. This is the reason why various migration studies envisage these days the migrations taking place within the international space, this pattern referring directly to international migration. The classical theories on migration are still considered, however, they are enriched and adapted to actual situations, especially if one considers that the migration forms, the motivations and the migrant fluxes have encountered significant changes.

The factors which determine migration emphasise a large number of elements whose importance is deemed determinative in relation to the approach to the phenomenon. Thus, geographical factors (considering the physical traits of the natural environment), economic, demographical, and psychological are being emphasised. In what the classification of migrations is concerned, the literature in the field provides numerous criteria expressing varied typologies, irrespective of the approach to the phenomenon.

2. Main causes and effects of the people's migration process

The migration process is a dependant phenomenon in relation to more elements, factors, and processes that mutually influence their evolutions. Moreover, it produces, due to its complexity, multiple consequences on various domains of private life or collectivities. The migration influences the evolution of more demographic, social, and economic processes directly Demographically, the main visible effects of migration specific to the Romanian space in the period 2000-2011 are represented by:

- *Demographic ageing*, result of the migration of the young (20-40 years), professionally active population.

- The negative fertility rate evolution (from a total fertility rate of 2.1 children/ woman in 1989 to 1.29 children/woman in 2011[5]).
- Changes in age and sex structure of population reflecting a slow, but constant process of demographic ageing.
- Changes in family dynamics.
- Overcrowing of the receiving areas and depopulation
- of the sending ones.

Table 1. The fertilility rate in Romania in the years 2000-2011

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fertilility rate	1.28	1.27001	1.25470	1.26842	1.29233	1.32188	1.31714	1.29730	1.35482	1.37627	1.31	1.29

Source: http://appsso.eurostat.ec.europa.eu/nui/setupModifyTableLayout.do

In the economic sphere, the effects of the migrating phenomenon occur as soon as the latter begins. They may be either positive or negative and can be felt on long, medium or short term. In general, the individuals who choose to migrate to other regions believe that they will acquire a better standard of living with their departure.

The migration may contribute to the increase in population income, increase in the standard of living, ensuring a workplace, decrease in the unemployment rate in certain activity fields, orientation of the migrants towards economic areas adverse in workforce at one point. Some negative effects can be also identified (a situation encountered in Romania after 1990):

a) *the brain drain*: S. Stănică, citing various sources, proves that the concept significance expresses, in most cases, *the migration of educated and qualified workforce from poor to rich countries[6]*, aiming at professional acknowledgement and higher wages, conditions fulfilled by the developed countries.

The negative effect of the highly qualified workforce migration upon the country of origin is felt when the migrants have professions significant for the economy, affecting the development of the entire society on short, medium, but also on long term.

b) *the loss of specialised /qualified workforce*: professionally qualified persons migrate leaving their fields without specialists the other country being the real beneficiary;

c) *the loss of professional qualifications*: the imigrants often give them up and take jobs inferior to their professional qualifications in exchange for higher wages.

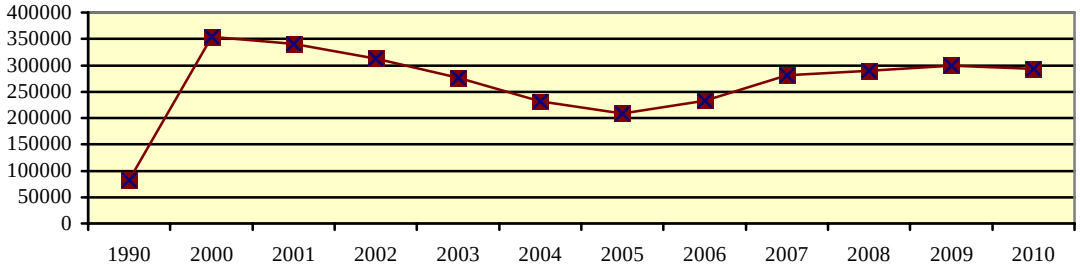
d) *the decrease in exports* (as a result of the decrease of internal production).

The cultural influence upon the family acquired through migration is traceable at the level of reconsidering the family dimensions, the relationships between its members, their roles, values and personal beliefs. As it is not an isolated phenomenon, we have also taken into consideration the effects produced by migration at the social deviance level, an idea tackled by many sociologists. For example, the sociologist I. Jaszinski (1964) tried to indentify a connection between one city economic and urban development and the crime dynamics. Delinquency is a phenomenon of social inadequacy, either the individual or the social context being responsible. It has been noted that crime (especially juvenile) increases in periods of accelerated urbanisation. It will diminish gradually when the new enlarged and crowded localities reach a certain degree of stability, which allows a better social control.

Various theoretical and statistical studies in the field prove that the crime rate in Romania has increased significantly after 1990 (82,500 crimes) when compared to the previous period, reaching 293,423 cases in 2010. It is worrying that both the number of the crimes committed and the fear of crime have increased, and this fear may seriously affect the social balance and functioning, at individual level as well as at the community level and negatively influences the quality of life. The fear of crimes, social insecurity felt or the increased probability to become victim of a crime in certain areas are reasons for many individuals to decide to change their residence, which is equivalent to territorial mobility.

Table 2. The number of crimes committed in Romania during the years 2000-2010[7]

Year	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of crimes	82500	353345	340414	312204	276841	231637	208239	232658	281457	289331	299889	293423



Source: http://appsso.eurostat.ec.europa.eu/nui/setupModifyTableLayout.do

3. Aspects of the evolution of patterns applied to the population migration process

Human migration is one of the few research fields of social processes that are truly interdisciplinary; it has extended consequences for both population and society and can be considered an economic, demographic, enthnologic, geographic, political, psychological or social process. Consequently, it should not come as a surprise that the number of social sciences involved in its study is in the increase: demography, economics, geography, political sciences, sociology and many more. However, each of the disciplines enummerated above has a peculiar orientation. For example, demography regards migration as one of the main demographic processes affecting the population dynamics and structure, while economics focuses on economic aspects of the migration, its impact upon states economy, regional economy or individual welfare.

Seven hypotheses had been first established:

1. Most emigrants migrate rarely on large distances; most emigrants are fast assimilated by developed commercial and industrial centres;
2. The population emigration process towards absortion centres presupposes the existence of activity branches with workforce shortage;
3. The dispersion process is opposite to the absortion process and has similar characteristics.
4. Each migration flux produces a counter-flux compensation. (Consequently, the net migration between the states X and Y is always smaller than the gross migration between the states X and Y).
5. In general, the migration on long distances sights large commercial and industrial centres.
6. The people born in urban environments migrate less than the one born in rural areas (this is the reason why the increase in migration fluxes takes place in the context of industrial and economic development).
7. Women migrate more often than men.

Ravenstein's contribution to the migration processes analysis is represented by his assertion that **the main migration factors** (not exclusive, however) are **economic factors**. According to his theory, oppressive laws, excessive taxes, a climate unfavourable to commercial and industrial development, various constraints (e.g. transportation of goods) produce migrant fluxes, but no such flux can be compared to the fluxes sprung from the inherent desire to have a higher living standard.

A significant contribution to the patterning of migration development in the twentieth century was represented by the improvement of the mathematical methods used in demography – the field known as econometrics. The development and expansion of the personal computers and the improved information technologies allowed technical flexibilities and the ability to perform complicated operations necessary for processing and generalising a large amount of statistical data.

At the same time, in the present day, out of the three demographic processes directly influencing the changes in population structure and number – fertility, mortality and migration, the third has the least developed mathematic tools. This happens mainly due to the absence of a unique migration theory which may become the ground for patterning, as well as to the lack of a common approach to statistics, records and specific terminology.

4. The classification of the analysis patterns of the migration process

A mathematical pattern of migration can be defined as a simplified description of the real migration processes in which all the essential relationships between real participants in the spatial movement – migrants and migration factors – are mathematically expressed. As a socio-economic process, the patterning of the migration process can be applied at both macro and micro levels. Although they sight the same research subject, *i.e.*, population, this two approaches differ in research objectives. The macro approach studies migration models for the entire population or certain social groups (*e.g.* ageing people, working people, people of Romanian citizenship, etc) within a certain area and is based either on census data or present day statistics. The features of the origin and destination areas (*e.g.* climate, income, unemployment, etc) are used as entry variables and the indices of the migration processes (*e.g.* migration growth) are exit variables. The basic objectives in applying migration patterning at the macro level are:

1. the analysis of the migration processes consisting in the identification of the key factors of the migration (*e.g.* the influence of interregional differences in salary and unemployment);

2. the prognosis of the migration indices (referring to the volume of migration fluxes from one region to another);

3. the simulation of the migration process developed on the ground of the noted interconnections (*e.g.* the analysis of emigration possible changes in various economic growth scenarios in the countries of emigration).

The micro approach focuses on the behaviour of individuals (families, households) and aims at explaining the decision-making process of the potential migrants, whether to stay in the present residence or to emigrate to another one. Usually, micro-migration patterns are based on recouped data (*e.g.* individual characteristics) obtained from censuses or sociological surveys. As entry variables, the micro patterns use both the features of the origin and destination regions and the traits of the individuals involved in the migration processes.

The main objectives of applying migration models at the micro level are:

1. the analysis of the decision-making process of the potential emigrant (*should I stay or should I go?*), the identification of the key-factors of the decision concerning the dynamic social groups;

2. the analysis of the individual selection process concerning available alternatives (*where should I go?),* the identification of the critical factors influencing the destination choice in the situation of a migration movement.

5. Data source used for applying the markovian model to the migration process of the romanian population in the interval 2000-2011

Table 3. The emigration of the Romanian citizenship population in the main EU states in the years 2000-2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Czech Rep.	64	278	350	440	361	440	442	900	1378	2176	3403	4123
Denmark	269	271	290	248	265	354	341	882	1406	1528	2026	2376
Germany	25270	24879	24560	24058	23825	23387	23844	43456	47642	49693	53187	54945
Spain	17696	23512	48671	55294	89620	94084	111981	174217	58377	42001	60220	66703
Italy	19710	18639	17257	78814	67148	46006	40555	274007	175907	106352	92591	90587
The Netherlands	635	694	627	703	711	559	718	2347	2390	1892	1634	1256
Austria	1977	2455	4232	5075	5278	5067	4553	9227	9218	15908	2369	4769
Slovenia	0	0	0	2	5	1	1	3	146	71	82	95
Slovakia	49	44	56	216	325	155	98	487	2133	925	415	734
Finland	120	91	33	46	58	63	102	188	184	155	182	326
Sweden	308	311	366	352	332	374	348	2457	2449	1746	1671	1829

Source: EUROSTAT: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=migr_imm5prv&lang=en

Table 4. Romanian citizenship population resident in the main EU states in the years 2000 - 2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Czech Rep.	2646	2336	2067	2173	2145	2445	2634	2697	3298	3649	4095	4415
Denmark	1099	1106	1176	1270	1329	1405	1563	1672	2386	3744	5076	6934
Germany	87504	90094	88102	88679	89104	73365	73043	78452	90614	100429	112230	135707
Spain	5682	26779	53087	112861	189979	287087	388422	539507	734764	799225	823111	843775
Italy	41587	62347	81987	95039	177812	248849	297570	342200	625278	796477	887763	968576
The Netherlands	1397	1694	2094	2360	2735	3020	3006	3225	4894	6256	7118	8289
Austria	16943	17470	17750	19482	20483	21314	21942	21882	27646	32341	38211	42789
Slovenia	90	84	102	145	148	131	136	166	225	240	195	230
Slovakia	1045	1289	1498	1678	1928	417	419	700	3005	4966	5424	5849
Finland	404	489	546	547	557	580	628	732	911	1045	1170	1303
Sweden	2981	2949	2495	2327	2343	2360	2371	2252	4442	6536	7661	8807

Source: EUROSTAT: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=migr_pop1ctz&lang=en

Table 5. The emigration of the Romanian citizenship population from the main EU states in the years 2000-2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Czech Rep.	1	56	158	141	113	178	276	333	378	432	487	502
Denmark	98	101	118	136	141	158	182	153	284	470	554	587
Germany	15478	18369	17555	19759	20275	20606	21713	24524	37778	38546	41059	42653
Spain	178	204	234	1438	3148	4044	16446	8050	14000	25901	32680	39324
Italy	195	234	318	499	673	1028	1251	3742	8308	9924	7488	8329
The Netherlands	67	72	83	127	155	143	158	295	473	558	594	604
Austria	1127	1514	1638	2963	3650	3700	3898	3491	4633	5356	6213	6367
Slovenia	29	35	1	31	135	85	93	138	46	111	48	79
Slovakia	3	0	1	406	508	21	45	237	266	324	44	176
Finland	8	14	28	13	22	15	10	30	66	41	26	32
Sweden	39	47	38	40	44	42	77	143	269	529	443	489

Source: EUROSTAT: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=migr_imm2ctz&lang=en

6. The presentation of the markovian model applied to the migration process for the romanian population in the 2000-2011 interval

The patterning of the Romanian citizens' emigration in the EU space using the Markov model requires the stipulation of the following entities:

a) Considering that ST={st(i), i =0,1,2,…10} – represents the vector of the abbreviations corresponding to the EU member states used in the analysis of the emigration of the Romanian citizens to the EU space using the Markovian model; since the process of Romanian citizens emigration is analysed for 11 EU states, then the dimension of the S vector is 11 and has the following structure:

ST={"CZ","DK","DE","ES","IT","NL","AT","SI","SK","FI","SE"};

b) The vector A={a(i), i=0,1,….10,11} represents the data structure used to define the years for the analysis of the Romanian citizens emigration to the EU space using the Markovian model. The vector dimension is 12, considering that values corresponding to the interval 2000-2011 are analysed:

A={2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010,2011};

c) Considering PE={pn(st(i),a(j)), where i=0,1,2,…10 and j=0,1….11}; PE is the matrix of the Romanian citizens emigrating to the specified EU state st(i) during the calendar year y(j):

$$PE=\begin{pmatrix} pe_{2000,CZ} & pe_{2000,DK} & pe_{2000,DE} & pe_{2000,ES} & pe_{2000,IT} & pe_{2000,NL} & pe_{2000,AT} & pe_{2000,SI} & pe_{2000,SK} & pe_{2000,FI} & pe_{2000,SE} \\ pe_{2001,CZ} & pe_{2001,DK} & pe_{2001,DE} & pe_{2001,ES} & pe_{2001,IT} & pe_{2001,NL} & pe_{2001,AT} & pe_{2001,SI} & pe_{2001,SK} & pe_{2001,FI} & pe_{2001,SE} \\ pe_{2002,CZ} & pe_{2002,DK} & pe_{2002,DE} & pe_{2002,ES} & pe_{2002,IT} & pe_{2002,NL} & pe_{2002,AT} & pe_{2002,SI} & pe_{2002,SK} & pe_{2002,FI} & pe_{2002,SE} \\ pe_{2003,CZ} & pe_{2003,DK} & pe_{2003,DE} & pe_{2003,ES} & pe_{2003,IT} & pe_{2003,NL} & pe_{2003,AT} & pe_{2003,SI} & pe_{2003,SK} & pe_{2003,FI} & pe_{2003,SE} \\ pe_{2004,CZ} & pe_{2004,DK} & pe_{2004,DE} & pe_{2004,ES} & pe_{2004,IT} & pe_{2004,NL} & pe_{2004,AT} & pe_{2004,SI} & pe_{2004,SK} & pe_{2004,FI} & pe_{2004,SE} \\ pe_{2005,CZ} & pe_{2005,DK} & pe_{2005,DE} & pe_{2005,ES} & pe_{2005,IT} & pe_{2005,NL} & pe_{2005,AT} & pe_{2005,SI} & pe_{2005,SK} & pe_{2005,FI} & pe_{2005,SE} \\ pe_{2006,CZ} & pe_{2006,DK} & pe_{2006,DE} & pe_{2006,ES} & pe_{2006,IT} & pe_{2006,NL} & pe_{2006,AT} & pe_{2006,SI} & pe_{2006,SK} & pe_{2006,FI} & pe_{2006,SE} \\ pe_{2007,CZ} & pe_{2007,DK} & pe_{2007,DE} & pe_{2007,ES} & pe_{2007,IT} & pe_{2007,NL} & pe_{2007,AT} & pe_{2007,SI} & pe_{2007,SK} & pe_{2007,FI} & pe_{2007,SE} \\ pe_{2008,CZ} & pe_{2008,DK} & pe_{2008,DE} & pe_{2008,ES} & pe_{2008,IT} & pe_{2008,NL} & pe_{2008,AT} & pe_{2008,SI} & pe_{2008,SK} & pe_{2008,FI} & pe_{2008,SE} \\ pe_{2009,CZ} & pe_{2009,DK} & pe_{2009,DE} & pe_{2009,ES} & pe_{2009,IT} & pe_{2009,NL} & pe_{2009,AT} & pe_{2009,SI} & pe_{2009,SK} & pe_{2009,FI} & pe_{2009,SE} \\ pe_{2010,CZ} & pe_{2010,DK} & pe_{2010,DE} & pe_{2010,ES} & pe_{2010,IT} & pe_{2010,NL} & pe_{2010,AT} & pe_{2010,SI} & pe_{2010,SK} & pe_{2010,FI} & pe_{2010,SE} \\ pe_{2011,CZ} & pe_{2011,DK} & pe_{2011,DE} & pe_{2011,ES} & pe_{2011,IT} & pe_{2011,NL} & pe_{2011,AT} & pe_{2011,SI} & pe_{2011,SK} & pe_{2011,FI} & pe_{2011,SE} \end{pmatrix}=$$

$$PE=\begin{pmatrix} 64 & 269 & \dots & 308 \\ 278 & 271 & \dots & 311 \\ . & . & . & . \\ 4123 & 2376 & \dots & 1829 \end{pmatrix}$$

d) Considering PM={pm(a(j),pi(st(i)), where j=0,1….11 and i=0,1,2,…10}; PM represents the matrix of Romanian citizens emigrating from the EU state st(i) during the calendar year y(j):

$$PM=\begin{pmatrix} pm_{2000,CZ} & pm_{2000,DK} & pm_{2000,DE} & pm_{2000,ES} & pm_{2000,IT} & pm_{2000,NL} & pm_{2000,AT} & pm_{2000,SI} & pm_{2000,SK} & pm_{2000,FI} & pm_{2000,SE} \\ pm_{2001,CZ} & pm_{2001,DK} & pm_{2001,DE} & pm_{2001,ES} & pm_{2001,IT} & pm_{2001,NL} & pm_{2001,AT} & pm_{2001,SI} & pm_{2001,SK} & pm_{2001,FI} & pm_{2001,SE} \\ pm_{2002,CZ} & pm_{2002,DK} & pm_{2002,DE} & pm_{2002,ES} & pm_{2002,IT} & pm_{2002,NL} & pm_{2002,AT} & pm_{2002,SI} & pm_{2002,SK} & pm_{2002,FI} & pm_{2002,SE} \\ pm_{2003,CZ} & pm_{2003,DK} & pm_{2003,DE} & pm_{2003,ES} & pm_{2003,IT} & pm_{2003,NL} & pm_{2003,AT} & pm_{2003,SI} & pm_{2003,SK} & pm_{2003,FI} & pm_{2003,SE} \\ pm_{2004,CZ} & pm_{2004,DK} & pm_{2004,DE} & pm_{2004,ES} & pm_{2004,IT} & pm_{2004,NL} & pm_{2004,AT} & pm_{2004,SI} & pm_{2004,SK} & pm_{2004,FI} & pm_{2004,SE} \\ pm_{2005,CZ} & pm_{2005,DK} & pm_{2005,DE} & pm_{2005,ES} & pm_{2005,IT} & pm_{2005,NL} & pm_{2005,AT} & pm_{2005,SI} & pm_{2005,SK} & pm_{2005,FI} & pm_{2005,SE} \\ pm_{2006,CZ} & pm_{2006,DK} & pm_{2006,DE} & pm_{2006,ES} & pm_{2006,IT} & pm_{2006,NL} & pm_{2006,AT} & pm_{2006,SI} & pm_{2006,SK} & pm_{2006,FI} & pm_{2006,SE} \\ pm_{2007,CZ} & pm_{2007,DK} & pm_{2007,DE} & pm_{2007,ES} & pm_{2007,IT} & pm_{2007,NL} & pm_{2007,AT} & pm_{2007,SI} & pm_{2007,SK} & pm_{2007,FI} & pm_{2007,SE} \\ pm_{2008,CZ} & pm_{2008,DK} & pm_{2008,DE} & pm_{2008,ES} & pm_{2008,IT} & pm_{2008,NL} & pm_{2008,AT} & pm_{2008,SI} & pm_{2008,SK} & pm_{2008,FI} & pm_{2008,SE} \\ pm_{2009,CZ} & pm_{2009,DK} & pm_{2009,DE} & pm_{2009,ES} & pm_{2009,IT} & pm_{2009,NL} & pm_{2009,AT} & pm_{2009,SI} & pm_{2009,SK} & pm_{2009,FI} & pm_{2009,SE} \\ pm_{2010,CZ} & pm_{2010,DK} & pm_{2010,DE} & pm_{2010,ES} & pm_{2010,IT} & pm_{2010,NL} & pm_{2010,AT} & pm_{2010,SI} & pm_{2010,SK} & pm_{2010,FI} & pm_{2010,SE} \\ pm_{2011,CZ} & pm_{2011,DK} & pm_{2011,DE} & pm_{2011,ES} & pm_{2011,IT} & pm_{2011,NL} & pm_{2011,AT} & pm_{2011,SI} & pm_{2011,SK} & pm_{2011,FI} & pm_{2011,SE} \end{pmatrix}=$$

$$PM=\begin{pmatrix} 1 & 98 & \dots & 39 \\ 56 & 101 & \dots & 47 \\ . & . & . & . \\ 502 & 587 & \dots & 489 \end{pmatrix}$$

e) Considering PR={pr(a(j),pr(st(i)), where i=0,1,2,…10 and j=0,1….11}; PR represents the matrix of the Romanian citizens resident in the EU state st(i) during the calendar year y(j):

$$PR=\begin{pmatrix} pr_{2000,CZ} & pr_{2000,DK} & pr_{2000,DE} & pr_{2000,ES} & pr_{2000,IT} & pr_{2000,NL} & pr_{2000,AT} & pr_{2000,SI} & pr_{2000,SK} & pr_{2000,FI} & pr_{2000,SE} \\ pr_{2001,CZ} & pr_{2001,DK} & pr_{2001,DE} & pr_{2001,ES} & pr_{2001,IT} & pr_{2001,NL} & pr_{2001,AT} & pr_{2001,SI} & pr_{2001,SK} & pr_{2001,FI} & pr_{2001,SE} \\ pr_{2002,CZ} & pr_{2002,DK} & pr_{2002,DE} & pr_{2002,ES} & pr_{2002,IT} & pr_{2002,NL} & pr_{2002,AT} & pr_{2002,SI} & pr_{2002,SK} & pr_{2002,FI} & pr_{2002,SE} \\ pr_{2003,CZ} & pr_{2003,DK} & pr_{2003,DE} & pr_{2003,ES} & pr_{2003,IT} & pr_{2003,NL} & pr_{2003,AT} & pr_{2003,SI} & pr_{2003,SK} & pr_{2003,FI} & pr_{2003,SE} \\ pr_{2004,CZ} & pr_{2004,DK} & pr_{2004,DE} & pr_{2004,ES} & pr_{2004,IT} & pr_{2004,NL} & pr_{2004,AT} & pr_{2004,SI} & pr_{2004,SK} & pr_{2004,FI} & pr_{2004,SE} \\ pr_{2005,CZ} & pr_{2005,DK} & pr_{2005,DE} & pr_{2005,ES} & pr_{2005,IT} & pr_{2005,NL} & pr_{2005,AT} & pr_{2005,SI} & pr_{2005,SK} & pr_{2005,FI} & pr_{2005,SE} \\ pr_{2006,CZ} & pr_{2006,DK} & pr_{2006,DE} & pr_{2006,ES} & pr_{2006,IT} & pr_{2006,NL} & pr_{2006,AT} & pr_{2006,SI} & pr_{2006,SK} & pr_{2006,FI} & pr_{2006,SE} \\ pr_{2007,CZ} & pr_{2007,DK} & pr_{2007,DE} & pr_{2007,ES} & pr_{2007,IT} & pr_{2007,NL} & pr_{2007,AT} & pr_{2007,SI} & pr_{2007,SK} & pr_{2007,FI} & pr_{2007,SE} \\ pr_{2008,CZ} & pr_{2008,DK} & pr_{2008,DE} & pr_{2008,ES} & pr_{2008,IT} & pr_{2008,NL} & pr_{2008,AT} & pr_{2008,SI} & pr_{2008,SK} & pr_{2008,FI} & pr_{2008,SE} \\ pr_{2009,CZ} & pr_{2009,DK} & pr_{2009,DE} & pr_{2009,ES} & pr_{2009,IT} & pr_{2009,NL} & pr_{2009,AT} & pr_{2009,SI} & pr_{2009,SK} & pr_{2009,FI} & pr_{2009,SE} \\ pr_{2010,CZ} & pr_{2010,DK} & pr_{2010,DE} & pr_{2010,ES} & pr_{2010,IT} & pr_{2010,NL} & pr_{2010,AT} & pr_{2010,SI} & pr_{2010,SK} & pr_{2010,FI} & pr_{2010,SE} \\ pr_{2011,CZ} & pr_{2011,DK} & pr_{2011,DE} & pr_{2011,ES} & pr_{2011,IT} & pr_{2011,NL} & pr_{2011,AT} & pr_{2011,SI} & pr_{2011,SK} & pr_{2011,FI} & pr_{2011,SE} \end{pmatrix} =$$

$$PR=\begin{pmatrix} 2646 & 1099 & \dots & 2981 \\ 2336 & 1106 & \dots & 2949 \\ . & . & . & . \\ 4415 & 6934 & \dots & 8807 \end{pmatrix}$$

f) It is defined as PRS=(prs(a(j),st(i)), where i=0,1,2,...10 and j=0,1....11}, the matrix of the Romanian citizens resident in the EU state st(i) during the calendar year y(j) who did not emigrate to other states. The calculation formula of the PRS matrix is:

PRS(a(j),st(i))=PR(a(j),st(i))-PM(a(j),st(i));

We obtain the PRS matrix whose values are indicated in the table below:

Table 6. Romanian citizens resident in the main EU states who did not emigrate during the 2000-2011 interval

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Czech Rep.	2645	2280	1909	2032	2032	2267	2358	2364	2920	3217	3608	3913
Denmark	1001	1005	1058	1134	1188	1247	1381	1519	2102	3274	4522	6347
Germany	72026	71725	70547	68920	68829	52759	51330	53928	52836	61883	71171	93054
Spain	5504	26575	52853	111423	186831	283043	371976	531457	720764	773324	790431	804451
Italy	41392	62113	81669	94540	177139	247821	296319	338458	616970	786553	880275	960247
The Netherlands	1330	1622	2011	2233	2580	2877	2848	2930	4421	5698	6524	7685
Austria	15816	15956	16112	16519	16833	17614	18044	18391	23013	26985	31998	36422
Slovenia	61	49	101	114	13	46	43	28	179	129	147	151
Slovakia	1042	1289	1497	1272	1420	396	374	463	2739	4642	5380	5673
Finland	396	475	518	534	535	565	618	702	845	1004	1144	1271
Sweden	2942	2902	2457	2287	2299	2318	2294	2109	4173	6007	7218	8318

g) The matrix of the transition probabilities for the Romanian citizens migrating from a state st(i) to a state st(j) is defined as $PT_{y(k)}$={pt(st(i),st(j)), where i=0,1,2,...10 and j=0,1....10}. As the values of the PT matrix are unknown, we will use a balanced calculation formula:

$$pt_{a(k)}(st(i),st(j))=\frac{pe(a(k),st(j))}{\sum_{n=0}^{10} pe(a(k),st(n))-pe(a(k),st(i))} \quad (3)$$

where: $pt_{a(k)}(st(i),st(i))=0$, k = 0,1,....11 and

$$\sum_{j=0}^{10} pt_{a(k)}(st(i),st(j))=1 \quad (4)$$

We have obtained the following matrices:

The matrix of transition probabilities for Romanian citizens PT2000											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
CZ	0.0000	0.0041	0.3827	0.2680	0.2985	0.0096	0.0299	0.0000	0.0007	0.0018	0.0047
DK	0.0010	0.0000	0.3839	0.2688	0.2994	0.0096	0.0300	0.0000	0.0007	0.0018	0.0047
DE	0.0016	0.0066	0.0000	0.4334	0.4828	0.0156	0.0484	0.0000	0.0012	0.0029	0.0075
ES	0.0013	0.0056	0.5221	0.0000	0.4072	0.0131	0.0408	0.0000	0.0010	0.0025	0.0064
IT	0.0014	0.0058	0.5448	0.3815	0.0000	0.0137	0.0426	0.0000	0.0011	0.0026	0.0066

The matrix of transition probabilities for Romanian citizens PT2000											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
NL	0.0010	0.0041	0.3860	0.2703	0.3011	0.0000	0.0302	0.0000	0.0007	0.0018	0.0047
AT	0.0010	0.0042	0.3941	0.2760	0.3074	0.0099	0.0000	0.0000	0.0008	0.0019	0.0048
SI	0.0010	0.0041	0.3823	0.2677	0.2982	0.0096	0.0299	0.0000	0.0007	0.0018	0.0047
SK	0.0010	0.0041	0.3826	0.2679	0.2984	0.0096	0.0299	0.0000	0.0000	0.0018	0.0047
FI	0.0010	0.0041	0.3830	0.2682	0.2987	0.0096	0.0300	0.0000	0.0007	0.0000	0.0047
SE	0.0010	0.0041	0.3841	0.2690	0.2996	0.0097	0.0301	0.0000	0.0007	0.0018	0.0000

The matrix of transition probabilities for Romanian citizens PT2001											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
CZ	0.0000	0.0038	0.3509	0.3316	0.2629	0.0098	0.0346	0.0000	0.0006	0.0013	0.0044
DK	0.0039	0.0000	0.3509	0.3316	0.2629	0.0098	0.0346	0.0000	0.0006	0.0013	0.0044
DE	0.0060	0.0059	0.0000	0.5079	0.4026	0.0150	0.0530	0.0000	0.0010	0.0020	0.0067
ES	0.0058	0.0057	0.5220	0.0000	0.3911	0.0146	0.0515	0.0000	0.0009	0.0019	0.0065
IT	0.0053	0.0052	0.4736	0.4475	0.0000	0.0132	0.0467	0.0000	0.0008	0.0017	0.0059
NL	0.0039	0.0038	0.3530	0.3336	0.2645	0.0000	0.0348	0.0000	0.0006	0.0013	0.0044
AT	0.0040	0.0039	0.3620	0.3421	0.2712	0.0101	0.0000	0.0000	0.0006	0.0013	0.0045
SI	0.0039	0.0038	0.3496	0.3303	0.2619	0.0098	0.0345	0.0000	0.0006	0.0013	0.0044
SK	0.0039	0.0038	0.3498	0.3305	0.2620	0.0098	0.0345	0.0000	0.0000	0.0013	0.0044
FI	0.0039	0.0038	0.3500	0.3308	0.2622	0.0098	0.0345	0.0000	0.0006	0.0000	0.0044
SE	0.0039	0.0038	0.3511	0.3318	0.2630	0.0098	0.0346	0.0000	0.0006	0.0013	0.0000

The matrix of transition probabilities for Romanian citizens PT2008											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
CZ	0.0000	0.0047	0.1589	0.1947	0.5866	0.0080	0.0307	0.0005	0.0071	0.0006	0.0082
DK	0.0046	0.0000	0.1589	0.1947	0.5867	0.0080	0.0307	0.0005	0.0071	0.0006	0.0082
DE	0.0054	0.0055	0.0000	0.2302	0.6937	0.0094	0.0364	0.0006	0.0084	0.0007	0.0097
ES	0.0057	0.0058	0.1962	0.0000	0.7243	0.0098	0.0380	0.0006	0.0088	0.0008	0.0101
IT	0.0110	0.0112	0.3802	0.4658	0.0000	0.0191	0.0736	0.0012	0.0170	0.0015	0.0195
NL	0.0046	0.0047	0.1594	0.1953	0.5886	0.0000	0.0308	0.0005	0.0071	0.0006	0.0082
AT	0.0047	0.0048	0.1632	0.1999	0.6024	0.0082	0.0000	0.0005	0.0073	0.0006	0.0084
SI	0.0046	0.0047	0.1582	0.1939	0.5842	0.0079	0.0306	0.0000	0.0071	0.0006	0.0081
SK	0.0046	0.0047	0.1593	0.1952	0.5881	0.0080	0.0308	0.0005	0.0000	0.0006	0.0082
FI	0.0046	0.0047	0.1583	0.1939	0.5843	0.0079	0.0306	0.0005	0.0071	0.0000	0.0081
SE	0.0046	0.0047	0.1595	0.1954	0.5887	0.0080	0.0309	0.0005	0.0071	0.0006	0.0000

The matrix of transition probabilities for Romanian citizens PT2009											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
CZ	0.0000	0.0069	0.2256	0.1907	0.4828	0.0086	0.0722	0.0003	0.0042	0.0007	0.0079
DK	0.0098	0.0000	0.2249	0.1901	0.4814	0.0086	0.0720	0.0003	0.0042	0.0007	0.0079
DE	0.0126	0.0088	0.0000	0.2431	0.6156	0.0110	0.0921	0.0004	0.0054	0.0009	0.0101
ES	0.0121	0.0085	0.2754	0.0000	0.5894	0.0105	0.0882	0.0004	0.0051	0.0009	0.0097
IT	0.0187	0.0132	0.4280	0.3618	0.0000	0.0163	0.1370	0.0006	0.0080	0.0013	0.0150
NL	0.0099	0.0069	0.2253	0.1904	0.4822	0.0000	0.0721	0.0003	0.0042	0.0007	0.0079
AT	0.0105	0.0074	0.2406	0.2034	0.5149	0.0092	0.0000	0.0003	0.0045	0.0008	0.0085
SI	0.0098	0.0069	0.2235	0.1889	0.4783	0.0085	0.0715	0.0000	0.0042	0.0007	0.0079
SK	0.0098	0.0069	0.2243	0.1896	0.4801	0.0085	0.0718	0.0003	0.0000	0.0007	0.0079
FI	0.0098	0.0069	0.2235	0.1889	0.4784	0.0085	0.0716	0.0003	0.0042	0.0000	0.0079
SE	0.0099	0.0069	0.2252	0.1903	0.4819	0.0086	0.0721	0.0003	0.0042	0.0007	0.0000

The matrix of transition probabilities for Romanian citizens PT2010											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
CZ	0.0000	0.0095	0.2481	0.2809	0.4319	0.0076	0.0111	0.0004	0.0019	0.0008	0.0078
DK	0.0158	0.0000	0.2465	0.2791	0.4292	0.0076	0.0110	0.0004	0.0019	0.0008	0.0077
DE	0.0207	0.0123	0.0000	0.3659	0.5625	0.0099	0.0144	0.0005	0.0025	0.0011	0.0102
ES	0.0216	0.0129	0.3376	0.0000	0.5877	0.0104	0.0150	0.0005	0.0026	0.0012	0.0106
IT	0.0272	0.0162	0.4249	0.4810	0.0000	0.0131	0.0189	0.0007	0.0033	0.0015	0.0133
NL	0.0157	0.0094	0.2461	0.2786	0.4284	0.0000	0.0110	0.0004	0.0019	0.0008	0.0077
AT	0.0158	0.0094	0.2469	0.2796	0.4298	0.0076	0.0000	0.0004	0.0019	0.0008	0.0078
SI	0.0156	0.0093	0.2443	0.2766	0.4253	0.0075	0.0109	0.0000	0.0019	0.0008	0.0077
SK	0.0157	0.0093	0.2447	0.2770	0.4260	0.0075	0.0109	0.0004	0.0000	0.0008	0.0077
FI	0.0156	0.0093	0.2444	0.2767	0.4255	0.0075	0.0109	0.0004	0.0019	0.0000	0.0077
SE	0.0157	0.0094	0.2461	0.2787	0.4284	0.0076	0.0110	0.0004	0.0019	0.0008	0.0000

The matrix of transition probabilities for Romanian citizens PT2011											
	CZ	**DK**	**DE**	**ES**	**IT**	**NL**	**AT**	**SI**	**SK**	**FI**	**SE**
CZ	0.0000	0.0106	0.2457	0.2983	0.4051	0.0056	0.0213	0.0004	0.0033	0.0015	0.0082
DK	0.0183	0.0000	0.2438	0.2960	0.4020	0.0056	0.0212	0.0004	0.0033	0.0014	0.0081
DE	0.0239	0.0138	0.0000	0.3860	0.5242	0.0073	0.0276	0.0005	0.0042	0.0019	0.0106
ES	0.0256	0.0148	0.3412	0.0000	0.5625	0.0078	0.0296	0.0006	0.0046	0.0020	0.0114
IT	0.0301	0.0173	0.4006	0.4863	0.0000	0.0092	0.0348	0.0007	0.0054	0.0024	0.0133
NL	0.0182	0.0105	0.2426	0.2945	0.4000	0.0000	0.0211	0.0004	0.0032	0.0014	0.0081
AT	0.0185	0.0107	0.2464	0.2992	0.4063	0.0056	0.0000	0.0004	0.0033	0.0015	0.0082
SI	0.0181	0.0104	0.2414	0.2930	0.3979	0.0055	0.0209	0.0000	0.0032	0.0014	0.0080
SK	0.0182	0.0105	0.2420	0.2938	0.3990	0.0055	0.0210	0.0004	0.0000	0.0014	0.0081
FI	0.0181	0.0104	0.2416	0.2933	0.3983	0.0055	0.0210	0.0004	0.0032	0.0000	0.0080
SE	0.0183	0.0105	0.2432	0.2953	0.4010	0.0056	0.0211	0.0004	0.0032	0.0014	0.0000

h) The matrix of the probabilities corresponding to the segment of Romanian citizens who do not change the residential status during the year y(k) is defined as $PS_{y(k)}$={pt(st(i),st(j)), where i=0,1,2,...10 and j=0,1....10} using the following calculation formula:

$$ps_{a(k)}(st(i),st(i)) = \frac{pr(a(k),st(i)) - pm(a(k),st(i))}{pr(a(k),st(i))} \tag{5}$$

and , pt. i≠j

$$ps_{a(k)}(st(i),st(j)) = 0 \tag{6}$$

We have obtained the following matrices:

$$PS_{2000} = \left(\begin{array}{cccc:c} 0.9996 & 0 & 0 & 0 & 0 \\ 0 & 0.9108 & 0 & 0 & 0 \\ 0 & 0 & 0.8231 & 0 & 0 \\ 0 & 0 & 0 & 0.9687 & 0 \\ \hdashline 0 & 0 & 0 & 0 & 0.9869 \end{array}\right) \quad PS_{2001} = \left(\begin{array}{cccc:c} 0.9760 & 0 & 0 & 0 & 0 \\ 0 & 0.9087 & 0 & 0 & 0 \\ 0 & 0 & 0.7961 & 0 & 0 \\ 0 & 0 & 0 & 0.9924 & 0 \\ \hdashline 0 & 0 & 0 & 0 & 0.9841 \end{array}\right)$$

$$PS_{2008} = \left(\begin{array}{cccc:c} 0.8854 & 0 & 0 & 0 & 0 \\ 0 & 0.8810 & 0 & 0 & 0 \\ 0 & 0 & 0.5831 & 0 & 0 \\ 0 & 0 & 0 & 0.9809 & 0 \\ \hdashline 0 & 0 & 0 & 0 & 0.9394 \end{array}\right) \quad PS_{2009} = \left(\begin{array}{cccc:c} 0.8816 & 0 & 0 & 0 & 0 \\ 0 & 0.8745 & 0 & 0 & 0 \\ 0 & 0 & 0.6162 & 0 & 0 \\ 0 & 0 & 0 & 0.9676 & 0 \\ \hdashline 0 & 0 & 0 & 0 & 0.9191 \end{array}\right)$$

$$PS_{2010} = \left(\begin{array}{ccccc} 0.8811 & 0 & 0 & 0 & 0 \\ 0 & 0.8909 & 0 & 0 & 0 \\ 0 & 0 & 0.6342 & 0 & 0 \\ 0 & 0 & 0 & 0.9603 & 0 \\ \hdashline 0 & 0 & 0 & 0 & 0.9422 \end{array}\right) \quad PS_{2011} = \left(\begin{array}{ccccc} 0.8863 & 0 & 0 & 0 & 0 \\ 0 & 0.9153 & 0 & 0 & 0 \\ 0 & 0 & 0.6857 & 0 & 0 \\ 0 & 0 & 0 & 0.9534 & 0 \\ \hdashline 0 & 0 & 0 & 0 & 0.9445 \end{array}\right)$$

i) The matrix of the transit probabilities for the entire Romanian citizenship population emigrating during the year y(k) is defined as:

$$\Gamma_{a(k)} = \left(\begin{array}{ccc|c} ps_{a(k)}(\mathrm{CZ,CZ}) & \tau_{a(k)}(CZ,DK) & \tau_{a(k)}(CZ,DE) & \tau_{a(k)}(CZ,SE) \\ \tau_{a(k)}(DK,CZ) & ps_{a(k)}(\mathrm{DK,DK}) & \tau_{a(k)}(DK,DE) & \tau_{a(k)}(DK,SE) \\ \tau_{a(k)}(DE,CZ) & \tau_{a(k)}(DE,DK) & ps_{a(k)}(\mathrm{DE,DE}) & \tau_{a(k)}(DE,SE) \\ \hline \tau_{a(k)}(SE,CZ) & \tau_{a(k)}(SE,DK) & \tau_{a(k)}(SE,DE) & ps_{a(k)}(\mathrm{SE,SE}) \end{array}\right)$$

$$\tau_{a(k)}\left(st(i), st(j)\right) = [1 - ps_{a(k)}(\mathrm{st(i), st(i)}) - \delta_{a(k)}(st(i))] * \mathrm{pt}(st(i), st(j)) \quad \text{pt. i}\neq\text{j}$$

7. Interpretation of the results obtained by applying the Markov model to the Romanian population migration process in the 2000-2011 interval

The economic depression has led to serious effects on the workforce market in the EU states due to the differences in shocks and the importance of politics in the field of workforce market. Due to the fact that male-dominated branches, such as constructions or manufacturing have been affected, the recession has had much more serious effects upon male population than it has had upon females. Also, if one considers the EU average rate, young workers have been more affected than the old ones, and the affirmation stands valid for migrant workers as well.

Workers hired at will and especially seasonal workers have been among the first to lose their jobs in many states. In some states, a series of measures have been implemented on the workforce market to specifically support workers hired at will and seasonal workers. In the context of economic recession, many EU countries have drafted measures to sustain and enhance passive and active politics in the field of workforce market and also measures to support occupancy during the recession.

The rates of workforce occupancy and unemployment are now equal to the rates recorded in 2006 and 2005 and the degradation of this situation is highly probable. The recent increase in workforce occupancy rates in the EU is mainly due to the increase in part-time and seasonal workforce occupancy.

In what the workforce market adjusted to the conditions of the economic recession is concerned, the demand for new workers has decreased significantly starting with 2008 and the most part of 2009, which led to slowing-down in economic growth. Thus the workforce unoccupancy rate in the EU (the number of workplaces in proportion to the amount of vacant and occupied workplaces) has constantly decreased, from the second quarter of the year 2008, decreasing by 2.2% in the first quarter to 1.3% in the third quarter of the year 2009, when it reached the minimum rate. In total, the rate decreased by 0.9 percentage points (or about 40% value) during this period. However, propelled by the economic growth in Germany, the unoccupancy rate started to rise again in the fourth quarter of the year 2010, when it slightly increased to 1.4%, then it increased again in the first quarter of 2011 by 1.5% and has frozen at this point.

8. Analysis of the results obtained by applying the Markov model to the Romanian population migration process in the 2000-2011 interval

The following results have been obtained from the analysis of the Romanian population migration in the 2000-2011 interval using the stochastic Markov model:

- The Romanian citizens emigrated to Germany – a relatively constant evolution of the migration rate (~25,000 persons) is observed for the 2000-2006 interval (25,270 in the year 2000 and 23,844 persons in the year 2006). During and prior to the economic recession, an increase in this trend has been noted (43,456 persons in 2007 and 54,945 in 2011). In what the transition probability for the Romanian citizens population residing in the main EU states, Italy and Spain, to Germany is concerned, we have noted a significant increase in the interval 2008-2011 (0.1962 probability in the year 2008 and a maximum of 0.3412 in 2011 for the Romanian population migrating from Spain to Germany). An increase has been also noted in full bloom of the recession, 2008-2011 (from 0.583089 in 2008 to 0.685698 in 2011) for the probability associated with the Romanian citizens population resident in Germany. Some of the causes leading to the evolution of the migration process for the Romanian citizens in Germany were: the fact that Germany is one of the most developed countries in the world, has a significant increase in the industrial product and the

volume of exports, has a constant improvement of the workforce situation and the German Federal government have adopted new ways and means for workforce occupancy.

- The Romanian citizens emigrated to Italy – a significant rising evolution of the Romanian population migration rate is observed for the 2000-2007 interval (19,710 persons in the year 2000 and 274,007 in the year 2007), but in the interval corresponding to the economic recession, a pronounced decrease is observed, from 175,907 persons in 2008 to 90,587 in 2011). Some of the causes leading to the evolution of the migration process for the Romanian citizens in Italy were: Italy has a varied industrial economy with an income per capita close to the rates in countries like France and the UK, the Italian economy continued to sink in recession in the first quarter of the year 2012, the GDP decreasing by 0.8% compared to the previous quarter, according to the first evaluations of the Istat Institute of Statistics.

In the midst of crisis due to national debts and affected by the austerity policy intended to regain the markets trust, the third economy in the Eurozone has been considered officially in recession starting with the fourth quarter of the year 2011, when the GDP lowered by 0.7%, after a 0.2% rebound in the third quarter.

- The Romanian citizens emigrated to Spain - a significant rising evolution of the Romanian population migration rate is observed for the 2000-2006 interval (17,696 persons in the year 2000 and 111,981 in the year 2006), but in the interval corresponding to the economic recession, a pronounced decrease has been observed, from 174, 217 persons in 2008 to 66,703 in 2011). In what the transition probability for the Romanian citizens population residing in the main EU states, Italy and Germany, to Spain is concerned, a slight increase is observed for the 2000-2007 interval (0.3815 probability in 2000 and a maximum value of 0.4258 in the year 2007, for the Romanian citizens population emigrating from Italy to Spain), nonetheless, during the economic recession this indicator comes to a standstill, from 0.4658 in the year 2008 to 0.4863 in 2011). The main causes leading to the evolution of the migration process for the Romanian citizens in Spain are the following: the expansion of the Spanish economy lasted for almost a decade, from the middle of the 1990s to the year 2007, the economic growth rates over the Euro average, the waves of immigrants and the dynamics of the real estate and construction branches made up the general picture of a national economy raising by 3% per year, the high unemployment rate has been produced by the discharge of the construction workers, which affected the banking system severely, in the year 2008, more precisely, in the third quarter, the Spanish economy hit the recession, which lasted until the last quarter of the year 2009. The recession lasted for six consecutive quarters (seven, if one considers the 0 growth in the second quarter of the year 2008), a period considered unusually long, as in a normal cycle, recession last 3 to 4 quarters, the unemployment rate increased from 8.3% at the end of the year 2007 (1,834,000 unemployed) to 20.1% at the end of the year 2010 (4,632,000 unemployed) and 21.7% at the end of the year 2011 (4.7 million unemployed). Unemployment increased mainly in the youth segment (16-25 years), especially for the uneducated and the immigrants.

- The Romanian citizens emigrated to Sweden – a relatively constant evolution of the Romanian population migration rate is observed for the 2000-2011 interval. Under the circumstances of the economic recession inception, a constant raising trend of the Romanians residents in this state in the 2008-2011 interval (from 4,422 persons in 2008 to 8,807 persons în 2011). The main causes leading to the evolution of the migration process for the Romanian citizens in Sweden are the following: Sweden is one of the countries with remarkable results reflected in the indices calculated by international agencies, the labour market policies in Sweden have had a long tradition in closing agreements between professional associations and trade unions as well as in the active politics of the labour market, the preservation of workplaces and creation of new jobs are some of the aims of the Swedish occupational policies, considering the advantage of having a workplace both at the individual and national levels.

9. Conclusions

The migration fluxes over the four expansions have not changed dramatically the ratio of foreign workers in the occupied population of the member states, the experts assert, however, we consider that the expansion to East and the federalisation of the European Union in the last years, together with the economic depression have exacerbated this migrant process. Consequently, the migration issue requires an effective management, to the advantage of every party involved, both at the national and European level. This Markov model used for the analysis of the evolution of the migration process in the case of the Romanian citizens in the EU space provides clear, indisputable results concerning the economic situation of the EU. It may be applied for the Romanian population, but also for other citizens inside the Union.

The migration process can be regarded as an eloquent and correct source of information in analysing the economic evolution for each state member of the European Union. The relevance of this model resides in that it allows:

- the calculation of the migration rate and a reasonable prognosis of the future situation of the migration process for the Romanian citizenship population (not exclusively) in the Union space;
- the identification of the workforce shortage, emphasised by the highest migration rate in the respective areas, regions or countries;

- the orientation of the investment process in the respective economy and /or support for starting personal businesses which lead to the development of the business environment and ensure development in a sustainable manner;
- occupancy policy making at the EU level and for each state.

With subsequent changes and additions, the model drafted and presented in this paper may be the ground for future analyses derived and applied to different situations concerning economic-occupational issues.

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