8 IMPACT OF GLOBALISATION ON THE EVOLUTION OF THE DEMOGRAPHIC PHENOMENON[1]

Mariana NICOLAE-BĂLAN[*]
Valentina VASILE[**]

Abstract

Globalisation is manifest under the form of some globalising processes, respectively the basic operational-action assembly for successive achievement of the purposes and objectives proposed within each stage. Globalisation and demography are the two main forces that model the development of contemporary societies and implicitly of the European one. Both provide for opportunities but also raise issues. Based on the Bosco Model we highlight the interdependency between the decision to migrate and the migratory balance between similar countries, with the exception of labour market, under the conditions in which wages are endogenously determined. The existence of some differences was assumed also between the semi-elasticity of wages in relation to unemployment rates.

1. Globalisation – concept, sizes, processes

The intensification of globalisation[2] represents the fundamental feature of the world economy at the beginning of the 21st century. Even though it is one of the most used terms in the specialised literature, there is no widely accepted definition. It is hard to

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[*] *Institute for Economic Forecasting, Calea 13 Septembrie no. 13, Bucharest, District 5, e-mail: mariana_prognoza@yahoo.com*

[**] *Institute of National Economy, Calea 13 Septembrie no. 13, Bucharest, District 5, e-mail: ieconn@b.astral.ro*

[2] *To the term of globalisation which is of Anglo-Saxon origin, synonymous to mondialisation in French can be attributed a series of significances. As shown by Zygmunt Bauman, "it turned rapidly into a slogan, a magical incantation, the key for opening the gates of all current and future mysteries" [7].*

define such a complex, and confuse phenomenon, as each author emphasises a certain aspect or size of it. *"Globalisation refers to the noticeable fact that for the last years an increasingly larger part of the economic activity at world level is developed between individuals and companies from various countries"(World Bank). "Economic globalisation is a historical process, the result of innovation and technological progress. It refers to the continuing growth of the economic integration of world's economies integration due in particular to the commercial and financial flows. The term refers also to population movements (respectively labour force) and to (technological) knowledge transfer across borders"(International Monetary Fund).* In conclusion, it might be said that globalisation is a complex phenomenon and process, characterised mainly by [4]: a deep trend of regaining unity; increased interdependencies at global level; internationalisation of exchanges and output; market liberalisation; free movement of capital, information, persons and wares; the third industrial revolution and trans-national technology; domination of multinational companies; intensifying competition at global level; time and room compression; ascertaining the contractual culture; the birth of a global civil society; influence on national sovereignty, cultural and spiritual identities.

Currently there are increasingly obvious the **dimensions of globalisation**, respectively:

- the *economic* dimension together with some criteria and characteristics, such as the integration of production processes, of markets, the interdependency of national economies, multinational economic complexes, transnational corporations, regional and area economic integration, sustainable development, resources control and rationalisation [6], [5];

- the *political* one, characterised by supporting and participating to the creation of the institutional structures of global political leadership, extended and intensified contacts, pluralist political visions in international relations;

- *the technological dimension:* the controlled export of high-tech technologies, technological connection of economic processes, orientation of scientific research towards sustainable development, and for the use of disfavoured areas, putting to good use for the general interest of the new achievements, etc.;

- *the information one,* that is connecting the citizen to world flows of information, guaranteeing free and opportune access to basic information, warning collectives in due time about unforeseen natural events and, perhaps the most important thing, ensuring the required infrastructure to developing the information society and further of the fundamental knowledge community;

- *the security dimension:* as evolution of regional, area, continental and intercontinental stability, by conventions and agreements at national, multinational and further on at world level, with the participation of interested stakeholders and with the necessary power for halting and eradicating the opposed or autarchic backwards-looking phenomena and processes, risks, threats, dangers, defiance and challenges globalisation;

- *administrative dimension:* which assumes the design and actual achievement – without breech of covenants and treaties, hence of borders – of the integrated community areas, of areas of sustainable development, of areas of controlled and rationalised resources, and of other areas of vital interest for the prosperity or continuity of the human being;

- *the cultural one:* on the way of being ascertained by means of two fundamental elements: i) the local cultural development in the spirit of integration and multinational community, and by showing respect to national identity, values and patrimony; ii) tolerance for a global, pluralist culture where next to existing national values universal values develop irrespective of to whom they are attributable, but which are for the use of the international community.

Globalisation is manifest under the form of some **globalising processes**, respectively the basic operational-action assembly for successive achievement of the purposes and objectives proposed within each stage. These processes are closely linked between them and expend around nuclei, attracting various determinant factors and at the same time they give the content and physiognomy of its achievement. From among the most important globalisation processes, following can be reminded [4]:

i) *Acceleration and compression of events*, for instance a) the system of modernisations which expand in every direction at high paces and swift outcomes, b) the system of scientific discoveries where the outcomes are expanded and generalised very quickly;;

ii) *Intensification of the complexity of international relations;*

iii) *territorial development under the aspect of creating and developing strong globalising and dependent connections*. The major condition for this development is represented by the non-discriminatory access to new technologies of knowledge, communication and information, but also their joint use on increasingly larger areas, in view of achieving the cooperation areas;

iv) *cross-border flows,* a process that still amazes part of the world. The aspects of migration to developed areas are multiple and represent themselves as true mirages. As long as this process is controlled and guided, it becomes beneficial for globalisation because it leads to local and regional elimination of autarchy and gives free way to multi-ethnicity and multiculturalism as ways of community existence, with shared interests and multiple acknowledged and developed values at local and regional level;

v) *universality of norms and values at cultural level,* which starts with what is national, then identifies with what might be globalising and finally is interspersed with the dominant culture of globalisation;

vi) *the infinity of global knowledge* exceeding some knowledge frontiers, that is transcending already known limits of time and space;

vii) the *socio-democratic imitation style.* Socio-democracy as community existence style is compulsory, because it generates collective energies and long-term motivations. The factors that lead on long term towards the uniformity of lifestyle are the policies, strategies and urban projects, and the doctrines of the consumption society, but the last only as a consequence of putting to good use all local and national resources and potentialities.

As result, it might be said that the processes presented and analysed are individually, each, a globalisation factor, but in correlation they turn into globalising factors.

In the last decades, the economic map of the world has been redesigned, due to spectacular turns on the international political arena but also under the influence of the unprecedented technological mutations. On the background of these substantial changes, two basic trends have been outlined: on one hand the favourable economic

globalisation, among others of diminishing transport and communication costs, and on the other hand the attempt of various nations, connected to their own territory, to organise themselves into regional groups defined by geographic and historical proximity links [5].

2. The impact of demographic phenomena on globalisation

Globalisation and demography are the two main forces that model the development of contemporary societies and implicitly of the European one. Both provide for opportunities but also raise issues:

- *Demographic trends* show a longer and healthier life and bring into discussion topics such as the new costs of an ageing society, the intra- and intergenerational equity, the higher importance granted to child nurturing and the balance work/private life in nurturing family life, the relationship between generations and the new threat of poverty.
- *Globalisation*, next to the new technologies supplies an enormous growth potential. But people must be able, based on education and vocational training to take advantage of these opportunities and to adjust to the disappearance of some traditional trades/professions, and to the emergence of some new trades/professions, to new occupational and work models. Technologies such as computer science, miniaturisation, digitalisation, satellite communication, optic fibres and Internet trigger specific competences and skills, but which develop the area of basic requirements for any active individual of the future society.

Globalisation has also its own demographic model: swift increase of individuals mobility from the rural area and from the farming lifestyle to the urban area which is closer linked to global trends with respect to food, markets, fashion and leisure.

These changes are true challenges also for the European Union. An enlarged Europe based on free movement and free change promoting the construction of the knowledge society and the diversification of the competitiveness forms on all markets led to the creation of new jobs and increased profitability and prosperity on which depend, finally, the welfare and a higher living standard. Nevertheless, in the last period, more and more Europeans ask whether the actual impact of globalisation, liberalisation and intensified competitiveness contribute to individual welfare and social development. In order to better understand the situation and to examine the dynamic of current social changes, the European Commission suggested in 2006 to perform an analysis of the social realities.

3. Trends of demographic evolution at world level

As shown in several specialised works, today we assist to the build up of three large economic poles having as nucleus the United States of America, the European Union and Japan which currently represent just as many macro-regions: a) the enlarged America from the northern to the southern part of the continent, including countries linked together mainly by the economy of USA; b) Eurafrica which includes as components Western and Eastern Europe, Africa and the Middle East with stats that are more or less gravitating in the economic orbit of the European Union and c) Asia-

Oceania regrouping mainly South-Eastern Asia and Oceania, having as economic engine Japan. Such a geographical subdivision influences also the evolution of the contemporary forces relationships one of the power limits being also given by the **sizes of the demographic phenomenon.**

World population has doubled in just about 40 years (from 1960 to 1999), but the distribution of this population in the territory is extremely unequal, even if at the level of the three macro-regions there were not recorded significant changes in the repartition of the world population, with the mention that Asia-Oceania continues to remain on the first place. If Earth population continues to increase at the current pace, than mankind might be faced in the near future with a critical issue which is generated by the imbalance that could appear between producers and consumers. The signs of such an imbalance are already felt nowadays, representing one of the most spectacular changes on the way of altering from the very roots the look of the world in which we live.   A Report of the World Bank[1] draws attention to the fact that up to 2024 many countries of Eastern Europe and the former USSR shall have populations that are among the oldest from the world, which represents a threat for the recent economic success of these countries, if an adequate approach shall not be made with respect to the reform of the pensions system, and of health protection, and if efficient policies of increasing productivity shall not be promoted. In the case of these countries, the issue is aggravated by the requirement of speeding up the economic transition and, at the same time, of quickly undertaking long-term reforms for approaching the demographic consequences. The experts of the World Bank consider that while the United States of America, Japan, France or Italy might adjust easier to the effects of a significant population ageing, the post-communist societies do not dispose of the necessary resources to face alone the issues of decreasing birth rates. One of the most shocking examples is the Caucasian state Georgia, a former Soviet Republic, which shall lose in two decades approximately 20% from the four millions population, representing the inhabitants of the country. The report shows that considering the existing reality in many former communist countries, the ageing populations of these countries shall exert new pressures which possibly the public system cannot afford on public expenditures, in particular for pensions and long-term care of elderly persons.

Long-term prognosis of UN, respectively of the United Nations Population Fund (UNPF) indicate a growth of world population to 8.3 billions persons by 2025, from which in the developed regions 1.24 billions (15% from total) and in the less developed ones 7.05 billions (85%). The most recent UN estimates regarding population show that the demographic increase shall be of 3.3 billions in the first half of the 21st century, the largest part being in the developing countries: "*some of the highest growths are forecasted for the Indian subcontinent and for Sub-Sahara Africa – two regions where there are concentrated most of the hungry of the world*".

Due to the limited support capacity of the financial and water resources from each country, all national governments require an adequately supported **articulated demographic policy** that would take into account the hosting capacity of the country, irrespective of the consumption level. As noticed by Edward O. Wilson, Harvard biologist: "*each nation has an economic policy and foreign policy. The time has come*

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[1] *Department of Economic and Social Affairs the Population Division of UN: Report 2006.*

to talk more openly about a demographic policy…which is, in the vision of the informed public, the optimum population?" [3].

For the following forty-five years, the trends of demographic projections from several economically developed countries are descending, while in almost all under-developed countries, or in weak economically developed countries the population shall increase at high speed. Some of the experts consider that **over 90% of the population increase appears exclusively in economically under-developed or less developed countries.** A first demographic projection for the first half of this century realised by the end of the 20th century has as interval limits for world prediction for the year 2050 the values of 73 and, respectively 107 billions inhabitants and considers the value of 89 millions as being the most probable. The forecasts elaborated in the field of demographic evolution indicated the fact that the population of African countries, which are among the poorest from the world, shall increase by approximately one billion inhabitants, whereas Europe shall lose about 60 millions from its citizens, some European countries being liable to lose almost one third from the current number of their inhabitants. Africa is regarded as the epicentre of the current demographic boom. In the year 2025, the population of Africa shall be at least twice as much as the one of Europe, and in the year 2050 almost three times higher. Massive population growths shall continue to take place also on the Asian continent. Even though the pace of demographic increase shall be relatively lower as compared with the one of the African continent, the higher volume of the population generates a considerable absolute growth. The new "top hierarchy" shall place India perhaps on the first place, with a population of about 1.6 billions inhabitants thus exceeding China with more than 100 millions already in the year 2030. In the year 2050 the two states shall, between them, gather not 40% as they have now, but almost 50% of the world population.

In order to hinder this growth, regarded as high particularly in developing countries, the UN experts in the field have introduced and generalised in these countries the concept of "family planning". It is estimated that enforcement of the family planning measures for the last 20 years in developing countries from Africa, Asia and Latin America has increased from 14% to 57%. Still, the access to the measures included in the family planning remains low in developing countries against developed ones, a fact also revealed by the average size of the family (at most two children per family in developed countries and up to six children per family in under-developed countries from Sub-Sahara Africa and Pacific Isles). Despite all measures undertaken by specialised organisations of UN (UNPF, WHO, etc.) it is considered that at world level there are more than 350 millions families that do not have access to any of the services and information with respect to the issue of modern family planning [2].
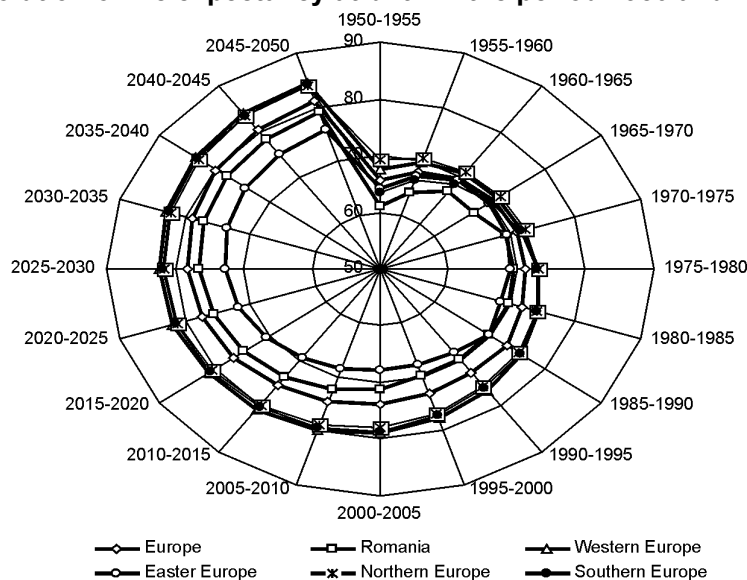
Leaving aside the environment, there are also other factors that might influence the population distribution. A strong influence on population's distribution is exercised by the **organisation and development of economic systems**. Because of the latter are affected the main demographic components, among which the most important are: fertility, mortality, and migration. The radical changes underwent by the economic systems in the last decades have triggered changes occurred in the numbers and structure of current population. Among others, the process of urbanisation should be mentioned, the trends of regional evolution of population, and especially the movement of persons.

The town represented always the most powerful expression of the fight of man against the vicissitudes of nature. Therefore, it constitutes a speaking example of "created environment" being an outcome of the revolutions that took place in time in agriculture, industry and transportation: the agricultural revolution allowed farmers to produce a surplus of products necessary for the growth of the non-farming population, the industrial revolution attracted masses turned available from villages and integrated them into factories and enterprises placed in the urban area, and the transportation revolution allowed for a more rapid and cheaper distribution of wares as required by the expanding population of the cities.

The spectacular changes occurred in the development of population in the last period depend on the **natural rate** which, in turn, results from the difference between the birth rate and mortality rate. For instance, in the year 2004, the highest rates of the natural increase were recoded in less developed countries: 1.5‰ and 1.8‰ excluding China. In countries with a somewhat higher living standard, the natural increase rate was placed at an inferior limit: 0.1‰. In the category of countries with a higher natural increase rate are included especially countries with higher levels of births and fertility such as the ones in the African area, except the southern part (2.4‰ - 2.8‰), Latin America, the Caribbean, South America (1.5‰) and Oceania (1‰). Also, in Asia was recorded a positive natural increase with rates between (1.2‰ - 0.55‰ in the East and 2‰ in the West). The lowest rates of natural increase are registered especially in developed countries and developing countries from Northern America and Europe. Hence, in Northern America the natural increase rate reaches a level of 0.6‰ and in Europe the natural increase is negative, the rate of mortality exceeding the births rate, the natural increase rate reaching a level of -0.1‰ (in Western Europe and Southern Europe 0.1‰, in Northern Europe 0.2‰, and 0.4‰ in Eastern Europe (the lowest). Thus, in 2005 the natural increase of the population is negative in almost all Eastern European countries with the exception of Macedonia, Bosnia-Herzegovina, Albania and Slovakia.

The *average life expectancy at birth* reaches high levels in Hong-Kong and Japan (82 years) as well as in Australia, Island, France and Switzerland (81 years). In Eastern Europe the average life expectancy at birth is of 69 years, by 10 to 11 years less than in other regions of the continent, the lowest and decreasing values of this indicator as compared to 1990 being found in Russia (65 years), Ukraine (68 years), and Moldova (69 years) (Figure 1).

Figure 1

Evolution of life expectancy at birth in the period 1950 and 2050

Date source: Department of Economic and Social Affairs, Population Division of UN: Report 2006, Statistics Section.

Data processing: authors.

In Europe (with the exception of Russia, Poland, Moldova, the Netherlands, Ireland and some Baltic countries), as well as in Japan the population aged 65 and over exceeds 15% of the total. For instance, in Japan the share of population aged 65 and over is of 21%, in Western Europe the average is of 17%, in Northern Europe of 16%, and in Southern Europe of 18%.

One of the demographic factors with deep global effects is **migration**. An immediate consequence of complying with the fundamental rights of man with respect to free communication and free movement, migration, irrespective of its character – either legal or illegal – is the expression of a significant correlation existing between economic development and demographic evolution and is manifest in a single major direction, as emigration of persons from the underdeveloped world towards developed regions. **Currently, the reasons of migration are less dependent on the political regime, cultural and religious persecution or on respect of human rights and more dependent on the living standard and the comparatively higher gain opportunity.** Anyway, from all the factors that influence migration flows, the economic factors remain determinant: hunger, unemployment, lack of agricultural land, etc. They leave in search of better paid jobs, or simply, just to be rid of poverty. Next to the voluntary factors, there are also several other involuntary reasons:: the forced transfer of some populations from one continent to the other, wars, expulsions, severe natural calamities, etc

Also, leaving aside the *quantitative aspects of migration* also the *qualitative* ones have to be analyzed. For instance, it should not be omitted that **as a rule young persons migrate, many of them having a higher vocational training.** This fact contributes to an increase of the average age in the origin countries, to an increased mortality rate and decrease of the birth rate. To these aspects also effects from the host country should be added, in particular social tensions created between the local population and the new comers, the adjustment difficulties of the latter, the cultural and religious differences, etc.

The collapse of socialist economies and the gradual process of European political and economic integration which disadvantaged flagrantly the former communist countries, triggering the migration of population, including the vulnerable social categories from East European countries to Western developed countries. **The contribution of this "economic Diaspora" to maintaining the viability of the market economies of the main countries of the European Union is regarded by the majority of international experts as crucial for the substantial economic growth which they enjoy.**

The liberalisation of the definitive migration procedures and the periodical legal reforms from some countries of the European Union, such as Italy, Spain and Portugal, by which large categories of illegal immigrants obtained the citizenship of the new states of residence have a special contribution to maintaining the demographic viability of the countries of "old Europe". By implementing social policies aimed to attract skilled labour force and high-skilled labour force from post-communist countries, without promoting measures that should attenuate the obvious economic and social shocks, the West-European governments contribute to intensifying the enormous demographic pressures affecting the region.

In the last 15 years, the number of migrants was close to 200 millions inhabitants, increasing by 23% and becoming thus comparable with the pace of the demographic surplus for the analyzed period.

The interdependence migration-globalisation-demographic evolution is obvious. Several researchers consider that migration flows have contributed to globalising the labour market, or as others state by a more vague formulation, to internationalising the labour force and sharpening the competition struggle between those who supply this production factor [1].

Even if at the level of some macro-regions there were not recorded significant changes in the population distribution (the American continent diminishing, for instance, its share with respect to output between 1960 and 1994 almost insignificantly from 13.7% to 13.6%) in the mentioned time interval, some significant changes were felt.

The analysis of the data regarding migration indicate the fact that particularly after the Second World War, we assist to a complex process of regionalisation and globalisation of migration, a very complex model of overlap and interaction being shaped between global and regional migration flows, of economic and non-economic nature.

In the specialised literature is considered the historical model of migration for the majority of European countries which comprises four aspects:
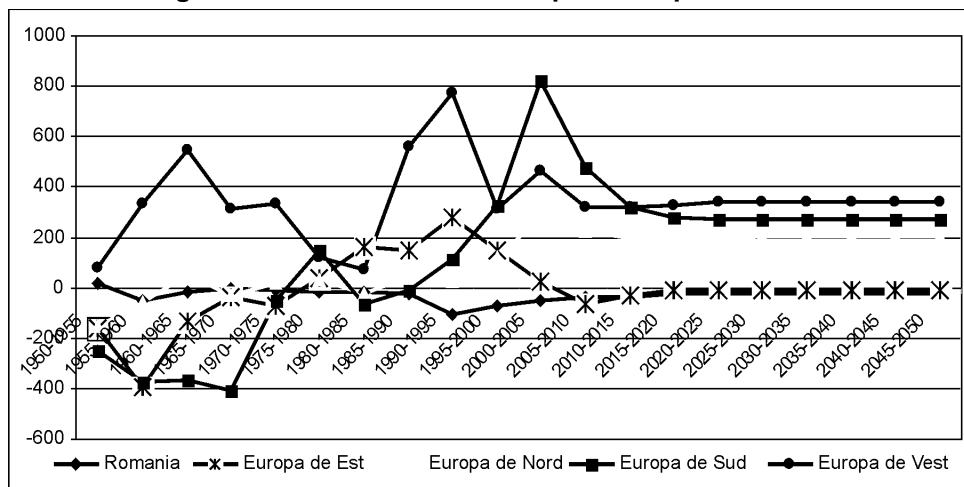
i) migrations began slowly after the Second World War and then it was temporarily intensified due to the variable movements of numerous displaced populations, movements generated by the war itself;

ii) in the years 1950 there was a gradual increase of the migration rate, which was accelerated in the sixties and reached a maximum in the seventies, due to the oil shocks on the economic development, the decrease of labour force demand and the hard policy with respect to immigration;

iii) migration continued after the mid-seventies but at somewhat lower levels and due more to family reunions than to the pressures and attraction provided by the global economic factors;

iv) in the eighties, the migration rate started to increase again, on a case to case basis. Migration intensified at the beginning of the nineties, as the economic booms from Western Europe, the post 1989 turbulence from Central and Eastern Europe and from the former Yugoslavia and the creation of the European Single Market propelled the levels of population movement.

The main earmark of the contemporary era is the *economic migration*. In Western Europe it started first as intra-regional migration from Southern Europe to Northern and Western Europe. A general assembly view of this phenomenon for Europe and Romania in the period 1950-2050 is presented in Figure 2.

Figure 2

Net migration in Romania and Europe in the period 1950-2050

Date source: Economic and Social Affairs Department, Population Division, UN: Report 2006, Statistics Section.
Data processing: authors.

Migration is favoured on one hand by minimising the importance of distances due to modern infrastructure and transportation, of developing communications and Internet, and on the other hand by the development of regulations in the field which facilitate the mobility, including the advantages (the possibility of transfers between national

insurance systems and social and medical assistance, for instance). Increasingly, institutions and governments intervene in the movement of persons by means of support, monitoring and managing policies for migration flows, in particular of the one for labour. The extent to which the infrastructures, but also the regulations become significant at interregional level or transcontinental level, shall influence and model the globalisation of migration itself.

4. Modelling the mobility of labour force using the Luigi Bosco Model

The issue of labour force mobility is approached in theory and practice as well in connection with the need of a balanced economic-social development at regional and sectoral level, combining aspects of structural nature with those of functional one.

In the specialised literature, next to the Harris-Todaro model (1970) were developed also a series of models for the study of labour force mobility in developed countries or with a transition economy.

Because one of the main reasons of labour force mobility is also the unemployment level, which depends on the economic developments from each country, many studies/models were elaborated in order to analyse the interdependency migration-wage (assumed as being perfectly flexible or fixed). The flexibility degree of wages and the nature of the relationship wage-unemployment are, as consequence, some of the determinant factors of migration. Therefore, in the following, is presented the model proposed by Luigi Bosco which is used for analysing the interdependency of the migration-wage flexibility phenomenon.

4.1. General formulation of the Luigi Bosco model

A first variant of the model used by the author is a formal model, with the help of which is attempted to study the migration between two countries, that shall be mentioned in the following as *N* and *S*.

The hypotheses of the model are:

1. the two countries have the same technology and the same endowment of the production factors;

2. in both countries there are "*n*" identical companies for manufacturing a single product *Y* based on a " Cobb-Douglas" technology with two production factors: capital *K* and labour *L*;

3. the distribution of the companies is: ω_N are localised in country *N* and ω_S are localised in country (in the model the additional assumption is made that the companies are symmetrically distributed $\omega_N = \omega_S$).

The production function for the country *N* may be defined with the help of the relationship:

$$Y_{Ni} = L_{Ni}^{\alpha} K_{Ni}^{1-\alpha} \tag{1}$$

and for the country *S* by the relationship:

$$Y_{Si} = L_{Si}^{\alpha} K_{Si}^{1-\alpha} \qquad (2)$$

Assuming that each company considers that it has a negligible influence on total aggregated employment, profit maximisation requires the fulfilment of a series of conditions, which are:

$$w_{LN} = \alpha L_N^{\alpha-1} K_N^{1-\alpha}$$
$$w_{LS} = \alpha L_S^{\alpha-1} K_S^{1-\alpha} \qquad (3)$$
$$r_N = (1-\alpha) L_N^{\alpha} K_N^{-\alpha}$$
$$r_S = (1-\alpha) L_S^{\alpha} K_S^{-\alpha}$$

where ω_{LJ} and r_{NJ} represent the wage, respectively the interest rate in the country *J* with *J=N, S.*

The migration decision is triggered by obtaining an expected income, resulting from the relation:

$$Y_{\min} = \left(1 - \frac{U_{LN}}{OL_N + mig}\right) \cdot w_N + \frac{U_{LN}}{OL_N + mig} wd - pc \qquad (4)$$

where:

O_{LJ} represents labour demand in country *J*, with *J=N, S;*

U_{LJ} represents unemployment in country *J*;

$\omega_J n L_J$ represents the aggregated labour demand in country *J*;

mig represents labour force migration from country *N* to *S*

pc is the personal cost related to the migration decision;

wd is the income received as unemployment aid which is assumed to be the same in both countries

$\left(1 - \dfrac{U_{LN}}{OL_N + mig}\right)$ is the employment rate and considered as an indicator of the

probability that the migrant shall have the same job after migration.

If the potential migrant decides to remain in the origin country he might expect an income which can be determined based on the relation:

$$Y_{sta} = \left(1 - \frac{U_{LS}}{OL_S - mig}\right) \cdot w_S + \frac{U_{LS}}{OL_S - mig} wd \qquad (5)$$

It is assumed that:

- all individuals display the same characteristics and that the differences between them appear due to costs resulting from the decision to migrate,
- the derivative costs of the decision to migrate are equally distributed between the population of the interval [0, c].

According to these hypotheses the percentage of population that migrates can be calculated based on the relation:

$$\frac{mig}{OL_S} = \int_0^{\left[Y_{mig}+pc-Y_{sta}\right]} \frac{1}{c}\,ds \tag{6}$$

or

$$\frac{mig}{OL_S} = \frac{1}{c}\left[\left(1-\frac{U_{LN}}{OL_N+mig}\right)\cdot w_{LN} - \left(1-\frac{U_{Ls}}{OL_S-mig}\right)\cdot w_{LS} + \left(\frac{U_{LS}}{OL_S-mig} - \frac{U_{LN}}{OL_N+mig}\right)wd\right] \tag{6}$$

Once the decision to migrate was made, the following identities:

$$OL_S - mig - \omega_S nL_S = U_{LS} \tag{7}$$

and

$$OL_N + mig - \omega_N nL_N = U_{LN}$$

are true.

The balance on the capital market and the hypotheses of a perfect mobility of capital and perfect flexibility of interest rate impose the conditions:

$$r_S = r_N$$

and

$$\omega_S nK_S + \omega_N nK_N = K \tag{8}$$

where k is the capital invested in the entire area.

The wages are assumed as not being perfectly flexible, and are in reverse proportionality to the unemployment rate, that is:

$$w_{LS} = f_S\left(\frac{U_{LS}}{O_{LS}-mig}\right) \tag{9}$$

$$w_{LN} = f_N\left(\frac{U_{LN}}{O_{LN}+mig}\right)$$

4.2. Wage flexibility and the migration decision

The perfect flexibility of wages and the free capital movement without costs are incentives for the migration of the population between two countries with identical technology. Under the conditions of perfect capital mobility, the wages would have been identical between the two countries even if in each there are differences with respect to labour supply/demand. All these might diminish any attempt for migration, that is:

$$r_S = r_N \Rightarrow k_S = k_N \Rightarrow w_S = w_N$$

where

$$k_J = \frac{K_J}{L_J} \quad cu\ J=N,\ S$$

If wages are endogenously determined by the unemployment rate, the assumption of perfect capital mobility is not enough to eliminate any intention of migration to the world where all these conditions plus the one regarding the share of the region with same technology are met[1].

Based on these hypotheses, the share of population that migrates can be determined with the help of the relation:

$$mig = \frac{1}{c}\left[w_N - w_S + w_S \cdot f_S^{-1}(w_S) - w_N \cdot f_N^{-1}(w_N)\right] \tag{10}$$

4.3. Linear form of the model

If $\overline{w}_{LS}$ is considered as the value of the wages in balance (the balance is characterised by the perfect symmetry between countries so that: $\overline{w}_{LS} = \overline{w}_{LN} = \overline{w}$, $\overline{K}_S = \overline{K}_N = \overline{K}$, $\overline{L}_S = \overline{L}_N = \overline{L}$, $\overline{O}_{LS} = \overline{O}_{LN} = \overline{O}_L$ and the additional assumption that unemployment is nil in both country, that is $\overline{U}_{LS} = \overline{U}_{LN} = 0$) and using the relation (9)$_1$ there results;

$$\frac{w_{LS} - \overline{w}_{LS}}{\overline{w}_{LS}} = \frac{f_S'\left(\dfrac{\overline{U}_{LS}}{\overline{O}_{LS}}\right)}{\overline{O}_L \overline{w}_{LS}}\left(U_{LS} - \overline{U}_{LS}\right) \tag{11}$$

relationship that can also be written under the form:

$$\tilde{w}_{LS} = \eta_S \frac{1}{\overline{O}_L}\tilde{U}_{LS} \tag{12}$$

where

$$\tilde{w}_{LS} = \frac{w_{LS} - \overline{w}_{LS}}{\overline{w}_{LS}} \ , \ \tilde{U}_{LS} = \left(U_{LS} - \overline{U}_{LS}\right) \text{ and}$$

η_S is the semi-elasticity of wages by complying with the unemployment rate.

Also the relation might be written:

$$\tilde{w}_{LN} = \eta_N \frac{1}{\overline{O}_L}\tilde{U}_{LN} \tag{13}$$

If we consider that in one of these countries an exogenous shock takes place with the increase of the labour force, than the effect of change in migration is given by the relation:

$$\frac{dm\tilde{i}g}{d\tilde{O}_{LS}} = \frac{\overline{O}_L\overline{w}(1-\alpha)(\eta_N - \eta_S)}{c \cdot \left[(1-\alpha)\overline{O}_L(\eta_N + \eta_S) + \overline{L}n\eta_N\eta_S\right]} \tag{14}$$

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[1] *In many studies it was shown that perfect capital mobility does not eliminated the intention to migrate in case that there are differences between technological levels.*

It might be said that, with a perfect mobility of capital, wages in the two countries are equal, so the decision to migrate is essentially triggered by the differences in the unemployment rate, but the latter is the highest in the country with the lowest semi-elasticity of wages. In fact, unemployment increases in both countries as result of increasing the labour force in country "*S*", still the increase is higher in the area with lower semi-elasticity of the wage than in the area with higher semi-elasticity of the wage.

$$\frac{d\tilde{U}_{LS}}{d\tilde{O}_{LS}} - \frac{d\tilde{U}_{LN}}{d\tilde{O}_{LN}} = \frac{\overline{O}_L(1-\alpha)(\eta_N - \eta_S)}{\left[(1-\alpha)\overline{O}_L(\eta_N + \eta_S) + \overline{L}n\eta_N\eta_S\right]} \tag{15}$$

Eliminating the intention of migration can be achieved when there is a positive migration from the area with lower semi-elasticity of the wage to the area with higher semi-elasticity of the wages.

These outcomes highlight some consequences of achieving a single capital market between two countries. If in the two countries the labour force market has differing characteristics that trigger different reactions of the wage against the unemployment rate, capital market liberalisation and perfect mobility of the latter cannot be regarded as perfect substitutes of labour force mobility.

4.4. The interdependency wage flexibility-migration-employment

It is known that migration cannot affect aggregate employment by simple redistribution of employees from a country to another. The migration effect on employment was determined in many models by the general assumption of the existence of an external economy of scale in the most advanced sector[1]. Still the difference between the semi-elasticity of wages in compliance with the unemployment rate is enough for determining the effect of migration on the aggregated output and employment without assuming any form of external economy. Therefore, in the model were made two simplifying hypotheses:

i) migration is considered as a variable of a policy,

ii) capital is maintained constant.

Under these conditions, the migration flow shall decrease wages ($\frac{d\tilde{w}_N}{dmi\tilde{\,}g} = -\frac{(1-\alpha)\eta_N}{\overline{O}_L(1-\alpha) + \frac{\overline{L}n\eta_N}{2}}$) and as consequence the increase in the number of

employees ($\frac{d\tilde{L}_N}{dmi\tilde{\,}g} = \frac{\eta_N}{\overline{O}_L(1-\alpha) + \frac{\overline{L}n\eta_N}{2}}$) in country *N*, while in country *S* wages shall

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[1] *Reichlin, P., Rustichini, A. "Diverging patterns with endogenous labour migration, Journal of conomic dynamics and Control", 22, 703-728, 1998*

increase ($\dfrac{d\tilde{w}_S}{dmi\tilde{}\,g} = \dfrac{(1-\alpha)\eta_S}{\overline{O}_L(1-\alpha)+\dfrac{\overline{L}n\eta_S}{2}}$) and the number of employed persons shall

decrease ($\dfrac{d\tilde{L}_S}{dmi\tilde{}\,g} = -\dfrac{\eta_S}{\overline{O}_L(1-\alpha)+\dfrac{\overline{L}n\eta_S}{2}}$).

All these depend on the value of semi-elasticity: the higher it is, the more higher shall be as absolute value the one from country *N*. Also, these effects, even though symmetrical as direction, they are not symmetrical as magnitude save for the case where the semi-elasticity values of the two are the same. This shows that if $\eta_N > \eta_S$, the wage diminishment in country *N* is stronger than their increase in country *S*, and hence the growth of the number of persons employed in country *N* is higher than the diminishment in *S*.

4.5. Capital flows, wage flexibility and employment. Application for Romania

For this analysis the authors assumed, in a first stage, that capital markets between the two countries are different and the effect on output and employment is due to the positive capital flow from one country to the other. Due to the linearity of the model by means of the point of balance (characterised through a perfect symmetry), this presupposes and not diminishes the generality of the model.

The capital flow from the country with low semi-elasticity (for instance country *S* in our situation: Romania) to the one with high semi-elasticity (country *N*) shall trigger the increase of unemployment in *S* and its diminishment in *N*;

$$\frac{d\tilde{U}_{LS}}{d\tilde{K}_S} = \frac{c\overline{O}_L\overline{L}_L(1-\alpha)\left(\overline{O}_L(1-\alpha)+\dfrac{\overline{L}n\eta_N}{2}\right)}{\overline{K}A}$$

and

$$\frac{d\tilde{U}_{LN}}{d\tilde{K}_{LN}} = \frac{c\overline{O}_L\overline{L}_L(1-\alpha)\left(\overline{O}_L(1-\alpha)+\dfrac{\overline{L}n\eta_S}{2}\right)}{\overline{K}A} \qquad (16)$$

where

$$A = \left\{ \left(\overline{O}_L(1-\alpha)\right)^2 \left[c\overline{O}_L + \overline{w}(2+\eta_S+\eta_N)\right] + \frac{\overline{L}(1-\alpha)}{2}\left[c\overline{O}_L(\eta_S+\eta_N)+\overline{w}(2\eta_S\eta_N+\eta_S+\eta_N)\right] + \frac{c\overline{L}n^2\eta_S\eta_N}{4}\right\}$$

In fact, it could be shown that:

$$\frac{d\left(\tilde{U}_{LS}+\tilde{U}_{LN}\right)}{d\tilde{K}_N} = \frac{\dfrac{c\overline{O}_L\overline{L}^2 n(1-\alpha)}{2}(\eta_N-\eta_S)}{\overline{K}A},$$

relation which shows that capital movement from country *S* to country *N* shall lead to marginal productivity increase of labour and than of wages in *N*, while in the area from the country *S* these shall be diminished. Hence, as long as the semi-elasticity of the wage in compliance with the unemployment rate is low in *S*, this indicates that the unemployment rate in S decreases relatively more than the increase in *N*. Thus, it might be said that while migration has a positive effect on aggregated unemployment and output, capital movement shall have a negative effect on these aggregate variables.

The aggregated effect of the capital movement shall depend, among others also on the migration costs, c and hence, the size of migration:

$$\frac{d\tilde{U}_{LS}/d\tilde{K}_N}{dc} = \frac{\dfrac{\overline{L}n}{2}\left[\overline{w}\,\overline{O}_L^2\,\overline{L}(1-\alpha)^3(\eta_N-\eta_S)(2+\eta_S+\eta_N)+(2\eta_S\eta_N+\eta_S+\eta_N)\right]}{(\overline{K}A)^2} \quad (17)$$

which shows that the costs in terms of aggregated unemployment shall depend on the mobility degree of labour. If the migration costs are high, the mobility of labour force shall be low and wages shall change more in the direction of reaching balance, and unemployment shall substantially increase. When the costs of migration are low, the migration flows from the country with low semi-elasticity to the other are high, the necessary adjustment of wages is less important and the aggregated unemployment increases slightly.

On the limit, when c=0 (perfect labour mobility) labour force movement triggered by capital flows shall be equal to $\dfrac{dm\tilde{i}g}{d\tilde{K}_N} = \dfrac{\overline{L}}{\overline{K}}$, this being perfectly proportional to the relationship capital-labour existing in the initial balance.

When $c \to \infty$ (perfect labour immobility – migration is null), the diminishment of the wage gap and of aggregated unemployment are diminished to maximum:

$$\frac{d\left(\tilde{U}_{LS}+\tilde{U}_{LN}\right)}{d\tilde{K}_N} = \frac{\dfrac{\overline{O}_L n\overline{L}^2(1-\alpha)}{2}(\eta_N-\eta_S)}{\overline{K}\left(\overline{O}_L(1-\alpha)+\dfrac{n\overline{L}\eta_N}{2}\right)\left(\overline{O}_L(1-\alpha)+\dfrac{n\overline{L}\eta_S}{2}\right)} \quad (18)$$

For the scenario proposed by the authors were considered for the model parameters the values presented in Table no. 1.

Table no. 1

Values of the parameters used by the model

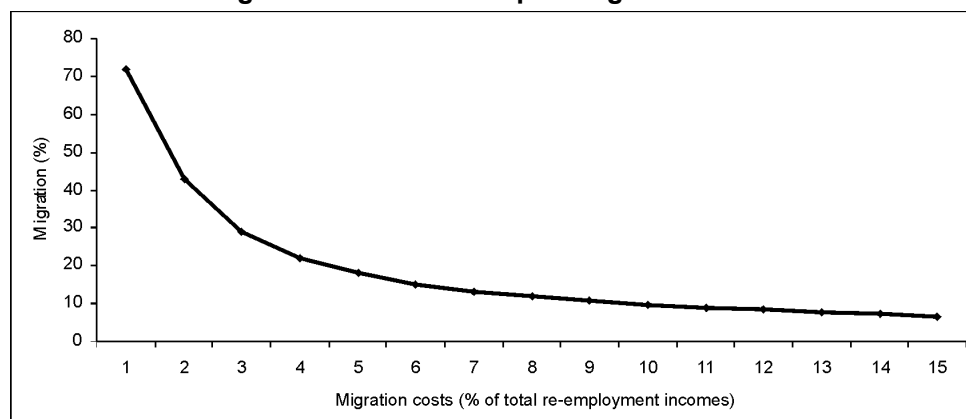| Production sector			Labour demand	Aggregated capital
$\alpha = 0,63$	$n_i=15$	$\omega_S = \omega_N = 0,5$	$O_{LS} = O_{LS} = 6$	$\widetilde{K} = 100$

The effect of the number of companies "*n*", is only to determine the size of a single company, but does not influence either migration, or other aggregated variables. In the model is assumed that also the stock of capital and labour force are more than scale parameters that can change to a certain extent the relative prices of the factors, but cannot significantly influence the aggregated variables.

Therefore the only free parameter is the value of α in the production function. The value that it has chosen is in line with the value used in other empirical studies, and it is entirely reasonable since it implies a labour share of 0.63: a value amply confirmed empirically.

In order to determine the correlation migration – output is assumed that the semi-elasticity of wages in country *N* is higher than in country *S* ($\eta_S = -2.25$ and $\eta_N = -3.2$). As result, the migration calculated as share from the labour force of *S* increases together with the diminishment of the migration costs (Figure 3).
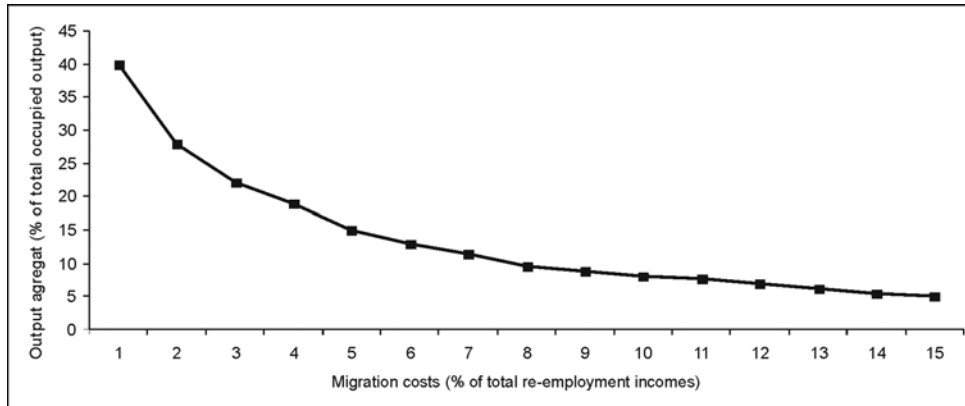
Figure 3

Migration evolutions depending on its costs

Source: authors' calculations.

and its increase has a positive effect on the aggregated output (figure 4).

Evolution of aggregated output depending on the migration costs

Source: authors' calculations

Labour force migration to country *N* is makes that capital takes the same direction, ensuring hence the equality of the relationship labour-capital. The increase of the aggregated output is due to the fact that the movement of the labour force from the country with lower semi-elasticity to one with higher semi-elasticity generates the diminishment of wages and lower inefficiency caused by the imperfect flexibility of wages.

The migration effect on the aggregated output can be analysed by means of the so-called migration multiplier defined by the relation $\mu = \dfrac{dY_A}{dmig}$. It can be noticed that the higher the rates of semi-elasticity and unemployment, the higher shall be the value of the migration multiplier, hence also the influence of migration on the output shall be higher. Thus, the capacity of migration to influence aggregated output is determined by the relation: $\dfrac{\eta_N - \eta_S}{\eta_S}$.

In order to demonstrate the affirmation in accordance to which the mobility of the capital may be undesirable when the costs of labour force mobility are higher, the author realises a numerical simulation with various hypotheses (the outcomes of the simulation are presented in Table no. 2).

In the first scenario, it is assumed that neither capital, nor labour force can cross borders. If the distribution of the capital stocks is identical in the two countries, it results that the unemployment rate, and also the wage rate are high in country *S*, while the interest rate is lower and implicitly the output per capita is lower in this country.

Simulation outcomes for Romania

		Immobile capital Immobile labour force	Mobile capital Immobile labour force	Immobile capital Mobile labour force	Mobile capital Mobile labour force
Aggregated output		18,213	18,189	18,313	18,378
Output on country/per capita	N	3,235	3,268	3,187	3,243
	S	3,043	3,024	3,067	3,015
Wages	N	1,202	1,108	1,184	1,101
	S	1,091		1,133	
Interest rate	N	0,441	0,612	0,048	0, 658
	S	0,752		0,069	
Labour force on companies	N	0,786	0,798	0,830	0,904
	S	0,524	0,517	0,515	0,486
Capital/companies	N	15	15,389	15	16,952
	S	15	14,611	15	13,048
Unemployment rate, %	N	3.897	3,526	4,021	3,758
	S	9.012	10,133	8,845	10,521
Migration, %		0	0	4,587	26,954

Source: authors' estimations

If it is assumed there is labour force immobility and the mobility of the capital between the two countries, then the capital shall migrate from the country with lower semi-elasticity of the wage to the country with higher semi-elasticity, equalising/bringing thus the price of the production factors from the two countries at an intermediary level, as compared with the previous scenario. The movement of capital from *S* to *N* in the absence of labour force mobility leads to increasing the gap in unemployment rates and of its aggregated rates.

The mobility of labour force and rigidity of the capital triggers the diminishment of the gap between the unemployment rates in the two countries and of their aggregated level , but also the increase of the wage differentials. Positive migration has as effect the diminishment of the gap between the output per capita in both countries.

The simultaneous mobility of capital and labour force makes the migration the strongest (Table 2) and this diminishes the gap between the national levels of the output per capita.

In **conclusion** it might be said that:

- the model elaborated by Luigi Bosco and applied by the authors for two countries (Romania and France) attempted to highlight the interdependency between the decision to migrate and the migratory balance between similar countries, with the exception of labour market, under the conditions in which wages are endogenously determined. The existence of some differences was assumed also between the semi-elasticity of wages in relation to unemployment rates in the two countries;

- the presence of a different institutional framework for the labour market and implicitly of a different functional connection between the unemployment rates and wages in the

two countries represents an independent motivation for migration even in the context in which there is a completely symmetrical distribution of labour supply and demand, and the capital is perfectly mobile – and hence able to equalise the relationship capital-labour in the two countries. In this context, migration may have effects on employment and aggregated output even in the absence of external economies of scale in the more developed country. The differences between the labour markets (the difference between the semi-elasticity of wages in relationship to the unemployment rate) are enough to trigger a migratory effect on the aggregated output;

- when the semi-elasticity of wages in relationship to the unemployment rates differ between countries, the capital and labour force tend to migrate together to the country with the higher semi-elasticity. Only that while labour force movement has a positive impact on aggregated employment and output, the capital flow negatively influences the aggregated output. The movement of the capital from country *S* to country *N* shall generate increases of the marginal labour productivity and wage from *N*, at the same time with their diminishment in *S*;

- the negative impact of the capital flows on aggregated incomes depends on the size of migration and on its costs: high costs of migration trigger migration diminishment, and the effects of the capital flow on aggregated employment and output shall be higher.

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