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## Article

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*Original scientific paper*

## **INFLOW AND OUTFLOW OF HUMAN RESOURCES: SPECIFIC CONDITIONS OF SOUTH EAST EUROPEAN COUNTRIES**

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### **Abstract**

Health and security crises could drastically influence the balance of human resource supply and demand in national economies. Economies in the region of Southeastern Europe are strongly exposed to effects of the crises. Human resource management in such periods for these countries must consider the effects of the crises on the flows of qualified people.

Methodology of the study involves use of a mathematical model, providing precise quantitative analysis in the case of absence of drastic events. Effects of the emerging crisis are anticipated qualitatively based on the expected influence on the parameters of the model.

In the present work balanced supply and demand model for human resources is proposed. The model was applied to the case of a specific numeric example for a group of occupations in Republic of North Macedonia connected with the qualifications provided by the vocational secondary education. Disbalance effects generated by security crisis are discussed consequently.

Methods for coping with the effects of disbalance aiming at keeping the existing growth of job positions are also proposed.

Keywords: human resources supply and demand, security crisis

*JEL classification: C22, J24*

### **INTRODUCTION**

Process of globalization along with modernization of the economy of all countries imposes additional constraints on human resource management, never seen earlier. In addition, global crises such as the Covid-19 pandemic (Novkovska and Milenkovska 2020) and security crisis, which was particularly extended with the Russia-Ukraine War affected not only the economic flows (Behnassi and El Haiba 2022), but also the human resources (HR) flows (Parmanand 2022).

Between the highly concerned with the international flows are human resources for the sectors of human health (Alnowibet et al. 2021) and ICT (Parmanand 2022). Region

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of Southeastern Europe is particularly touched by the outflow of human resources in these two sectors (Jurić 2021, IOM 2022).

Efficient human resources management (HRM) requires an outstanding system of anticipation of inflow of the qualifications from the educational system in a specific country (Novkovska 2020, Tomljenović et al. 2022).

Under existing conditions, standard methods for anticipation of the inflow of human resources to the companies could not provide sufficient relevant information. The outflow of human resources due to accelerated international mobility strongly influences the available human resources for companies in the region. Additionally, transitions from a civilian to a military economy induced by the security crisis could further reduce the inflow available to companies. Economies in the region of Southeastern Europe are at higher risk to be touched by the effect of both factors considered. Therefore, HRM in the region must involve detailed information on the international migration of professionals along with the changes in the structure of the economy connected with the security crisis, since it may continue to subsist in the medium term.

For comparison between the countries of the region, the crude rates of net migration for six countries are presented in Table 1. The crude rate of net migration is defined as the ratio of net migration during the year to the average population in that year. The value is expressed per thousand persons.

**Table 1.** Crude rates of net migration for six countries in the region for the period 2013-2022

Year	Crude rate of net migration (per thousand)					
	Albania	Bosnia and Herzegovina	Croatia	Montenegro	Serbia	N. Macedonia
2013	-5.82	-10.19	-2.74	-1.57	0.95	-0.83
2014	-4.93	-9.95	-3.00	-2.74	1.07	-0.76
2015	-4.24	-9.60	-3.15	-3.06	0.98	-0.65
2016	-3.77	-9.21	-3.21	-3.33	0.79	-0.55
2017	-3.39	-8.88	-3.25	-3.13	0.60	-0.48
2018	-3.16	-8.54	-3.16	-3.20	0.45	-0.47
2019	-3.09	-8.25	-3.02	-2.59	0.07	-0.47
2020	-3.18	-8.06	-2.83	-2.11	0.03	-0.23
2021	-3.71	-7.88	-2.56	-0.16	0.03	-0.23
2022	-2.81	-0.16	-0.50	-0.77	-1.38	-0.48

Source of data: (United Nations Population Division Data Portal 2022)

From the table 1 it is seen that all the countries considered have negative crude rates of net migration for the year 2022. Therefore it is expected in next years to observe marked immigration for these countries.

In the present work, the approach for anticipation of available human resources for companies in Southeastern Europe is proposed and developed, based on available information for outflows mentioned above.

Particularly important for maintaining the speed of development of the company in such periods is to secure recruitment of staff indispensable for all operations of the company.

## 1. METHODOLOGY

Proposed approach in this paper is based on the use of the known methods for anticipation of inflow of human resources from the educational system along with the anticipation of demand for specific qualifications (Novkovska 2020, Tomljenović et al. 2022). The standard method practically equals the inflow of human resources and their supply on the labour market, based on the assumption that under normal conditions the outflow does not affect in a great measure the total supply (balanced conditions). Considered actual situation in this work takes into account the serious imbalance caused by the outflow of human resources to foreign labour markets, due to emigration of domestic workforce, without even temporary entering the domestic labour market. Therefore, the correct balance expressions can be constructed including the contribution of the outflow in a substantial decrease of the supply attaining the domestic labour market.

## 2. MODEL DESCRIPTION

### 2.1. Model without outflow to international labour market

This model describes the situation where there is no outflow to international labour market, due to emigration of domestic workforce. The main purpose of this model is to assess whether the actual inflow of labour force satisfies the needs for future employments in domestic companies.

First we construct the expression for the graduation rate (number of graduated within a specific qualification in a given year corresponding to the end of an academic year. i.e. year 2021 for the academic year 2020/2021) for a given qualification required on the labour market ( $V_q$ ). Exponential growth with a coefficient  $k_q$  is assumed as the most realistic. Coefficients in the expression ( $V_q(0)$  and  $k_q$ ) are obtained by best fit of the theoretical curve (1) to the historical set of data for previous years:

$$V_q(t) = V_q(0) * \exp(k_q * t) \quad (1)$$

Index 0 is for the reference year, considered to be the last year of the period covered by historical data. Values of the argument ( $t$ ) are negative ( $t < 0$ ) and for the anticipation period positive ( $t > 0$ ).

Similarly, dynamics of the part of the demand leading to growth of the employment ( $W_q$ , new jobs generated in a given year), assuming exponential growth, can be described by the following expression (2):

$$W_q(t) = W_q(0) \cdot \exp(r_q \cdot t) \quad (2).$$

Coefficients in the expression ( $W_q(0)$  and  $r_q$ ) are obtained by best fit of the theoretical curve (1) to the historical set of data for previous years.

Matching supply ( $V_q$ ) and demand for qualifications crucial for economic development, by various measures, is an important task for human resource management. Using here shown expressions it will be demonstrated how to assess this match.

## 2.2. Model without outflow to international labour market numerical example

In order to illustrate the method, further we show the results for supply (inflow from the educational system to the labour market) and demand of qualifications produced by secondary vocational education for the case of Republic of North Macedonia. Inflow is measured here by the number of graduates by secondary vocational schools in a given year. Demand is measured by the number of employed in following groups of occupations:

- Clerical support workers;
- Service and sales workers;
- Skilled agricultural and fishery workers;
- Craft and related trades workers and
- Plant and machine operators and assemblers.

(International standard classification of occupations ISCO-08<sup>2</sup> major groups 4, 5, 6, 7 and 8).

It is expected graduates from vocational secondary education to be dominantly employed in the listed groups (4, 5, 6, 7 and 8), since their qualifications are related to the occupations covered by these groups. The supply of HR is generated by the secondary vocational education. Demand is composed of two parts:

- need to fill new job openings and positions emptied due to retirement and
- need to fill new job openings.

Possible changes in unemployment are considered to be of minor importance and are not taken into account by this model.

Data from MakStat Database<sup>3</sup> are used in the numerical example for the analysis, aimed at testing the model.

In Table 2 are shown available data for the number of graduates by secondary vocational schools, for four academic years).

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<sup>2</sup> <https://www.ilo.org/public/english/bureau/stat/isco/index.htm>

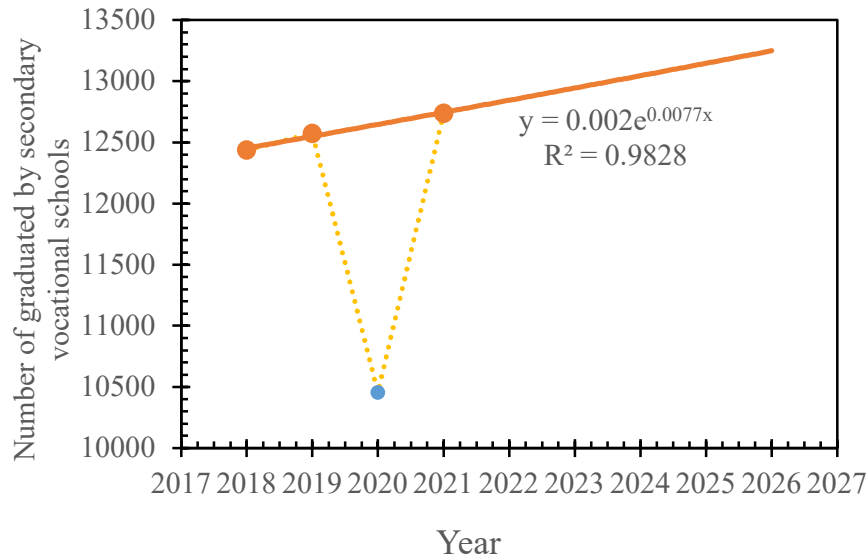
<sup>3</sup> SSO, MakStat Database, <https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/>

**Table 2.** Number of graduates by secondary vocational schools for four academic years

Year	2017/2018	2018/2019	2019/2020	2020/2021
Graduates	12438	12572	10455	12738

Source of data: MakStat Database

Data for graduates by vocational secondary schools for the given period are displayed graphically in Figure 1. Point at year 2020 is considered to be outlier. Clear exponential trend is observed for the three years excluding 2019/2020, where the value is very low, obviously due to the Covid-19 pandemic. The effect of the crisis is delayed by one year (from 2019 to 2020), since the graduation occurred a year after the start of the academic year affected by the pandemic. Therefore, the health crisis affected strongly the inflow of graduates, but after the crisis the trend resumed. Based on this trend, the values for the next five years (2021 do 2026) have been anticipated. These values will be listed later in this paper.



**Figure 1.** Observed (filled circles) and anticipated (solid line) number of graduates by secondary vocational schools. Point at year 2020 is considered to be outlier.

Source: Author's results using data from MakStat Database

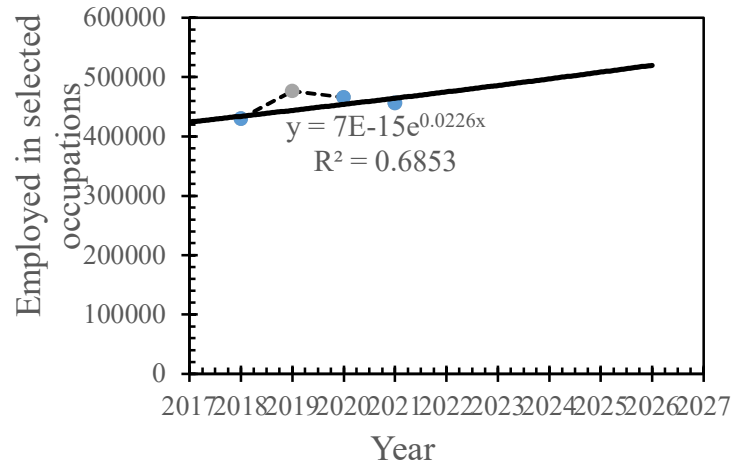
Table 3 displays number of employed in selected groups of occupations, for the period 2018-2021. For the considered period of time the effect of Covid-19 pandemic is to be taken into account in the analysis of the result and the anticipation of future trend of the employment. Such analysis is provided below based on the observed trend excluding the outlier occurring due to the disturbance caused by the Covid-19 pandemic.

**Table 3.** Number of employed in selected groups of occupations, for the period 2018-2021

Year	2018	2019	2020	2021
Clerical support workers	39708	47087	53372	51666
Service and sales workers	127368	142155	136628	140392
Skilled agricultural and fishery workers	59174	66269	57982	58351
Craft and related trades workers	96393	103952	95976	93102
Plant and machine operators and assemblers	107505	116858	121744	112951
Total	430215	476321	465702	456462

Source of data: MakStat Database

Figure 2 displays the observed growth of the number of employed in selected occupations (circles) along with the exponential trend (solid line) including the anticipated values until year 2026. Point at year 2019 is considered to be outlier, attributed to the Covid-19 pandemic.



**Figure 2.** Observed growth of the number of employed in selected occupations (circles) along with the exponential trend (solid line) with anticipated values until year 2026. Point at year 2019 is considered to be outlier.

Source: Author's results using data from MakStat Database

In table 4 the data used in the analysis are resumed. Both observed and projected values on medium term are presented in the table 4. Projected values for years 2022 to 2026 ( $t = 1$  to 5) correspond to anticipated values (forecasting), while those for years 2020 and 2021 provide the smoothed trends. Values corresponding to smoothed trends are subsequently used in the analysis when anticipating the derivative functions (growth rate of number of jobs and graduated flows by years). Period of five years in future is estimated to be satisfactory long to describe the changes in the period of interest for this work, where the security crisis is expected to have strongest impact.

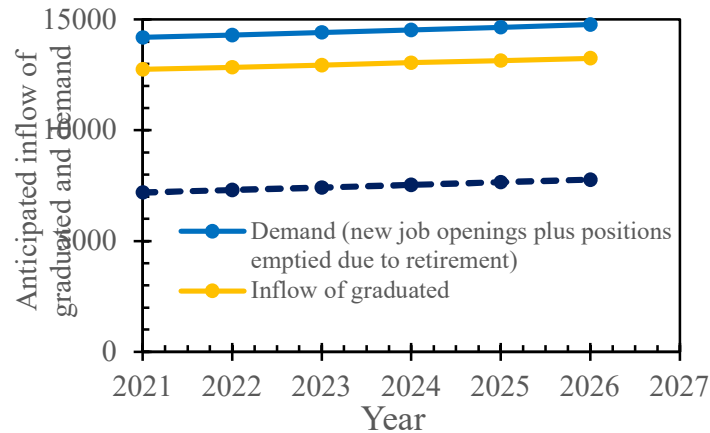
**Table 4.** Observed values of the indicators along with projected values

Period	Graduates flow		Employed total		New jobs	
	Year	Observed	Projected	Observed	Projected	$W_t$
-3	2018	12438		430215		
-2	2019	12572		476321		
-1	2020	10455		465702	460413	
0	2021	12738	12746	456462	467605	7192
1	2022		12845		474909	7304
2	2023		12944		482328	7418
3	2024		13044		489862	7534
4	2025		13145		497514	7652
5	2026		13246		505286	7772

Source: Author's results using data from MakStat Database

Figure 3 shows the anticipated inflow of graduated from secondary vocational schools (supply), along with the anticipated demand for qualifications for new job openings (additional demand), as well as with the total demand (including both new job openings and positions emptied due to retirement).

It is observed that the anticipated total demand and the anticipated supply match well (two upper solid lines with filled circles).



**Figure 3.** Anticipated inflow of graduated from secondary vocational schools (supply) and anticipated demand for qualifications for new job openings, along with the total demand, including both new job openings and positions emptied due to retirement.

Source: Author's results using data from MakStat Database

### 2.3. Model with outflow to international labour market

The Russian-Ukrainian armed conflict showed severe consequences in various domains. It jeopardize the normal functioning of global supply chains (Ngoc et al. 2022). Substantial changes are expected to occur under conditions of war (Kaminsky et al.



2022). It influences strongly the economy in other countries which are not directly involved in the war conflict (Mbah and Forcha Wasum 2022).

In the presence of massive outflow of HR to international labour markets, matching of demand with the supply is deteriorated. Mainly the demand is increased, due to the outflow of employed with appropriate qualifications. Thus, already achieved matching is degraded and supply becomes rather low compared to the increased needs for HR.

Massive outflow towards international labour markets is expected to occur in future years due to the security crisis. Developed countries in Europe are expected to increase the volume of activities in military economy, thus attracting significant parts of the domestic labour force there and emptying many positions in the civil economy. These vacancies will subsequently attract workers from the South East Europe and thus generate outflow of the labour force from these countries.

In order to prevent harsh consequences of the outflow, HRM has to consider remediative measures allowing to keep the existing development trends. Enhanced transitions from unemployment into employment along with the economic activation of already retired persons are to be considered.

## CONCLUSIONS

Actual situation on international level with a harsh security crisis impacts strongly the balance of the supply and demand on domestic labour markets of the countries in South East European countries. Higher demand for military related jobs in developed EU countries generates job vacancies in civil economy. These vacancies tend to be filled by increased emigration of qualified people from other countries, such as South East European countries. As a result, disbalance in the supply and demand of human resources is generated in these countries, leading to deficit of otherwise provided in balanced manner qualifications.

In order to cope with such a deficit, particular measures of human resources management are to be applied. This includes employment of persons with qualifications which not meet the optimum requirements of the jobs, followed by additional trainings and requalifications. Another option is the delayed retirement of employed in the period of security crisis.

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