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# International Migration of Human Resources in the Conditions of Social Transformations

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**Abstract:** The complexity and multidimensionality of international migration, as a form of international economic relations in the current conditions of the global economy, requires a review of scientific approaches to its study and understanding. The paper aims to develop a systematic study of the international migration of human resources under conditions of social transformation, by analyzing the positive and negative economic consequences for labor-exporting and labor-importing countries. The methods of cognition used in this study included statistical methods and comparative analysis, to assess the geo-economic risks facing countries and regions; economic–mathematical modeling with correlation–regression to build a model for assessing the attractiveness of migration, and for verification and testing of the model; and a graphic–analytical approach to illustrate the examined processes. As a result, a system of determinants of the formation of motives for migration is suggested. These include economic, socio-demographic, political–security, linguistic–cultural, and ecological–natural determinants. The suggested mechanism for parameterizing the migration attractiveness of countries is the identification of which indicators should be taken into account when studying and formalizing the preconditions of migration processes. Based on the identified need to compare countries according to factors of "attraction–repulsion", using the proposed list of determinants of migration motives, a model of a country's migration attractiveness was formalized. The model was tested using EU indicators for 2014–2020. The relationship between migration attractiveness and the number of asylum applications in the EU was analyzed, and a high inverse relationship density was established. As a result, the use of the developed model makes it possible to explain and predict migration flows between countries, through the prism of the migratory attractiveness of countries for potential migrants.

**Keywords:** migration attractiveness; risk; manpower migration; migration flows; institutional environment; migration policy

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## 1. Introduction

Numerous problems faced by countries in connection with international migration of human resources indicate that the mechanisms for regulation of migration processes are not perfect, and have not adapted to the challenges of the current demographic, economic, political, legal, and cultural environment. This situation can be explained by the shortcomings of the theoretical basis for the formation of these mechanisms, which has lost its relevance under conditions of rapidly developing globalization with the strengthening

of formal and informal institutions' actions relating to the movement of human resources, which can manifest in the form of international migration.

International migration causes sharp political controversy all over the world, and given its socio-demographic nature has exceptional geo-economic significance, because the mobility of human resources changes the established labor structures and demographic potentials of countries and regions, in some cases strengthening imbalance, and in others balancing existing disparities of territorial, gender–age, and professional distributions of human resources.

The modern dynamic conditions of the global economic environment require countries and regions to build and implement effective geo-economic strategies, an integral part of which includes the management of human resources and their migration (Davda et al. 2018). Today, international migration is becoming more widespread and forced migration is also increasing. The reasons for this include economic problems, aggravation of military–political conflicts, climate change, etc. (Păunică et al. 2017).

The socio-economic importance of international migration is manifest in helping to overcome population poverty. The amount of remittance from international migrants to their countries of origin is growing annually, and the majority of these funds are directed to low- and middle-income countries (SeemaParveen 2020).

The activation of international migration is facilitated by the elimination of institutional barriers to the international mobility of human resources. However, numerous crisis phenomena (illegal migration, human trafficking, shadowing of migrants' incomes, humanitarian problems, social and security tensions) testify to the shortcomings of the institutional environment in terms of the formation and implementation of countries' migration policies. Meanwhile, the deepening of economic integration in less developed regions of the world requires the construction of a regional migration policy as an element of the geo-economic strategies of regional integration associations.

Certainly, the international migration of labor resources has negative as well as positive aspects for countries. It is possible to divide the economic consequences of labor migration into positive and negative effects, for exporting as well as importing countries.

The positive consequences for exporting countries include (Wae-Esor 2022): decreasing levels of unemployment and reducing costs associated with it; inflow of foreign currency to countries of emigration through transfers of funds by migrants from abroad to support families and relatives, which generally contributes to the improvement of their economic situation; improving the qualification level of workers, including the benEPIts of experiences from more developed countries, and the introduction of new technologies.

The negative consequences for exporting countries include (Carling and Schewel 2018) losing some of their most capable labor resources, leading to the aging of labor resources; increased expenses for the attraction of highly qualified personnel; decreased development potential within the country.

However, there are many positive points for importing countries and businesses, such as (Otero and Lotta 2020) stimulating the development of production due to the extensive increase in the workforce; increased competitiveness of products resulting from the use of cheaper immigrant labor; reducing expenses for training and retraining employees, including those with higher qualifications; filling vacancies in non-prestigious areas of the economy; decreased budgetary burden due to savings on pensions and social benEPIts; increased productivity of workers and efficiency of production as a whole, due to competition in the labor market.

The negative consequences include (Sinha 2017): increased competition in the labor market for resident workers, due to the presence of a cheaper foreign workforce; the outflow of currency funds abroad in the form of remittances from immigrants; and increased expenses for social protection and assistance for migrants.

Highly appreciative of previous scientific results, as well as recognizing the need to establish the role and place of institutions in regulating the international migration of human resources at all levels of international economic relations in the context of geo-

economic transformations, we assert that it is appropriate to focus on the formation and implementation of migration policy. However, the patterns of migration processes under conditions of geo-economic transformation require further in-depth study. Consideration should furthermore be given to aspects of migrant stratification, to generalize and specify the advantages and disadvantages of countries' involvement in international migration. In addition, the need for further formation of vectors for the regulation of the corresponding processes requires determining the degree and nature of the influence of environmental factors on migration motives.

This led to the selection of the study topic, its object, subject, and the formulation of its purpose and objectives. The purpose of the paper is to develop a systematic study of the international migration of human resources under conditions of social transformations. To achieve the dEPIned purpose and according to the logic of the study, the following objectives were dEPIned and achieved:

- To systematize the factors affecting migration motives and their formation in the context of connections with geo-economic risks, and to establish patterns of formation of migration flows;
- To assess comparatively the levels of geo-economic risk faced by countries, and outline their relationships with the formation of migration flows;
- To form and substantiate a model for assessing the migration attractiveness of a country, to ensure the ability to predict future migration flows.

The object of the study was the processes of international migration of human resources under conditions of social transformation. The subject of the study was a set of theoretical and methodological principles and mechanisms for regulating the international migration of human resources under conditions of social transformation.

This paper consists of six sections. The introduction section considers the relevance of the problem, highlights issues that were insufficiently studied before this study, and dEPInes the purpose, objectives, and subject of the study. The literature review analyzes scientific publications addressing the concepts of international labor migration and the characteristics of indicators, according to the types of geo-economic risk associated with international migration. The section describing the study materials and methods dEPInes the logic and methodology of the study and assessment of countries' geo-economic risk, indicators of comparative analysis, and the formation of asymmetries associated with other types of geo-economic risk. The results provide the authors' findings for determining an integrated indicator of the level of geo-economic risk associated with international migration, determinants of indicators of migration attractiveness of EU countries for 2014–2020, a general indicator of migration attractiveness of EU countries for 2014–2020, and regression analysis of migration attractiveness and the number of asylum seekers in the EU. The discussion section considers the constructed models of the migration attractiveness of EU countries for 2014–2020, and also the limitations of this study. The conclusions in the final section are based on the results of the study.

## 2. Literature Review

### *2.1. Analysis of Concepts of International Labor Migration*

The problems of international migration have been actively studied in international scientific works since the 1990s. These problems are primarily related to the aggravation of social, demographic, and environmental problems, including depletion of resources, and the inability of states to effectively implement their geo-economic strategies, as well as increasing stratification of society based on conflicts of interest and political controversy (Kutor et al. 2021).

These problems are the consequences of, among other things, international migration and the growing burden placed by migrants on countries and regions (Wang et al. 2018). On the other hand, they are preconditions for further intensification of international migration of human resources, and for countries' loss of human potential (Böhme et al. 2020).

According to the results of bibliometric analysis, the problems of international migration go far beyond economics, and systematic interdisciplinary approaches can contribute to a more complete study of the preconditions for and consequences of international migration processes (McLeman 2019). International migration has been the subject of not only demographic but also economic, political, environmental, ethnic, historical, legal, and urban studies, addressing aspects of health, education, and social security (Theoharides 2018).

The nature and patterns of international migration, including its problems and the prospects for its development, have been actively studied around the world, as evidenced by the existence of numerous national and international research centers (Cattaneo and Bosetti 2017). These include the European Research Centre on Migration and Ethnic Relations (ERCOMER), the Institute for the Study of International Migration, the Institute for Migration and Ethnic Studies, the Institute for Migration Research and Intercultural Studies, the Migration Policy Institute, the Refugee Studies Centre, the Centre for Refugee Studies, etc.

Analysis of scientific publications from the above research institutions allowed trends in research subject matter to be observed, in particular, increasing the attention of the scientific community on the problems of adaptation faced by migrants in host countries (Gorinas and Pytliková 2017), their growing impact on all spheres of society (Clist and Restelli 2021), and associations with socio-economic, environmental, political, cultural, and other threats (Arif 2020). Some of these works have contributed to the theoretical basis of this study.

The interdisciplinarity of scientific publications on international migration was revealed based on their analysis, highlighting the necessity to transform approaches to the study of international migration as a form of international economic relations. Theoretical and methodological provisions of such research should be based on the synthesis of economic, social, institutional theories and concepts, to ensure the systematic nature of the study.

In particular, relevant issues include the impact of immigration on the economic development of the state (Hassan et al. 2019); the need for state regulation or restriction of migration according to the national interests of states (Gamso and Yuldashev 2018); the relationship between immigration flows and the levels of wages and employment in host countries (Păunică et al. 2017); and factors affecting labor demand and labor supply at macro and micro levels (Walton-Roberts 2021). However, these issues must be suitably structured since the logic of the migration movement can be lost within this diverse formulation; this issue is covered below during the substantiation of the research methodology.

The need to study and overcome the negative consequences of migration and to harness its potential in countries that have always attracted migrants dictates that countries which are actively involved in international migration should be involved. The complexity and multidimensionality of migration processes determine the existence of different theoretical and methodological approaches to their study.

In the course of the current study, based on the works of scientists and researchers of international migration, existing theories and concepts were distinguished. According to the results of the study of the content and main points of these theories as presented the scientific literature, they can be positioned on the intersecting planes of global, macroeconomic, and microeconomic theories, as well as institutional theory (Organiściak-Krzyszkowska 2017). Here, we consider them in more detail.

Conventionally, these theories can be divided into three groups:

(1) Macroeconomic, focused on explaining the causes and consequences of migration through the prism of changes in macroeconomic and market indicators (for example, GDP per capita growth, inflation, unemployment, average wages) (Rosenberg 2019);

(2) Microeconomic, based essentially on the formation of internal migration motives, balancing the psychological aspects of potential integration into the society of another country with assessment of the comparative benEPIts of migration (Cederberg 2017);

(3) Global, including consideration of international preconditions for the movement of migrants between countries, considered as natural in the conditions of deepening integration processes (O'Brien and Eger 2021).

Macroeconomic theories (White and Buehler 2018) in general explain factors affecting population migration (the circumstances of economic development that provoke migration), and outline its consequences (impact on the labor market, average wage dynamics, aggregate demand). In our opinion, macroeconomic theories do not study migration itself, but the environment of its course—in fact, the state of this environment before and after migration. At the same time, its spatial aspect is also important, because different countries and accordingly different environments are involved in the migration movement (Hinnells 2017).

However, the fact of migration is determined not by environment, but by the decision of the migration subject (migrant); so the study of the same factors and consequences is transferred to another level—the microeconomic level—that consides the individual as an economic agent who decides on migration (this decision is essentially economic, as the migrant assesses the opportunities and losses from migration) (Sabater and Graham 2019). In the other case, the subject of such a decision may be a household that analyzes the advantages and disadvantages of the migration of one of the household members.

Global theories are based on assumptions of the regularity of international migration in a globalized world (Duquette-Rury and Chen 2019). At the same time, the systematization of theories of international migration is quite conventional, because the genesis of the relevant theoretical knowledge occurred in the process of the evolution and complication of economic theories, and their symbiosis.

With the beginning of international migration, many institutes and international organizations were created, seeking to eliminate the imbalance between employers in host countries and potential migrants (Brzozowski and Coniglio 2021). However, there have been significant inconsistencies in the characteristics of personnel seeking employment opportunities in corporations within industrialized countries, and the restrictions on the visa regimes applicable to immigrants in these countries.

As a result, to solve problems faced by migrants and employers, networks of recruiting and non-profit organizations were created to address the situation of wage earners (Popescu et al. 2018). Most of these public organizations have emphasized the humanitarian aspect of migration, while recruiting organizations interested in profit, together with private entrepreneurs, have facilitated border crossings, provided (sometimes illegal) travel documents, arranged marriages between migrants and citizens of the country of destination, as well as providing loans at high rates (Ryndzak and Bachynska 2022).

Because business organizations operating in this area often act illegally, many non-profit organizations help affected migrants by counseling, social services, legal support on immigration law issues, etc., to create a more favorable and transparent framework of migration policy for sending and receiving countries (Castelli 2018).

We considered the main concepts of international labor migration, and describe the postulates of our study.

The ongoing discussion about migration processes, which is considered unfinished, has involved various approaches to its explanation, development, and strategies. Classical and neoclassical migration theories consider income differences in the international labor market as the root cause of migration.

People migrate to maximize their incomes, to improve the welfare of their families, and to receive positive benEPIts from living in a territory with developed social institutions and social infrastructure, and to minimize social deprivation (Kniess 2020). Other theories (Cranston et al. 2018) insist that there is no conclusive evidence to support these concepts, due to the simultaneous operation of many factors dEPIned by economic efficiency, social inequality, and absolute poverty, but the available data suggest that migration exacerbates inequality, because economic growth, which is caused by migration, has no broad basis and stratifies society.

The latter further emphasizes the complex nature of migration processes, which are multidimensional phenomena that cover different areas of human life, and require constant attention from scientists, governments, and public institutions. Research activities should focus on forecasting the development of the national labor market in relation to scenario strategies for the deployment of global migration processes, in the context of intensification of the development of human potential.

### *2.2. Characterization of Indicators by Types of Geo-Economic Risk of International Migration*

Given the numerous indicators regarding the political and security stability of countries, conditions of institutional practices, economic development, and environmental efficiency, when studying geo-economic risk levels a problem in encountered in the comparison and matching of features by their different types. Therefore, to study the level of geo-economic risk by type, several indicators were selected; shown in Table 1.

**Table 1.** Characteristics of indicators by types of geo-economic risk associated with international migration.

| Risk Type | Indicator |
|---|---|
| Economic policy risk | Economic Freedom Index (EPI) ** |
| Economic risk | Unemployment rate * |
| | Labor share ** |
| Socio-demographic risk | Human Development Index (HDI) ** |
| Spatial risk | Logistics Performance Index ** |
| | Global Connectivity Index ** |
| Political and security risk | Fragile States Index * |
| | Gender Inequality Index ** |
| Ecological and natural risk | Environmental Performance Index ** |
| | Extreme climate events * |

Note: * stimulator, ** destimulator.

Establishing the nature of indicators allows further selection of the formula for their normalization.

Here we consider in more detail each type of geo-economic risk in the countries of the selected regional associations, allowing us to specify the risks inherent in each of them. The numerical value is characterized by data for 2020.

Economic policy risk: In the course of the study, EPI was analyzed to evaluate factors of the institutional environment of economic activity. The meaningful content of the index's components indicates the expediency of its use.

To determine this index, indicators of variation were calculated for the grouping of countries. They allowed the boundaries to be set for groups of countries according to their degree of economic freedom, which demonstrates the level of economic policy risk as part of the geo-economic risk Environmental Performance Index (EPI 2020). The use of the obtained scale allows assessment of the asymmetry in the levels of economic freedom between countries, and certain groups of countries demonstrated a need to improve their institutional environments for conducting economic activity, which can cause the strengthening of relevant economic determinants of the formation of migration motives.

Thus, the Economic Community of West African States (ECOWAS) countries were characterized by relatively uniform but low indicators of this index, although the region Guinea, Liberia, and Niger (EPI 2020) were the weakest countries in this aspect. The indicators for the Southern African Development Community SADC countries were also quite low, due to levels of inflation and low indicators of GDP per capita. In the Eurasian

Conformity (EAC), the problems were traced by the macroeconomic indicators and the EPI. Such trends partly explain the significant flows of labor migrants in African countries.

The Mercado Común del Sur Mercado Comum do Sul Ñemby Ñemuha (MERCOSUR) indicators differed the most, due to different macroeconomic trends; countries showed different annual nominal GDP growth—from 0.3% in Venezuela to 5.5% in Bolivia (EPI 2020). Brazil (65% of the region's GDP), Argentina (20%), and Venezuela (11%) were the leaders in terms of GDP (EPI 2020). Uruguay (38th) and Paraguay (80th) had the best EPI scores, while other countries in the region were ranked between 140th and 179th (EPI 2020).

Within North America, Canada and the USA were characterized by higher EPI values (seventh and 17th in the world) (EPI 2020). Mexico lagged far behind them, which was especially evident in the components of government honesty, judicial system efficiency, freedom of employment, and protection of property rights. At the same time, Mexico has experienced extremely strong industrial development, being ahead of other North American Free Trade Agreement (NAFTA)countries in terms of economic growth (2.8% annually), and the GDP of Mexico is 1.5 times larger than that of Canada (EPI 2020).

The indicators for South Asian Association for Regional Cooperation (SAARC) were extremely low, related to the problems of brutal institutional regulation of economic processes and a poorly developed economy. However, another association in the Asian region, Association of South East Asian Nations (ASEAN), had much higher indicator values. This precisely explains the development in the region of new industrial countries with favorable business climates and high investment attractiveness.

Socio-demographic risk was studied based on the Human Development Index (HDI), which takes into account the standard of living of the population, environmental safety, level of education, and life expectancy (DHL 2021).

Based on the calculated indicators of variation and the geographical reflection of the range of variations within associations, it should be stated that there is a significant differentiation between countries in the regions themselves. This indicates quite significant gaps in the living standards of the populations, and therefore the strengthening of the effect of socio-demographic determinants, potentially stimulating the formation of motives for interregional migration. With the use of calculated variation indicators, the boundaries of the groups were determined for the classification of countries according to levels of socio-demographic geo-economic risk (DHL 2021). Based on the HDI formation methodology, we believe that the socio-demographic type of risk, characterized in this case using HDI, demonstrates the effect of economic, socio-demographic, and linguistic–cultural determinants.

Thus, there is naturally a gap in HDI between ASEAN countries, with the highest values in Singapore and the lowest in Myanmar, Cambodia, and Laos; the gap between ASEAN countries in terms of GNI per capita is almost 140 rating places (DHL 2021). This is partially due to the economic gains of the countries' economies, which are described above.

Despite stable and fairly rapid economic growth, the SAARC region continues to suffer socio-humanitarian problems, which explains its lagging behind other regions of the world in terms of HDI indicators and its high risk level according to EPI indicators. SAARC countries are quite poor, especially Afghanistan and Nepal, with Gini Index values ranging from 30.69 in Pakistan to 39.16 in Sri Lanka (DHL 2021). The share of the population living below the poverty line is significant: from 0.016 million people in Bhutan (2.17% of the country's population) to 268.025 million people in India (21.23% of the country's population). Therefore, according to their overall average HDI indicator, SAARC countries fall into the category of medium-developed countries. Despite the intensification of economic activity and economic growth trends, the situation of the population has not changed significantly—SAARC countries are rated low by GNI per capita indicators.

The unevenness of economic development in the NAFTA countries reflects disparities within levels of human development. Thus, levels of geo-economic risk are increased, based on Mexico's low level of economic freedom and its lagging behind in terms of HDI indicators. The preconditions for a low HDI are a significant stratification of the population by income, comparatively lower average levels of income per capita (17.5 thousand US

dollars in Mexico, which is 2.6 and 3.2 times less than in Canada and the USA, respectively (DHL 2021).

These types of risk were combined, based on the fact that economic freedom conditions the possibility of active economic activity of companies and households, affecting standards of living and access to economic benEPIts. The groups of countries dEPIned on this basis made it possible to assume the presence of "pull-push" factors affecting the formation of economic, social, and educational objectives for regulating migration processes.

We analyzed economic risk, to study "push-out" factors based on indicators of unemployment rate and share of the workforce in the population, which demonstrate the availability of human resources within the labor market. The higher the share of the workforce in the population of a country, the greater its labor resource, and so its productive force. In addition, the burden on the country's social security and pension insurance system is less, and so the level of geo-economic risk becomes lower.

At the same time, the level of geo-economic risk is directly proportional to the level of unemployment, because the growth of unemployment means an excess of human resources, their waste, and unproductive losses for the training of specialists not in demand by the labor market.

Based on data from the World Bank (The World Bank 2022) regarding international levels of unemployment, the scale of variation of unemployment indicators in the countries under study was revealed, allowing assessment of problems present in each association. At the same time, it is important to note the significant disproportion of indicators within separate associations, which determines the trend of significant intra-regional migrations, mainly of the labor market.

Currently, 48.5% of the population of the EU is involved in the workforce, and the unemployment rate in some countries is extremely high, which has been a factor in the redistribution of labor resources within the EU.

In the NAFTA countries, there has been a rapid increase in the share of the workforce, in particular in Mexico, where during 1991–2020 this indicator increased from 35.8% to 45.3% (The World Bank 2022). At the same time, in Canada and the USA, the share of the workforce was 55.0% and 50.3%, respectively, against a background of fairly high unemployment in Canada (The World Bank 2022). NAFTA countries, in general, are characterized by a significant share of workforce in the population, in particular the USA and Canada, along with average levels of unemployment. In Mexico, this factor was recorded at a low level, while other factors of a macroeconomic nature, including the standard of living and the level of the development of social infrastructure, formed strong factors of "attraction for the same migrants from Mexico" ("Mexico–USA" was found to be the largest migration pair).

We analyzed spatial risk by using two indicators, i.e., the Logistics Index and the Global Connectivity Index, indicating the development of the infrastructure of a country. This made it possible to assess options for transport and communication (including migration networks) to support migration, as well as the general level of each country's infrastructural capabilities to receive and accommodate migrants. For example, refugees should be ensured stay in the territory of the country of refuge. Relevant factors include telecommunications, transport connections, development of the system of checkpoints, operative transportation, evacuation of refugees, and ensuring delivery of humanitarian aid and provisions.

The differentiation of countries by this indicator was quite significant, due to the comparative development of connections (communication, transport, trade, etc.). The state of such connectivity determines greater organizational opportunities for migratory movements, in particular in cases of organized movements of refugees. As a result of the analysis of data for the above indices, indicators of variation and the boundaries of groups of countries were calculated according to levels of ecological and natural geo-economic risk.

Political and security risk was determined based on the Fragile State Index (FSI) and the GIWPS Index (Georgetown University's Institute for Women, Peace and Security). This approach was dictated by the complexity of the specified indices from the point of view

of taking into account internal and external security threats (in particular, the element of threats to gender groups). The Fragile State Index 2020 allows the effects of political and security determinants to be assessed. The formation of migration motives determines the potentially significant pressure placed by migrants on destination countries. We consider it appropriate to consider separately the risks related to gender gaps; based on the GIWPS index, we were able to consider the push factors regarding the access of gender groups to economic benEPIts.

During the study, discrepancies were found in the indicators for the countries in each selected association. The countries of EAC, ECOWAS, SAARC, and SADC had the highest fragility rates.

The ecological–natural risk was analyzed based on the aggregated indicator of extreme climatic events, which was determined by clustering regional integration associations and the Environmental Efficiency Index. In particular, the level of environmental readiness potentially determines the safety of life and the health of the population in both the short and long term, andthis indicator varied within associations. This made it possible to determine the ranking of countries according to levels of risk in the general state of the environment, ecological safety, levels of ecological and natural risks in general, and the push factors relating to a country's membership in its corresponding group.

## 3. Materials and Methods

In the process of migration policy formation, factors taken into account should include the socio-economic background of migration processes in the country, its ethnic and religious profile, and its cultural, educational, and environmental environment. Together these constitute the factors of "attraction–repulsion" and determine the actual state of international involvement in international migration.

We determined that it is appropriate to base the study on just this approach, taking it into account as follows:

(1) To assess objectively existing differences in populations' living standards by calculating levels of geo-economic risk, which can fully reveal living conditions;
(2) To determine the attitude of migrants towards objectively existing differences, in terms of their impact on the formation of migration motives.

The intensity and format of countries' involvement in migration processes depend partly on the levels of geo-economic risk that shape the migration attractiveness of countries and regions, because the level of geo-economic risk (by its types) indicates the presence of repulsion factors. In this case, higher risk values reflect higher levels of intensity of these factors. Given the peculiarities and uniqueness of each country, we consider it appropriate to parameterize geo-economic risk, to allow comparative analysis of countries by risk level and assessment of preconditions for the formation of migratory pairs, based on the asymmetries of geo-economic risk between them. The logic and selection methodology for the study of geo-economic risk indicators are shown in Figure 1.

To achieve the purpose of this study, we considered it appropriate to use regional groups of countries for comparative analysis, as the ratio of the level of risks of countries within integration associations is determined by the vectors of intra-regional migration. EU, ASEAN, SAARC, NAFTA, MERCOSUR, SADC, ECOWAS, and EAC were selected for the study. Therefore, the units of observation were the countries within these associations, and the units of the populations under study were the indicators for these countries.

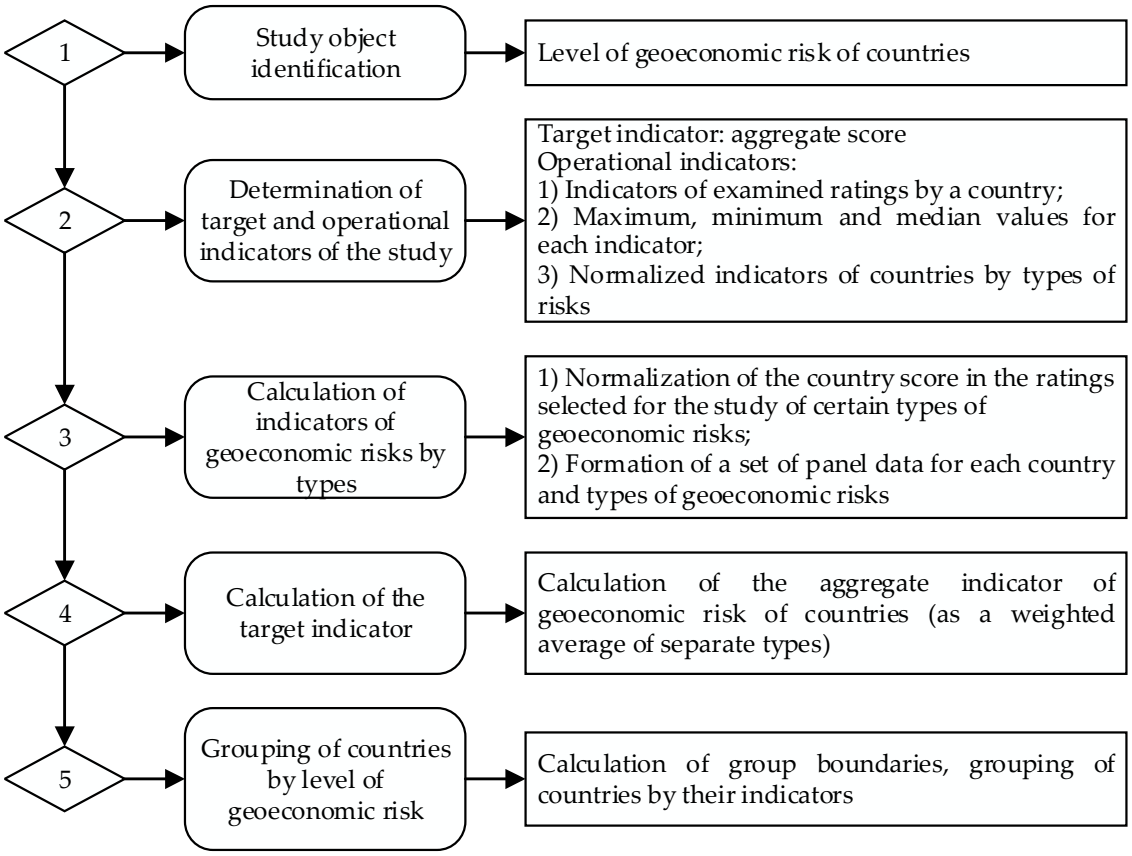



**Figure 1.** Logic and methodology of the study and assessment of geo-economic risks of countries.

We dEPIned three main hypotheses to carry out the study:

**Hypothesis 1 (H1).** *The investment attractiveness of EU countries is influenced by the following determinants: linguistic–cultural, ecological–natural, social, economic, and political–security. The problem of refugee migration is becoming more widespread in the globalized world and is intertwined with numerous global challenges and threats. Particularly, the expansion of refugee migration is related to military and political instability, growth of geopolitical tension, and the aggravation of environmental and natural–climatic threats. However, socio-demographic imbalances also determine the tension of the internal political environment and provoke further armed conflicts and potentially the movement of refugees, asylum seekers, and, as a rule, flows of illegal migrants.*

**Hypothesis 2 (H2).** *The indicator of migration attractiveness of EU countries has an average value. As of 2022, the EU includes 28 states. Each country has different determinants of influence on investment attractiveness. But primarily, the presence of political regulators in the EU allows its countries to be either donor or recipient, to average the relevant determinants.*

**Hypothesis 3 (H3).** *There is a relationship between the indicators of migration attractiveness and the number of asylum seekers in the EU. The relationship between the selected resulting indicator and the migration attractiveness indicator is as follows: the higher each normalized political–security indicator of migration attractiveness, the higher the final indicator of migration attractiveness, because the nature of the indicators was taken into account for the normalization of the initial data; the higher the indicator of migration attractiveness, the less the effect of "pushing" factors.*

For comparative analysis of countries and the formation of the idea of asymmetries in certain types of geo-economic risk, risks were parameterized based on the above indicators.

As a result of the calculation of normalized indicators by types of geo-economic risk, the integrated indicator was calculated as a weighted average of normalized data

of individual types. We proceeded from the assumption of equivalence of types of geo-economic risk, although this approach is flexible in terms of the possibility of introducing correction factors into the calculation, with the following formalized form:

$$TR_i = \sum_{j=1}^{m} v_j \times p_{ij} \quad (1)$$

where $v_j$ is the weight of the $j$-th indicator; $p_{ij}$ is the value of the $j$-th indicator (units of the population under study) of the $i$-th country (observation units); $m$ is the number of indicators taken into account for the calculation of certain types of risks.

Note that the integrated indicator varies from 0 to 1, where 0 is the lowest and 1 is the highest level of geo-economic risk. Conventionally, we dEPIned the gradation of risk as follows: 0.00, 0.25—low; 0.25, 0.50—below average; 0.50, 0.75—above average; 0.75, 1.00—high.

We believe that the level of the share of migrants in general can be represented in the form of matrix A, and the level of migration growth in the form of matrix B:

$$A = \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix}, B = (1\ 2\ 3\ 4)$$

where 1 is low level, 2 is below average level, 3 is above average level, 4 is high level.

Multiplication of matrices A and B allows a new matrix C to be obtained containing a score of the intensity of the country's use of migratory human resources, which is based on a combination of two indicators under study (groups of countries dEPIned in Table 2).

$$C = \begin{pmatrix} 1 \times 1 & 1 \times 2 & 1 \times 3 & 1 \times 4 \\ 2 \times 1 & 2 \times 2 & 2 \times 3 & 2 \times 4 \\ 3 \times 1 & 3 \times 2 & 3 \times 3 & 3 \times 4 \\ 4 \times 1 & 4 \times 2 & 4 \times 3 & 4 \times 4 \end{pmatrix}$$

**Table 2.** Groups of countries by the intensity of use of migratory human resources.

| **Share of Migrants in the Population** | **Migration Growth (M)** | | | |
|---|---|---|---|---|
| | **Low** | **Below Average** | **Above Average** | **High** |
| Low | M(1) = 1 | M(2) = 2 | M(3) = 3 | M(4) = 4 |
| Below average | M(5) = 2 | M(6) = 4 | M(7) = 6 | M(8) = 8 |
| Above average | M(9) = 3 | M(10) = 6 | M(11) = 9 | M(12) = 12 |
| High | M(13) = 4 | M(14) = 8 | M(15) = 12 | M(16) = 16 |

The above clusters served as a basis for further decomposition of elements and components of migration policy, based on existing economic, socio-demographic, environmental, political–security, and other components of geo-economic risk.

Their use is also appropriate when conducting a comparative analysis of migration processes within a regional integration association, by grouping its member countries and identifying vectors of national migration policies to reconcile the interests of parties at the regional level, taking into account their existing factors of "attraction" and "repulsion".

Approbation of the developed model of migratory attractiveness within the limits of this study assumes:

(1) Selection of the studied period. We selected the period 2014–2020 because due to the large number of determinants introduced into the model, as well as the variety of information sources for their calculation, it was difficult to establish a longer period

(the main problem was the variability of methodologies for the formation of selected indices and ratings, which can distort empirical data);

(2) Territorial limitation of the model. The selected approach for the normalization of indicators, taking into account the existing minimum and maximum values for the entire study population, provided the opportunity to apply the proposed model to any country in the world;

(3) Calculation of weighting coefficients and model indicators;

(4) Checking the adequacy of the built model. In particular, a numerical experiment was used for the correlation of analysis regarding the influence of the level of migratory attractiveness on the resulting indicator. In this case, in contrast to the above economic–mathematical model, the resulting indicator was the number of migrants from the country, for which forecasting the integrated indicator of migratory attractiveness was essentially designed.

The authors improved the methodological approach to the assessment of countries' geo-economic risks, which included the suggested method of calculating the integrated indicator of geo-economic risk as a weighted average of normalized aggregated indicators of individual types of geo-economic risk (economic policy, socio-demographic, spatial, political–security, ecological–natural). This allowed the position of each country to be determined according to certain types of geo-economic risk and their integrated indicator, as well as to clustered countries according to levels of geo-economic risk and the intensity of use of migratory human resources.

## 4. Results

Modern migration processes around the world are characterized by extreme dynamism, which is natural in the context of globalization of not only economic relations, but of all social and political processes. In turn, this has determined the format of state involvement in the migration of human resources, where some countries are "classically" suppliers and others are their net consumers.

Expansion of international migration and integration of a country into the world community creates preconditions for its participation in international migration processes. However, existing demographic problems, increased public spending, increased pressure on social systems, and political and security threats are often largely due to the problems associated with the emigration of able-bodied people and young professionals, as well as with mass immigration from other countries. In addition, the intensification of migration flows changes the structure of labor supply, in particular its educational and professional levels, and affects average wages in the regions most involved in migration processes.

The results of our calculations of the integrated indicator by types of geo-economic risk for international migration are given in Table 3.

The obtained results can be used for a comparative analysis of countries in terms of levels of geo-economic risk, allowing assessment of the overall impact of "push" factors.

The intensity of the use of migratory human resources affects the migratory attractiveness of the country.

Recently, approaches to determining the factors of migration have been considerably diverse, however, in the vast majority of cases research findings tend to explain migration movements in terms of income maximization, and therefore the main centers of attraction of migration are OECD countries. Note that existing theories of international migration mainly explain the formation and vectors of migration flows through economic factors (theories that analyze the patterns of migration through the dynamics of unemployment, inflation, GDP, wages, and purchasing power). In terms of formal logic, the higher the unemployment, the higher the motivation to migrate; at first glance, such dependence is linear.

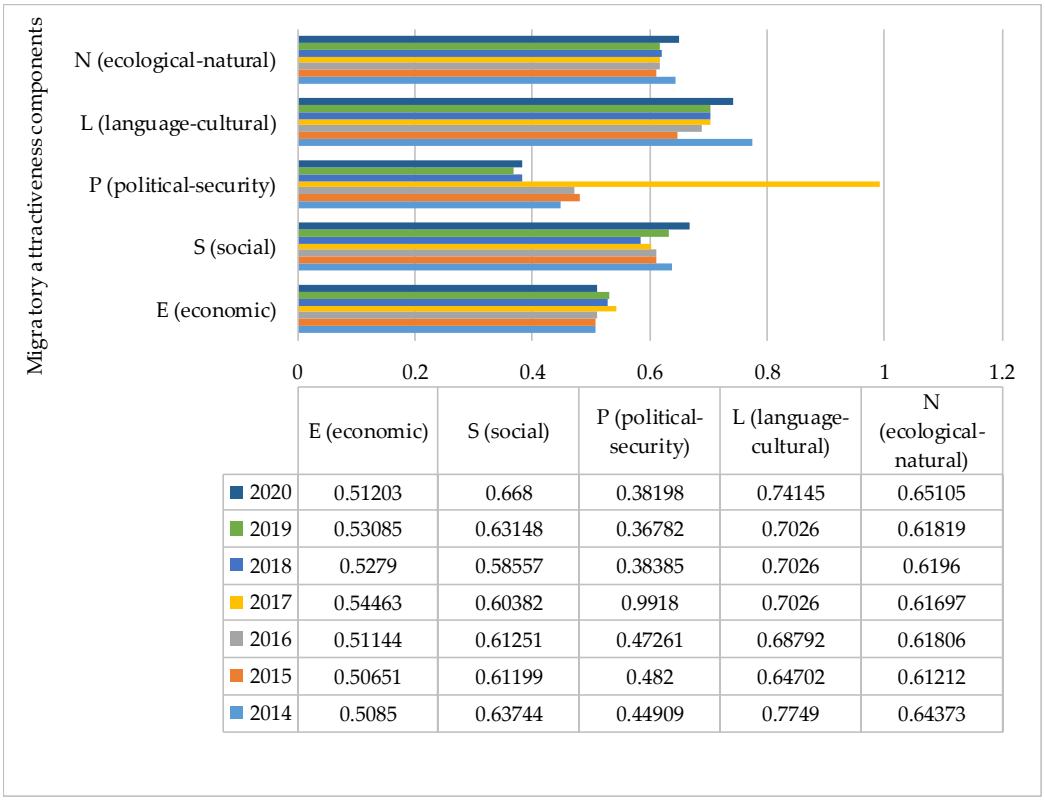
**Table 3.** Calculated integrated indicator of the level of geo-economic risk of international migration.

| Country Associations | Low | Below Average | Above Average | High |
|---|---|---|---|---|
| EU | Netherlands, Sweden, Luxembourg, Germany, Denmark, United Kingdom, Austria, Ireland, Finland, Belgium, Czech Republic, France, Estonia (0.158–0.255) | Slovenia, Lithuania, Portugal, Malta, Spain, Poland, Latvia, Italy, Hungary, Slovakia, Cyprus, Romania, Croatia, Bulgaria, Greece (0.267–0.395) | X | X |
| ECOWAS | X | Cape Verde, Ghana, Togo (0.446–0.492) | Benin, Burkina Faso, Côte d'Ivoire, Senegal, Nigeria, Sierra Leone, Guinea-Bissau, Liberia, Guinea, Gambia, Mali, Niger (0.522–0.647) | X |
| EAC | X | Tanzania, Uganda, Rwanda (0.427–0.483) | Kenya, South Sudan, Burundi (0.508–0.597) | X |
| SADC | X | Zambia, South Africa, Tanzania, Botswana, Seychelles, Mauritius (0.305–0.479) | Mozambique, DR Congo, Swaziland, Angola, Madagascar, Lesotho, Malawi, Zimbabwe, Namibia (0.505–0.622) | X |
| SAARC | X | X | Pakistan, Bangladesh, Nepal, India, Bhutan, Maldives, Sri Lanka (0.517–0.651) | Afghanistan (0.780) |
| ASEAN | Singapore (0.157) | Cambodia, Indonesia, Philippines, Vietnam, Brunei, Thailand, Malaysia (0.356–0.484) | Myanmar, Laos (0.552–0.665) | X |
| MERCOSUR | X | Venezuela, Bolivia, Paraguay, Argentina, Brazil, Uruguay (0.288–0.428) | X | X |
| NAFTA | Canada, USA (0.186–0.234) | Mexico (0.370) | X | X |

Source: authors' calculations based on data (The World Bank 2018; EPI 2020; DHL 2021; Fund for Peace 2021; The World Bank 2022).

In the course of this study of scientific works, the selected factors they describe relating to international migration were divided into six groups: economic, socio-demographic, political–security, linguistic–cultural, ecological–natural, and institutional.

Figure 2 presents the indicator of migration attractiveness for each subgroup of determinants and summarizes the above indicators in groups of economic, socio-demographic, political–security, linguistic–cultural, and ecological–natural determinants.




| | E (economic) | S (social) | P (political-security) | L (language-cultural) | N (ecological-natural) |
|---|---|---|---|---|---|
| 2020 | 0.51203 | 0.668 | 0.38198 | 0.74145 | 0.65105 |
| 2019 | 0.53085 | 0.63148 | 0.36782 | 0.7026 | 0.61819 |
| 2018 | 0.5279 | 0.58557 | 0.38385 | 0.7026 | 0.6196 |
| 2017 | 0.54463 | 0.60382 | 0.9918 | 0.7026 | 0.61697 |
| 2016 | 0.51144 | 0.61251 | 0.47261 | 0.68792 | 0.61806 |
| 2015 | 0.50651 | 0.61199 | 0.482 | 0.64702 | 0.61212 |
| 2014 | 0.5085 | 0.63744 | 0.44909 | 0.7749 | 0.64373 |

**Figure 2.** Determinants of the indicator of migration attractiveness for EU countries, 2014–2020. Source: authors' calculations based on data (The World Bank 2018; EPI 2020; DHL 2021; Fund for Peace 2021; The World Bank 2022).

Determining the ranking of the impact of determinants on the migration attractiveness of EU countries in 2014–2020 by average growth rate, the situation is as follows. In first place was L (linguistic–cultural determinants) (0.707). Note that linguistic–cultural readiness supported by social and demographic readiness also determined the difficulty of adaptation of migrants in the country of their destination as a result of extreme climate events.

In second place was N (ecological-natural determinants) (0.626). To identify the causal links between the ecological–natural type of geo-economic risks and migratory movements, we considered it appropriate to outline the impact of extreme climate events and climate change on the formation of push factors. Extreme climate events have serious consequences, at least in the short term. They affect the economic resources of communities and consequently severely limit the possibility of further living in the territory affected, and of overcoming the consequences of these climate events. For example, natural disasters (climatic, meteorological, geological, and oceanic) have led to significant destruction of territories and infrastructure (transport, telecommunications, social infrastructure, etc.) and housing, as well as the destruction of resources needed to ensure the life and health of a country or region. In general, such consequences pose a physical threat to the life of the population and make it impossible to live in destroyed areas. This can lead to more intensive migration (depending on the scale of the destruction, these movements may be internal or external, i.e., occur within the country or abroad).

In third place was S (social determinants) (0.621). Social readiness for migratory attractiveness is characterized by factors including qualifications, levels of education, competitiveness in the labor market, level of socialization of persons and the presence of strong personal ties, access to sanitation, and clean drinking water.

In fourth place was E (economical determinants) (0.52). Economic readiness for migratory attractiveness is characterized by the level of welfare in the population, the availability of stable earnings and permanent employment, levels of material security in

households, and levels of deprivation. The need to take into account the effects of economic determinants while addressing migration motives has been recognized, particularly levels of inflation and unemployment, increases in consumer lending rates, and increases in the fiscal burden on small business entities. In particular, the action of these determinants has brought to the fore the issue of labor migration to EU countries.

In fifth place in the results analysis was P (political–security determinants) (0.475). Based on the described circumstances of political–security threats in the context of military conflicts, the formulated study objective was specified as follows: (1) delineation of existing military–political and security threats in the world in terms of their connection with the political–security type of geo-economic risk; (2) identification of causal links between military–political conflicts and the migration of refugees and asylum seekers, and description of the current state of such activity (3) establishing the impact of the migration of refugees and asylum seekers on the socio-economic development of their countries of asylum. We conclude that the spread of refugee migration is associated with security risks on the one hand, while it exacerbates many other risks on the other. Certain risks are growing, including economic risks as an influx of refugees is an asymmetric burden on the territory of the asylum country and its infrastructure. Ecological-natural risks may be due to increasing population density and concentration, including refugee settlements (camps), determining an increase in the intensity of exploitation of fresh drinking water sources, environmental pollution, waste generation, and violations of individuals' treatment. Demographic risks arise as the migrant population originates from countries with a high birth rate (due to high fertility rates), which determines significant population growth and changes in its gender and age structure (at least in the refugee settlement area).

This stage of the study confirmed the first hypothesis (H1)—the investment attractiveness of EU countries is influenced by the following determinants: linguistic–cultural, ecological–natural, social, economic, and political–security.

The general indicator of migration attractiveness of EU countries is shown in Figure 3.

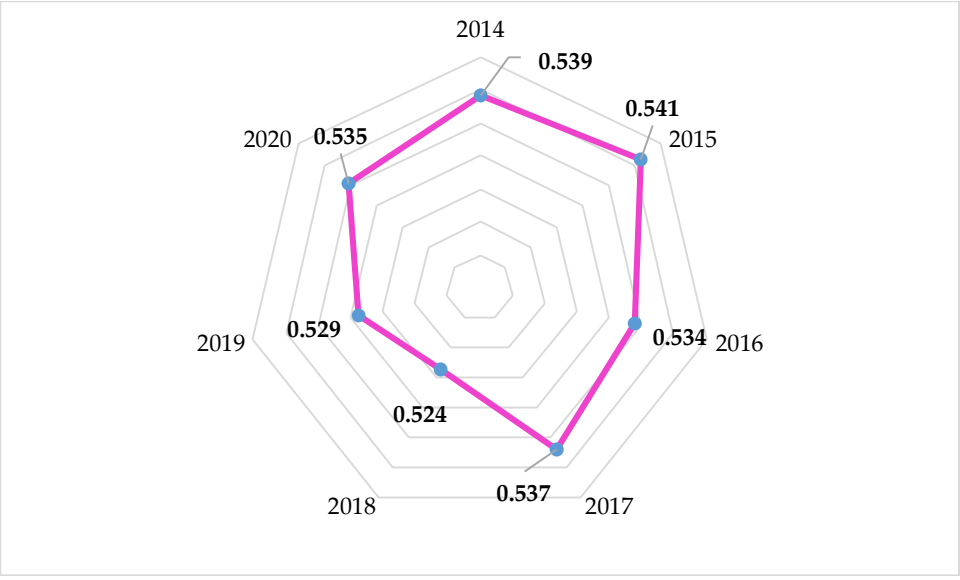



**Figure 3.** Indicator of migration attractiveness of EU countries for 2014–2020. Source: authors' calculations based on data (The World Bank 2018; EPI 2020; DHL 2021; Fund for Peace 2021; The World Bank 2022).

The obtained results indicate the average migration attractiveness of EU countries for the study period. This stage of the study confirmed the second hypothesis (H2)—the indicator of migration attractiveness of EU countries has an average value.

The resulting indicators of migration attractiveness, calculated based on empirical data of EU countries for the study period, were used to build a regression model of their impact on the number of requests for asylum in EU countries during the same period.

Checking the adequacy of the built model, assumptions can be made in general about the relationship between the selected resulting indicator and the migration attractiveness indicator; i.e., the higher the rate of migratory attractiveness, the less the action of "push" factors, and therefore the smaller the number of asylum seekers from the country. Checking the adequacy of the model involved the following sequence of actions.

A matrix of input data was constructed, where the indicators of migration attractiveness of EU countries during 2014–2020 belong to set X, and the indicators of the number of asylum applications submitted by citizens for each year from this period belong to set Y (Table 4).

**Table 4.** Matrix of input data to determine the correlations between migration attractiveness and the number of asylum seekers in the EU during 2014–2020.

| Indicators | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|
| X | 0.54685 | 0.53888 | 0.54192 | 0.53689 | 0.52365 | 0.52859 | 0.53547 |
| Y | 2900 | 3425 | 3280 | 42.900 | 66.850 | 37.755 | 30.750 |

Source: author's calculations.

In particular, based on a small number of observations of variables (seven observations containing indicators for 2014–2020), with the help of a graphical method, a correlation field was built (Figure 4). The X-axis shows the value of the migratory attractiveness factor (Migr attract), and the Y-axis the dependent variable (Migr asyl).

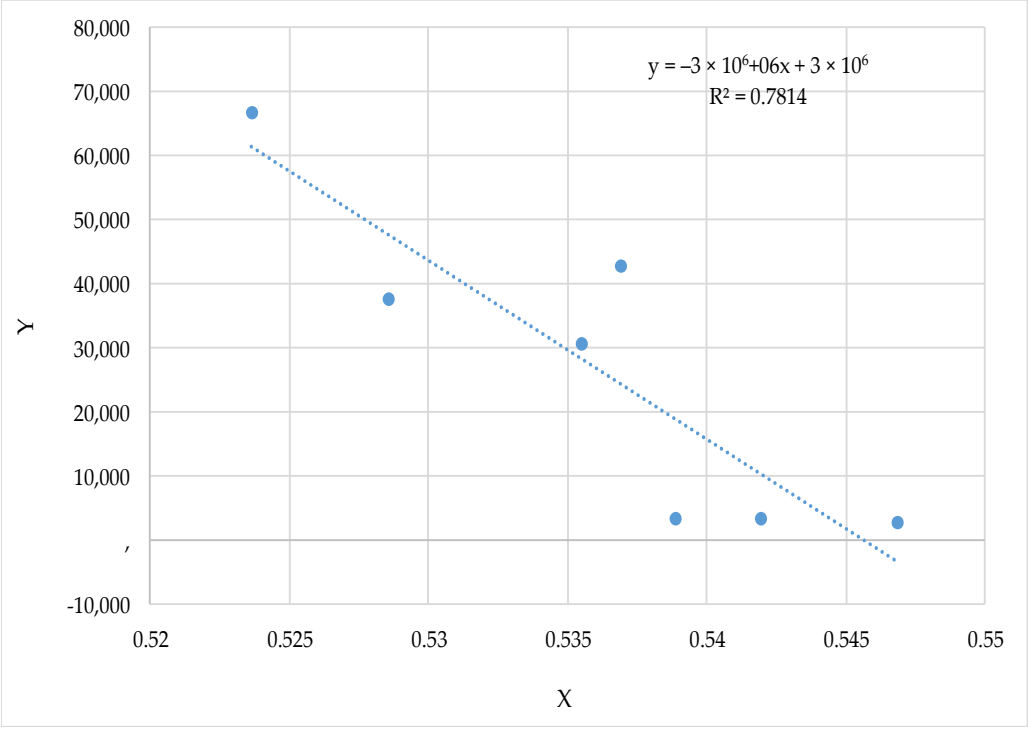



**Figure 4.** Correlation field of indicators of migration attractiveness and the number of asylum seekers in the EU during 2014–2020. Source: authors' calculations.

This made it possible to visually demonstrate the trend of the inverse relationship between the indicators under study, and to formulate a hypothesis about the linear relation-

ship between the indicators of migration attractiveness and the number of asylum seekers from the country, which requires more thorough analytical study.

In addition, to estimate the parameters of the model, we considered it appropriate to use LSM (least squares method), to provide potentially the best estimates of the parameters of the regression equation. Solving the system of equations according to the input data made it possible to obtain empirical values of the regression coefficients: a = 15,209,921,771 and b = −27,713,527,396. In this regard, the regression equation was (Table 5): y = −27,713,527,396x + 15,209,921,771.

**Table 5.** Statistics of regression indicators.

| Indicators (Regression Statistics) | Coefficient | Standard Error | t-Statistics | *p*-Value |
|---|---|---|---|---|
| Const | $1.51646 \times 10^6$ | 403.209 | 3.761 | 0.0131 ** |
| Migr attract (migratory attractiveness) | $2.76296 \times 10^6$ | 747.806 | −3.695 | 0.0141 ** |

Note: ** significance level $\alpha = 0.05$.

Calculation of the sample linear correlation coefficient, which indicates the closeness of the relationship between the studied indicators, made it possible to set its value at −0.857. Evaluation of this result by the Chaddock scale suggested that the closeness of communication is high and inverse, i.e., a larger value of migratory attractiveness is matched by a smaller number of asylum seekers from the country (in most cases). That is, the relationship between the indicators is close and inverse.

This stage of the study confirmed the third hypothesis (H3)—there is a relationship between the indicators of migration attractiveness and the number of asylum seekers in the EU.

In addition, it should be kept in mind that assessing the importance of individual determinants should not only take into account the sum of scores, but also a more complicated approach which involved considering the importance of determinants from a comparative perspective.

According to the results of the analysis, the main geo-economic risks inherent in the selected regional integration associations were identified.

EU: In general, this association was characterized by a high level of development of the economic and institutional environment, reflected in the indicators of logistics (high levels of connectivity and wide transport connections) and human development. However, the EU is characterized by a risk associated with high unemployment, which worsens the situation for the settlement of migrants and exacerbates negative attitudes towards them in society.

ASEAN: Medium risks for economic policy, including mostly high indicators of economic freedom; rather high indicators of spatial risk, leading to further economic risks due to low global connectivity; moderate risks of labor market saturation (fairly high share of the labor force, but with a high unemployment rate); a rather high failure rate of countries, mainly due to latent social and inter-ethnic conflicts, and intensification of criminal activity, including drug trafficking, which increases socio-political tensions and indicates a low level of respect for rights and freedoms.

SAARC: High risks for economic policy. Mostly high risks of an inadequate institutional environment for economic activity; rather high indicators of spatial risk, leading to further economic risks due to low global connectivity; moderate risk of labor market saturation (fairly high share of the labor force, but with a high unemployment rate); a rather high failure rate of countries, mainly due to latent social and inter-ethnic conflicts, intensification of criminal activity, including drug trafficking, which increases socio-political tensions and indicates a low level of respect for rights and freedoms.

ECOWAS: This association was characterized by a high level of poverty, which is related to high socio-demographic risks; high levels of political–security risk associated with military–political conflicts, as evidenced by the highest failure rates; low levels of

economic freedom, and hence high risks of economic policy; high spatial risks due to low levels of logistics development and global connectivity; significant ecological–natural risks, with this association being part of a cluster including a low level of risk of extreme climate events.

SADC: This association was characterized by a high level of poverty, related to high socio-demographic risk; in addition, the high level of political–security risk in some countries brings military and political instability to the region; the level of economic freedom is low, and therefore the risks of economic policy are high; spatial risks are high, in particular a rather low level of logistics development; ecological–natural risks are significant, although, like ECOWAS, SADC is part of a cluster with a low risk of extreme climate events.

EAC: Significant political–security risks related to military conflicts; a large gap in levels of economic freedom indicating asymmetric risks of economic policy; significant ecological–natural risks, in particular low environmental performance against a background of low risk of extreme climate events.

MERCOSUR: Brazil and Argentina have a high risk relating to economic freedom, and there are significant political–security risks in this regional association, including those caused by civil unrest and confrontation, a significant shadow sector, an active drugs trade, and human trafficking.

NAFTA: On average, the risks relating to economic policy are low, but there are significant gaps in the indicators of economic freedom between countries; high levels of ecological–natural risk, mainly due to the risks of natural disasters and catastrophes, which determine not only the dynamics of external but also internal migration in North America; other risk indicators are quite low due to the high level of development of the institutional environment, which is also typical of the EU; political–security risks are minimal (except Mexico).

## 5. Discussion

The study of scientific works on the determinants of migration revealed that the correlation between the dynamics of migration flows and macroeconomic indicators (such as inflation, unemployment, real wages, etc.) has often been considered (Gröschl and Steinwachs 2017). However, despite the patterns of growth of emigration flows against the background of deteriorating macroeconomic indicators, as revealed by scientists and researchers, we believe that it is the wrong approach to aggregate migration factors and derive such patterns exclusively at the macro level, without taking into account perceptions of these factors.

We base our opinion on the fact that migration flows are formed by specific individuals who have decided on the appropriateness or need for migration, guided by their subjective perceptions of the effect of numerous economic and non-economic factors, which may be measurable or non-measurable, and the same effects of environmental factors (economic, social, political, cultural, linguistic, ethnic, etc.) are differently perceived by these individuals (Kim 2018).

Therefore, it is impossible to abstract the effect of these factors based only on the personal assessment of those individuals (Abel and Cohen 2019). In this regard, we consider it appropriate to determine non-correlated patterns of dependence of migration flows on macroeconomic indicators, by aggregating individual assessments of the importance of separate determinants for the formation of migration motives. We used this approach as the basis for determining the weighting coefficients provided for in a substantiated economic–mathematical model.

Thus, the determinants of the formation of migration motives determined by us from the total population indicated the predominant influence of economic and political–security determinants (respectively, determinants five and three were predominant among the above categories). In this regard, attention should be paid to the exceptional importance of monitoring the dynamics of the corresponding indicators, to support the process of operational forecasting of emigration flows and planning for risks of their intensification.

According to the conducted study, it was found that the decisions of individuals to migrate, in addition to economic determinants, have been significantly influenced by political–security concerns. Therefore, it is inappropriate to evaluate only the correlation between migration flows and changes in macroeconomic indicators, as the formation of migration motives is subjective and occurs at the personal level. This allows us to evaluate only the general impact of external factors on the formation of an environment favorable to the emergence of migratory motives. Meanwhile, analysis should be conducted concerning regional, age, and gender factors to identify potentially dangerous intensities of factor effects (determinants) for certain groups of human resources, in the context of reasonable coverage of human resources by different types of migration (Carling and Schewel 2018).

The aggregate of numerous environmental factors and the intensity of their effects constitute the aggregate of geo-economic risks that are inherent in each country due to the peculiarities of its economic, demographic, environmental, political, cultural, and institutional environment (Beine et al. 2019). We believe that the increase in geo-economic risks across the world has been a consequence of increasing economic and social imbalances, environmental problems and challenges, and the exacerbation of geopolitical problems.

At the same time, the development of transport connections and telecommunications, as well as the liberalization of cross-border movement of persons, has created the preconditions for the global movement of human resources and redistribution of their potential (Wesselbaum and Aburn 2019).

The proposed mechanism for the evaluation of countries' geo-economic risks is adaptable for conducting international comparative analysis, as it allows any statistically measurable data that can be parameterized to be taken into account. The use of official indices and ratings will ensure the comparability of country indicators.

Analysis of the variation of the studied indicators in the countries within separate regional associations showe significant differences in the development of entrepreneurial activity and production capacity in the countries within associations that generate new employment, as well as levels of social, environmental, and other threats (Chamie 2020). At the same time, intra-regional differences provoke migration, because regional unemployment rates, levels of human development, and the security of living conditions also vary (Kutor et al. 2021).

Other authors' models of migration attractiveness of EU countries for the study period of 2014–2020 were considered.

Vasyltsiv et al. (2020) constructed a regression model for the contribution of domestic economic factors to the number of immigrants to Poland from Ukraine. After determining multicollearity, the main stimulating factor was identified—the level of wages (Vasyltsiv et al. 2020). With an increase in the average salary in Poland by 1 thousand zlotys, the number of immigrants from Ukraine to Poland increased by 2.26 thousand persons (Vasyltsiv et al. 2020).

Other authors (Bombiak and Marciniuk-Kluska 2018) have claimed that knowledge of a foreign language was considered important for successful communication in the working environment, by 46.99% of respondents from a group of experienced migrants and 64.55% of respondents who had less experience in labor migration abroad. In terms of communication experience with foreigners, language problems were cited by 15.66% of respondents from the group of experienced migrants and 27.38% of those respondents who had never worked abroad (Bombiak and Marciniuk-Kluska 2018).

In that study, the authors considered a statistical analysis of structural changes in remittances of Slovak wage-earners from abroad. With the help of correlation analysis, the built model allowed analysis of the connections, nature, and dynamics of structural changes in cash flows and numbers of labor migrants. The results of the conducted correlation analysis showed that the volume of remittances to Slovakia had significant connections with several factors, including a common border (correlation coefficient + 0.705 at the significance level of 0.01), language remoteness (correlation coefficient + 0.670 at

the significance level of 0.01), and GDP per capita (correlation coefficient + 0.541 at the significance level of 0.01).

It should be noted that it is the integrated assessment of the migration attractiveness of EU countries that allows groups of factors to be taken into account when providing an assessment in general. If the focus is only on certain factors (economic, social, political, etc.), it significantly narrows the recommendations for improving the migration policy of a country.

For example, this form of assessment can help to choose the appropriate migration policy for EU countries. For example, in 2022, the European Union took a big step toward adopting the Pact on Migration and Asylum. After 21 months of negotiations, EU interior ministers at a meeting in Luxembourg finally reached a "political agreement" on the most difficult issues,. It was decided to cancel mandatory quotas for the resettlement of people from the countries in which they first arrive, but it remains mandatory to show solidarity with EU members who need support.

Taking into account the level of geo-economic risks allows explanation of the patterns of formation of migratory pairs. Regulated development and support of migration contribute to the redistribution of labor within a region, promote the efficient use of labor resources, and reduce the burden on the labor market, while household income growth contributes to overcoming poverty in a region.

In this regard, for the purposes of study, it is also advisable to structure countries according to the actual indicators of their use of migratory human resources, to characterize the state of involvement of countries in international migration processes. This will also help clarify the vectors of interests for countries within regional integration associations, during the processes of international migration of human resources.

## 6. Conclusions

Analysis of the variation of the studied indicators in the countries of separate regional associations showed significant differences in the development of entrepreneurial activity and production capacity, demographic situations, economic growth, etc. It was found that intra-regional differences provoke migration, as unemployment rates within regions also vary, as do levels of human development and security of living conditions.

The authors' suggestions have theoretical and practical results; the theoretical results are considered first.

According to the results of the study of approaches to the parameterization of migration attractiveness, a tool is proposed for identifying the relationship between international migration of human resources and geo-economic risks. This is presented through the integrated indicator of migration attractiveness, proposed to be calculated as the weighted average of synthetic indicators aggregated by groups of normalized economic, socio-demographic, political–security, linguistic–cultural, and environmental–natural indicators that demonstrate the determinants of the formation of migration motives. The proposed method allows comparative cross-border analysis of migration flows based on countries' levels of migration attractiveness and the impact of certain groups of factors on migration motives.

To ensure its practical application, an information base for calculating each determinant was formed, based on which the model was built. To take into account the personal importance of certain determinants identified in the study, weighting coefficients were introduced into the model, the values of which were expediently determined by applying a questionnaire method. In particular, based on the scoring of the importance of determinants for the formation of personal migration motives, aggregate weighting coefficients were formed for their introduction into the calculation model. The substantiated and developed model is adaptable from the point of view of possibly expanding the panel of indicators, and also the selection of bases for calculation of weighting coefficients. It can be applied to determine the migratory attractiveness of countries for certain gender–age and educational–

professional groups of migrants, and the use of the survey method allows separation of these groups into samples using other indicators for selection.

Turning to the practical results, taking into account levels of geo-economic risk allows patterns of formation of migration pairs to be considered. Regulated development and support of migration processes can contribute to the redistribution of labor in a region, including the efficient use of labor, reducing the burden on the labor market, helping to increase household income and overcome poverty in the region.

The study has the following limitations. Firstly, the calculation of indicators according to the model covered the period of 2014–2020. To confirm or reject the obtained results, it is necessary to increase the study period. Secondly, the initial data for the authors' calculations were the indicators provided by various international organizations, which had certain shortcomings in their methodologies, and a synergistic effect is additionally possible when duplicating the shortcomings of various methodologies. In further studies, it will possible to apply methods that allow levelling of this problem. Thirdly, a regression model was used. The main disadvantage of linear regression is that it can model only direct linear relationships, while it is often necessary to create models of other types of relationships between data. Fortunately, there are simple methods to display data without linear dependence, with the help of linear regression. The first method is the conversion of the initial data. In practice, instead of using original variables to create a model, it is often necessary to use various transformations, such as dEPIning the logarithm of values, or exponentiation. Even if there is no direct linear relationship between values, one can exist between the logarithms of those values. In this case, a model will show that if the dependent variable is increased by 1 %, the target variable will increase by X%. Another method involves the inclusion of squared terms within the model. For this purpose, the values are squared and added to the equation as an additional variable. Another data-transformation technology involves taking into account the interactions of predictors when the original variables are considered in combination.

In future, the obtained results will allow us to develop strategies for assessing and controlling the migration attractiveness of countries and regions, with specific recommendations by groups of factors; economic, socio-demographic, political–security, language–cultural, and ecological–natural. To improve the quality of the built model, we plan to take measures to overcome the limitations of this study, especially to increase the period of analysis of empirical indicators.

**Author Contributions:** Conceptualization, B.L. and I.T.; methodology, O.S.; software, T.V.; validation, I.T. and A.V.; formal analysis, I.T.; investigation, O.S.; resources, T.V.; data curation, A.V.; writing—original draft preparation, O.S.; writing—review and editing, I.T.; visualization, T.V.; supervision, B.L.; project administration, B.L.; funding acquisition, A.V. All authors have read and agreed to the published version of the manuscript.

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