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AN APPROACH TO MODELLING THE IMPACT OF INTERNATIONAL MIGRATION ON THE ECONOMY OF RECEIVING COUNTRY

Abstract. Being an objective element of the global economic system, international migration produces a significant impact on the performance of individual countries nowadays. The economic impact of international migration is driven by various factors, primarily the type of international migration (labour migration, refugee migration, family migration, or student migration) and the legislation of a receiving country which determines the ability of international migrants to interact with the host country's economy and to produce the respective impact. The hypothesis of this study builds on the premise that legislation of the receiving country determines the "capabilities of migrants", that is a set of actions that can be performed by an international migrant on the territory of receiving country, the consequences of which will produce an impact on the economy of receiving country. We identified the following capabilities: the ability to enter and stay in the country; the ability to be employed; the ability to obtain social protection, education and citizenship; the ability to own and dispose of property. Capabilities are not firmly attached to particular types of international migration. For example, the capability to be employed is associated with such types of migrants as labour migrants, refugees, family and other migrants, depending on the country. The influence of international migrants on the economy of receiving country is determined not by the type of migration, but by the combination of actual capabilities that correspond to certain types of migration. We found five combinations of migrants' capabilities that determine four types of economic relationships between the migrants and the receiving country's economy. Each type of economic interaction produces a different effect on the economy of receiving country and can be changed by means of expanding or constraining certain capabilities of migrants, which requires that respective amendments be introduced in the legislation of the receiving country. The scientific appropriateness of our approach to modelling the impact of international migration on the economy of receiving country is based on the analysis of the global legal framework for purposes of identifying the rights that ensure the respective capabilities of migrants, as well as on the application of SNA-2008 principles to modelling the impact of international migration on the economy of receiving country. In this study, we used the method of analysis to single out the rights that ensure the migrant's capabilities; the method of generalization to reveal attributes, based on which separate rights could be matched with respective capabilities; the method of explanation to describe the notions of "migrant's capabilities" and "type of economic interaction"; the method of classification to separate specific types of economic interaction; and the method of modelling to describe the relationship between the legislation of the receiving country, the migrants' capabilities, the types of international migrants, and the impact of such migrants on the economy of receiving country.

Key words: Impact on the economy, international migration, legislation, migrant's capabilities, modelling.

Introduction.

In result of globalization, international migration has become an inseparable element of economic systems in many countries. The influence of international migration is ambivalent and can strongly differ across countries. In this study, we focused on studying the influence of international migration exclusively on the receiving country. Separate studies suggest that international migration generates negative effects in some countries, whereas other investigations unambiguously prove that international migration is important for stable economic development in other countries.

The ambivalence of assessing the impact of international migration on the economy of a country is caused by many factors. In our opinion, the most important of them are the type of international migration (labour migration, refugee migration, family migration, etc.) and the respective legal rights which are associated with it. The rights determine the ability of migrants to interact with the economy of receiving country. In this work, we introduce the notion of "migrant's capabilities", which we understand as a set of actions defined by international and national legislation that an international migrant can perform on the territory of receiving country and that will bear consequences for the economy of receiving country.

This notion is important in the context of the suggested approach to modelling the impact of international migration on the economy of receiving country because it allows us to establish a functional relationship between the migration law of the receiving country and the impact of international migrants on the economy of such a country.

We define such capabilities as the ability to enter and reside, to be employed, to obtain social security, education and citizenship, and the ability to own and dispose of property. It is important to note that the aforementioned capabilities are not firmly attached to certain types of migration. The expansion of rights for certain types of migrants leads to them obtaining respective capabilities and vice versa. For example, the capability of employment is there not only for labour migrants, but also for refugees, international students, and other types of migrants.

The combinations of migrant capabilities determine the type of interaction between the migrants and the economy of receiving country. We identified five combinations of migrant's capabilities that correspond to four types of economic interaction.

At the final stage of the theoretical part of this study, we developed a model for the impact of international migration on the economy of receiving country. The developed model allows us to estimate the impact of international migration taking into account the types of migration, as well as the legislation and economic conditions in the receiving country.

In accordance with the developed model, we calculated the impact of international migration on the economy of Germany in 2017. Germany was selected for this study because it is the country which hosts different types of migrants, and moreover, sufficient statistical data are available for this country in open-access format.

The results of our calculations revealed that the overall gain for the German economy from economic interaction with international migrants amounted to €51.3 bn or 0.62 % of its GDP in 2017. Illegal migrants produced a negative impact on the euro. The refugees and asylum seekers who received subsistence benefits funded by the German state budget did not produce a negative impact. Other types of migrants generated only positive impacts.

Literature review

The influence of international migration on the economy of receiving country has become subject of many studies. The proposed notion of "migrants' capabilities" was used (as a phrase) in separate articles to explain the migrants' interaction with economic, social and political systems of the receiving countries. In the research performed by Tysland (2016), the focus is made on the rights of labour migrants and the capabilities that arise from such rights. The mentioned work concentrates on the ability of migrants to interact with institutions in India, in particular judicial institutions. The migrant's capability is interpreted here as a set of respective rights granted to a migrant, which can change in line with the migrant's legal status and

her involvement in the labour market. Mauru (2017) focused her research on the legal status of migrants as the main factor which affects their ability to stay and be employed in the receiving country. At that, the author analyzes other studies and highlights the ideas of other authors, which is also important in the context of our research. In particular, the researchers of critical migration believe that it is only due to existence of borders that we can speak of international migration; otherwise, only internal mobility could have been possible (Tazzioli, 2015; De Genova, 2013). Therefore, international migration is a process that can and should be regulated (Tazzioli, 2015). The existence of borders creates an opportunity for the existence of heterogeneity in migration flows which is brought in by differences in legislation. However, the differences in legislation are produced by different factors, such as economic conditions in the receiving country, geographical location, as well as social, political and cultural factors. Legislation in this case stands in as an instrument for regulation of international migration.

Having performed an extensive review of the early 1950s' migration theories, de Haas (2010) acknowledged the ambivalence of international migration effects for the economies of participating countries. Ichino (1993) admitted that no clear conclusion could be drawn about the influence of migration on the economy of receiving country. Blanchflower, Seleheen and Shadforht (2007) carried out a review of numerous studies concerning the effects of migration on the labour market as a part of their research on the effects of migration from Eastern Europe to Great Britain. Their review showed that the relationship between the number of migrants and the wages of local employees could significantly vary depending on the country. In particular, a 10 % increase in the number of migrants in the USA induced a 1 % decrease in the wages of local workers (Friedberg and Hunt, 1995). A study carried out by Cortes (2006) indicated that if the number of migrants increased by 10 %, the wages of local workers decreased by 0.6 %, whereas wages of the migrants decreased by 8 %. The author also notes that although migration produces benefits for the economy of the USA, it also leads to redistribution of wealth, a decrease in the wages of low-skilled

employees and an increase in the wages of high-skilled employees. The research performed in Germany over the period from 1991 to 2005 showed that an increase in the number of labour migrants by 10 % was accompanied by an increase in unemployment among local population by 1.5 %. At the same time, as the number of foreign employees increased by 10 %, the wages of local medium-skilled employees were observed to increase by 0.2 %, whereas wages of local high-skilled employees increased by 1.3 % (Munz, Straubhaar, Vadean and Vadean, 2006).

The research on the relationship between the number of migrants and the GDP of the receiving country testifies to positive effects of migration. In particular, the World Bank Group notes that a 10 % increase in the number of low-skilled labour migrants in Malasia contributed to a 1.1 % increase in the real GDP of the country (Djalal and Pontes, 2017, October 9). A 1 %-increase in net migration increases the rate of GDP growth by 0.1 % (Borjas, 1995).

The growing number of migrants also produces a positive effect on the bilateral trade between the countries involved in the migration process. Thus, a 10 %-increase in the number of immigrants in the USA increases its exports to the respective countries of origin by 4.7 %, whereas its imports from these countries increase by 8.3 % (Nairn, 2002).

The existing models and methods that can be used to calculate the influence of migration on the economy of receiving country were considered in the research carried out by Boubtane, Coulibaly and Rault (2013). The authors admit the complexity of their development due to availability of cross-dependencies among numerous variables that should be factored in when constructing and using such models and methods. The models and methods that were considered by the authors are based on determining the relationship between the net inflow of migration and the level of unemployment, and the respective linkages between the level of unemployment and the GDP and income levels in the receiving country. In their research on migration, Ortega and Peri (2005) focused on migration flows and established a causal relationship between the differences in the levels of GDP based on PPP valuation observed in the receiving and sending countries and the number of migrants. The authors acknowledged that

legislation of the receiving country played a significant role in this respect. Imposing constraints on the right to enter the country has led to a considerable decrease in the number of migrants in such a country and vice versa.

The aim of the article is to develop an approach to modelling the economic processes which arise in the receiving country taking into account the types of international migration.

Methodological approach

In this study, we used the method of analysis to single out the rights that define the capabilities of migrants; the method of generalization to identify the attributes based on which certain rights can be matched with respective capabilities; the method of explanation to describe the notion of "migrant's capabilities" and "type of economic interaction"; the method of classification to single out specific types of economic interaction; the

method of modelling to explain the relationship between the legislation of the receiving country, the capabilities of migrants, the types of international migrants, and the impact of such migrants on the economy of receiving country.

Main findings

The International Organization for Migration, in its *Glossary on Migration* (2011), defines migration as "the movement of a person or a group of persons, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification."

The *World Migration Report 2000 (IOM 2000)* generally classifies international migration into voluntary and involuntary migration, as well as specifies its separate subtypes as shown in Table 1.

Table 1

Classification of migration and types of migrants

Voluntary migration	Involuntary migration	Mixed migration
1	2	3
Labour migrants Family migrants Foreign students	Refugees Asylum seekers Displaced persons	Illegal migrants

Source: developed by the authors based on data the World Migration Report (2000)

The aforementioned classification of international migrants is generally acceptable since it is used in international agreements that determine the rights of migrants. In this work, we consider only those rights that determine the ability of migrants to affect the development of the receiving country's economy.

Under the notion of "migrant's capabilities" we understand a set of actions defined by international and national legislation, which can be performed by a migrant on the territory of the receiving country and which will bear consequences for the economy of the receiving country. For example, Article 23(1) of the Universal Declaration of Human Rights (1948) reads that "everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against

unemployment". This right means that migrants also have the capability to be employed, as there is no indication that such employment should take place exclusively in the country of origin.

However, we have to understand that in the modern legal practice the states are primarily committed to guarantee a full set of rights to their citizens. Certain restrictions can apply to non-citizens. Article 22 of The Universal Declaration of Human Rights (1948) reads: "Everyone, as a member of society, has the right to social security <...> in accordance with the organization and resources of each State". Article 2(3) of the *International Covenant on Economic, Social and Cultural Rights* (1966) establishes the right of the developing countries to determine by themselves to what extent they would guarantee the individual rights to non-nationals. Therefore, international

migrants can be granted the same rights, and thus, the same capabilities as do the nationals of the state. However, different countries can limit such rights in different ways, thus determining the migrant's way of interaction with the economy of such a country.

In their turn, the universally applicable international agreements within the UN framework clearly define the rights and the respective capabilities which can be granted to migrants and which lay the foundation for migrants' interaction with the economy of receiving country depending on the type of migration.

Taking into account the principle of the rule of law, the study considers only the universally applicable international treaties and some specific agreements regarding separate types of international migration.

The first and the main agreement in the sphere of human rights is the Universal Declaration of Human Rights (UN General Assembly, 1948), which affirms the fundamental rights of individuals that equally apply to migrants in their host countries. The Universal Declaration of Human Rights determines that each individual has the right to move freely and choose the country of residence (Article 13); to work (Article 23); to obtain social security (Article 22); to own and dispose of property (Article 17), etc. It should be separately noted that involuntary migrants have the right to enter the country in accordance with Article 14(1), which specifies the right of each individual to "seek and to enjoy in other countries asylum from persecution".

Another important agreement is the *International Covenant on Economic, Social and Cultural Rights (1966)*. This agreement defines the rights of individuals to obtain work, social protection and education, and separately covers the protection and support for families and mothers.

The following international agreements deal with specific types of international migration.

The legal status of refugees is defined by the *Convention and Protocol Relating to the Status of Refugees* (1951). This Convention was ratified by 145 countries. In accordance with this international agreement, refugees can be granted the right to enter and stay, to be employed, to obtain social protection, and to have access to education. This agreement also establishes conditions for recognition of the refugee status and acceptance of refugees, asylum-seekers and displaced persons.

A showcase agreement in the field of asylum-seekers' rights is the *Reception Standards for Asylum Seekers in the European Union* (2000). This agreement indicates that "The expression 'reception standards' refers to a set of measures related to the treatment of asylum seekers <...>. These measures range from adequate reception conditions upon arrival at the border, access to legal counselling, freedom of movement, accommodation, and adequate means of subsistence to access to education, medical care and employment. Special arrangements are necessary to cover the specific needs of children, women and elderly asylum seekers. States have a broad discretion to choose what forms and kinds of support they will offer to asylum seekers. These may range from 'in kind' support, such as accommodation, food and health care, to financial payment or work permits to allow self-sufficiency".

The international agreement which defines the legal status of labour migrants is the *International Convention on the Protection of the Rights of All Migrant Workers* (1990). The Convention specifies a list of persons defined as migrant workers, as well as their rights in the receiving country. In particular, it establishes the right to obtain social protection, to have access to education and healthcare, the right to own and dispose of property including the right to transfer it to their country of origin. An important element of this international agreement is the protection and support of families in the context of international labour migration. Thus, this Convention defines the capacity of the states to create necessary conditions for reunification of the families of migrant workers, thus enabling a respective type of voluntary migration.

As for migration of the family members of refugees and asylum-seekers, a rather clear and extensive description of this process is provided in the *International Agreement on Family Reunification in the Context of Resettlement and Integration* (2001). This document defines the notion of "family" and puts forward general recommendations for the states with respect to the process of family reunification. The document also lists the advantages, including economic ones, which the receiving country obtains as a consequence of introducing and expanding the

process of family reunification. From an economic standpoint, it is important that the receiving countries are assigned an obligation to cover the specific costs related to providing temporary assistance to refugees and their families and the costs of providing the programs and procedures of family reunification for refugees and asylum seekers.

What concerns student migration, we can refer to the above-mentioned agreements that ensure the right of migrants to obtain education. Nevertheless, separate attention should be paid to student mobility programs, which are introduced by separate universities, organizations or governments and provide an opportunity for foreigners to obtain education abroad. It is worth pointing out that there are several terms that define different groups of international students: "Internationally mobile students" (UNESCO, n.d.), "foreign students" and "credit-mobile students"

(Migration Data Portal, n.d). In this study, we understand "foreign students" as defined in *Migration Data Portal* (2018). An extensive review of student migration and its legal status was made by Beine, Noël and Ragot (2014).

What concerns illegal migration, it is obvious that such migrants cannot be granted the rights to social protection and education, as well as the right to own and dispose of property in view of the illegality of stay on the territory of the receiving country.

Having performed the analysis of international agreements, we singled out six capabilities of migrants (P_i) that determine the ways in which migrants interact with the economy of receiving country. Table 2 shows a list of these capabilities and a description of their relationship with the effects of international migration on the economy of receiving country.

Table 2

Capabilities of migrants and description of their impact on the economy of receiving country

No.	Capabilities of migrants (P_i)	Description of the impact on the economy of receiving country
1	2	3
1	The capability to enter and stay (P_1)	The capability of entry and stay includes the right to enter and stay that arises when a migrant concludes an employment contract, reunites with her family, obtains asylum, or participates in international mobility programs. This leads to an increase in consumption.
2	The capability to be employed (P_2)	The capability of being employed means that migrants support their own consumption. The state benefits from increased inflow of taxes and social contributions into the state budget. Along with that, public expenditures related to social protection of the employed migrants might increase. In addition, economic benefits arise for owners of capital in the process of distributing the value added which was created with the help of migrant labour. The negative effect for the receiving country consists in the outflow of funds through personal remittances of migrants.
3	The capability to obtain social protection (P_3)	The ability to obtain social protection in full arises when the person becomes officially employed and pays her social contributions. Involuntary migrants can obtain public benefits without paying social contributions. For the receiving country, ensuring social protection means that public spending increases, especially in the case of involuntary migrants.
4	The capability to own and dispose of valuable property (P_4)	The ability to own and dispose of cash and non-cash property means that a migrant can own private property on the territory of receiving country, hold current and savings accounts at a bank, and participate in the share capital, which discourages an outflow of money (personal remittances) from the country and correspondingly stimulates its consumption and investment (savings) in the receiving country.
5	The capability to obtain education (P_5)	The ability of a migrant to obtain education leads to an increase in her consumption in the receiving country due to an increase in her education expenditures. Concurrently, living expenses (housing, food, transport, telecommunication services, etc.) increase in case the migrant has not previously resided on the territory of the receiving country. If student migration happens due to family reunification or labour migration, then the volume of personal remittances decreases.
6	The capability to obtain citizenship (P_6)	This capability means that a migrant gradually breaks her ties with the country of origin, which leads to a decrease in remittances and an increase in consumption and savings.

Source: developed by the authors

**The interaction between the migrants
and the economy of receiving country:
Its types and formalization**

Irrespective of the type of migration, the presence of migrants in the receiving country leads to increased consumption within the economy, which is induced by the fact that migrants have to satisfy their basic needs in food, housing, telecommunication services, transport, etc. Therefore, international migration, irrespective of its type, produces a positive impact on the economy of receiving country by increasing basic consumption (C_m), which is related to satisfying the primary needs of migrants.

Before we can proceed with describing the impact of migration on the economy of receiving country, it is important to answer the following question: At whose cost this increase in consumption will be achieved?

Involuntary migrants are entitled to social protection from the government to support their minimum subsistence level of living. That is, an increase in consumption of involuntary migrants who receive public benefits occurs thanks to redistribution of the state budget in favour of such migrants. In other words, the receiving country's gains from an increase in basic consumption (C_m) are offset by an increase in public expenditures (G_e), i.e. the funds are redistributed without any value added being created. The potential benefit of the receiving country in this case can be generated if the multiplication effect from such consumption appears to be larger than in the case if the funds were used to other purpose. An important circumstance here is that any assistance granted to migrants – whether in kind or in cash – will be consumed for the benefit of national producers in the receiving country.

In the case of voluntary migration, migrants have to support their consumption with their own funds, which means that either (a) the migrant's subsistence costs are covered by the third party or (b) the migrant is employed.

If the migrant's subsistence costs are covered by the third party, then, in order to determine the impact on the economy of receiving country, it is important to answer the following question: Is this third party a resident of the receiving country or not? If the third party is the resident of the

receiving country, the economic benefit of the receiving country is negated due to redistribution of funds within the country's economy. For example, a nominal organization specializing in student exchange programs awards a grant for education to a student from a foreign country. Thus, the money received by the migrant student will be spent on consumption inside the receiving country, but the benefit from consumption obtained by the receiving country is negated as such consumption expenditure is incurred by the resident. Therefore, if the migrant's subsistence costs are financed by a third party, the receiving country's economy either obtains a benefit from basic consumption and additional consumption (C_m + C_a) if this consumption expenditure is covered by a non-resident, or does not receive any benefits if this consumption expenditure is covered by a resident.

By "additional consumption" (C_a) we mean expenses, which are not related to ensuring the migrant's minimum subsistence level of living, such as expenses on education, textbooks, travel, purchases of electronic appliances, etc.

We would like to note that, irrespective of the fact that family migration is considered as a separate type of migration, such migrants interact with the economy of receiving country as labour migrants or migrant students supported by a third party. The procedure for family reunification is in fact an opportunity for such migrants to enter and reside in the country.

The most complicated and the most ambivalent task is to assess the impact of the employed migrants on the economy of receiving country.

We would like to separately mention that the possibility of employment in different countries is available for both the involuntary migrants and the education migrants. We would like to emphasize that it is not only the labour migrants who can be employed.

The fact of employment means that a migrant is involved in the process of value added creation, which will further be distributed between the owners of capital (benefit of the capital owners), the state (government revenue derived from taxes), and finally, the migrants (income of a migrant worker). However, the influence of the employed migrants on the economy of receiving

country is not limited to this. In our opinion, when determining the impact of such migrants, the most important question is: Where and how the migrant's income will be used? Let us assume that the migrant's income, excluding basic consumption (C_m), is deemed to represent savings of the migrant (S_d) up until the moment when the migrant decides to spend them. This relationship can be formalized as:

$$Y = C_m + S_d \qquad (1)$$

where Y is the migrant's income (after tax and social contributions, etc.); S_d is the migrant's savings, which can later be sent to the country of origin or spent in the receiving country.

The aim of the migrant, in our opinion, is to increase her own welfare. From the standpoint of welfare maximization, the available public goods, the opportunities for employment, career development and personal growth, the political order, the level of civil society development, and other factors increase the attractiveness (A) of a country for the migrant. A detailed list of such goods and factors and principles of their choice are described in the *Push and Pull Migration Theory* (Stanojoska, Angelina & Petrevski, Blagojce, 2012).

Thus, the attractiveness of sending (A_O) and receiving (A_H) countries is assessed by migrants in terms of their personal welfare maximization. In result of country attractiveness assessment, the migrant determines where and how her income will be spent.

It is important to note that the receiving country cannot significantly influence upon the majority of mentioned factors in the short-term perspective. However, ensuring favourable legislative environment, which enables migrants to use available goods, can quickly increase the country's short-term attractiveness.

Hence, the receiving country can stimulate migrants to spend their income within its borders under the condition that it expands the existing rights and grants new rights to migrants, i.e. if it expands the migrants' capabilities, thus increasing the attractiveness of the receiving country (A_H).

Given that $A_H > A_O$, the migrant maximizes her welfare in the receiving country, which induces her to concentrate her economic interests within this country. In this case, her deemed savings (S_d) can remain in the receiving country in full or in part, i.e. be shared between the receiving country and the country of origin.

The deemed savings that were not remitted to the migrant's home country can be spent by the migrant on additional consumption (C_a) in the receiving country or remain unused as savings. Such savings can be recorded in the national accounts of the receiving country in case the migrant is considered a resident in accordance with SNA-2008 (World Bank, 2009). As a result, the migrant's income will be divided into four components, and Formula 1 will be written as:

$$Y = C_m + C_a + S + R \qquad (2)$$

where *Ca* is the migrant's additional consumption if $A_H > A_O$; S is the part of migrant's savings that were not remitted to the country of origin if $A_H > A_O$; R is the part of migrant's savings that were remitted to the country of origin (remittances).

Thence, the following relationships hold:

$$\begin{cases} 0 \leq C_a; S; R \leq S_d \\ C_a + S + R = S_d \end{cases} \qquad (3)$$

Having taken into account the Keynesian equality I=S (Keynes, 1936), Formula 2 takes the form:

$$Y = C_m + C_a + I + R \qquad (4)$$

where I is investments received by the country if $A_H > A_O$.

Therefore, in addition to government revenue, the benefit of capital owners and basic consumption, the receiving country derives an economic benefit from increased additional consumption and investments ($C_a + I$); whereas the volume of personal remittances (R), which are an expense for the economy, decreases.

As for personal remittances, it is not possible to univocally treat the total amount of factual remittances as expenses of the receiving country. In order to understand at whose expense is it that a migrant earns her income, a part of which is remitted to the country of origin, we have to answer the following question: Who is the consumer of the goods and services that were produced by the migrants in the receiving country? If, for example, the good was produced in the receiving country with the help of migrant labour and later exported to a third country, then the value of the migrant's labour embedded in the value of

this good is actually remunerated by the third country, whereas the receiving country redistributes the incoming funds. If the good was produced and consumed in the receiving country, then the part of the good's value representing the cost of migrant labour can be treated as "imports" of labour into the receiving country, and thence, personal remittances represent an expense for the economy of the receiving country. Nevertheless, it is complicated to determine which of the products that have been produced in the receiving country, were later consumed in the receiving country and which were exported to third countries. That is why personal remittances cannot be fully treated as expenses of the receiving country.

Taking into account the aforementioned dependencies, the economic benefit of the receiving country arising from economic interaction with the employed migrants (Y_{mig}) can be written as a sum of the following elements:

$$Y_{mig} = C_m + C_a + (G_r - G_e) + I - R \qquad (5)$$

where G_r is government revenue in the receiving country (taxes, social contributions, etc. paid by migrants); G_e is government expenditure in the receiving country (social protection of migrants, etc.).

This equation can also be used to explain the economic relationship between other types of migration and the receiving countries taking into account the following remarks and constraints:

1. The weight of each element of migrant's expenses (C_m; C_a; G_r; G_e; I; R) in relation to total amount of expenses ($\sum(C_m$; C_a; G_r; G_e; I; R)) varies depending on the type of migration and the migrant's capabilities (P_i).

2. The benefit arising from consumption ($C_m + C_a$) for all types of migration is adjusted taking into account the coefficient of propensity to import because some of the consumed goods can be imported.

3. Wages obtained by migrants from participation in production of goods and services that are further exported to third countries are assumed to be obtained from the third countries. Thus, personal remittances cannot be fully treated as expenses of the receiving country.

4. For all involuntary migrants, which are not employed and receive public benefits from the

receiving country, the equation takes the form $Y_{mig} = 0$, since public funds are redistributed from the state budget to migrants without creating any value added.

5. For voluntary migrants, whose subsistence costs are covered by a third party, the equation takes the form $Y_{mig} = 0$ if the migrant's subsistence is funded by a resident of the receiving country, and $Y_{mig} = C_m + C_a$ if the migrant's subsistence is funded by a non-resident of the receiving country.

6. In the case of illegal migration, the government does not collect revenue arising from migrants' taxes ($G_r=0$), but it might incur expenses on measures against illegal migration ($G_e \geq 0$); additional investments are not available ($I_a=0$) since migrants cannot interact with the financial system, cannot own property, etc; the volume of additional consumption (C_a) is defined by the needs and personal decisions of such migrants and does not depend on migrants' capabilities (P_i); the volume of personal remittances (R) converges to maximum.

The total economic benefit of the receiving country (Y_t), except for the benefit arising from interaction with migrants (Y_{mig}), includes also the profits of the owners of capital (Y_c). Thus, Y_t for the receiving country can be described as:

$$Y_t = Y_{mig} + Y_c \qquad (6)$$

It is worth to acknowledge that the profits of the owners of capital can arise from: a) the process of distribution of the value added embedded in goods that were produced additionally with the help of additional migrant labour inputs, that is an increase in the volume of production; b) as an effect from reduced level of wages, including that of the local workers (Bosak, Grigoriev, Chernobai & Skibinskyi, 2015). In case the owners of capital obtain their profits due to decreased wages of local workers, such profits cannot be considered an economic benefit for the economy of receiving country, since it is only the redistribution of funds from the local workers to local owners of capital that occurs inside the economy. It is important to note that the profits of the owners of capital arise only if the migrant is employed. In all other cases, $Y_c = 0$.

To sum up the aforementioned, we believe it is feasible to classify international migration by type of its interaction with the economy of

receiving country. The criteria that are used for the purposes of such classification include the combinations of migrant's capabilities P_1, P_2, P_3 which determine the legal status of the international migrant and determine who should be assigned the responsibility to cover the costs of migrant's subsistence.

In our opinion, it is possible to single out the following types of international migration:

1. Involuntary migration with subsistence support provided by the receiving country without a possibility of employment. Capabilities P_1 and P_3 are ensured.

2. Voluntary migration with subsistence support provided by a third party without a possibility of employment. Capability P_1 is ensured, whereas subsistence support is provided by the third party.

3. Voluntary or involuntary migration with possibility of employment. Capabilities P_1 and P_2

are ensured. Capability P_3 arises when the migrant finds employment.

4. Illegal (mixed) migration. None of the capabilities is ensured.

In order to formalize and generalize the aforementioned, we constructed the formulas for calculation of the total economic benefit of the receiving country in accordance with the type of interaction with the economy of receiving country (see Table 3).

In Table 3, Columns 3 and 5 contain indicators that characterize the positive and negative impacts of the respective type of migration. Columns 4 and 6 show the capabilities of migrants that produce an impact on the respective indicators in Columns 3 and 5.

The list of economic development indicators (DI_i), which are used in this study and their description are shown in Table 4.

Table 3

Formalization of the impact of international migration on the economic development of receiving country depending on the type of economic interaction

No.	Type of economic interaction	Positive impact (DI_i)	Migrant's capabilities (Pi)	Negative impact (DI_i)	Migrant's capabilities (Pi)	Calculation of Yt
1	2	3	4	5	6	7
1	Involuntary migration (excluding employed migrants)	Cm	P_1	Ge	P_3	Yt = Cm – Ge
2	Voluntary migration (excluding employed migrants)	Cm	P_1	–	–	Yt = Cm + Ca
		Ca				
3	Voluntary and involuntary migration (employed migrants)	Cm	P_1	Ge	P_3	Yt = Cm + Ca + I + + (Gr - Ge) – R + Y_c
		Ca	P_2, P_3, P_4, P_5, P_6	R	P_2, P_3, P_4, P_5, P_6	
		I	P_2, P_3, P_4, P_5, P_6			
		Gr	P_2			
		Y_c	P_2			
4	Mixed migration	Cm	–	R	–	Yt = Cm + Ca – R + + Y_c
		Ca	–			
		Y_c	–			

Source: developed by the authors

Table 4

**The list of economic development indicators (DIi) which describe the impact
of migration on the economy of receiving country**

No.	Economic development indicator (D_i)	Definition of an economic development indicator
1	2	3
1	C_m	Basic consumption – the migrant's consumption related to ensuring minimum subsistence level of living (housing, food, telecommunication services, transport, etc.).
2	G_r	Government revenue – the receiving country's government revenue derived from collection of taxes, social contributions, etc., which are paid by migrants.
3	G_e	Government expenditure – the receiving country's budget expenditures that are connected with a) providing assistance grants to involuntary migrants; b) social protection of migrants that are officially employed; c) other expenditures connected with international migration.
4	S_d	Deemed savings – the migrant's deemed savings calculated as the difference between the migrant's after-tax income and her basic consumption expenditure. In the future, these savings can be used for additional consumption, investing or remittances to the country of origin.
5	C_a	Additional consumption – additional consumption of the migrant, which is not related to ensuring minimum subsistence level of living.
6	I	Investments – the volume of investments received by the receiving country from a migrant if $A_h > A_o$.
7	R	Personal remittances – the transfer of funds by a foreign employee to a private individual in the country of origin.
8	Y_c	Benefit of capital owners – the gains that arise from distribution of the value added which is embedded in products that were produced with the help of migrant labour.
9	Y_{mig}	Benefit from economic interaction with migrants – the benefit obtained by the economy of receiving country from economic relationship with a migrant.
10	Y_t	Total economic benefit – an integral indicator of the impact of international migration on the economy of receiving country. It is calculated as the sum of Y_{mig} and Y_c.

Source: developed by the authors

Migrant's capabilities and the impact of migrants on the economy of receiving country. In Table 4 each indicator of economic development (DIi) is juxtaposed with certain capabilities of the migrant (P_i). In our opinion, there is a functional relationship between such indicators and the respective capabilities. For example, the indicator of the volume of personal remittances of the employed migrants directly depends on the capability to be employed (P_2) and inversely depends on the capabilities to obtain social security (P_3), to own and dispose of property (P_4), to obtain education (P_5), and to obtain citizenship (P_6). Such a relationship can be formalized as:

$$R = f(P_2; P_3; P_4; P_5; P_6) \qquad (7)$$

The availability of functional relationships and the nature of such relationship between the indicators of economic development and the capabilities of the migrant are shown in Table 5.

The "plus" sign in Table 4 means that there is a direct relationship between the indicator of economic development and the migrant's capability. In other words, the expansion of rights that ensure such a capability leads to an increase in the value of a respective indicator. The "minus" sign indicates an inverse relationship.

We also singled out two groups of capabilities: Basic capabilities (P_1, P_2, P_3) and additional capabilities (P_4, P_5, P_6). Basic capabilities determine how the migrants will interact with the economy of receiving country, i.e. define the type of interaction with the economy of receiving country.

Table 5

The matrix of interrelationships
between the indicators of economic development and the migrant's capabilities

	C_m	G_r	G_e	C_a	I	R	Y_c
P_1	+						
P_2		+		+	+	+	+
P_3			+	+	+	-	
P_4				+	+	-	
P_5				+	+	-	
P_6				+	+	-	

Source: developed by the authors

Expansion of the rights of migrants that ensure basic capabilities leads to an increase in the values of economic development indicators (DI_i). Obviously, the sum of the values of economic development indicators will increase as well. This relationship can be formalized as:

$$\sum_{i=1}^{i}\left(DI_i^{LPR}\right) < \sum_{i=1}^{i}\left(DI_i^{EPR}\right) \qquad (8)$$

where DI_i^{LPR} is the indicator of economic development if basic rights are limited, and DI_i^{EPR} is the indicator of economic development if basic rights are expanded.

For example, the easing of legislative requirements of the receiving country with respect to employment of migrants, i.e. an expansion of capability P_2 leads to an increase in the number of employed migrants. In other words, an increase in economic development indicators (DI_i) is caused by an increase in the number of migrants who interact with the economy of receiving country in one or another way, and vice versa.

A change in the rights defining additional capabilities leads to a change in the value of economic development indicators (DI_i), but the sum of the values of economic indicators does not change, however. Thus, an increase in the value of one of the economic development indicators occurs due to a decrease in the value of other indicator(s) (see Formula 3). For example, an increase in the volume of additional consumption (C_a) is accompanied by a decrease in the volume of investments (I) or personal remittances (R), or both indicators at the same time.

The aforementioned relationship can be formally written as:

$$DI_i^{LSR} \neq DI_i^{ESR} \qquad (9)$$

where DI_i^{LSR} is the indicators of economic development given that additional rights are limited; and DI_i^{ESR} is the indicators of economic development given that additional rights are expanded.

At that, the following equation holds true:

$$\sum_{i=1}^{i}\left(DI_i^{LPR}\right) = \sum_{i=1}^{i}\left(DI_i^{EPR}\right) \qquad (10)$$

In other words, a change in the scope of rights that define additional capabilities allows to influence upon the values of economic development indicators with the aim of maximizing the positive outputs of migration and minimizing the negative outputs of migration (see Table 3), keeping the factual number of migrants unchanged.

A conceptual model of the impact of international migration on the economy of receiving country

Proceeding from the assumption that there exist functional relationships between the migrant's capabilities (P_i) in the receiving country and the indicators of economic development (DI_i), as well as taking into account the legislative peculiarities of regulating different types of international migration and taking into consideration the classification of international migration by type of interaction with the economy of receiving country, we developed a conceptual model (hereinafter referred to as Model) of the impact of international migration on the economy of receiving country (see Fig. 1).

The Model consists of five combinations of the migrant's capabilities (P_i), which are juxtaposed

with five alternative impacts of international migration on the economy of receiving country characterized by total economic benefit (Y_t).

In order to explain the Model in Figure 1, we use a set of arbitrary notations. The result produced by each combination is shown in a block titled "Total economic benefit", where indicators shown in columns with the "+" sign indicate positive impact, whereas indicators in columns with the "-" sign indicate negative impact. The numerical value of total economic benefit for a respective combination is calculated as the difference between the indicators in the columns marked with "+" sign and indicators in the columns marked with "-" sign.

Such symbols as "$DI_i \rightarrow$ max/min" indicate whether the respective indicator approaches its maximum ($DI_i \rightarrow$ max) or minimum ($DI_i \rightarrow$ min) if a respective condition is fulfilled. For example, notation "$C_a \rightarrow$ max" in block "Total economic benefit (2)" indicates that the volume of additional consumption of the migrant converges to maximum if the migrant is granted expanded rights that ensure additional capabilities (P_4, P_5, P_6).

Let us consider the suggested combinations in detail:

Combination 1 (red line) describes the impact of mixed migration. Capability P_1 is constrained. The migrant has no possibility to legally enter the receiving country, but nevertheless she makes a decision to cross the border illegally. The migrant financially supports herself, which requires that she is illegally employed. As a result, the total economic benefit (1) of the receiving country consists of the basic and additional consumption and the benefit of the owners of capital. The losses include personal remittances. The volume of additional consumption is minimal, since the ability of the migrant to interact with the economy is limited, that is why the majority of earnings are transferred by the migrant to the country of origin.

Combination 2 (orange line) describes the impact of mixed migration. Capability P_1 is realized, but Capability P_2 is constrained. The migrant enters the receiving country as a tourist, for example, but later finds illegal employment. The economic relationship of such a migrant with the economy of receiving country and the total

economic benefit (1) is similar to that in Combination 1.

Combination 3 (blue line) characterizes the impact of involuntary unemployed migrants. Capabilities P_1 and P_3 are realized. Capability P_2 is constrained. According to international agreements, the receiving country commits to ensure the minimum subsistence level of living for the migrants and may grant the capability of employment. At that, the illegal crossing of the border does not deprive such migrants of the right to stay in the receiving country and other rights in the future. Therefore, the economy of the receiving country obtains a benefit from increased consumption (C_m), which is negated due to respective increase in public spending (G_e), i.e. the redistribution of funds.

Combination 4 (yellow line) describes the influence of voluntary unemployed migrants. The capability P_1 is realised. Capability P_2 is constrained. Such migrants can be students or members of migrants' families who migrate in order to reunite with their family. The interaction of such migrants with the economy of receiving countries occurs through basic (C_m) and additional (C_a) consumption. If the third party is a resident of the receiving country, then the total economic benefit (4) equals 0 because the funds are redistributed within the economy of receiving country. If the third part is not a resident of the receiving country, then the total economic benefit (4) is a sum of basis consumption C_m and additional consumption C_a, which can be tentatively considered as exports from the receiving country to the country of third party's origin.

Combination 5 (green line) characterizes the impact of voluntary and involuntary employed migrants. The capabilities P_1 and P_2 are realised. The relationship of such migrants with the economy of receiving country is described by Formula 5. At that, the expansion of migrants' rights that ensure additional capabilities (P_4, P_5, P_6) leads to increasing volumes of additional consumption (C_a) and investments (I) and decreasing volumes of personal remittances (R) (see total economic benefit (2) in Figure 1), and vice versa if the rights are reduced (total economic benefit (3)).
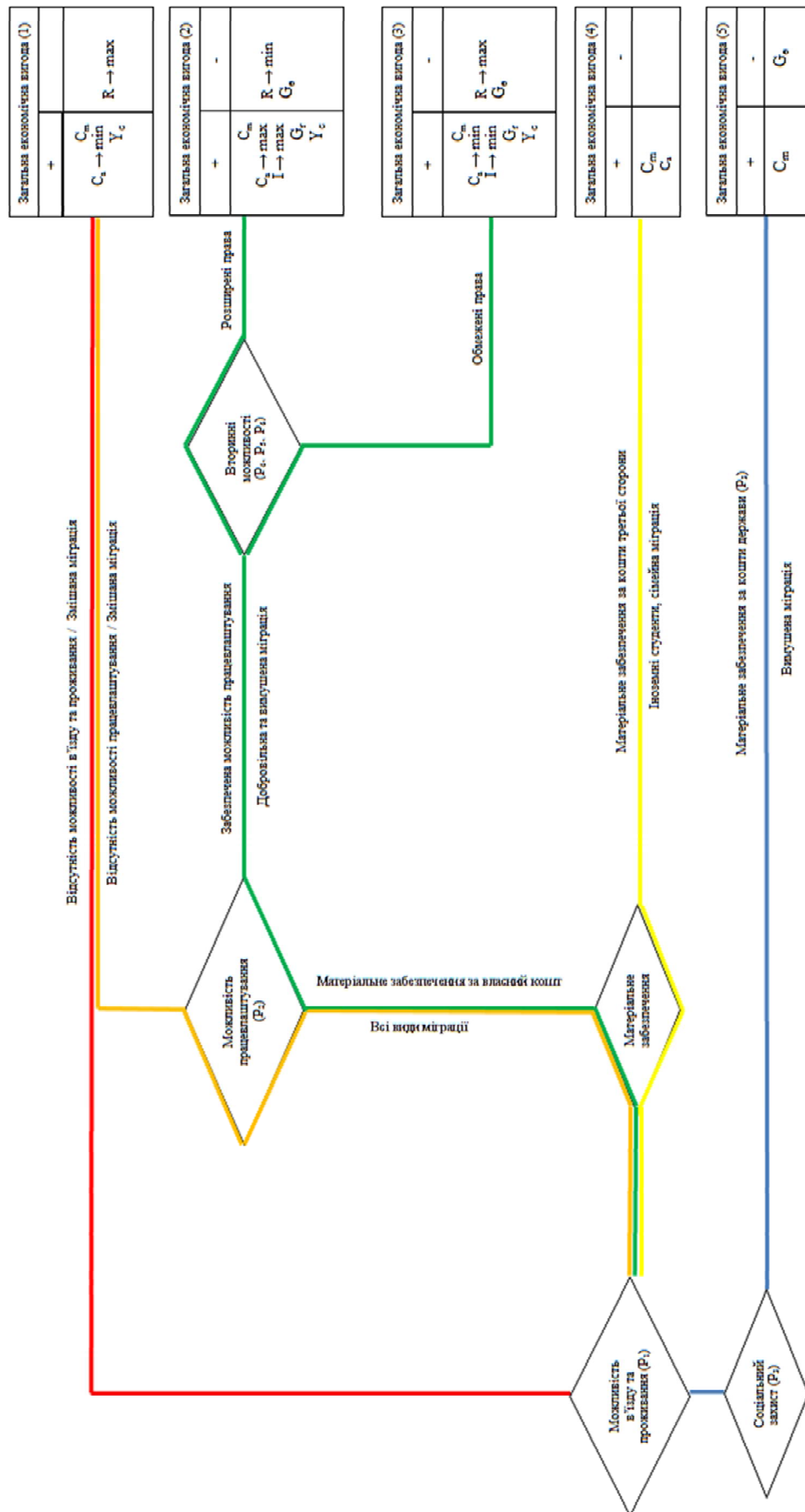
Fig. 1. A conceptual model of the impact of interntonal migration on the economy of receiving country

Source: developed by the authors

**The results of applying the conceptual model
of the impact of international migration
on the economy of receiving country (the case
of Germany)**

For the purposes of this study, Germany was selected as a country whose data could be used to perform calculations specified in our models. This choice was predetermined by the following factors: a) Germany hosts quite a large number of migrants, who reached 10.624 million persons in 2017 accounting for nearly 12.83 % of total population in 2017 according to estimates of the Statistisches Bundesamt (2018, April 12); also, Germany is the second largest country in terms of the number of received migrants since 2005, according to data of UN DESA (IOM, 2017); b) Germany hosts different types of migrants, which allows to perform calculations with respect to all suggested types of interaction with the economy of receiving country; c) sufficient amount of verified statistical data sources are available for carrying out the required calculations.

Within the frames of the developed model, our calculations are performed in several stages:

Stage I. Determining the factual number of international migrants in Germany as of December 2017 depending on their legal status (capabilities) and classifying them by type of their interaction with the economy according to specified criteria.

Stage II. Forming the data set of economic development indicators that characterize the types of interaction between the international migrants and the economy.

Stage III. Calculating the factual indicator of total economic benefit (Y_t) for Germany in 2017.

Stage IV. Characterizing the factual impact of international migration on the economy of Germany in 2017.

During Stage I, we determined the number of migrants in Germany in 2017 by type of their interaction with the economy. The results are shown in Table 6.

Table 6

The number of international migrants in Germany by type of interaction with the economy in 2017

No.	Type of international migration	Number of migrants, thousands			
		Type I	Type II	Type III	Type IV
1	2	3	4	5	6
2	Involuntary migrants	468		1 129.57	
3	Voluntary migration				
4	Labour migrants			3 470	
5	Family migrants			273.578	
6	International students		297.37		
7	Mixed migration				
8	Illegal migrants	166.068			62.79
9	Total	634.068	297.37	4873.148	62.79

Source: constructed and calculated by the authors

According to data of Statistisches Bundesamt (2018), the number of persons who were seeking asylum, that is were involuntary migrants, was 1 597 570 persons as of December 2017.

As noted by AIDA (n.d.), "the available statistical data of the German Bundesagentur für Arbeit include the number of unemployed [asylum seekers] by nationality, but without any division based on legal status". It is necessary to note that when entering the receiving country, all involuntary migrants are granted the legal status of

an asylum seeker, which is later reviewed. As a result, the migrant can retain her asylum seeker status or be granted the refugee status or subsidiary protection or be deported.

In this context, the data on the number of involuntary migrants in Table 6 are shown without division into Types shown in Table 1, since the status of the asylum seeker means that the migrant has the right to work under §5 of the Asylum Seekers' Benefits Act (Bundesamt für Justiz, 2017).

Therefore, all involuntary migrants in Germany are ensured all basic capabilities (entry and stay, employment and social protection) given that they comply with the requirements of the Asylum Act, and thus they can be classified as a Type III interaction. If such a migrant does not find employment, she continues to obtain social protection as stipulated by the Asylum Seekers' Benefits Act and is classified as an interaction of Type I.

According to data of the Federal Statistical Bureau of Germany (Statistisches Bundesamt, 2018, August 23), the number of involuntary migrants who received benefits, i.e. interaction of Type I, was 468 000 persons in 2017. Thus, the number of involuntary migrants included under Type III was respectively 1 129 570 persons.

According to data of the Federal Ministry of Education and Research of Germany (2017), the number of foreign citizens employed in Germany as of 2017 was 3.470 million persons. It is noted that all of the employed migrants are granted the right to social protection. Thus, the number of labour migrants included under Type III interaction was 3.470 million persons in 2017.

The reports on family migration were published annually up to and including 2015. As a result of "technical changes in compilation of official statistics", the data for 2016 and afterwards are absent (BAMF, 2019). In view of this, we calculated the approximate number of new family migrants to equal 70.335 thousand persons in 2016 and 63.417 thousand persons in 2017. The calculations were carried out as follows: 1) we calculated the value of the coefficient of correlation (0.953) between the data on the number of new family migrants for the 10 years from 2006 to 2015 (BAMF, 2016) and the data on the number of new international migrants in total (OECD, 2019) for the same time period; 2) the number of new family migrants for 2016 was calculated as a product of the number of new family migrants in 2015 by the rate of growth in total new international migrants in 2016; 3) the number of new family migrants in 2017 was calculated in a similar way in relation to previous year.

Before we can proceed with calculating the number of family migrants in Germany in 2017, it is necessary to note that, in order to obtain citizenship, migrants have to officially reside on the territory of Germany for at least 8 years (Grote, 2017). Thus, the number of family migrants in Germany in 2017 is calculated as the number of all new family migrants in 2010 inclusive, which equalled 498 262 persons, of which 132 026 persons were children, which obviously are included under Type II interaction. However, it is necessary to note that since it is parents who carry the costs of their children's living and with whom the family reunification is performed, the economy of receiving country does not receive any economic benefits due to the fact that the funds are redistributed inside the economy. The specific data on those employed among adult migrants are not available. According to BAMF (2019), the share of employed persons among all international migrants in Germany in 2017 was 74.7%. Therefore, out of all family migrants, 224 684 persons can be included under Type II interaction and 273 578 persons can be included under Type III interaction.

The number of foreign students in 2016/2017 study year was 358 901 persons (Germany, Federal Ministry of Education and Research, 2017). However, it should be taken into account that 61 528 students were granted education allowances by Germany (DAAD, n.d.), i.e. the funds were redistributed inside the economy, and such foreign students are deducted from the total number of migrants of this type. Thus, the number of foreign students, which were classed as Type II relationship, was 297 367 persons.

The annual data on the number of illegal migrants in Germany is unfortunately not available. Obviously, this is connected with the complexity of tracing and accounting for such migrants. The estimates of the number of illegal migrants range approximately from 180 000 to 520 000 persons as of 2014 (Vogel, 2015). The German Federal Department on Migration and Refugees reported 228 859 illegal migrants in 2017 (Grote, Hoffmeyer-Zlotnik, Kuntscher and Tangermann, 2018), of which 166 068 persons were asylum seekers who remained in Germany illegally after they had been rejected the refugee status. It is worth to note that these migrants were not deported; however, they lost their capability to be employed, but instead obtained minimum social protection. Therefore,

166 068 illegal migrants in 2017 were included under Type I, whereas 62 791 migrants were included under Type IV interaction.

The total number of international migrants equalled 5.867 million persons. This number was obtained from the data on international migrants which could be verified in official sources with respect to specific types of migration.

At Stage II, we formed a data base (see Table 7) of the economic development indicators and the respective factual numbers of migrants within their respective types of interaction with the economy.

Table 7

**The indicators of economic development, which characterize the types
of interaction between international migrants and the economy of Germany in 2017**

No.	Type of international migration	Indicator values, €/person						Total economic benefit, €/person
		Basic consump-tion	Additional consump-tion	Investments	Govern-ment revenue	Government expenditure	Personal remittances	
1	2	3	4	5	6	7	8	9
1	Involuntary migrants (Type I)	15300	–	–	–	15300	–	0
2	Involuntary migrants (Type III)	4248	10 928		10 024	8288	0	16912
4	Labour migrants (Type III)	4248	5 294		10024	8288	5633	5644
5	Family migrants (Type III)	4248	10 928		10024	8288	0	16912
6	Foreign students (Type II)	5796	22349	–	–	–	–	28145
7	Illegal migrants (Type I)	10000	–	–	–	10000	–	0
8	Illegal migrants (Type IV)	4248	3278	–	–	–	12662	-5135.2

Source: constructed and calculated by the authors

The detailed data on government expenditures related to protection of asylum seekers in Germany are not publicized (EMN, 2017, December 29). However, the data of Migration Policy Database (OECD, 2017, January) indicate the expenditures of at least €10 000 per year to support at least one asylum seeker, which matches the level of expenditures in the neighbouring countries (EMN, 2017, December 29). A study of Cologne Institute for Economic Research indicates the expenditures of €15 300, which include the expenses in value of €3 300 for language courses and refugee integration programs. Thus, public expenditures related to financial assistance provided to migrants of Type I are €15 300 per year (Becker, 2016). It should be noted that these expenditures are related to maintenance of facilities that are necessary for the process of registration, keeping records and providing support to refugees, etc. Basic consumption equals government expenditure and does not decrease by the coefficient of propensity to import, since the majority of goods and services is provided in kind, mainly with the help of attracting labour of the

asylum seekers themselves, whereas more than a half of the amount of financial benefits are allotted to cover the housing rents.

According to data of German Academic Exchange Service (2017), average monthly student expenditures related to satisfaction of basic needs were €644. The sum of other monthly expenditures was approximately €261. Also, the organization notes that average monthly cost of studying in Germany varied around €10 000 per semester. Thus, basic consumption of foreign students in Germany was €5 796 per year, additional consumption equalled €22 349, total consumption was €28 145. The amount of consumption per year is calculated taking into account the fact that the duration of study is 9 months.

The minimum wage in Germany in 2017 was €1 498 per month (EXPATICA, 2019, January 30). The monthly wage of low-skilled workers was €2 100 or €25 200 per year (Trading Economics, n.d.). Taking into account that international migrants usually work at low-skilled occupations (IOM, 2000), we consider it feasible to assume this particular size of wages for further calculations. The tax rate on wages in Germany is 19 % (Trading Economics, 2019), whereas the size of social contributions for employees was 20.78 % (Trading Economics, 2018). Thus, the amount of public revenue derived from migrants of Type III was €10 024 in 2017. According to data of the World Bank (2018), the volume of personal remittances from Germany in 2017 was €19.579 billions. This is €4 011 per migrant per year. However, we consider that it is feasible to deduct the employed involuntary migrants from the total number of migrants included under Type III since we assume that such migrants do not make personal remittances for those very reasons that preconditioned their search for asylum. We also assume that the volume of personal remittances of family migrants is also equal to 0, since the households of such migrants are located in the receiving country. Therefore, the volume of personal remittances is €5 633 per person per year and €0 for employed voluntary and family migrants. Basic consumption is assumed to be at the level of €354 per month or €4 248 per year,

which corresponds to maximum amount of benefits for an asylum seeker (AIDA, 2018). The amounts of additional consumption and investments for migrants of Type III are calculated together, which is connected with a) the complexity of searching for data on values of these indicators in open access sources; b) construction of the function for calculation of total economic benefit for the migrants included under this type of relationship. Thus, the amount of additional consumption for involuntary migrants and family migrants included under Type III equals €10 928 and €5 294 for labour migrants included under Type III. The costs of social protection in Germany were €8 288 per person in 2015 (OECD, 2018). Unfortunately, the data for 2017 are not available. Therefore, the amount of government expenditures on social protection of the Type III interaction was €8 288 per person.

The size of wages for illegal migrants is assumed to be at the level of wages for migrants of the Type III interaction. The amount of basic consumption is also assumed to be at the level of basic consumption for migrants of the Type III interaction. The amounts of taxes and social contributions are equally divided between the employer and the migrant. Taking into account the fact that illegal migrants are not able to perform investments and assuming that their propensity for additional consumption is lower compared with the migrants of Type III, the amount of additional consumption for illegal migrants of Type IV relationship is assumed to be at the level of 30 % of the size of additional consumption and investments of labour migrants of Type III, amounting to €3 278. The amount of personal remittances was €12 662, which was calculated as the difference between the migrant's wage and the sum of basic and additional consumption.

The data on benefit of the capital owners is not available due to complexity of calculating such an indicator with the help of open-access data.

During Stage III, the total economic benefit was calculated for Germany in 2017 (see Table 7). The results of intermediate calculations and total economic benefit for each type of interaction are shown in Table 8.

In Table 8 we see that the overall sum of economic benefits that Germany obtained from its interaction with migrants equalled €51 363 million in 2017, which accounts for nearly 0.62 % of GDP in 2017 (World Bank, n.d.). Worthy of note is the fact that the aforementioned result of calculations concerns only those 5.867 million migrants (55.2 % of total number), who could be clearly put under some type of economic interaction.

During Stage IV, we characterized the factual influence of international migration on the economy of Germany in 2017. Based on the results of our analysis, we described the impact of each type of international migration on the economy of Germany (see Table 9).

Table 8

Total economic benefit of Germany from economic interaction with migrants in 2017

No.	Type of interaction	Type of international migration	Values of indicators, €mn						Total economic benefits, €mn
			Basic consumption	Additional Consumption	Investments	Government Revenue	Government expenditure	Personal Remittances	
1	2	3	4	5	6	7	8	9	10
1	Type I	Involuntary migrants (Type I)	7160	–	–	–	7160	–	0
		Illegal migrants (Type I)	1661	–	–	–	1661	–	0
2	Type II	Foreign students (Type II)	1724	6646	–	–	-	–	8 369
3	Type III	Involuntary migrants (Type III)	4798	12 344	11323	9362		–	19 103
		Labour migrants (Type III)	14741	18 371	34783	28759	19550		19 586
		Family migration (Type III)	1162	2 990	2742	2267	–		4 627
4	Type IV	Illegal migrants (Type IV)	267	206	–	–	–	795	-322
5		Total	31512	40 556	48848	49 210	20 345		51 363

Source: constructed and calculated by the authors

Table 9

Description of the impact of the types of international migration on the economy of Germany in 2017

No.	Type of migration	Description of the impact
1	2	3
1	Involuntary migrants (Type I)	This type of migrants did not produce a negative impact (zero total economic benefit) since government expenditures on migrants' social security were used on consumption, which activated demand that was satisfied by local producers. The IMF report (IMF, 2016, May 9) states that such a redistribution of funds in the end produces a positive result thanks to incentives given to local producers
2	Involuntary migrants (Type III)	The employment of involuntary migrants produced a positive impact on the economy of Germany (total economic benefit equal to €19 103 mn). This occurred thanks to a) decreased number of persons that receive public benefits; b) decreased social protection expenditures from €15 300 per person for unemployed involuntary migrants to €8288 per person for employed migrants; c) increased tax receipts in value of €10 024 per person. The economy of Germany as a whole received additional consumption and investments in value of €5 634 per person, since such migrants do not make personal remittances

Table 9 continuation

1	2	3
3	Labour migrants (Type III)	The total economic benefit from such migrants was €5 644 per person in 2017. This result is the lowest among other types of migration within the Type III interaction. This is primarily connected with personal remittances
4	Family migrants (Type III)	The total economic benefit from employed family migrants is high, equalling to €16 912 per person. This is connected with the fact that such migrants do not carry out personal money transfers
5	Foreign students (Type II)	Foreign students who arrive to study and support themselves on their own generate the highest total economic benefit among other types of migration, equalling €28 145 per person in 2017. Such a migration does not induce government expenditure or other costs to the economy of the country as a whole
6	Illegal migrants (Type I)	The illegal migrants that receive state-funded assistance include asylum seekers that have not been granted official refugee status, but remained on the territory of Germany. In accordance with active laws, the country cannot deport them. The impact of such migrants on the economy of Germany is similar to that of the involuntary migrants of the Type I interaction (total economic benefit is equal to zero)
7	Illegal migrants (Type IV)	Such migrants produced a negative impact on the economy of Germany, which is connected with a) lack of government revenue in the form of tax receipts and social contributions in value of €10 024 per person; b) lower additional consumption and investments, which amounted to €3 278 per person compared with €5 294 per person for ordinary labour migrants; c) significant personal remittances in value of €12 662 per person compared with €5 634 per person for regular labour migrants. As a result, the indicator of total economic benefit equalled -€5 135 per person

Source: developed by the authors

Conclusions

Based on the results of this research, we introduced the concept of "migrant's capabilities", which laid the basis for our model of the impact of international migration on the economy of receiving country. The concept of "migrant's capabilities" allowed us to establish a functional relationship between the migrant's legal status as defined by legislation of the receiving country and the indicators of economic development that characterize the impact of migrants on the economy of such a country. Such capabilities include: the ability to enter and stay, to work, to obtain social protection, to own and dispose of property, to obtain education, to obtain citizenship. It should be noted that different types of migration (labour migrants, refugees, etc.) have different legal statuses which define their capabilities and, respectively, their impact on the economy of receiving country. In the process of research, the capabilities were divided into basic capabilities and additional capabilities.

We also proposed to classify international migration by type of interaction with the economy of receiving country. The type of interaction is determined by a factual set of basic capabilities of the migrant. A change in the rights that define basic capabilities of the migrant enables a change in the type of her interaction with the economy and respectively the outcomes of her influence on the economy. A change in the rights that define the migrant's additional capabilities allows maximizing/minimizing the positive/negative outcomes of the impact of migration.

Therefore, the developed model describes the relationship between the migrant's capabilities and the impact of international migration on the economy of receiving country. The model comprises five combinations of migrants' capabilities, which are matched with four types of international migrants' interaction with the economy of receiving country, and five blocks of outcomes which characterize the results of the impact of international migration on the economy of receiving country.

In the applied part of our study, we calculated the total economic benefit of Germany from its relationship with migrants in 2017. The

results of our calculations show that it was only illegal migration that produced a negative impact on the economy of Germany in value of €322 millions. At that, the total economic benefit amounted to €51 363 millions. The largest total economic benefit per person was generated by foreign students (€28 145). The employed involuntary and family migrants generated €16 912 per person. The involuntary and illegal migrants that were granted public benefits by Germany produced neither positive nor negative impact.

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