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**THE MITIGATION OF BRAIN WASTE & BRAIN DRAIN MIGRATION
IN UKRAINE: CONVERGENCE OF ECONOMIC AND EDUCATIONAL
TRANSFORMATIONS**

The article considers such concepts as brain drain and brain waste and analyzes the current state of professional migration in Ukraine. Brain drain is a phenomenon that describes the migration of highly skilled people to more developed countries caused by globalization, economic imbalances in the world, and the policies of developed countries. Brain loss is a

phenomenon that describes the complete or partial loss of competence by a person during working in a position that does not correspond to his or her qualification level.

Migration trends in Ukraine were analyzed. The flow of students studying abroad is increasing due to exchange programs and international projects. Regarding professional migration, the main countries that accept emigrants from Ukraine are neighboring Russia and Poland, which coincides with global trends, according to which people most often migrate to neighboring countries with more developed economies.

The article also provides examples of combating the effects of brain drain and brain waste in different countries. Ways to reduce the consequences of these can be tax policy improvements, monetary incentives for scientists, or stimulating the economy, for example, through cooperation between universities, government, and business.

Keywords: migration, brain drain, brain waste

Fig. – 1, Tab. – 2, Ref. – 9.

Problem statement. Several tendencies characterized the modern world: an increased international interconnectedness, the rapid rate of urbanization, technological advances, the devastation of natural resources, and increased migration. As the world is more open now, people are more and more likely to risk and migrate to another country. And it is quite common decision of educated Ukrainians.

The population of Ukraine is annually decreasing. Partly it can be caused by the continuous rise of migration. Especially important to understand the current situation about the migration of professionals. That's why we decided to investigate the current condition of brain drain and brain waste in Ukraine and know how we can minimize its consequences.

Analysis of the last investigations and publications. Brain drain is a part of many investigations since the beginning of 21 century, but scientists begun to use this term after II World War. At that time, this term was defined as the health personnel migration in search of a better quality of life, higher salaries, access to advanced technology, and more stable political conditions in different places worldwide. Three types of brain drain can be distinguished: between developed countries, from developing to developed countries, and between developing countries. In Table 1, we compare the main aspects of brain drain definitions in most cited articles by different authors.

Table 1 - Comparison of “brain drain” definition by different authors

Author	Definition	Main driver	Main issues
Michel Beine [3]	negative externality on the population left in the source country due, for example, to imperfect substitution between skilled and unskilled labor	an underdevelopment trap of economy, economy exhibits a relatively high growth performance	BBD model
Frederic Docquier [6]	high-skill migration	globalization	development theory
Andrew Mountford [12]	emigration is only permitted for educated agents	endogenous human capital accumulation, continuous successful emigration, the interaction between human capital accumulation decisions, growth and income distribution	Macroeconomic approach
Robyn Iredale [7]	the loss of skilled human resources from developed countries.	Increasing globalization and the competition for skilled resources	“war” over skills

Table 1 (continued)

Jean-Baptiste Meyer [11]	Migration of highly skilled persons		Network approach, human capital
Stuart C. Carr [12]	skilled personnel leave their country	the socio-economic disparity	Talent flow
Sami Mahroum [8]	The net flow that is heavily in one direction	The management professions, the expansion of business and industrial activities overseas	Different groups of professions are driven by different push and pull factors

So, as we see in the table, the main reasons for brain drain are globalization and different economic development level. The scholars use the BBD model and macroeconomic and network approaches to calculate the impact of brain drain on the economic of both developed and developing countries. Also, to resist the consequences investigators recommend various approaches that differ dependently on the group of professionals.

In comparison to brain drain, “brain waste” is a new term that more used in medical literature, than in the social science context. Brain waste is a reduction or complete loss of a person's qualification level or, in other words, the non-recognition of the skills and qualifications acquired by migrants outside, which prevents them from using their potential fully. In Table 2, the different definitions and aspects of brain waste used in the most cited articles are presented, updated by the time of current investigation.

Table 2 - Comparison of “brain waste” definition by different authors

Author	Definition	Main driver	Main issues
Aaditya Mattoo [10]	the skills of immigrants are being underutilized in the labor market	the quality of relevant human capital, conflict at home, host-country policy	Skilled occupation
Armando J. Garcia Pires [14]	a situation with skill downgrading, where an individual is working in a job that requires a skill level lower than the one he/she has acquired	low international transferability of skills	International Transferability of Human Capital
Çağlar Özden [13]	The situation in which migrants earn less than natives with the same skills has been referred	origin country characteristics and destination country immigration policies	theoretical model to investigate the labor market performance of educated immigrants
Sami Mahroum [8]	immigrants' skills are underutilized in their new country		

As we see, there is still not much information about the reasons of the brain waste effect, so this issue still needs investigations. Also, local data analyses are needed, as every country has its own historical background, which has a big impact on the migration drivers.

The article is aimed to analyze the effects of brain drain and brain waste in Ukraine and propose possible ways to reduce the circumstances based on the other countries' experience.

Main material. Individuals usually decide to emigrate because of a combination of economic and existential reasons [2]. Economically, people usually behave more rationally as the main reason here is to have a bigger salary than the average in the country of origin. Existential questions are usually more individual, depending on gender, family status, quality

of life, educational level, or other reasons. Also, common language, political tensions, and geographical vicinity may play a role. Moreover, it was founded that citizens with high educational levels mostly go abroad or return for academic or job-related economic reasons, rather than for family or personal reasons.

One of the psychological reasons that were noticed in the Southern European countries [2], and shared in Ukraine, is criticism of youth people towards their home societies for limiting their potential. Parents are often pushing on their children to migrate during university training, or after graduation; as for them, the perspectives in other countries are more prominent.

The imbalance in the world causes an increase in migration. So developing countries should put extra efforts into building capacities inside their economics to avoid huge emigration. A limited number of established institutions in a limited number of world regions tend to control current mobility flows [16].

Another factor that pushes individuals to seek better career opportunities is economic imbalances across countries and regions. The OECD identified potential increases in earnings as one of the most important drivers for people to migrate. For example, in academic society, people are particularly attracted to better science infrastructure and funding, as well as higher salaries. Sometimes there are no conditions to perform “good science” in the home country, which leads to migration.

At the same time, the developed countries also needed migrants with high competencies to continue developing further. Especially nowadays, because of Covid-19 crisis, creativity and innovation competencies are strongly needed to be boosted [2]. That’s why countries are often recruiting highly qualified workforce in neighboring countries with a lower level of economics. The biggest players on the international level, both countries and universities, also try to attract as many international talents as possible to ensure that they have a leading role in innovation and research. That’s why many highly educated and competent people decide to emigrate to developed countries, and therefore the brain drain and brain waste effects are observed.

It is better to divide educational and professional migration, as these cases have different drivers and consequences. The educational migration sector shows growth even during quarantine, since students can cross borders with educational visas. According to OECD reports, 52% of international students worldwide are from Asia. And three-quarters of all flow of the students are concentrated in four countries: the United States, Australia, the United Kingdom, and Japan. In addition, intra-EU educational mobility shows the trend to increase the number of students from other countries. The ERASMUS, LEONARDO, and SOCRATES programs help a lot in this question, as they already have a big base of universities all around the world and the set of tools and tutors to make the migration easier for students. With the participation of Erasmus and its partners' many projects were accomplished in Ukraine, among which 153 volunteer projects (CA125) with 28 member countries of the Program, including 2 projects from 1 free economic zone of Ukraine and 3,306 youth mobility projects (CA105) with 31 member countries received funding [1].

According to UNESCO, the number of Ukrainian students in mobility programs has reached 72 063 people. It is 1.3% of the total population, and outbound mobility ratio is 4.5 [1]. According to studies in the 2013/2014 academic year, most Ukrainian students, who participated in full-basis program in foreign universities, studied in Poland, Germany, Russia, Canada, the Czech Republic, Italy, the USA, Spain, France, and Great Britain. The countries-main destinations of Ukrainian students are presented in fig. 1.

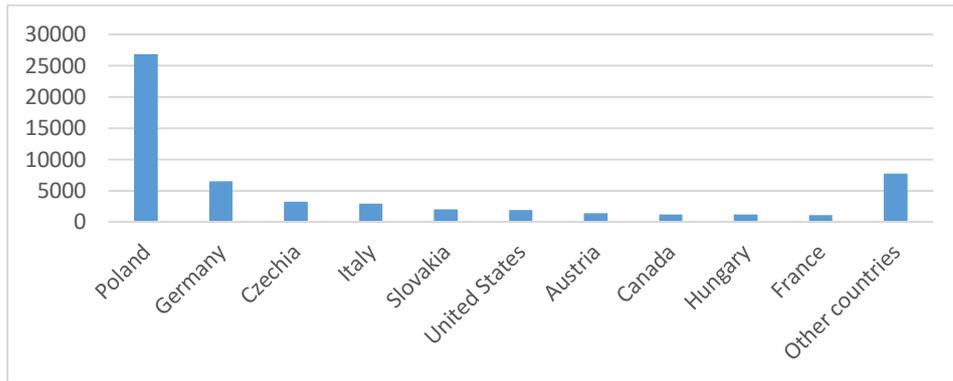


Figure 1 – Ukrainian youth that study abroad, number of students participated in full-basis programs, by countries [1].

While previously international students were mainly ranked among temporary migration movements, nowadays, they are mostly recognized as a source of high skilled labor for developed countries. It was evaluated that in about 15–30% of cases, international study is the first step toward permanent employment in the host country [16]. Moreover, in 2014 the European Parliament adopted a new guideline, according to which international students can work (without limiting the number of hours) during their studies and even stay 1.5 years after graduation to search for a job or start up their own company. EU also aims to attract researchers through the Blue Card policy.

Describing the situation with professional migration, the areas of employment of Ukrainian workers abroad are primarily construction (men) and work in households (women), as well as services and agriculture. The main country to immigrate to is Poland. 34% of all amount of people, who migrate to Poland in 2019, were from Ukraine. Ukrainians are also in inflows of top 10 nationalities in Russian Federation (approximately 24% of population), Bulgaria (17%), Czech Republic (17%), Lithuania (14%), Latvia (13%), Hungary (12%), Estonia (9%), Slovak Republic (6%), Denmark (4%), Finland (3%), Greece (2%), Slovenia (2%). The destinations where Ukrainian emigrants go are presented in Table 3 by regions.

Table 3 - Amount of migrants from Ukraine by 2019

Total	12 329
European countries	7 431
Countries of America	4 361
Asian Countries	509
African countries	9
Countries of Australia and Oceania	19

Source: [5]

An understanding of factors that promote the retention of talent may help to avoid such effects by promoting economic competitiveness.

Before choosing the way to reduce brain drain and brain waste effects, government authorities should remember that everyone has a right to migrate. People should be free, when making important life decisions, to pursue new possibilities and honor the attachments they have already made. For these reasons, people have a human right to immigrate to other states and a human right to stay on their own. Unless these rights are respected, people's life choices are significantly constrained.

Since immigration is a human right, immigration restrictions should not be imposed when there are alternative means to counteract the brain drain effect. Since people have a human right to stay, and since this right is of particular importance, people are entitled to assistance in fulfilling their basic needs without the requirement to migrate abroad. When there are no alternatives available in either case, immigration policy can be used to address poverty. But immigration policy should be regarded as a policy of last resort. When states employ it as a policy of first resort, they risk unnecessarily curtailing the freedom of people in developing countries to live their lives as they choose. Poverty is reduced but at an unacceptably high price.

But governments could stimulate back migration. Often countries with a large number of students abroad (for instance, India and China) create the incentives and attract researchers back to the country of origin. In order to do that, China implemented several financial tools to attract researchers. The 1000 Talent Plan ensures, under certain conditions, an additional subsidy for leading researchers in the domains of science and technology [16].

Furthermore, it is better to use the migrant competencies in their home countries by giving them the opportunity to have a worthy job. One of the most effective approaches is co-competition projects between government, universities, and businesses. Co-competition as a development strategy is not new for enterprises in Western Europe or the United States, but it is a revolutionary approach for Ukrainian companies. The co-competition model of development was presented in a researcher's works [15, 16], where were indicated that cooperation with competitors is a winning strategy on a "win-win" basis. The same applies to public-private partnerships. Given all the above, we believe that educational institutions, businesses, and government cooperation could fulfill all stakeholders' needs and expectations and create a significant synergy effect on the economics.

But the changes should be complex in all areas. For example, if only universities will raise the level of education, it doesn't mean that many new highly competent staff will stay in Ukraine. The studies made in the US have shown that almost half of the graduates leave their first job or major, for which they have studied or receiving their degrees. Moreover, before moving or opening an office, companies consider the labor potential in a particular place. Employers will follow the workforce.

Conclusions. The migration processes in Ukraine have a continuously increasing trend. The brain drain is a big part of the total percentage of migration. Also, the brain waste effect is becoming more and more common. The main reason for it is the globalization of the world, which makes the impact of migration less problematic, so people are more likely to risk. In addition, there are many international students nowadays because there are many international organizations that help young people study abroad, and educational institutions inside the Ukrainian educational system also force their students to participate in such programs.

As people are free in their mobility anywhere, it is better not to reduce the number of migrants but to use their competencies. To maintain this, government, business, and educational institutes could co-competite to develop the economy and provide return migrants with positions where their previous experience can be used. The government could stimulate people to come back through alleviation of tax burden or grants.

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ПОМ'ЯКШЕННЯ ФЕНОМЕНІВ «РОЗТРАТИ МІЗКІВ» І «ВІДТОКУ МІЗКІВ» В УКРАЇНІ: КОНВЕРГЕНЦІЯ ЕКОНОМІЧНИХ ТА ОСВІТНІХ ТРАНСФОРМАЦІЙ

В статті розглядаються такі поняття як *brain drain* («відтік мiзкiв») і *brain waste* («розтрата мiзкiв») та аналізується сучасний стан професійної мiграції в Україні. «Відтік мiзкiв» – це феномен, що описує мiграцію висококваліфікованого населення в більш розвинені країни, спричинені глобалізацією, економічною незбалансованістю світу та політикою розвинених країн. «Розтрата мiзкiв» – це явище, яке описує повну або часткову втрату компетенції людиною при роботі на посаді, що не відповідає її кваліфікаційному рівню.

Проаналізовано міграційні тенденції в Україні. Збільшується потік студентів, що навчаються за кордоном завдяки програмам обміну та міжнародним проектам. Щодо професійної міграції, то основними країнами, що приймають емігрантів з України є сусідні країни, в тому числі Польща, що співпадає зі світовими тенденціями, згідно з якими люди найчастіше мігрують в сусідні країни з більш розвиненими економіками.

Також в статті наведено приклади боротьби з наслідками «відтоку» та «розтрати мізків» в різних країнах. Шляхами зменшення наслідків можуть стати зміни у податковій політиці, грошове стимулювання вчених, а також стимулювання економіки, наприклад через коопетицію між університетами, урядом та бізнесом.

Ключові слова: міграція, «відтік мізків», «розтрата мізків».

**Швиндина Г.О., Артюхов А.Е., Петрушенко Ю.Н., Мотречко В.В., Пивень Д.А.
СМЯГЧЕНИЕ ФЕНОМЕНОВ «РАСТРАТЫ МОЗГОВ» И «УТЕЧКИ МОЗГОВ» В УКРАИНЕ:
КОНВЕРГЕНЦИЯ ЭКОНОМИЧЕСКИХ И ОБРАЗОВАТЕЛЬНЫХ ТРАНСФОРМАЦИЙ**

В статье рассматриваются такие понятия как brain drain («утечка мозгов») и brain waste («растрата мозгов») и анализируется современное состояние профессиональной миграции в Украине. «Утечка мозгов» - это феномен, описывающий миграцию высококвалифицированного населения в более развитые страны, вызванные глобализацией, экономической несбалансированностью мира и политикой развитых стран. «Растрата мозгов» - это явление, которое описывает полную или частичную потерю компетенций человеком при работе на должности, не соответствующей его квалификационному уровню.

Проанализированы миграционные тенденции в Украине. Увеличивается поток студентов, обучающихся за рубежом благодаря программам обмена и международным проектам. Что касается профессиональной миграции, то основными странами, принимающими эмигрантов из Украины являются соседние страны, в том числе Польша, что совпадает с мировыми тенденциями, согласно которым люди чаще всего мигрируют в соседние страны с более развитыми экономикami.

Также в статье приведены примеры борьбы с последствиями "утечки" и "растраты мозгов" в разных странах. Способами смягчения последствий могут стать изменения в налоговой политике, денежное стимулирование ученых, а также стимулирование экономики, например с помощью коопетиции между университетами, правительством и бизнесом.

Ключевые слова: миграция, утечка мозгов, растрата мозгов