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BRAIN-DRAIN –THE POSITIVE AND NEGATIVE ASPECTS OF THE PHENOMENON

Abstract

A large number of available analyses and research on the brain-drain phenomenon support the fact that this issue is very relevant and important from different social aspects, and therefore we have chosen it as the topic of our paper. While analyzing the available theories, we were confronted with a number of different viewpoints regarding the brain-drain phenomenon: from a neutral impact over the negative to full positive impact of the brain-drain on countries of origin. All researchers, however, agree that there is a range of push and pull factors influencing the brain-drain phenomenon of the general social, economic, family, but also geographical and natural conditions. An important economic factor is the money arriving from developing countries precisely from the people who left their home countries. It is impossible to analyze the brain-drain phenomenon and ignore the globalization process. It directly affects the transformation of the brain-drain phenomenon into brain-circulation as a recent phenomenon.

Keywords: Brain-drain, migration, population, brain-circulation

JEL Classification: J22, J24, O15

ОДЛИВ МОЗГОВА – ПОЗИТИВНИ И НЕГАТИВНИ АСПЕКТИ ФЕНОМЕНА

Апстракт

Велики број доступних анализа и истраживања о феномену одлива мозгава говори у прилог томе да је ова тема веома актуелна и важна из различитих друштвених аспеката, па смо је због тога и изабрали као тему нашег рада. Анализирајући доступне теорије сусрели смо се са више различитих гледишта када је феномен одлива мозгава у питању: од неутралног утицаја, преко лошег, па све до потпуно позитивног утицаја одлива мозгава на матичне земље. Сви истраживачи се међутим слажу да постоји низ фактора који утичу на феномен одлива мозгава, почев од

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опште друштвених, економских, породичних, али и географских и природних услова. Посебну пажњу треба посветити и приливу новца који стиже из дијаспоре у матичне земље. Немогуће је сагледати феномен одлива мозгава без разматрања глобалних кретања и глобализације уопште. Управо она утиче на трансформацију феномена одлива мозгава у феномен циркулације мозгава као новијег феномена.

Кључне речи: *Одлив мозгава, миграције, популација, циркулација мозгава*

Introduction

The topic of brain-drain is becoming increasingly important. According to the EconLit statistics (American Economic Association), 247 articles were written on the subject in the period between 2005 and 2009 which is twofold more than in the previous 15 years. Also, a growing number of statistical indicators are published annually which are related to the specific country as well as their comparative analysis.

Also, the term “brain-drain” was first used by the British Royal Society and related to the exodus of scientists from Great Britain to the United States and Canada during the 1950s and 1960s (Cervantes&Guellec, 2002). However, today the term is used to describe the emigration of highly educated individuals from the home country. It is important to note that in this case that mainly includes engineers, physicians, scientists, and even other highly educated people with a university degree (Rapoport & Docquier, 2006). Also, migrations usually occur from underdeveloped and developing countries to developed countries, but the shifts from rural to urban areas with high incomes are frequent, too.

Considering that human capital is the initiator of development of every country, it can be concluded that the brain-drain from underdeveloped to developed countries represents a serious problem. The departure of highly qualified people from the country has a negative effect on the overall situation, which further encourages those who remain to consider emigrating. On the other hand, the countries in which educated people arrive to find a job and gain better living conditions are in a position to raise brains (so-called “brain-gain”).

The author Ellerman states that in the event of departure of talented people, it is a matter of the classic “prison” dilemma - individual strategies of success do not necessarily equal the best collective strategy of success. When the greatest potentials leave the country, the pressure to achieve general prosperity and well-being begins to decrease (Ellerman, 2006).

According to the author Harry Johanson, brain-drain is primarily a phrase rather than a term. Actually, the very word “drain” indicates serious implications in this case, suffered by the country from which all the potential departures. On the other hand, educated migrants and the countries to which they go in search of a better life are at gain (Johanson, 1965). Of course, there are also situations which bring benefits to the home country. That situation is typical for India, which annually generates high rates of income from the Diaspora. According to Prime Minister Manmohan Singh, India

has “converted the brain-drain misfortune into an opportunity” (<http://pib.nic.in/release/release.asp?relid=68026>)

The authors Kapur & McHale have identified three long-term trends which encourage migration. Firstly, new companies are constantly opened in the developed countries whose operation is based on innovation. Of course, their need for a qualified workforce is permanent, which on the other hand represents a strong incentive for emigrants. In addition, highly productive and qualified foreign personnel have a positive effect on strengthening the budget of the home country. And finally, employers in the developed countries understand much better the benefits and importance of productivity of highly qualified personnel, and as such offer much better working conditions (Kapur & McHale, 2005).

Importance of the Brain-drain Issue

It is obvious that the economists, at the global level, are very interested in the aforementioned issue. In fact, if the outflow continues at the “already seen” continuity, that could lead to dramatic economic and social consequences (Sattaur, 1989). Of course, economists of the countries from which people are leaving, as well as of those in which they are arriving, closely monitor the situation.

It is important to note that the situation should be perceived firstly from the standpoint of global labour mobility. The qualified workforce moves to destinations with a promising outlook for better income. The research conducted in five countries suggests that growth in income after migration to developed countries has increased to an extremely high 40,000 - 60,000 \$ per year. Of course, only highly educated employees were represented in the sample. It is certain that the stated situation creates a particular type of barrier to migrants who are not sufficiently qualified. While they can easily move to more developed areas in developed countries, such opportunities do not exist in underdeveloped countries as well as in developing countries (Gibson & McKenzie, 2010).

Of course, one must not forget the fact that the brain-drain to the most popular “destination” leaves employees from their home country in an unenviable position. For example, in the US alone, engineers from developed countries with PhDs account for 47% of the workforce working on computer software development. The situation is similar with employees in the medical profession (Gibson & McKenzie, 2011).

Also, often the emigrants in the immigrant country do the jobs for which they are overqualified. This phenomenon is called “brain-waste.” According to statistical reports, educated people from the science, technology, engineering and mathematics fields are often working lower class jobs. Also, reports from 2008, from the territory of the US, indicate that 90% of emigrants with a Master’s Degree and 96% of those with a PhD Degree have jobs which require only a college diploma and where most of the employees do not possess higher qualifications from their home country (Mattoo et al., 2008).

It is not a rare situation that a certain number of qualified migrants, after some time, decide to return to their home country. The most common reasons for this are improvement of the economic situation and better conditions in the labour market. Favourable outcomes of return are the logical outcome – they now “employ” their new

experiences, financial resources, business connections and acquaintances in their own country.

Also, according to various researches, highly educated migrants upon returning to their country often choose to start their own business. In fact, the duration of stay and the amount of money they have earned at the destination are positively correlate with the start of entrepreneurial activity. This trend is especially present among the Turkish migrants (Dustmann& Kirchkamp, 2001).

In the opinion of many authors, when the situation is viewed from a broader perspective, the majority of migrants returning home are those who did not achieve a satisfactory performance abroad. On the other hand, those who have provided good jobs and living conditions rarely come back regardless of the situation in their home country. Consideration should be given to the trend of large multinational companies opening their branches in a growing number of developing countries, as so often the migrants, as employees of the foreign branch, return to work the same job, but now from their home country (Luo & Wang, 2001).

The Diversity of Views on the Issue

It is interesting to note that three generations of economists have different views and understandings regarding the outcome of brain-drain.

The first movement was created in the 1960s and their main conclusion, in general, was that the brain-drain has a “neutral” impact on the country of origin. In their opinion, the departure of the qualified workforce can be successfully compensated by funds/assets they leave in their country. On the other hand, there are still people in the home country who will finish the work in a proper, professional manner. Also, they point out that the free migration can only have positive implications for the world economy (Grubel & Scott, 1966).

The second generation approached this issue in a much more critical way and presented a number of models that serve as support for the established hypotheses. Specifically, the first ideas were developed during the 1970s and this group of authors claimed that the country which qualified people are leaving in search of a better life is definitely the losing side. The brain-drain from certain areas/countries leads to the creation of imbalance at the international level, where rich countries are becoming richer and the poor poorer (Bhagwati & Rodriguez, 1975).

The third movement was created in the 1990s and observes the issue differently. In their opinion, the brain-drain should actually encourage home countries in the direction of thinking about revising their educational systems, and generally about the possibility of somehow turning this phenomenon into an opportunity. With the help of well-designed programs, it is possible to attract migrants to the home country, to work on creating different network forms of cooperation between developing countries and developed countries, etc. (Stark et al., 1997).

Push and Pull Factors

And in the case of brain-drains, the situation can be considered from the point of push and pull factors (Kello & Wachter, 2004).

The strongest push factor is certainly the conditions in the country - economic, political, legal, and other. When all these factors are unfavorable, the potential for brain-drain becomes stronger. In this situation, the pull factors of the destination for which the people are leaving will act - the possibility of better income and employment, a regulated economic system, etc.

Social security and the cost of living are stated as important push and pull factors. It is certain that people will go to the destinations where their income provides better management of the cost of living. Also, social conditions which are open for good pension possibilities at the end of working life are very favourable.

In considering the push and pull factors, one must not forget the family and friendship ties. For example, a person will make a quicker decision to go to another country if they have relatives and/or friends there. Then, if one spouse is already living at the destination, it is more likely that the other will follow them. The same is true for the Diaspora network in the country which is the preferred destination for emigration, and so the strong Diaspora will be a strong pull factor.

Statistics also indicate that the geographical distance between the home country and the preferred destination is a very important factor in the decision relating to departure. The possibility for the family, relatives and friends to see each other often will encourage the individual's decision to leave the home country.

Consideration should be also given to the diversity of languages, possible knowledge of the destination language, possibility to learn that language fast or at all, etc. Knowledge of the language is of great importance especially for highly professional personnel, although the situation is somewhat easier due to the fact that almost all multinational companies in the world use the English language for communication at work.

In addition to these factors, it is necessary to take into consideration some other factors which at first glance may seem less important. Firstly, the age - people who have reached 40 years of age rarely decide to emigrate. One of the explanations for this phenomenon, which is the most accepted, is that young people have more opportunities to get a return on their migration investment since the amortization period is considerably longer. Also, the majority of migrants are male. Women usually go to join their spouses. However, experts in this field predict that this trend is likely to change relatively in the future (Kello & Wachter, 2004).

Recent Understanding of the Brain-drain Phenomenon

It seems that recent research on migration carries many controversial issues. By examining the literature, migration is seen as a “one-way trip” in which the home country is left without qualified personnel in whose education it has invested a lot of resources. At the same time, migrants take with them their property leaving the home country “in the red.” However, recent research suggests quite the opposite - the migration of highly educated people produces low costs, and great benefit to the country of origin (in this case, developing countries).

Until recently, it was believed that brain-drain is the main reason for the shortage of educated workforce in underdeveloped or developing countries. However, the authors who conducted recent research cite many reasons to be taken into account (but cannot be linked to brain-drain). Firstly, it should be noted that a large number of factors influence an individual's decision whether and how much to invest in their education. Very strong disincentives were noted in a number of countries when it comes to the stated decision - individuals are not able to “monetize” their knowledge after leaving school due to a lack of jobs, corruption in the education system, setting excessively high fees for private education, etc. In this situation, the laws of supply and demand in the field of education lead to the fact that educational systems become really poor and low-quality. Thus, the brain-drain can be seen as a problem, but only partially (Clemens, 2013).

According to the researchers and authors, the costs of the country left by the qualified employees, i.e. which experienced a brain-drain, are much lower than traditionally believed. For example, the brain-drain, of doctors from Africa (Sahara region) has cost the home country around 2 billion \$. On the other hand, in the past five or six years, the OECD countries have invested 206 billion dollars in the development of the same area (Mills et al., 2011).

Even on the assumption that migrants are not returning to their country, they carry out the transfer of money, skills and democratic ideas in different ways. Their inspiring stories can initiate a variety of improvements in the education systems.

In particular, the benefits that the home country can have in this situation could be summarized, as follows:

Ana Lee Saxenian, a professor from Berkeley University, pointed out that the development of new industries in China, India, Israel, Taiwan, is directly influenced by the educated migrants from these areas (Saxenian, 2002). In her opinion, this is the case of technology transfer and networking between countries. Author from Harvard University states that the situation is the same when it comes to patents (Kerr, 2008)

Also, young people who plan to leave the home country and seek well-paid jobs in the other, invest money in education, which regardless of the further development of the situation remains in the country of origin. The authors came to the conclusion that the Philippines and Fiji are an extreme example of that practice (Clemens, 2009).

Migrants who have good jobs annually send remarkable sums of money to the home country. For example, African doctors working in the United States or Canada, for a period of three or four years, send money which practically paid off their education (Clemens, 2011).

Also, it is important to mention the opinion of Antonio Spilimbergo from the International Monetary Fund, who states that the home country is experiencing a strong democratic influence when most of its young people seek to study in foreign democratic countries.

Brain-circulation – New Overview of the Issue

The governments of developing countries have a very serious task, and that is to work on gathering new knowledge and, in general, new ways in which things can be done. Only in this way can they become competitive in the global market. Generally, further progress of the

developing countries depends on the use of knowledge, learning, new research, creation of innovation, collaboration with other countries (Kuznetsov & Sabel, 2006).

In today's knowledge society, in which globalization is becoming stronger, the “flow” of the workforce between markets has become normal. The authors cite that both countries, the home which people are leaving and the one they move to, can benefit from the knowledge and experience of high professionals. On the other hand, the trend of a qualified workforce looking for jobs not only in their country but internationally, too, is increasing, and so the authors increasingly began to write and speak about brain-circulation instead of the concept and term “brain-drain.” In fact, brain-circulation is a vital process that contributes greatly to the development of a country. Many countries are developing programs and policies which will help them bring their experts “home”, but also to attract a foreign qualified workforce. Of course, thus they will continuously strengthen their economy and competitiveness (Zweig, 2008).

The term “brain-circulation” was first introduced by the author Saxenian, and then numerous authors made their contributions and opinions. The term in this case emphasizes the two-way flow, i.e. the movement of the qualified workforce from country to country. After examining the literature, it can be concluded that most of the authors perceive the brain-circulation as a phenomenon typical of the modern era in which professionals migrate looking for work in different markets. This phenomenon is no longer seen as a loss, as is the case of brain-drain, but quite the opposite –the moving of intellectual resources can serve as a source of benefits for all the countries participating in the exchange (the ones which the experts are leaving and those they are coming to). The transfer of knowledge can be well used, in this case by both sides. Qualified employees are able to turn their knowledge and experience into innovative products/services which cannot be seen as a loss in any case. The developing countries whose employees have left to work in other countries shall profit from the money they send home, as well as from the innovations which promote the economic development of both countries. Brain-circulation as a global phenomenon affects the overall development of societies, nations and the global economy (Daugeliene, 2007).

The author Tung (2008) cites the factors which have a strong influence on the brain-circulation phenomenon as follows:

1. Globalization has made countries around the world interdependent, more than they have ever been in the history of mankind
2. Abolition of migration barriers which allows for the movement of workforce across different international markets (US, Canada, EU)
3. Existence of a large number of people with dual citizenship
4. Emergence and strengthening of the concept of a career without borders.

Entering the 21st century, knowledge and its diffusion are observed as initiators of the economic development of countries, both at the individual and global level. Human resources, with the characteristics of professionalism and possession of different skills have never been more important; they are the crucial factor which determines the competitiveness of a country. Therefore, every country should work on finding ways in which to attract and retain a highly qualified workforce.

Of course, consideration should be given to the fact that a country primarily must have resources, i.e. must be an attractive “destination” for the workforce. This depends

on several factors, but the most important one is to provide better conditions for work and life in general (Zweig, Fung & Han, 2008).

When considering the brain-circulation trend, it seems there is no universal recipe. The author Vetrovec emphasizes that it is necessary for all countries to work toward the harmonization of policies so this trend would result in a complete “win-win-win” effect. Thus, the countries the workforce leaves would benefit from the money the migrants send to the home country, the countries in which the workforce arrives would fill the jobs with employees who can perform the work in the best possible way, and finally, the migrants would provide better living and work conditions for themselves (Vetrovec, 2007).

Many authors point out that the existence of a strong Diaspora is one of the main factors which stimulate brain-circulation, and thus economic development. Today’s developed communication technology enables the Diaspora to really contribute to the development of institutions and companies in the home country (Teffer, 2004).

After examining the literature, it can be concluded that brain-circulation can be “profitable” for all parties. For example, during the 1970s and 1980s, India experienced a serious, even worrisome brain-drain. The qualified workforce left the country in large numbers and went to the West, in particular the US. However, this trend has now “reversed” - many Indian experts, trained in the US, have returned to India bringing with them knowledge and practical experience. This particularly applies to cities like Bangalore, Delhi, Hyderabad and Mumbai. These cities have received back a large number of professionals from the IT, finance and management fields (Chacko, 2007).

The situation is similar when it comes to China. However, the government has found a way to include students living and studying abroad in different national programs. Also, in 2001, the country adopted a new policy that has encouraged all Chinese immigrants to be involved in the modernization of their country. Of course, before that, a platform was created which allowed the best ways for their contribution. China is an example of a country that is not afraid of brain-circulation counting on all forms of assistance from the Diaspora.

The use of all the advantages of a strong Diaspora no longer leaves the country “desperate” when the qualified personnel migrate. Through various forms of exchange, they can always provide the necessary assistance to the development of the home country, and so contribute to further economic development. In particular, the measures taken by China relate to the following: 1. Opening of centres for post-doctoral studies in order to attract Chinese PhD students who have completed this part of their education abroad, 2. Opening of incubators for employees in the field of high technology, 3. Increased allocations in research centres, 4. Creating good working conditions for migrants who return to the home country, 5. Implementation of the program “Serve the Nation Without Returning to the Nation” (Zweig, Fung & Han, 2008).

Movement of Workforce at the Global Level

The new world economic consensus is deepened and widened the gap between rich and poor. From 1990 to 2011, the number of extremely poor has expanded from 217 million to 415 million people. The average life expectancy of the population in those environments is 56 years and the daily wage is less than \$ 1.25 (Momirović, Janković & Radelović, 2016). On the other hand, the according to the UN global database the

number of international migrants is growing dramatically - in 1960 there were 75 million, while in 2010 the number increased to 215 million. Analysts have tried to determine the underlying causes, and so they naturally took into account the total population growth at the global level. However, they came to the conclusion that this trend did not cause the growth of migration to this extent. The factor that has drastically increased the number of migrants, especially in the 1990s, is the dissolution of the USSR.

When observing the movement of migrants to more developed countries with high incomes, it can definitely be concluded that the number of migrants is steadily growing. Measured proportionally, in 2010, the number of people who sought “a better life” in a foreign country tripled compared to the 1960s (<http://esa.un.org/migration>).

Most migrants come from countries which do not belong to the OECD Group. According to valid statistical indicators, migration on the line of underdeveloped and developed OECD countries continues to dominate, which amounts to 72.6 million people, or 45% of international migration recorded in 2010. Then, there is the movement from developing countries to developed countries, or expressed numerically - 55 million people, accounting for 38% of total migration. And finally, there are movements between the developed countries, although their participation is the lowest and amounts to 28 million people, or 17% of the total international migration (Özden, Parsons, Schiff & Walmsley, 2011).

The share of highly educated migrants is much higher than in the lower educated. The most dramatic brain-drain was recorded in the small poor tropical countries, and the trend particularly intensified after the 1990s. Haiti and Jamaica can be mentioned as good examples, where nearly 80% of educated people have immigrated to another country. Also, about 20 countries have lost almost a third, even half of university-educated personnel, and among them are Libya, Somalia, Cambodia, Afghanistan, Hong Kong, Ireland (Docquier, Lowell & Marfouk, 2009).

OECD countries are the territories with the highest brain inflow, up to 85% of highly educated migrants from various countries around the world.

Authors Docquier and Marfouk cite that the term “highly educated emigrant” means any person older than 25 who came from another country and has an academic diploma. Also, we should mention the category of illegal emigrants regarding the migrants who do not have a resolved relocation status. After a certain period, they either return to the home country or regularize their status in the country where they decided to live (Docquier & Marfouk, 2006).

Conclusion

Exploring the literature on the brain-drain issue, we can conclude that this phenomenon is very present and current from different social aspects. Human capital and knowledge, are the driving force of development of every country, so at first it can be concluded that the brain-drain from underdeveloped and developing countries is detrimental to the overall situation of these countries. On the other hand, the countries to which educated people are going to find jobs and obtain better living conditions, are in a position to brain-gain. However, analyzing the available theories we encountered three completely contradictory economic standpoints when it comes to the outcome of brain-drains. The first consider that the brain drain has a “neutral” impact on the home country.

The second generation of researchers claims that the country which qualified people are leaving in search of a better life definitely suffers a loss, while the third movement argues that the brain-drain could actually be observed as an opportunity and incentive for the home countries in the direction of thinking about revising the educational systems.

There are a number of push and pull factors which influence the brain-drain phenomenon and that are generated from the general social, economic, family to geographical and natural conditions. Recent research has shown that the home country shall experience a strong democratic influence when a large number of young people are looking to study in foreign democratic countries. On the other hand, those who leave their home countries after graduation continue to send money, usually for different family reasons, which has a great significance in most underdeveloped countries in the overall economic order. In the research of any social phenomena the globalization factor must not be forgotten. It affects the transformation of the brain-drain phenomenon to brain-circulation phenomenon. Many countries are developing programs and policies which shall help in returning their experts “home”, and also attract foreign qualified personnel by simultaneously strengthening its economy and competitiveness. Recent research suggests that taking advantage of a strong Diaspora no longer leaves the country “desperate” when qualified personnel migrate. Through various forms of exchange, they can always provide the necessary assistance to the development of the home country and thus contribute to its further economic development.

We can conclude, based on the data we obtained, that the number of people in 2010 who sought “a better life” in a foreign country tripled compared to the 1960s (<http://esa.un.org/migration>). This alarming figure is the motive for authors to continue to work on this phenomenon in the context of their country.

References

- Ana Lee Saxenian (2002). Transnational Communities and the Evolution of Global Production Networks: The cases of Taiwan, China and India. *Industry and Innovation* 9, no3, 183-202 Available at www.cgdev.org/files/4473_file_Global_Hunt_for_Talent_Brief.pdf , last accessed 9 October 2008.
- Bhagwati, Jagdish N. & Carlos Rodriguez (1975): Welfare theoretical analyses of the brain drain, *Journal of Development Economics*, 2, 3: 195-222.
- Cervantes, Mario & Dominique Guellec (2002) —The brain drain: Old myths, new realities, *OECD Observer No. 230*, January.
- Chacko, E. (2007). From brain drain to brain gain: reverse migration to Bangalore and Hyderabad, India’s globalizing high tech cities. *Geo Journal*, 131 – 140.
- Daugeliene, R. (2007). The position of knowledge workers in knowledge-based economy: migration aspect. *European Integration Studies* (1), 103 – 112.
- Docquier, F. & A. Marfouk (2006): *International migration by educational attainment* (1990-2000). International Migration, Remittances and Development, Palgrave Macmillan: New York.

- Docquier, F., B. L. Lowell & A. Marfouk. (2009) A gendered assessment of highly skilled emigration. *Population and Development Review* 35/2. 297–322.
- Docquier, Frédéric & Hillel Rapoport. (2006) The brain drain, in L. Blume and S. Durlauf (eds.) *New Palgrave Dictionary of Economics* (second edition), London: Palgrave and MacMillan.
- Dustmann, Christian & Oliver Kirchkamp. (2001) *The optimal migration duration and activity choice after re-migration*. Institute for the Study of Labor (IZA) Discussion Paper no. 266. Bonn, Germany: IZA.
- Edward J. Mills et al (2011). The financial cost of doctors emigrating from sub Saharan Africa: human capital analysis. *British Medical Journal* 343: d7031
- Ellerman, D. (2006) *The dynamics of migration of the highly skilled: a survey of the literature*. In *Diaspora Networks and the International Migration of Skills – How Countries Can Draw on Their Talent Abroad*, ed. Y Kuznetsov, pp. 21–57. Washington DC: World Bank.
- Gibson, J. & McKenzie, D. (2010) The economic consequences of brain drain of the best and brightest: Microeconomic evidence from five countries, *World Bank Policy Research Working Paper* No. 5394.
- Gibson, J. & McKenzie, D. (2011) Eight Questions about Brain Drain. *Journal of Economic Perspectives*, 25 (3): 107-28
- Government of India. (2010) Prime Minister’s Office Press Release: Hiren Mukherjee Memorial Lecture Parliament of India Prime Minister’s Remarks. December 2. <http://pib.nic.in/release/release.asp?relid=68026>
- Grubel, H. & Scott, A. (1966) The international flow of human capital, *American Economic Review*, 56: 268-74.
- Johnson, H. (1965) The economics of the brain drain: The Canadian Case, *Minerva* 3(3): 299-311.
- Kapur, D & McHale, J. (2005) *The Global Migration of Talent: What Does it Mean for Developing Countries*. Centre for Global Development, Washington, DC.
- Kuznetsov, Y. & Sabel C. F. (2006) Work globally, develop locally: diaspora networks as entry point to knowledge-based development. *Innovation: Management, Policy & Practice* (8), 45-61.
- Luo, Y-L. & Wang, W. (2001) *High-skill migration and Chinese Taipei’s industrial development*. In *International mobility of highly skilled*, OECD, 253–70. Paris: OECD.
- Kello, M. & Wachter, B. (2004) *Brain Drain and Brain Gain: Migration in the European Union after Enlargement*, ACA, Academic Cooperation Association, Brussels
- Aaditya, M., Neagu, I., C. & Özden, C. (2008) Brain waste, Educated immigrants in the US labor market, *Journal of Development Economics* 87 : 255–269.
- Clemens, M. (2009) *Skill Flow: A Fundamental Reconsideration of Skilled worker Mobility and Development*. Working Paper 180, Center for Global Development, Washington, DC, August 27
- Clemens, M. (2011) *The Financial Consequences of High Skilled Emigration: Lessons from African Doctors Abroad*. In Sonia Plaza and DilipRatha, eds, *Diaspora for development in Africa* (Washington DC: World Bank, 2011)

- Clemens, M. (2013) *What Do We Know About Skilled Migration and development?*. Migration Policy Institute, Washington DC.
- Kaz, M. (1991) Scale economies in education and the brain drain problem, *International Economic Review*, 32, 3: 743-59.
- Momirović, D., Janković, D. & Randelović, M (2016) Invention, world economy and poor countries, *Ekonomika*, Vol. 62/1: 83-96.
- Özden, Ç., C. R. Parsons, M. Schiff, & T. L. Walmsley. Where on earth is everybody? The evolution of global bilateral migration 1960–2000? *World Bank Economic Review* 25:1 (2011): 12–56 [2].
- Omar, S. (1989) *World Bank calls for halt to Africa's brain drain*, New Scientist, November 25, page. 28.
- Saxenian, A. (2005) *From Brain Drain to Brain Circulation: Transnational Communities and Regional Upgrading in India and China*. Available at: <http://people.ischool.berkeley.edu/~anno/Papers/scid-2005.pdf>
- Oded, S., Helmenstein, C., & Prskawetz, A. (1997) A brain gain with a brain drain, *Economics Letters*, 55: 227-34.
- Teferra, D. (2004) *Brain Circulation: Unparalleled Opportunities, Underlying Challenges, and Outmoded Presumptions*. Available at: <http://www.wes.org/ewenr/symp/DamtewTeferraPaper.pdf>
- United Nations database on international migrant stock*, (2008) revision (<http://esa.un.org/migration>) and World Trade Organization online database (<http://stat.wto.org>)
- Vertovec, S. (2007) *Circular Migration: the way forward in global policy?* Available at: <http://www.imi.ox.ac.uk/pdfs/wp4-circular-migration-policy.pdf>
- Kerr, R., W. (2008) Ethnic Scientific communities and International Technology Diffusion. *The Review of Economics and Statistics* 90, no3, 518-37
- Yun-Chung, C. (2007) *The limits of brain circulation: Chinese returnees and technological development in Beijing*. Available at: <http://www.cctr.ust.hk/articles/pdf/WorkingPaper15.pdf>
- Zweig, D., Fung C. S., & Han D. (2008) Redefining the Brain Drain: China's "Diaspora Option". *Science, Technology & Society*, 1 – 33.
- Zweig, D., Fung C. S., & Han D. (2008) Redefining the Brain Drain: China's "Diaspora Option". *Science, Technology & Society*, 1 – 33.