

GLOBAL BRAIN DRAIN AND LABOR MARKET DYNAMICS: AN EXPLORATORY STUDY ON THE MOBILITY, IMPACTS, AND RETURN POTENTIAL OF SKILLED HUMAN CAPITAL

Sergen GÜRSOYⁱ 

Abstract

In today's rapidly accelerating globalization environment, the labor market is a primary factor impacting the economy. With the emergence of labor market distortions, academic focus is constantly increasing. This study aims to draw exploratory conclusions on the impact of brain drain on the socioeconomic structure and the potential for return by considering the mobility in labor markets where qualified human capital resides. It covers the push and pull factors for brain drain, working conditions, selection criteria, and human capital externalities. The aim is to explore the circulation of brain drain and brain gain by clarifying conceptual distinctions. Accordingly, a systematic synthesis is created based on the research findings and policy implications are presented. The research method utilizes document analysis, a qualitative research technique, and exploratory analysis is conducted on studies frequently cited within the scope of the topic. The findings suggest that brain drain in Turkey can be transformed into circulation rather than loss under proper governance. Institutionalizing sustainable economic and socio-cultural bridges, building an autonomous and merit-based career-governance infrastructure that will make the savings of returnees visible, and strengthening local-sectoral capacity in areas such as information technologies, health, and engineering to ensure skill compatibility appear critical.

Keywords Brain Drain, Reverse Brain Drain, Brain Circulation, Human Capital

Research and Publication Ethics Statement The study has been prepared in accordance with the rules required by research and publication ethics. It does not involve any situation that requires ethical committee approval.

Financial Support and Conflict of Interest Statement No support has been received from any institution or organization for this study.

INTRODUCTION

The concept of migration is one of the most important phenomena since the beginning of human history. It is a movement of displacement from one area to another for various reasons. Although there are many compulsory factors such as war, famine, climate, etc. in the formation of the phenomenon of migration, it is observed that the tendencies towards voluntary migration have increased in the last fifty years. Especially as a result of the emergence of labor migration, the rapid transfer of human capital in the last twenty years has also been effective. Highly skilled individuals have had to migrate from one country to another for a variety of socio-economic reasons. Brain drain is defined as the process of migration from one country to another, especially for highly skilled individuals such as engineers and health workers. This phenomenon creates socio-economic multidimensional effects such as labor market dynamics, productivity level, and social policy perspectives of countries beyond individual career planning (Docquier & Rapoport, 2012). Especially in today's labor market, where human capital is gaining importance day by day, there is an increase in global competition for highly skilled workers (Kerr et al., 2016). With the concept of brain drain, developed countries gain productivity advantage on a sectoral basis on the one hand, while on the other hand, costs such as living expenses and education costs incurred in the source countries are not reciprocated and a shortage of qualified labor may arise.

The phenomenon of brain drain involves many labor economic parameters such as supply-demand balance, working conditions, labor intensity, and mobility of human capital (Clemens, 2011). The effects on the labor market in the destination country are shaped by factors such as wage pressure, unfavorable working conditions, and skill mismatches that may arise when

ⁱ Lecturer Dr. Alanya Alaaddin Keykubat University, Career Center, Alanya-Antalya, Türkiye. ORCID: 0000-0002-9032-2999. E-mail: sergen.gursoy@alanya.edu.tr
Gönderim (Submission): 13.11.2025. Kabul (Acceptance): 17.12.2025.

migrant workers compete with local workers. The migration of white- and gold-collar workers with high human capital, especially in science, technology, engineering, mathematics, etc., fills the labor need for destination countries in sectors that require technology, but brings about sectoral contraction and productivity declines in source countries (Mihi-Ramírez et al., 2016). Brain drain is closely related to the effectiveness of public policies in both source and destination countries and the sustainable context formed within the framework of the importance given to the socio-economic structure. In the case of the source country, the migration of individuals with high human capital levels, who are trained using public resources, reduces the outputs of the state's investments in education and results in a loss of added value in return for the costs incurred (Özden & Schiff, 2005). Migration-prone individuals, which pose a great risk for source countries, have the potential to create political problems in the context of labor planning by leaving the local labor market. The fact that the concept has taken place in such a grave situation has necessitated holistic evaluations and policy recommendations in both theoretical and practical contexts.

This chapter aims to provide an up-to-date and holistic assessment of the multi-stage impact of brain drain on the labor market from this perspective. Based on empirical studies and models developed within the framework of theoretical developments, the dynamics of the labor market for both source and destination countries are examined. On the other hand, in addition to the global context, a sectoral impact and a holistic perspective on skilled labor in Turkey is presented. In this direction, it is aimed to reduce the negative effects of brain drain and strengthen reverse migration strategies by developing recommendations for policy makers.

RESEARCH METHODOLOGY

The research is conducted using document analysis and qualitative analysis to systematically synthesize scientific evidence on the mobility of individuals with high human capital. The study design is based on the integration of document analysis with the logic of systematic review. First, the scope was defined, then source discovery, screening, and data extraction were conducted. Finally, qualitative content analysis and exploratory content definition were applied (Bowen, 2009; Levac et al., 2010). The research data sources include articles, book chapters, and international organization reports on brain drain. National and international studies focusing on brain drain, but methodologically opaque or lacking full-text access, were excluded. The screening process was quite comprehensive. Academic articles, book chapters, technical reports from international organizations, and national policy documents on brain drain, talent mobility, diaspora relations, brain circulation, and return dynamics were included in the review. This screening initially yielded a fairly extensive document pool; however, because not all studies are of the same quality, texts that did not directly address the scope or lacked methodological transparency were eliminated. Following full-text reviews, only documents that could be linked to the central research question, provided sufficient content, and provided an analytical contribution were considered. This approach also aligns with the logic of qualitative research, which focuses on content quality rather than sample size. The data sources were obtained through Web of Science, Scopus, Google Scholar, and Dergipark search channels. Search strings were generated by scanning the topic-specific brain drain. Before the elimination method, preliminary eligibility was assessed using title and abstract, and then full texts were tested against inclusion criteria. For the filtered data, publication year, context, method, sample/scope, examined outcomes, key findings and policy implications were defined. The search process was conducted between October 2024 and January 2025, and all studies accessible in the databases were evaluated during this period. No specific publication year limitation was applied to the research, and the literature, spanning from past to present, was examined holistically to capture the historical development and conceptual transformation of

brain drain. The screening was conducted in two steps. In the first step, a rapid relevance assessment was conducted based on titles and abstracts, and in the second step, the relevance of the documents to the study questions was assessed in more detail through a full-text review. For each document, the year of publication, context, methodological approach, scope of content, and policy contributions were recorded separately. This systematic recording process made different documents comparable and provided a solid basis for the analysis phase. The analysis process was based on qualitative content analysis. Each document was read in detail, and frequently recurring concepts, phenomena, causal explanations, and relationships in the texts were first marked as open codes. During this initial reading, both the conceptual framework suggested by the literature and new semantic categories derived from the text itself were considered. Codes with similar content were then brought together, and broader thematic clusters encompassing economic, managerial, socio-cultural, and technological aspects were created. In the final stage of the analysis, these themes were transformed into a more holistic structure ranging from the push and pull mechanisms of brain drain to motivations for return. Conceptual consistency was strengthened by comparing common patterns emerging across different document types. This multilayered reading and coding process prevented the research from being a mere compilation of findings; it enabled a more analytical and explanatory contribution to the literature through the strengthening of themes. This methodological framework ensured that the study proceeded with a qualitative research logic that was both comprehensive and tractable. The systematic approach applied throughout the selection, processing, and analysis of documents contributed to the reproducibility of the research and ensured that the resulting themes were authentically data-based.

LITERATURE REVIEW

Brain drain is an important concept that affects both countries in the socio-economic context. Beyond individual preferences, it also creates advantage-disadvantage outcomes in labor markets according to countries. Individuals who leave the country through brain drain create a shortage of labor supply in the country of origin, on the other hand, they are at a stage of increasing productivity by diversifying the supply of qualified labor for their destination countries. The literature on brain drain demonstrates that the factors explaining mobility fall under four main headings: push factors, pull factors, institutional determinants, and potential for return. This thematic distinction places scattered findings within a more coherent framework and clarifies the multidimensional nature of migration dynamics. Studies focusing on push factors indicate that economic fragility, limited research opportunities, and uncertain career paths drive young, highly qualified individuals, in particular, to migrate abroad (Docquier & Rapoport, 2012). These findings reveal that brain drain is often associated with structural bottlenecks individuals face in their home countries. Research on pull factors emphasizes that factors such as high wages, strong scientific infrastructure, international collaboration opportunities, and professional autonomy offered by developed countries support the decision to migrate (Kerr et al., 2015). The literature suggests that these factors are particularly influential in STEM fields. Studies on institutional determinants reveal that governance quality, perceived merit, academic freedom, and transparency in administrative processes are critical components in shaping the decision to migrate (Acemoglu & Robinson, 2019). This approach demonstrates that brain drain is not merely an economic calculation; it is also closely linked to individuals' trust in institutions. Research on the potential for return suggests that diaspora networks facilitate the transfer of skills acquired abroad, and that return is closely linked to institutional recognition, career opportunities, and professional autonomy (Saxenian, 2005; Clemens, 2014). This literature demonstrates that, under the right conditions, brain drain can transform into a brain drain rather than a permanent loss. This thematic synthesis facilitates understanding commonalities that may not be apparent through a mere sequential review of the

literature and establishes a more holistic theoretical framework for the research. This strengthens the relationship between the findings and the literature, and the discussion section is grounded in a more analytical framework.

Neoclassical economic theories, human capital models, and institutionalist perspectives are noteworthy as theoretical developments on the effects of brain drain on the labor market, especially in the context of labor economics. Kapur and McHale (2005) state that the poor-to-rich oriented full human capital ratios are accelerating due to the increasingly skill-oriented migration policies and aging structural structure of developed countries, and that the effects of this process on development are more complex than thought. While the theoretical foundation of this study discusses concepts from a broad literature, its fundamental foundation lies in an explanatory framework that combines the human capital approach and the institutional perspective. Findings demonstrating that the factors determining the migration decision of skilled labor depend not only on individual return calculations but also on factors such as the opportunity structure offered by institutions, professional autonomy, scientific infrastructure, and governance quality, position the study at the intersection of these two approaches. While neoclassical and endogenous growth models provide a conceptual framework for understanding the economic aspects of migration, the study's explanatory weight lies in the integrated institutional-human capital approach, which examines the institutional conditions under which skilled human capital does not turn into a loss and in which contexts it generates the potential for circulation and return. Therefore, while drawing on the descriptive contributions of different theories, the article primarily pursues its analytical discussion within this framework, which explains the interaction between human capital accumulation and institutional capacity.

Brain Drain from the Perspective of Neoclassical Economic Theories

Neoclassical employment theory is shaped by the realist thinking of individuals and their actions are shaped towards the highest income earning potential of their labor as they are in the rational decision-making stage (Sjaastad, 1962). In this context, the concept of brain drain is an output of the decision-making stages that employees make as a result of the analysis of the cost and benefit comparison on the basis of real wage differences and employment opportunities by country. Individuals have an incentive to move in the context of higher living and working conditions in the destination country, and economic difficulties, political uncertainties and career constraints in the sending countries are seen as triggering factors for migration (Borjas, 1989). In neoclassical employment theory, one of the main reasons for brain drain is the differences in marginal returns to labor between sending and receiving countries.

Individuals become mobile as a result of the advantageous cost of living, high wage levels and career planning in the countries of migration. In the theoretical context, as a result of individuals' investment in human capital such as education, skills, talents, etc., countries receiving migration have returns (Becker, 1964). However, in the long run, the continuous transfer of skilled labor to developed countries leads to a decrease in wage levels for those working at high levels in these countries over time, and at the same time, wage increases are experienced in sending countries due to the decrease in labor supply, and employees are included in the balancing mechanism (Todaro, 1969). It is seen that the factors that cause brain drain are not only due to material returns, but also many other conditions such as scientific freedom, academic environment, cultural values, social norms, research opportunities, etc. (Kahanec & Zimmermann, 2011). Ultimately, although neoclassical theory emphasizes rationality and wage differentials as the basis for brain drain, it tends to ignore social structures, political influences, social capital, infrastructural conditions, freedom of expression, and merit issues. However, it should not be forgotten that the decisions of an individual's brain drain movement are not only economic but also have socio-political effects.

Brain Drain from the Perspective of Endogenous Growth Theory

Endogenous growth models argue that knowledge accumulation and technological developments are at the heart of economic development (Aghion & Howitt, 1992). In this context, in addition to the productivity generated by highly skilled migrants, knowledge spillovers in the socio-economic context increase the production capacity in the destination country within the scope of social capital by encouraging institutional learning and innovative reflections. In the context of OECD countries, it is known that qualified migrant workers positively affect patent output, scientific publication impact, and entrepreneurial activities in destination countries (Hunt & Gauthier-Loiselle, 2010). Ultimately, brain drain is seen as one of the only factors affecting the long-term growth capacity of a country. At the same time, the emigration of highly skilled individuals from the country of origin reduces the long-term growth potential of that country by reducing its knowledge and social capital (Beine et al., 2001). This is because one of the basic assumptions of endogenous growth theories is that human capital is effective in economic growth through the speed of diffusion.

On the other hand, since technological developments are among the factors affecting economic development, it is argued that they are accelerated by the participation of highly skilled individuals in research and development (R&D) activities (Romer, 1990). Brain drain limits the R&D capacity and output for innovative patents for source countries and may have a negative impact on growth. Especially for developing countries, they may become dependent on external sources for innovative outputs based on R&D activities due to the lack of sufficient qualified labor force (Aghion & Howitt, 1992). This theory adopts the view that education and knowledge transfer contribute to society by spreading through externalities. For receiving countries, an increase in the number of educated individuals has the potential to affect knowledge spillovers and hence productivity, while for sending countries, it brings about a decline in social capital. According to some endogenous growth theorists, brain drain does not always have a negative impact on the sending country, and in case of reverse migration of individuals, knowledge, physical capital, social capital and experience obtained from abroad are transferred to the source country (Stark et al., 1997). However, this process may take place in the long term or the transfer may be limited due to low return rates.

Brain Drain from the Perspective of Human Capital Approach

Schutz (1961) had an impact on the institutionalization of this theory, the foundation of which was laid by Adam Smith. Human capital theory defines the impact of factors that provide gains in individuals' skills, abilities, experience, knowledge, etc. on economic growth and productivity. From this perspective, brain drain is characterized as the transfer of the return output provided by the investment made by individuals in their knowledge and skills to other countries. It appears as a rational investment preference for individuals to earn high wages and benefit from career opportunities (Becker, 1964). The migration of highly skilled labor results in countries losing output in return for investing in education. The migration of individuals who have been trained by incurring the cost of state-funded education abroad triggers the situation where public investments cannot support domestic financing (Docquier & Rapoport, 2007). Especially for developing countries, the resulting loss of productivity brings with it risks such as a decline in innovation capacity and weak institutionalization.

On the other hand, the trained labor force coming to the destination countries has a rapid impact on the increase in value added in sectors such as R&D, education, health and technology without incurring any cost in terms of public investments. According to human capital theory, the social diffusion of knowledge and skills is an important factor in the formation of the externality effect. It is valuable not only for the individual and his/her family but also for the transfer of knowledge between countries. Especially in cases of reverse brain drain, individuals

returning to the source country may tend to create surplus value by transferring their human capital gains to the country of origin (Saxenian, 2006). However, in contrast to this exceptional situation, in brain drain, mostly educated individuals are unable to operate in their country of citizenship, which affects inefficiency on a sectoral basis. Especially in underdeveloped countries of Africa, the migration of people with professions such as doctors, nurses, etc. can have negative consequences on health services in countries (Clemens, 2007). Considering all these problems, it is necessary to create employment and working conditions for the skills possessed by individuals with high human capital.

Institutionalist and Structuralist Approaches

The brain drain movement, which usually takes place from underdeveloped and developing countries to developed countries, creates transformations not only at the individual level but also at the institutional and structural level. Institutionalist and structuralist theories evaluate the phenomenon of brain drain in broad social, historical and structural contexts. In this context, brain drain is not only evaluated by considering the economic gain of the individual, but also shaped by conditions such as institutional weakness, structural dependency, unequal development, etc. First of all, from the perspective of the institutionalist approach, the brain drain movement focuses on the impact of formal and informal institutions beyond market signals. For this reason, brain drain is shaped not only by income differences but also by the institutional environments in which individuals live. In this regard, brain drain movement is experienced as a result of conditions such as weak institutional structure, legal uncertainty, merit-based disorder, political instability, corruption, and restriction of freedom in the source countries (Kaufmann et al., 2009). In this regard, individuals migrate to live in a stable and transparent socio-economic order that they trust. In particular, migration mobility accelerates as a result of subjective criteria based on loyalty instead of a merit-based production system. In structures where political and political connections and ideological harmony are prioritized instead of taking into account the human capital of qualified employees, talented individuals are pushed out of the system (Acemoglu & Robinson, 2013). Moreover, according to the institutionalist perspective, when factors such as justice, education, job opportunities and infrastructural facilities are implemented, a reverse brain drain movement may emerge.

On the other hand, for those who adopt a structuralist perspective, the concept of brain drain is formed as a product of structural dependency relations in the global context beyond individual decisions. Developed countries are located in the center and undeveloped-developing countries are called periphery. While specialization based on high technology comes to the forefront in central countries, low value-added jobs and the workforce are shaped accordingly in peripheral countries. Therefore, the highly qualified labor force is oriented towards the central countries where productivity is used at a high level. In this process, peripheral countries lose their trained individuals to central countries and may become more dependent on those countries (Cardoso & Faletto, 1979). The continuous loss of highly skilled labor and technology in peripheral countries causes them to be at a stage that limits their growth capacity. The migration of gold-collar individuals reduces R&D capacity, limits productivity growth and causes a growth trap. Brain drain is therefore considered as a structural obstacle to economic growth. In this case, which is seen as intellectual capital, the transfer of human capital to central countries leads to a deepening of growth differences between countries (Rønning, 2006).

The Effects of Brain Drain: Micro and Macro Level Analysis

Brain drain has many socio-economic impacts on destination and source countries. One of the biggest effects covers the basic parameters of labor markets. Integration of skilled migrants into the labor market, which is one of the most important drivers of a country's economic growth,

can lead to suppression in working conditions due to an increase in labor supply in strategic sectors such as technology, health and science (Borjas & Katz, 2007). As a result, it increases competition among individuals with the same skill level and brings wage pressures to the agenda. In the long run, it is accepted that qualified migrants have the opportunity to increase productive and innovation capacity (Peri, 2012). In terms of countries of origin in brain drain, migration mobility in many occupational groups such as doctors, engineers, academicians, technicians, etc. within the fields of activity for the public sector can be effective in reducing the quality of service in the public sector (Bhargava & Docquier, 2008). With the tendency of highly qualified employees to migrate, human capital deficiency may emerge in the labor market in the source countries, and in the long run, the public expenditure deficit and the efficiency of education investments for this purpose decrease (Docquier & Rapoport, 2012).

If there is a mismatch between the qualifications of individuals experiencing brain drain and their positions in the labor market, inefficiency arises both in the individual and socio-economic context. If there is a similarity of qualifications between the native labor force and brain migrants, it can lead to low wages and even unemployment by increasing the number of individuals with similar qualifications (Dustman et al., 2010). However, through the qualifications and cultural diversity created by migrants, migrants often enable competitive advantage to be gained in the destination country. Especially in mass multinational companies and export-oriented sectors, migrants' access to different social networks, flexibility in customer base and language skills can be an important outcome for strategic development (Nathan, 2014). For employers, highly skilled migrants are generally seen to be beneficial in terms of both flexible employment and innovative capacity. The potential for innovative production in the fields of knowledge, technology, engineering, mathematics, etc. increases. Especially in the US, one of the countries with the highest brain drain, migrants are known to have a positive impact on R&D activities and patent increases (Kerr, 2013). However, the employer is shaped not only by technical conditions but also by the legal status of the country, language proficiency, socio-cultural adaptation capacity and institutionalization. For this reason, it is emphasized that the labor force participation of brain migrants is not only about political conditions but also about social integration mechanisms (Dustmann & Glitz, 2011).

For source countries, brain drain reduces the productive output of public resources, especially education investments, and reduces fiscal efficiency. Although education expenditures are largely borne by countries of origin, these individuals are characterized as a complete loss of public investment (Desai et al., 2009). Migrants with high skill levels in destination countries may contribute to social security systems in particular. Since the vast majority of migrants are individuals who have already come to work, their health expenditures for destination countries are low in the background and their contribution to public resources can be high. For this reason, social insurance resources generally have the potential to have a positive impact on destination countries in the short or medium term. However, in the long run, systemic adaptation problems may arise in terms of social security entitlements, pension transfers and access to social services (OECD, 2019).

Brain Drain in Turkey: A Current Assessment on Trends, Causes and Potential for Return

Brain drain is one of the most exposed phenomena, especially in the global intensive period. Although labor migration has been evident for every country for a long time, the phenomenon of brain drain has become popular after the 1980s with the increasing importance of the concept of human capital. This concept, which is popular with all countries in the global context, has started to gain prominence especially after the 2000s. Especially in the process until the 2000s, the perception of brain drain had become popular due to economic instabilities, political

pressures, etc. deadlocks. Since the past, brain drain has come to the fore in Turkey due to economic concerns, instability, lack of emphasis on scientific activities, and lack of career development. According to the World Population Review (2024) 2025 Brain Drain Index, Turkey's score of 3.6 indicates that the country is at moderate risk of brain drain. However, because the index only measures general migration trends, it does not fully reflect deeper indicators such as the distribution of highly skilled labor across fields, the level of expertise, and the loss of strategic sectors. Therefore, the index alone is insufficient to assess Turkey's brain drain dynamics and must be supported by national and international empirical data. According to a comprehensive report by TÜİK (Turkish Statistical Institute) (2024), when the brain drain rates for graduates in Türkiye are examined at the program level, the highest rates are seen in the fields of molecular biology and genetics (17.9%), bioengineering (10.2%), management engineering (9.8%), electronics engineering (9.1%), mathematical engineering (8.9%), and computer engineering (8.4%). This distribution reveals that graduates trained in basic life sciences, engineering, and technology are particularly likely to pursue higher education abroad. The same report also evaluates graduates' country of origin preferences, with the United States (21.4%), Germany (17.5%), the United Kingdom (11.2%), the Netherlands (6.9%), and Canada (4.9%) being the top destinations. Another notable finding concerns the correspondence between country preferences and graduate fields. While the largest portion of graduates heading to the United States and Canada are individuals from business and management fields, computer engineering graduates appear to have a significant weight among those migrating to Germany, the United Kingdom and the Netherlands. Low wages, non-merit hiring, limited investments in R&D activities, and low wages of the highly qualified labor force, which includes young academics, engineers, software/designers, have been factors in the preference for abroad. Especially with the effect of the unstable structure of the 1980-2000 years, it is seen that there is a two-fold trend in the outflow of educated individuals after the 2000s (OECD, 2022). However, stating that this process emerged entirely as a result of negative reasons and that its outcomes would be negative is a narrow definition of the issue. Individuals also define brain drain as gaining experience abroad in order to develop at a certain stage of their career rather than leaving their country of origin permanently (Tansel & Güngör, 2014). For this reason, it should be taken into consideration that it has the potential to return with human capital increase rather than permanent departure.

One of the most important professions with high demand for brain drain has been academia. For academic circles, the reflection of brain drain can result in an increase in research capacity, the number of publications, and the quality of teaching and learning. It can lead to positive results such as developing joint projects by increasing cooperation, ensuring scientific diversity and ensuring transfer to the country of origin. Thus, even if the output in the country of origin is negative in the short term, it is obvious that there will be positive reflections with returns in the long term. For this reason, especially in a country like Turkey, where there is a majority of individuals with young potential, the potential for return as a reflection of a possible brain drain in the long term can create an opportunity for the country. Human capital such as knowledge, experience, skills, social networks, etc. gained abroad by highly qualified individuals can create a significant social capital contribution if they return to the country (Wadhwa et al., 2009). It should be recognized that individuals who leave the country, especially in the early stages of their careers, have the potential to return to Turkey if given the opportunity. As a matter of fact, TÜBİTAK provides incentives for brain migrants to return within the framework of the 2232 "International Leading Researchers Program", and it is important to continue structural reforms in order to create lasting effects (Akyıldız, 2025). In this regard, structural reforms that encourage the return of brain migrants are generally listed as: scientific freedom and freedom of expression, support for career development, research incentives and transparency, socio-cultural belonging, etc. (OECD, 2022). Many developing countries have started to see brain

drain as a mechanism of circulation rather than lost human capital. For this reason, strategies for gold-collar workers who go abroad in Turkey support the development of an interaction-oriented policy approach that establishes a link between the destination country and the source country rather than expecting a return. In Turkey, brain drain should not only be seen as a “problem of the outgoing” but also as a “field of potentials” where knowledge, skills and global connections can be regained. It should not be forgotten that the problem is not a one-way loss, but a process that can turn into a mutual gain when managed properly. Through structural reforms and diaspora policies to strengthen the potential for return, Turkey can turn brain drain into a part of sustainable development.

Brain Drain in a Global Context: Causes, Effects

There are many factors that cause brain drain movement. As well as individual reasons, there are many global factors such as knowledge transfer between countries, impact on development, and gaining competitive advantage (Dustmann & Glitz, 2011). One of the most fundamental factors in brain drain is the conditions such as high income advantage, social security, economic advantages, free thinking environment offered by developed countries. In particular, it is seen that the majority of the brain drain movement takes place with the transition from undeveloped-developing countries to OECD countries. As a result, serious structural problems arising from the unbalanced labor market between developed countries and other countries arise. Universities and research centers in particular encourage the mobility of high profile researchers in order to gain a global competitive advantage. This not only accelerates the transition of postdoctoral researchers from developing countries to developed countries, but also ensures their permanence (Franzoni et al., 2012). Another reason is the migration of individuals who are exposed to sticky problems such as intensification of authoritarian regimes, restriction of freedom of expression, corruption, poverty, and lack of merit (Czaika & Parsons, 2017). Highly qualified individuals are driven not only by economic factors but also by conditions such as security, freedom, dignity, etc. (Czaika & Parsons, 2017).

Brain drain has various consequences for source and destination countries in the global context. For low-development countries, brain drain creates a labor shortage in strategic areas that require high qualifications such as health, education and R&D, and deepens social inequality by reducing their development capacity. It is known that the migration of health workers, especially in Sub-Saharan Africa, the Caribbean and underdeveloped Asian countries, poses a vital risk to public health (WHO, 2010). However, it should not be forgotten that in the global context, migration is not only a loss but also a phenomenon that can be turned into a gain with the right policies. At this point, the concepts of “brain circulation” or “brain sharing” are increasingly being proposed instead of “brain drain” (Faist, 2008). On the other hand, for destination countries, brain drain is an important condition for closing the talent gap in science and technology-intensive fields, accelerating innovation, supporting economic development and gaining competitive advantage (Hunt & Gauthier-Loiselle, 2010). In fact, it is known that a significant number of academically successful scientists in the USA are of immigrant origin.

An In-Depth Study on Return Potential

For many years, the main target of studies on brain drain has been the migration movement from low-development countries to developed countries. However, a situation that has been overlooked, especially in recent years, has been the reversal of brain drain. The classical approach to brain drain has been replaced by a dynamic and bidirectional perspective. This situation causes the brain drain to evolve into the concept of brain circulation, taking into account that the brain drain has the potential to return. These concepts have revealed the possibility of highly qualified individuals returning to the country of origin with all the human

capital factors obtained at the same time rather than leaving the source country and accelerating the spread of social capital through social networks (Tung, 2008). Brain circulation is seen as the transfer of human capital gains to countries of origin beyond the permanent return of individuals to the country of origin. Migrants not only contribute to the destination country, but also transfer this knowledge to the country of origin, providing consultancy services and enabling investments through cooperation (Saxenian, 2005). It enables strong diaspora networks, especially for knowledge-based sectors. International collaborations contribute to academic publications, patents, start-ups and mentoring activities. In this context, India has enabled the innovation capacities of its own countries to increase due to its Silicon Valley employees. Similarly, it is known that Chinese researchers have made significant gains in development by transferring their human capital to their country. In this way, it increases the integration of the source country into the knowledge economy by encouraging both knowledge circulation and scientific diversification.

Brain migrants who have the potential to return have the potential to return from source countries to destination countries after a certain period of time, and the contribution of the return to the country becomes important. In this process, individuals can contribute to productivity by integrating their human capital gains abroad into the labor market of the source country (Dustmann & Weiss, 2007). The causal reasons for reverse brain drain are listed as conditions such as economic and political stability in the source country, ensuring rights and freedoms, increasing the quality of life, providing career opportunities, etc. (Cassarino, 2013). However, low rates of return to developing countries are associated with the persistence of structural and institutional barriers. Weak merit-based employment, strict implementation of bureaucracy, lack of entrepreneurial atmosphere, and inadequate R&D infrastructure can have a negative impact on reverse brain drain.

In the global context, projects and programs that support return in developing countries have emerged and have turned into a structure that encourages reverse brain drain. Academic positions, laboratories, entrepreneurship incentives suitable for researchers can have an accelerating effect on return. Ultimately, there are four basic conditions that have the potential to create sub-units for the circulation of brain drain or the acceleration of return;

- Local strategies for reverse brain drain and mobility: It is important to build constructive and strategic relationships with migrants in countries of origin to address diaspora policies in both economic development and socio-cultural contexts.
- Autonomous voluntary thinking and merit-based infrastructure: Effective utilization of the human capital acquired by returnees depends on the establishment of a comprehensive system in terms of both career opportunities and governance.
- Sectoral and local capacity: In order for returnees to be employed according to their competencies, to assume an entrepreneurial role or to carry out scientific activities, sectoral competence must be established in the country. Otherwise, the potential of individuals is not reflected in added value and accelerates re-migration.
- Increasing incentives for brain circulation: Establishing strategies as a result of policies such as the creation of joint workspaces and funds within the framework of international cooperation, granting dual citizenship, and establishing R&D infrastructure.

Ultimately, the return potential of brain migrants and the phenomena of brain circulation show that migration is not only a stage that generates stable losses, but can also bring significant gains to both the country of origin and individuals when managed with the right policies and institutions. Therefore, engaging in networks with migrants, integrating their gains into national

development, and constructively designing the global labor cycle are critical for sustainable brain drain management.

CONCLUSION AND POLICY RECOMMENDATIONS

This study distinguishes itself from existing studies in the literature by examining the international mobility of highly skilled workers in Turkey not merely as an economic "exit" phenomenon but within a holistic framework that addresses multilayered components such as institutional capacity, professional autonomy, human capital externalities, and potential for return. In particular, the combination of national and international empirical data on brain drain with thematic content analysis creates a unique field of interpretation that evaluates both the causes of migration and the capacity for return and circulation within the same model in the Turkish context. In this respect, the study repositions the concepts of "brain drain" and "brain circulation," which are often treated separately in the existing literature, on a common ground for explanation. Furthermore, the study fills a significant gap in the literature by providing an analytical synthesis that establishes the cause-and-effect relationship between current brain drain statistics for higher education graduates, field and program-based exit trends, and country preferences. By systematically analyzing scattered data on the mobility of human capital in Turkey, it offers an original, governance-focused assessment of the conditions under which skilled migration can translate into loss and circulation. Therefore, the study not only describes the current situation but also offers a concrete and innovative contribution to the literature by proposing a conceptual framework for the manageability of brain drain.

Brain drain is not only framed according to individual patterns but also differentiates according to the socio-economic and cultural structure of countries at the macro level. Factors such as countries' growth capacities, competitiveness in the labor market, and social capital arising from human capital are structural concepts that are directly effective. In general, the concept of brain drain is considered as a loss of highly qualified labor force for countries with low levels of development, while it is defined as one of the most important factors in creating added value for developed countries (Docquier & Rapoport, 2012). In this context, multidimensional policy approaches that encourage returns to ensure sustainable socio-economic development by identifying the factors that cause brain drain become important.

The content obtained from the document analysis demonstrates that brain drain is not merely an individual choice but a multilayered phenomenon shaped by economic conditions, institutional structures, professional expectations, and quality of life. The first reading revealed that mobility occurs in a context that goes beyond economic returns; factors such as institutional credibility, the quality of the scientific ecosystem, research infrastructure, and professional autonomy are decisive in decision-making processes. Frequently recurring concepts across the codes indicate that many of the relationships explaining brain drain are structurally based, with individuals evaluating their decisions not only by wage levels but also by the integrity of the work environment provided by institutions. The second reading revealed strong overlap between economic and institutional explanations. While economic-focused studies emphasize wage differentials and employment security, institutionally framed studies emphasize academic and professional advancement opportunities, merit mechanisms, and management quality. When these two approaches are considered together, it becomes clear that skilled migration is closely linked to institutions' ability to retain human capital, and that brain drain also becomes an indicator of governance. A comparison of documents on return trends reveals that the decision is often related not to economic convergence, but to professional autonomy, social ties, shifting priorities throughout the life cycle, and the reciprocity of accumulated knowledge in the country. In this context, the concept of "brain drain" is understood to refer to a structure in which individuals can transfer knowledge not only by returning to their home countries but also

through diaspora channels. This flow is particularly evident in the fields of technology, engineering, healthcare, and academia. Studies focusing on the Turkish context reveal that high-quality migration is not limited to economic conditions but is closely linked to scientific freedom, perception of merit, quality of governance, professional satisfaction, and lifestyle expectations. In cases where return is possible, the recognition of individuals' knowledge, the provision of institutional autonomy, and the transparency of professional advancement paths become decisive. The analysis demonstrates that these conditions are not yet fully institutionalized in Turkey, and therefore, brain drain operates within a limited scope. Overall, the content analysis demonstrates that brain drain is too complex to be explained by a single determinant. Economic conditions, institutional capacity, quality of life, professional expectations, and social connections act as complementary components. This multilayered structure demonstrates that, under appropriate governance conditions, brain drain can transform from a loss into a circulation mechanism, clearly supporting the integrated interpretation aimed at by the research.

Directing a sustainable mobility of highly qualified workforce in Turkey requires a policy set that clarifies institutions' areas of responsibility and strengthens their implementation capacity. Within this framework, it is crucial for higher education institutions to facilitate access to research funds and create clear and predictable career paths for young researchers. Steps to strengthen university infrastructure are particularly effective tools for encouraging the retention of individuals specializing in science and technology. TÜBİTAK and the Ministry of Industry and Technology should prioritize targeted programs that increase the motivation for researchers to return abroad. Removing bureaucratic burdens from R&D support, strengthening performance-based monitoring mechanisms, and expanding repatriation scholarships could have a significant impact on reversing the brain drain. While these programs may incur short-term costs, in the long term, recapturing qualified human resources will increase economic and scientific returns. Regulations regarding working life are also crucial for retaining a skilled workforce in the country. It is crucial to increase predictability in employment conditions, ensure merit in professional advancement, and reduce uncertainty in the workplace through joint efforts between the Ministry of Labor and Social Security and professional organizations. Such regulations are particularly effective in areas such as informatics, engineering, and healthcare. Effective communication with the diaspora is another element that strengthens brain circulation. Establishing regular interaction mechanisms where qualified Turkish experts living abroad can develop joint projects with universities and technology companies within the country stands out as a low-cost yet highly effective policy option. A common characteristic of these proposals is that, rather than an approach that merely seeks to reduce the mobility of the skilled workforce, they aim to establish an institutional ecosystem that can channel the knowledge and experience of individuals for the benefit of the country. Such a structure would enable the re-creation of value through the circulation of human capital, which is often considered lost.

As a result of policies for reverse brain drain, citizens of the countries of origin move from abroad to their home countries and bring surplus value to their home countries. Generally, financial incentives, support for research and development infrastructure, scientific freedom, entrepreneurship exemptions, etc. can be used to encourage brain drain repatriation (Wadhwa et al., 2009). However, the fact that incentives for return are limited to financial support makes the concept vague. For this reason, it is revealed that academic freedom, stable career planning and merit-based job security are among the most influential factors in individuals' return decisions. For this reason, making the reverse migration phase effective supports both structural and cultural developments. Moreover, in recent years, return practices in virtual status have reached a remarkable importance. Even if it is not possible for migrant researchers to physically

return, transferring their knowledge through online platforms is important in terms of addressing the continuity of institutional collaborations in their countries of origin (Agunias & Newland, 2007).

One of the important factors for the popularity of migration among highly skilled individuals is the incompatibility of their education level with the local labor market. Individuals who leave the education system at a young age are triggered to migrate due to the inability to find adequate employment opportunities, widespread job insecurity, and income instability. Especially for countries where structural unemployment is at the forefront, qualified transformations are important to ensure education-employment integration. The lack of suitable employment opportunities for countries with a high number of university graduates in research and development, engineering, software-design and technical fields makes brain drain inevitable. For this reason, job and internship opportunities are created by considering the sector, graduate tracking systems and skill matching platforms carried out in cooperation with the public-private sector, and structural reforms are very important to keep young talents within the country (OECD, 2022). Ensuring the integration of education and employment processes is an important policy tool both to reduce the tendency of brain drain and to prevent the alienation of returning individuals from local systems by encouraging their movement (Dustmann & Glitz, 2011).

Ultimately, the prevention or reversal of brain drain for source countries is not based solely on individual demands; it requires a holistic structure that affects many areas from education policies to the labor market, from political freedoms to institutional capacity. In order for programs that encourage the return of brain migrants to be successful, general strategies at the vocational, socio-psychological level are needed in addition to financial incentives. On the other hand, education-employment integration is another important factor that directly affects the migration decisions of highly qualified individuals. Finally, restructuring migration policies in a way that not only attracts qualified individuals but also integrates them into social and economic systems will ensure that migration is a win-win for both sides.

REFERENCES

- Acemoglu, D., & Robinson, J. A. (2013). *Why nations fail: The origins of power, prosperity, and poverty*. Crown Currency.
- Acemoglu, D., & Robinson, J. A. (2019). *The narrow corridor: States, societies, and the fate of liberty: Winners of the 2024 Nobel Prize in economics*. Penguin UK.
- Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*.
- Agunias, D. R., & Newland, K. (2007). *Circular migration and development: Trends, policy routes, and ways forward*. MPI.
- Akyıldız, İ. E. (2025). Beyin Göçü Politikaları: Dünya'dan ve Türkiye'den Örnekler. *Anadolu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 26(1), 326-361.
- Becker, G. S. (1964). *Human capital: a theoretical and empirical analysis, with special reference to education* (Vol. 3). Chicago: University of Chicago Press.
- Beine, M., Docquier, F., & Rapoport, H. (2001). Brain drain and economic growth: theory and evidence. *Journal of development economics*, 64(1), 275-289.
- Bhargava, A., & Docquier, F. (2008). HIV pandemic, medical brain drain, and economic development in Sub-Saharan Africa. *The World Bank Economic Review*, 22(2), 345-366.
- Borjas, G. J. (1989). Economic theory and international migration. *International migration review*, 23(3), 457-485.
- Borjas, G. J., & Katz, L. F. (2007). The evolution of the Mexican-born workforce in the United States. In *Mexican immigration to the United States* (pp. 13-56). University of Chicago Press.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, 9(2), 27-40.

- Cardoso, F. H., & Faletto, E. (1979). *Dependency and development in Latin America*. Univ of California Press.
- Cassarino, J. P. (2013). Theorising return migration: the conceptual approach to return migrants revisited. *REMHU: Revista Interdisciplinar da Mobilidade Humana*, 21, 21-54.
- Clemens, M. A. (2007). Do visas kill? Health effects of African health professional emigration. Center for Global Development Working Paper, (114).
- Clemens, M. A. (2011). Economics and emigration: Trillion-dollar bills on the sidewalk?. *Journal of Economic perspectives*, 25(3), 83-106.
- Clemens, M. A. (2014). Does development reduce migration? (pp. 152-185). Edward Elgar Publishing.
- Czaika, M., & Parsons, C. R. (2017). The gravity of high-skilled migration policies. *Demography*, 54(2), 603-630.
- Desai, M. A., Kapur, D., McHale, J., & Rogers, K. (2009). The fiscal impact of high-skilled emigration: Flows of Indians to the US. *Journal of Development Economics*, 88(1), 32-44.
- Docquier, F., & Rapoport, H. (2007). *Skilled migration: the perspective of developing countries*. (Discussion Paper Series 10/07). Centre for Research and Analysis of Migration: London, UK.
- Docquier, F., & Rapoport, H. (2012). Globalization, brain drain, and development. *Journal of economic literature*, 50(3), 681-730.
- Dustmann, C., & Glitz, A. (2011). Migration and education. In *Handbook of the Economics of Education* (Vol. 4, pp. 327-439). Elsevier.
- Dustmann, C., & Weiss, Y. (2007). Return migration: theory and empirical evidence from the UK. *British Journal of Industrial Relations*, 45(2), 236-256.
- Dustmann, C., Frattini, T., & Halls, C. (2010). Assessing the Fiscal Costs and Benefits of A8 Migration to the UK. *Fiscal Studies*, 31(1), 1-41.
- Faist, T. (2008). Migrants as transnational development agents: an inquiry into the newest round of the migration–development nexus. *Population, space and place*, 14(1), 21-42.
- Franzoni, C., Scellato, G., & Stephan, P. (2012). Foreign-born scientists: mobility patterns for 16 countries. *Nature biotechnology*, 30(12), 1250-1253.
- Güngör, N. D., & Tansel, A. (2014). Brain drain from Turkey: Return intentions of skilled migrants. *International Migration*, 52(5), 208-226.
- Hunt, J., & Gauthier-Loiselle, M. (2010). How much does immigration boost innovation?. *American Economic Journal: Macroeconomics*, 2(2), 31-56.
- Kahanec, M., & Zimmermann, K. F. (2011). *High-skilled immigration policy in Europe*. BR Chiswick, High-Skilled Immigration in a Globalized Labor Market, American Enterprise Institute, Washington DC, 264-314.
- Kapur, D., & McHale, J. (2005). *The global migration of talent: What does it mean for developing countries*. CGD Brief (Washington: Center for Global Development).
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). *Governance matters VIII: Aggregate and individual governance indicators 1996–2008*. World Bank Policy Research Working Paper No. 4978.
- Kerr, S. P., Kerr, W. R., & Lincoln, W. F. (2015). Skilled immigration and the employment structures of US firms. *Journal of Labor Economics*, 33(S1), S147-S186.
- Kerr, S. P., Kerr, W., Özden, Ç., & Parsons, C. (2016). Global talent flows. *Journal of Economic Perspectives*, 30(4), 83-106.
- Kerr, W. R. (2013). *US high-skilled immigration, innovation, and entrepreneurship: Empirical approaches and evidence* (No. w19377). National Bureau of Economic Research.
- Levac, D., Colquhoun, H., & O'brien, K. K. (2010). Scoping studies: advancing the methodology. *Implementation science*, 5(1), 69.
- Mihi-Ramírez, A., García-Rodríguez, Y., & Cuenca-García, E. (2016). Innovation and international high skilled migration. *Engineering economics*, 27(4), 452-461.
- Nathan, M. (2014). The wider economic impacts of high-skilled migrants: a survey of the literature for receiving countries. *IZA Journal of Migration*, 3, 1-20.
- OECD (2019). *International Migration Outlook 2019*. OECD Publishing.
- OECD (2022). *International Migration Outlook 2022*, OECD Publishing, Paris, <https://doi.org/10.1787/30fe16d2-en>.
- Özden, Ç., & Schiff, M. (Ed.). (2005). *International migration, remittances, and the brain drain*. World Bank Publications.

- Peri, G. (2012). The effect of immigration on productivity: Evidence from US states. *Review of Economics and Statistics*, 94(1), 348-358.
- Romer, P. M. (1990). Endogenous technological change. *Journal of political Economy*, 98, 71-102.
- Rønning, H., Thomas, P., Tomaselli, K. G., & Teer-Tomaselli, R. (2006). Intellectual property rights and the political economy of culture. *Critical Arts*, 20(1), 1-19.
- Saxenian, A. (2005). From brain drain to brain circulation: Transnational communities and regional upgrading in India and China. *Studies in comparative international development*, 40, 35-61.
- Saxenian, A. (2006). *The new argonauts: Regional advantage in a global economy*. Harvard University Press.
- Schultz, T. W. (1961). Investment in human capital. *The American economic review*, 51(1), 1-17.
- Sjaastad, L. A. (1962). The costs and returns of human migration. *Journal of Political Economy*, 70(5, Part 2), 80-93.
- Stark, O., Helmenstein, C., & Prskawetz, A. (1997). A brain gain with a brain drain. *Economics letters*, 55(2), 227-234.
- Todaro, M. P. (1969). A model of labor migration and urban unemployment in less developed countries. *The American economic review*, 59(1), 138-148.
- TÜİK. (2024). Higher Education Brain Drain Statistics, 2021-2023. <https://data.tuik.gov.tr/Bulten/Index?p=Higher-Education-Brain-Drain-Statistics-2021-2023-53839&dil=2>
- Tung, R. L. (2008). Brain circulation, diaspora, and international competitiveness. *European Management Journal*, 26(5), 298-304.
- Wadhwa, V., Saxenian, A., Freeman, R. B., & Gereffi, G. (2009). America's loss is the world's gain: America's new immigrant entrepreneurs, Part 4.
- WHO. (2010). *Global Code of Practice on the International Recruitment of Health Personnel*. Geneva: World Health Organization.
- World Population Review. (2025). Brain Drain Countries 2025. <https://worldpopulationreview.com/country-rankings/brain-drain-countries>