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THE BRAIN DRAIN IN EGYPT AND ITS IMPACT ON ECONOMIC GROWTH

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ABSTRACT

This study aimed to assess the "brain drain" of Egypt and measure its impact on the country's economic growth during the period 2000–2018, as well as explore specific policies that Egypt could adopt to reduce the phenomenon of brain drain. The results show there is an inverse relationship between the brain drain variable and gross domestic product (GDP), as an increase in talent migration by 1% leads to a 5.7% decrease in GDP, and this relationship is incredibly important. Capital accumulation positively affects GDP, as a 1% increase in the variable of capital accumulation leads to an increase of 3.2% in GDP, and human capital also positively affects the GDP, as a 1% increase in the human capital variable leads to an increase of 4.4% in GDP. These results are consistent with the economic theory that increased capital leads to an increased rate of economic growth. The study concludes that there are positive and negative effects associated with the brain drain in Egypt. The positive aspects are the increased remittances of workers abroad and the transfer of technology and investments through migrants who continue to have an association with Egypt, while the negative aspects are a decrease in human capital and decreased economic growth and productivity due to the migration of talents.

Contribution/Originality: This study contributes to the existing literature on the brain drain phenomenon. The study uses new estimation methodology to fill the research gap regarding the impact of brain drain on economic growth; this study is one of few that have investigated the brain drain in Egypt using econometrics methodology.

1. INTRODUCTION

The brain drain has incurred many costs and burdens for Egypt, emptying it of its national competencies, which compels the country to seek foreign expertise and pay high wages due to the migration of its talents abroad, especially because it has spent money on preparing and qualifying these migrants.

The study aimed to assess the brain drain of Egypt and to measure its impact on economic growth, as well as exploring the ways that Egypt can reduce the phenomenon of brain drain, regarding the difficulty of attracting migrant competencies back to the country.

The term "brain drain" means the migration of those with high-level qualifications from their country's borders to other countries (Beine, 2010). Definitions of brain drain vary between international organizations and researchers. The United Nations Educational, Scientific and Cultural Organization (UNESCO) states that a brain drain is based on a kind of unequal scientific exchange between countries where the flow is one way: from developing countries towards developed countries (United Nations, 2017). The Organization for Economic

Cooperation and Development (OECD) defines brain drain as the migration of those with high-level qualifications, who go outside of their countries to work or go abroad to study (Dumont, 2017). The International Organization for Migration (IOM) defines a brain drain as the migration of talented and trained individuals from origin countries to receiving countries (Mohapatra, 2015).

2. LITRATURE REVIEW

Globalization has made the world a single entity or, as some call it, a "small village", which has facilitated the transfer of human capital. A brain drain may be internal or external (Docquier, 2017), and according to the study of Deshingkar (2015), which concentrates on the internal migration of competencies, there are multiple factors that drive internal migration (moving from occupations that enable society to progress to "lower" occupations) such as when persons leave scientific and technical research in favor of occupations where talents and competencies are dissipated. Moreover, the study of Capuano (2015) shows that there is no advanced knowledge society in the country, and therefore researchers and scientists within it are forced to pursue professions that are far removed from scientific research to meet their material needs imposed by the requirements of life.

The external migration of competencies means the transfer of human capital from one country to other countries, and external migration is divided into two categories. The first category involves reciprocal competencies, meaning the exchange of individuals with skills and competencies between countries. This type of exchange, between developed countries, is for the purpose of cognitive integration and does not require immigration or permanent residence in the receiving country, but rather it adheres to the specific agreement between the receiving and exporting countries, and thus it benefits both of them at every level since the relationship is equal and not mutually exclusive (Csonto, 2015). The second category refers to the most common form of migration between developed and developing countries, whereby only the developed countries benefit. Skilled workers are attracted by the introduction of advanced programs in various fields, and this reflects the unilateral benefit with one-way migration from South to North (Righard, 2016).

The study of Bijwaard (2013) has linked the supply and demand of labor and economic development and the development of labor migration, to show that wage differences is the main reason for migration from low-wage areas to high-wage areas, with the aim of increasing income. The study of Millette (2013) indicates that differences in the degree of economic growth between countries is a sufficient explanation for the flow of migrants, and in the long run, these waves of migration should help to achieve equal wages for both developing and developed countries. This leads to an economic equilibrium, but there are negative effects of migration, such as declining levels of technical skill in the countries receiving migrants and the possibility of lower wages for local workers with modest competencies. There are, however, negative effects on the exporting countries also: it is expected they will suffer in the long term from Drain, their discerning minds on the level of international migration (Millette, 2013).

The study of Kurekova (2013) explains the need for developed economies for more migrants with dual labor market in the sense of being divided in to two parts: a main section, including experienced and advanced training competencies, where there exists high wages and a regular and stable sector, and a secondary section consisting of those who do not receive an advanced education or efficient training and often receive lower wages (Kurekova, 2013).

Samir Amin and Dos Sants are two of the most important theorists for dependency theory, and some researchers point out that dependency theory emerged from the dual labor market and the world order theory, as both emphasize that the global capitalist system is based on the interest of rich countries without concern for the poor. The theory emphasizes that the global economic structure consists of center countries and peripheral countries, and the relationship between them is based on exploitation; this is reflected in migration that may occur for historical reasons, but contemporary migration from the peripheral to the center conveys to the surrounding

countries that they are advanced economic structures capable of absorbing them into their research and production institutions (Mariani, 2014).

Emmanuel Wallichten has described the mechanism of the world system as being based on the absorption of value from peripheral countries by central countries, whereby the peripheral countries transform into advanced economic structures capable of absorbing the center countries into their research and production institutions. This leads to the persistence of factors involving attraction and expulsion on the one hand, and of economic differences on the other, by creating higher jobs for lower jobs, as long as the center countries have the ability to import the necessary labor for the lower jobs or to export these jobs to the peripheral countries (Page, 2015).

Human capital is one of the most important elements of production, and this theory began to appear alongside research that focused on the migration of talents. Human capital is defined as the capabilities and skills that a person (or population) possesses that increase his or her productivity (Goldin, 2014). The study of Zanker (2011) believes that migration is an investment in human capital. The human element comes into play when the migrant assesses the costs and benefits of migrating before making a decision, where the costs are not limited to material costs alone. Hence, migration is ultimately the individual's choice (Zanker, 2011).

3. ANALYSIS OF THE PHENOMENON OF BRAIN DRAIN

3.1. Migration in the World

The global migration pulled millions of people out of poverty and boosted economic growth, but destination countries risk losing their global competitiveness for talent and leaving large gaps in labor markets by not implementing policies that deal with labor market forces and not managing short-term economic tensions. The large and persistent wage differentials around the world are the main driver of economic migration from low-income countries to high-income countries (World Bank, 2019). Migrants often triple their wages after moving to a new country, and this helps millions of migrants and their relatives in origin countries escape poverty. Destination countries, where migrants play important roles, often benefit in terms of development, including the latest technologies in Silicon Valley to the skyscrapers built in the Middle East. Despite the high-wage temptation, the number of migrants as a proportion of the world's population has remained mostly unchanged for more than five decades, even with the large expansion in global flows of trade and investment during this period. Between 1960 and 2018, the proportion of migrants in the world's population fluctuated slightly between 2.5% and 3.5%, with international borders, distance, culture, and language remaining strong handicaps (World Bank, 2019).

Immigration flows are highly concentrated by location and profession. The number of international migrants around the world in 2019 amounted to about 265 million people, representing 3.3% of the world's population, and about 7% of the European Union's population (Migration Data Portal, 2019).

The top 10 countries of destination attract 60% of the 250 million global migrants, and, surprisingly, focus levels increase with skill levels. Two-thirds of immigrants who have a university education live in the United States, the United Kingdom, Canada, and Australia. The United States alone has a staggering 85% of all Nobel Science prize winners (The Institute for Employment Research IAB, 2019).

Furthermore, Women's education levels are increasing rapidly, especially in developing countries, but opportunities for professional advancement are still limited. As a result, university-educated women from low- and middle-income countries represent the fastest growing group of migrants moving to high-income countries (United Nation., 2019). The number of working migrants in the world according to the estimates of the International Labor Organization in 2018 reached about 164 million, representing 65% of the total number of international migrants (The International Labor Organization, 2018).

Moreover, Germany, the United Kingdom, France, Spain, and Italy host nearly three quarters of migrants, and the volume of cash transfers sent by migrants to their origin countries doubled from 132 billion dollars in 2000 to 440 billion in 2010, amounting to 583 billion dollars by 2014 and reaching 636 billion dollars in 2018; for Egypt it

reached about 29 billion dollars. The International Organization for Migration explained that cash transfers from Egyptian workers residing in Italy to Egypt amounted to about 15 million dollars, and this contributed to the recovery of the Egyptian economy significantly (The International Organization for Migration, 2019).

3.2. Indicators of Migration in Egypt

In the past ten years, Egypt has witnessed an increase in the number of immigrant scholars working in Europe, especially medical, engineering and science scholars. A study by the Central Agency for Public Mobilization and Statistics indicates that more than 260 Egyptians work in prestigious scientific positions, particularly in America, where approximately 844 Egyptian scientist, in Germany 340 scientist, in Canada 196, in Spain 142, and in France 132 scientists. Despite all attempts to regulate the talent migration of Egypt, the developed countries continue to attract these competencies (CAPMAS, 2019).

Despite Egypt's investments in university education, a large amount of its funding has been wasted due to immigration attracting scholars and researchers. Egypt is sending a large amount of scientific Arab talent to the United States of America, becoming the country with the greatest Arab talent loss due to talent migration. According to the Central Agency for Public Mobilization and Statistics, the number of Egyptian migrant experts and scholars is estimated to be 854,000, of whom 600,000 work in rare specialties. The total number of immigrants with a PhD is 66, the total of number of immigrants with a master's degree is 164, and the total number of immigrants with a high diploma is 119 (CAPMAS, 2019).
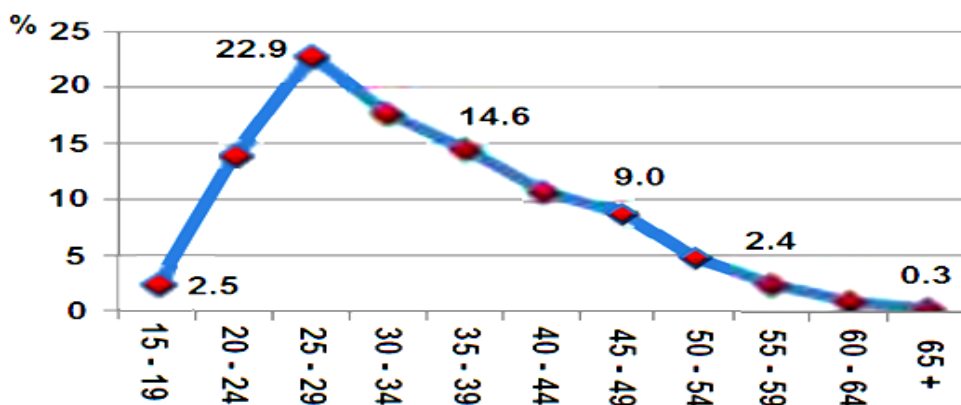

Figure-1. The relative distribution of Egyptian migrants according to age group.
Source: CAPMAS (2019).

Figure 1 shows that the percentage of migrants in the age group 15–19 is low, while the age group 25–29 has the highest percentage, followed by 30–34, then 35–39. The over 65 age group has the lowest percentage of migrants.
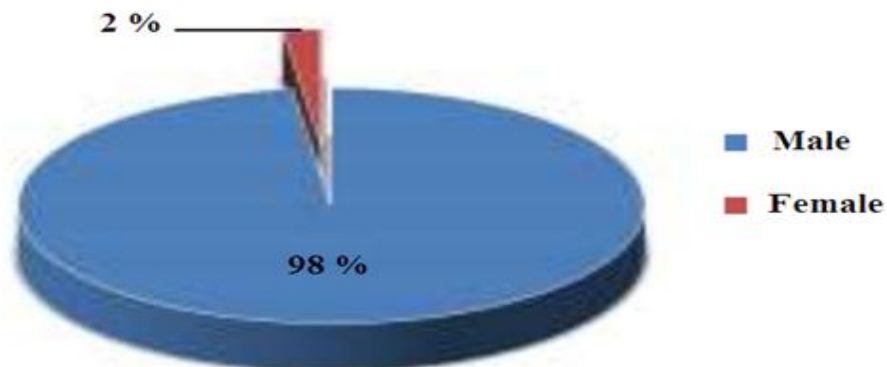

Figure-2. The relative distribution of Egyptian migrants according to gender.
Source: CAPMAS (2019).

Figure 2 shows that 98% of Egyptian migrants are male, while 2% are female; therefore, Egyptian migrants are mostly young people of working age.
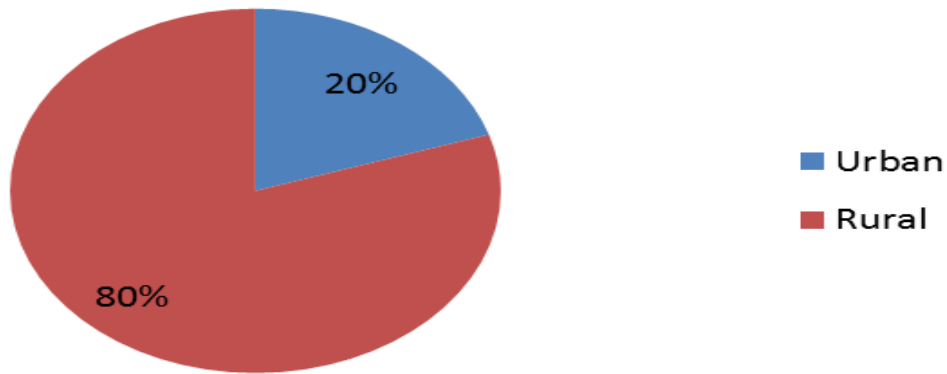
Figure-3. The relative distribution of Egyptian migrants according to residence.
Source: CAPMAS (2019).

Figure 3 shows that migration is more common in rural areas than urban ones. 80% of Egyptian migrants are from rural families, and 20% are from urban families.
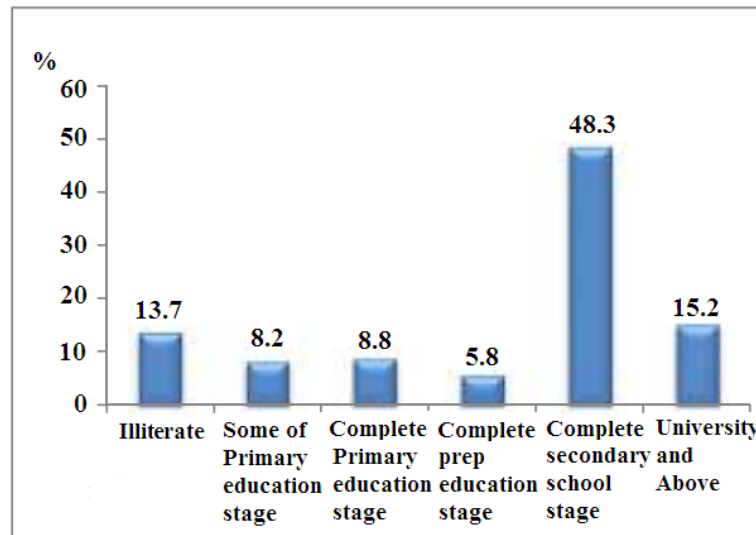
Figure-4. The relative distribution of Egyptian migrants according to education.
Source: CAPMAS (2019).

Figure 4 shows that the vast majority of migrants are well educated. 86% have been educated to some degree, with 48% completing secondary education, and 15% have obtaining a university degree.
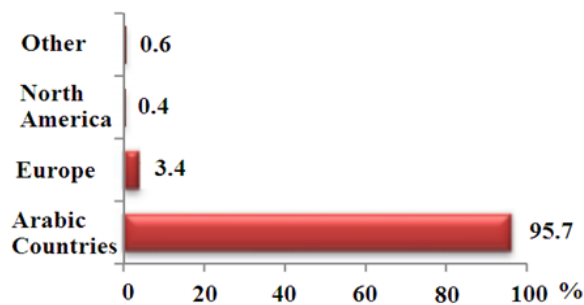
Figure-5. The relative distribution of Egyptian migrants according to host country.
Source: CAPMAS (2019).

Figure 5 shows 95% of Egyptian migrants go to Arab countries, while less than 5% go to Europe and North America. This pattern indicates that South-South migration in Egypt is more prevalent than South-North.
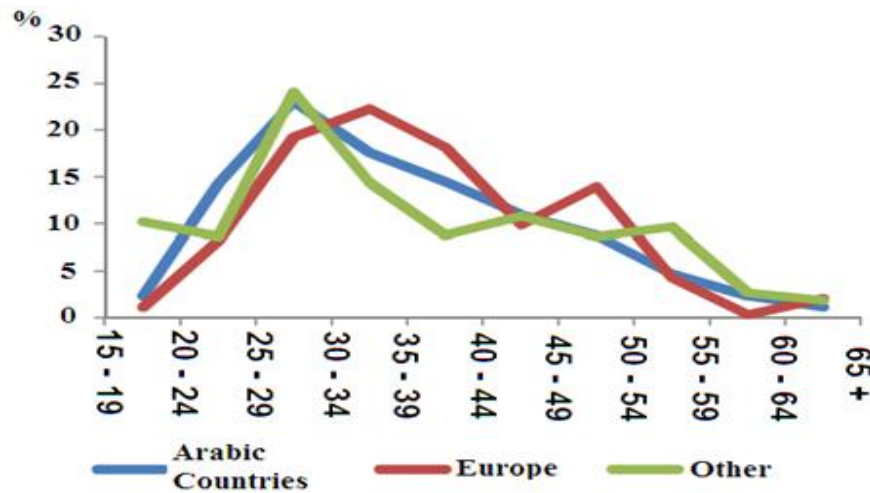

Figure-6. The relative distribution of Egyptian migrants according to current age in host country.
Source: CAPMAS (2019).

Figure 6 shows the ages of Egyptian migrants who go to Europe and North America compared to migrants who go to Arab countries. The largest proportion of migrants who go to Europe are in the age group 30–34, compared to 25–29 years for Arab countries.
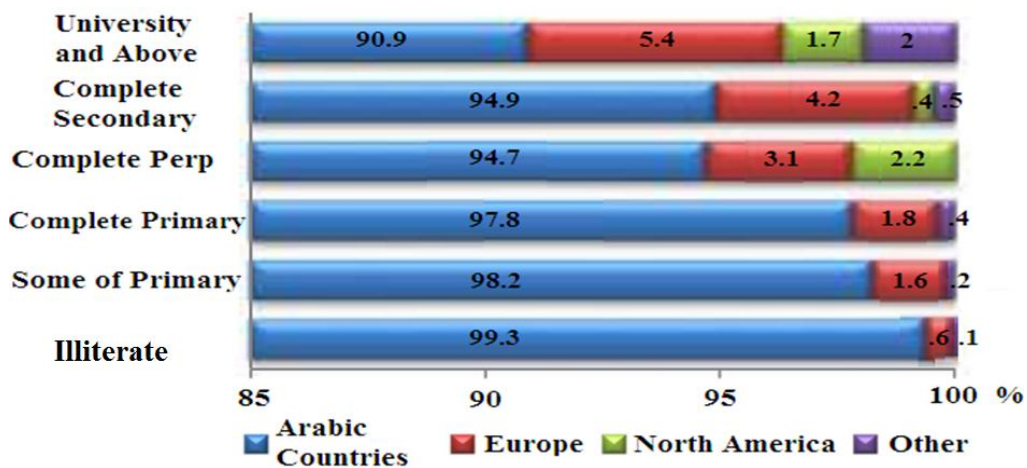

Figure-7. The relative distribution of Egyptian migrants according to host country and educational level.
Source: CAPMAS (2019).

Figure 7 shows that the percentage of migrants moving to Arab countries decreases with increased educational level. Therefore, more than 98% of migrants who have completed primary education reside in Arab countries, compared to 95% who have completed secondary education and 91% who have a university education. It is also clear that migration to Europe and North America tends to increase with age and higher levels of education, as 1.6% of those with a primary education reside in Europe and North America, while 1.8% has completed secondary education and more than 5% have a university education.
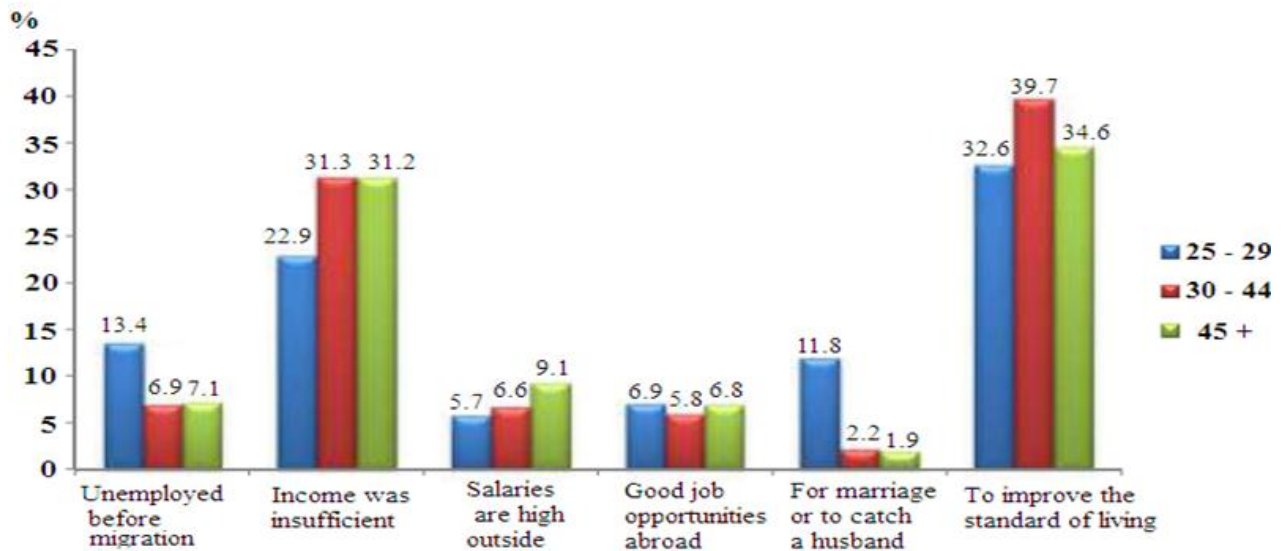
Figure-8. The relative distribution of Egyptian migrants according to the motives for migration and age.
Source: CAPMAS (2019).

Figure 8 shows the motives for migration in Egypt. Improving the standard of living is considered the primary motive, followed by insufficient income, then good job opportunities abroad and higher wages abroad.
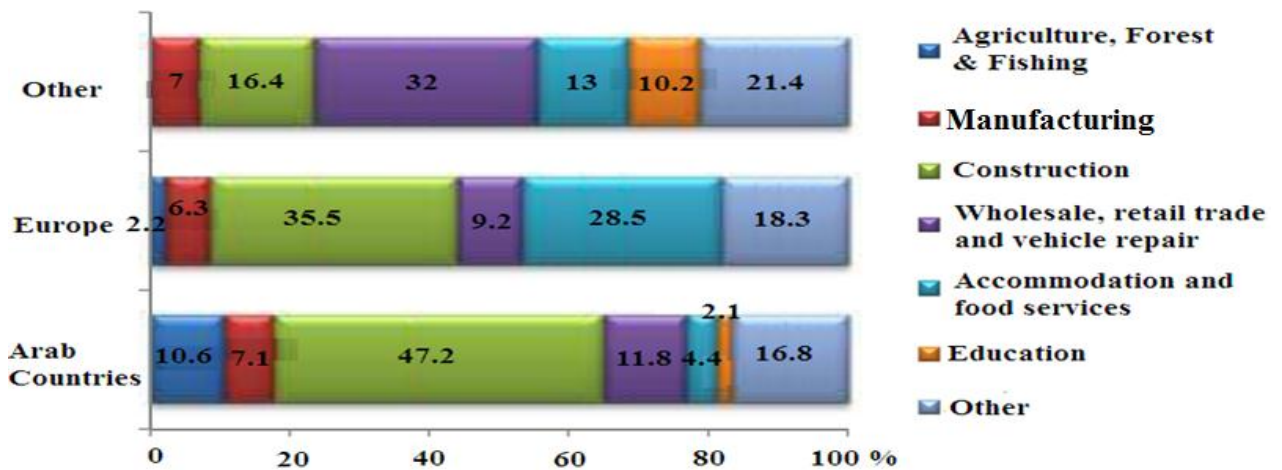

Figure-9. The relative distribution of Egyptian migrants according to main occupation and host country.
Source: CAPMAS (2019).

Figure 9 indicates that 47% of Egyptian migrants who move to Arab countries work in building and construction, 12% in wholesale and retail, 11% in agriculture, and 7% in manufacturing. 36% of Egyptian migrants who move to Europe work in the construction and building sectors, 29% in food and accommodation services, 12% in other sectors, and 9% in the wholesale and retail trade.
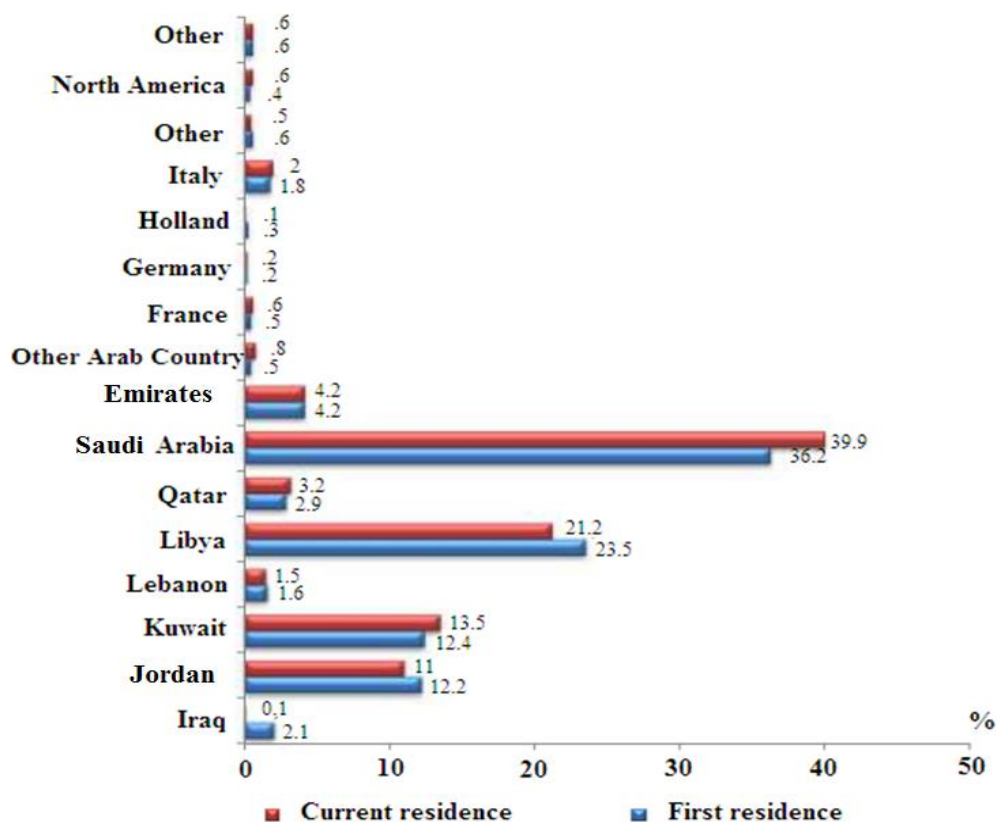
Figure-10. The relative distribution of Egyptian migrants according to first and current host country.
Source: CAPMAS (2019).

Figure 10 shows that Saudi Arabia is the country receiving the largest number of Egyptian migrants, the preferred country of residence for 36% of Egyptian migrants. Libya attracts 24% of Egyptian migrants, Kuwait 12.4%, and Jordan 12.2%, followed by UAE, Qatar, Iraq, Italy, and Lebanon.
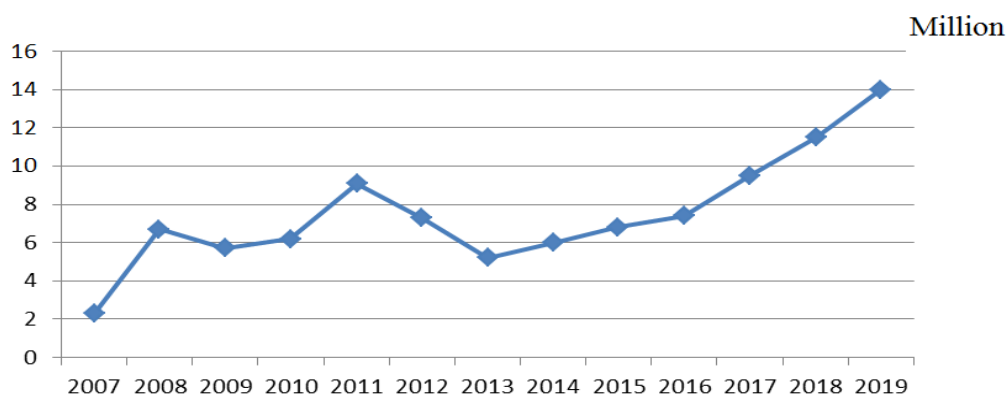

Figure-11. Number of Egyptians residing abroad during the period 2007–2019.
Source: CAPMAS (2019).

Figure 11 indicates that Egyptian residents abroad increased from two million in 2007 to 14 million in 2019.

Table-1. Number of Egyptian scientific delegates abroad by sector during the period 2008–2018.

	Medical		Engineering		Agriculture		Basic		Human		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
2014	266	32.4	157	19.1	112	13.6	201	24.5	86	10.5	822
2015	271	32.3	186	22.1	78	9.3	194	23.1	111	13.2	840
2016	377	36.9	200	19.6	106	10.4	220	21.5	118	11.6	1021
2017	129	23	153	27.3	83	14.8	121	21.6	74	13.2	560
2018	388	35.5	208	19.0	118	10.8	217	19.8	163	14.9	1094

Source: CAPMAS (2019).

Table 1 shows that the number of Egyptian delegates abroad in the field of science increased from 822 in 2014 to 1094 in 2018.
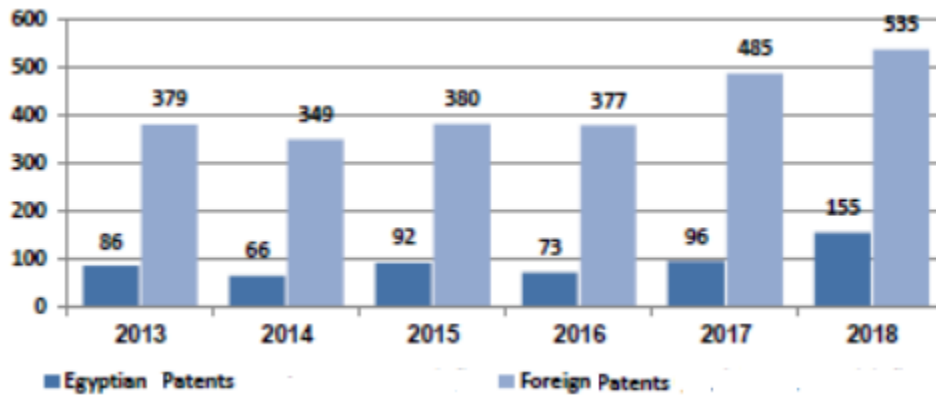

Figure-12. Number of granted patents for egyptians and foreign nationals during the period (2013–2018).
Source: CAPMAS (2019).

Figure 12 shows that the number of patents granted was 155 for egyptians and 555 for foreign nationals in 2018.

According to The International Monetary Fund (2020) database index that compares the number of scientific and technical patents registered by migrants with those registered by citizens of the country, 60% of patents were registered by Egyptian migrants in 2019, compared to 35% by Egyptian citizens and about 5% by returning migrants (The International Monetary Fund, 2020).
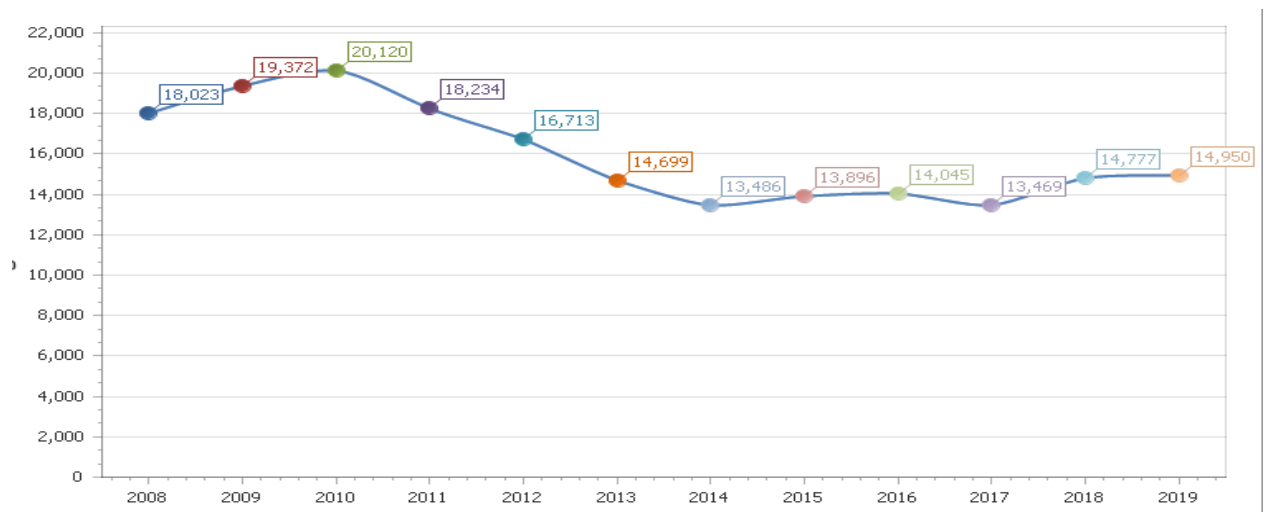

Figure-13. Number of foreign workers in private sector in Egypt during the period 2008–2019.
Source: CAPMAS (2019).

Figure 13 shows that the number of foreign workers in the private sector in Egypt declined from 18023 in 2008 to 14950 in 2019, but the number remains relatively high due to internal talent migration.
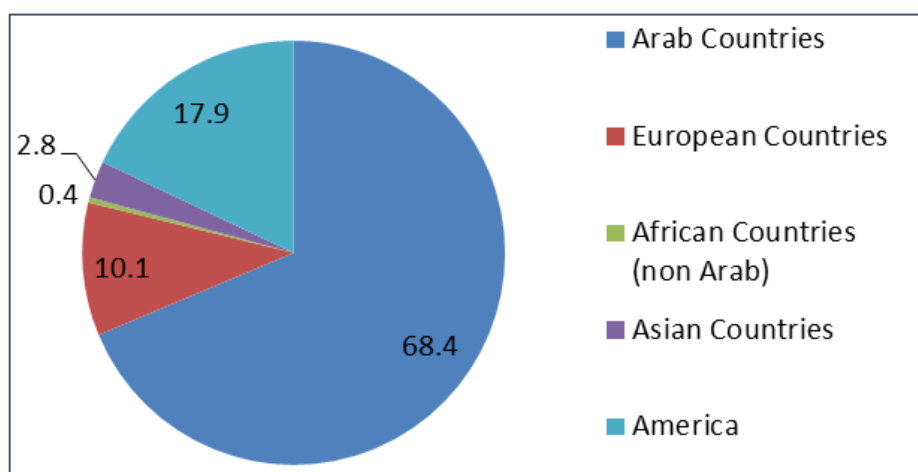
Figure-14. Number of Egyptians abroad according to country group in 2019.
Source: CAPMAS (2019).

Figure 14 shows that 68.4% of Egyptians abroad reside in Arab counties, 17.9% in America, 10.1% in Europe, 2.8% in Asian countries, and 0.4% in African countries.

Table-2. Number of migrant competencies in 2018.

Country	Migrant Competencies	Country	Migrant Competencies
Algeria	217,347	Libya	15,541
Morocco	207,117	Saudi	12,348
Egypt	147,835	Palestine	6,581
Lebanon	110,960	Yemen	6,287
Iraq	83,465	Emirates	3,487
Tunisia	68,190	Bahrain	3,017
Syria	43,898	Mauritania	2,475
Jordan	26,640	Comoros	1,901
Sudan	17,066	Djibouti	1,592
Kuwait	16,542	Qatar	1,465
Somalia	16,516	Oman	1,012

Source: OECD (2019).

Table 2 indicates that Egypt had the third largest number of migrant competencies out of the Arabian countries, Algeria had 217,347 migrants, Morocco had 207,117, and Egypt had 147,835 migrants in 2018.
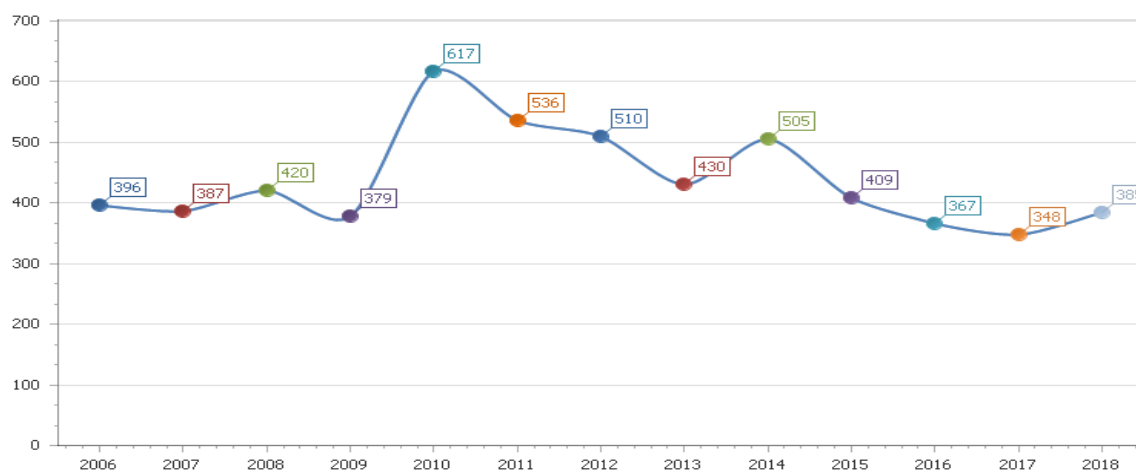

Figure-15. Number of Egyptian migrants who acquired immigrant status.
Source: CAPMAS (2019).

Figure 15 shows that the number of migrants who acquired immigrant status totaled 358 in 2018.
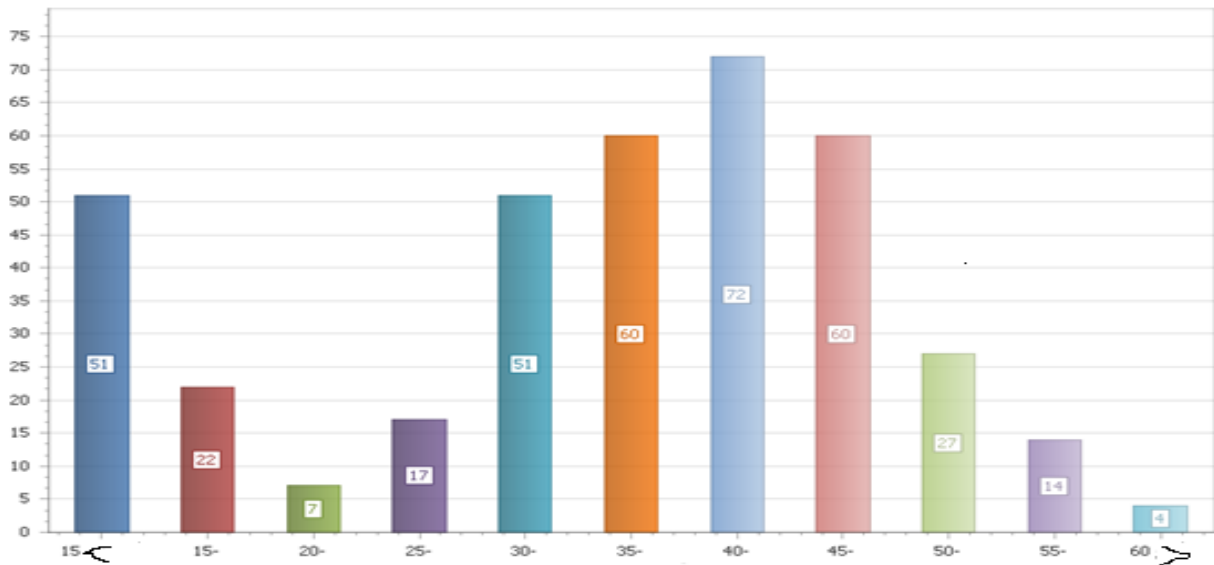
Figure-16. Number of Egyptian migrants who acquired immigrant status according to age group in 2019.
Source: CAPMAS (2019).

Figure 16 indicates that the 30–45 age group had the largest number of migrants who acquired immigrant status in 2019.
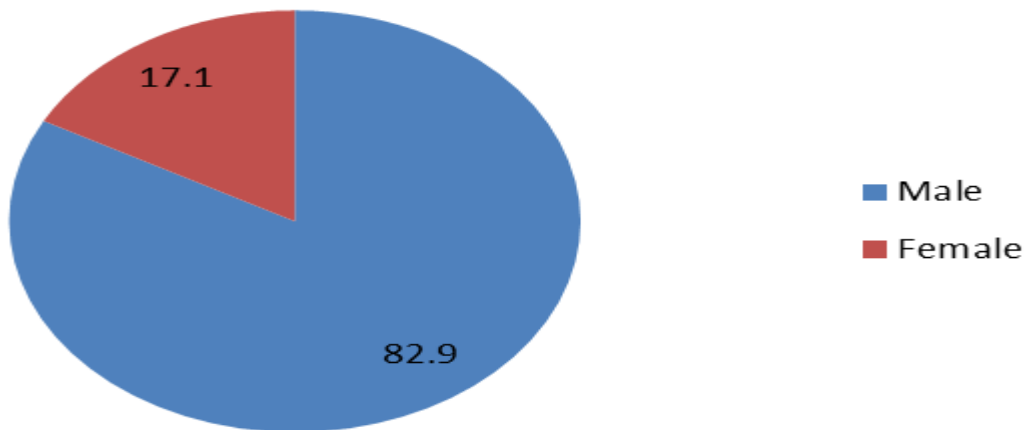

Figure-17. Number of Egyptian migrants who acquired immigrant status according to gender in 2019.
Source: CAPMAS (2019).

Figure 17 shows that 82.9% of Egyptian migrants who acquired immigrant status in 2019 were male, while 17.1% were female.
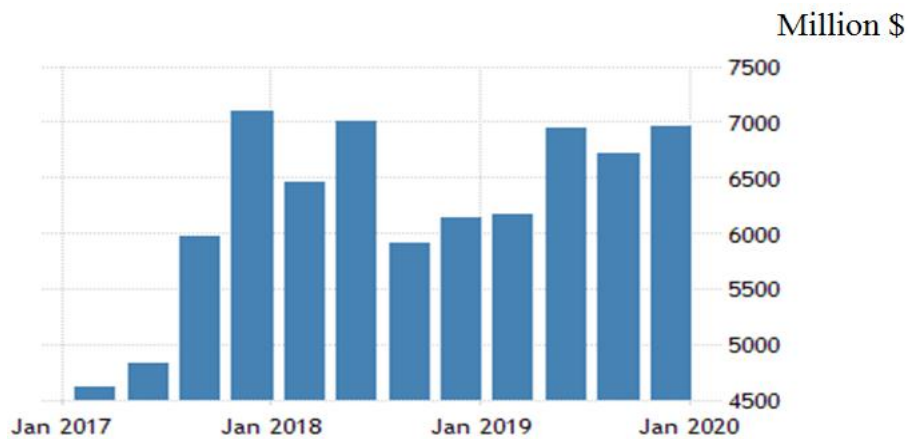

Figure-18. Remittances of Egyptian workers abroad during the period January 2017–January 2020.
Source: Trading economics.

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Figure 18 shows that the number of remittances from Egyptian workers abroad totaled 6963.90 million dollars in January 2020.
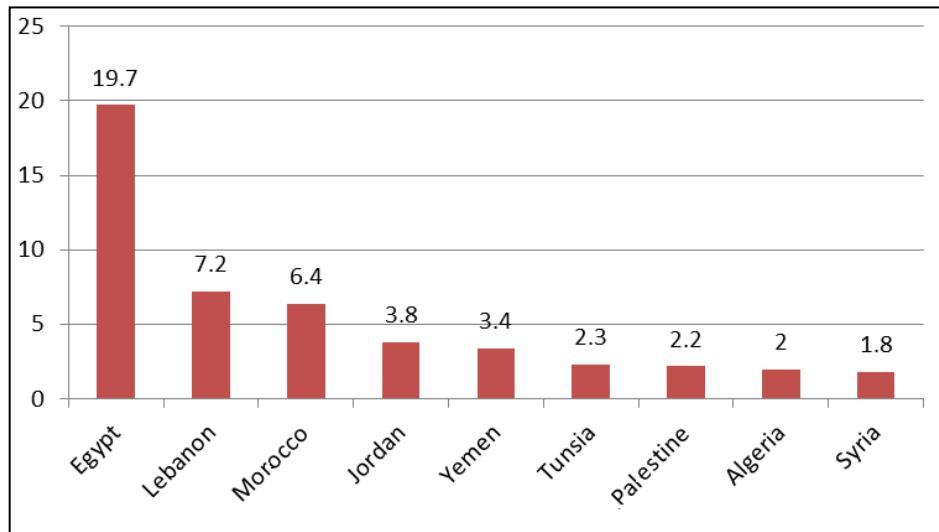
Figure-19. The percentage of worker remittances as gross domestic product percentage in 2019.
Source: OECD (2019).

Figure 19 indicates that the percentage of worker remittances from abroad made up 19.7% of Egypt's gross domestic product in 2019.
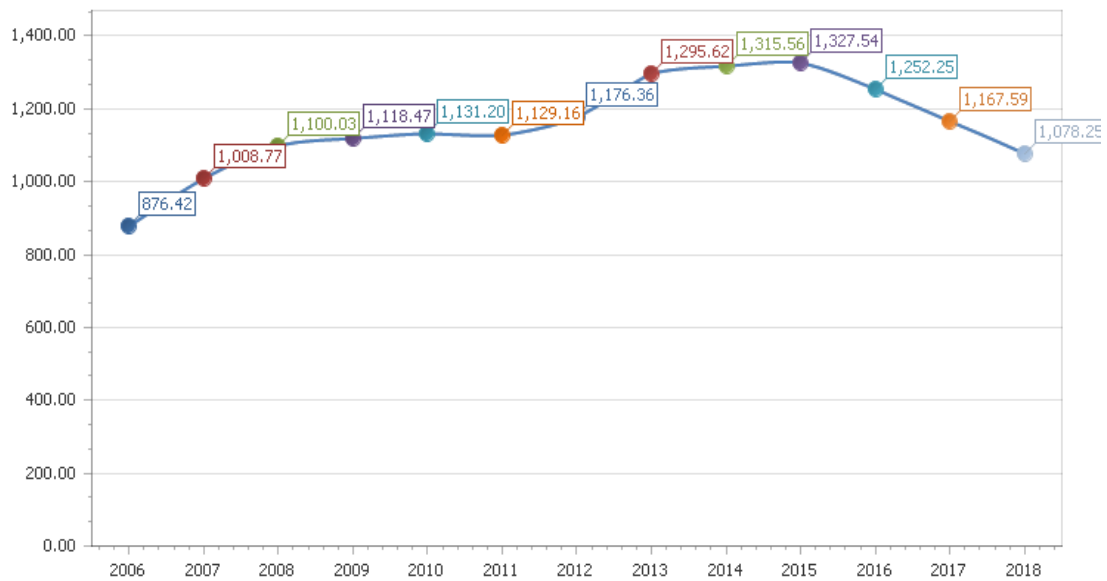
Figure-20. Work permits issued to Egyptians for working abroad by the thousand.
Source: CAPMAS (2019).

Figure 20 shows that there were 1078,25 thousand work permits issued to Egyptians for working abroad in 2018.

4. METHODOLOGY

In line with the study of Emara (2013), the following model was used to measure the impact of brain drain on economic growth in Egypt during the period 2000–2018.

$$GDP = a + b_1 BD_t + b_2 HC_t + b_3 INV_t + U_t$$

Where:

A: Constant.

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GDP: Growth rate of the gross domestic product.

INV: Capital accumulation is expressed as a percentage of total physical capital to GDP.

HC: Human capital is expressed as a ratio of university graduates to the total population.

BD: Brain drain is expressed as the ratio of the number of immigrants with a higher education to the number of graduates with a higher education.

U: Random Error.

T: Years.

The study relies on the World Bank Data Base (2020), which provides data on the annual growth rate of GDP, in addition to the ratio of physical capital to GDP. The Central Agency for Public Mobilization and Statistics in Egypt provides data on the number of graduates from higher education, and the annual publication The Permanent Migration of Egyptians was used to obtain the number of immigrants according to university education.

4.1. The Unit Root Test

This study performed a unit root test using the augmented Dickey–Fuller (ADF) method to examine the stability of the time series. The null hypothesis is that the time series has a unit root problem (the time series is not static), and the alternative hypothesis is that the time series does not have a unit root problem (the time series is static).

Table 3 shows the unit root test results, by comparing the calculated value with the tabular value. The calculated value is less than the tabular value at the level for BD only, so here the time series is static, and the calculated value is greater than the tabular value at the level for GDP, HC, INV, so these time series' are not static. Looking at the first differences, the calculated value is less than the tabular value, so the time series for the first differences are static with a confidence degree of 99%.

Table-3. The unit root test results.

Variables	Calculated value		Tabular value		
	Level	First Difference	%1	%5	%10
GDP		-6.561277	-4.200056	-3.175352	-2.728985
BD	-4.180599		-4.057910	-3.119910	-2.701103
HC		-6.354802	-5.124875	-3.933364	-3.420030
INV		-5.624343	-4.121990	-3.144920	-2.713751

4.2. The Model Estimation

The study used the ordinary least squares method (OLS) to estimate the model and results, as follows:

$GDP = 42.342 - 5.791* BD_t + 4.432* HC_t + 3.257* INV_t$

Table-4 Results of estimation.

Variables	Coefficient	Std. Error	t-Statistic		Prob.
Constant	42.342	19.23365	2.399009		0.0174
BD	-5.791	1.42 6155	-2.59 4020		0. 0258
HC	4.432	2.644507	3.718073		0.0014
INV	3.257	0.068289	2.006558		0.0272
R-squared	0.935	F-statistic	43.85911	DW	2.452476
			0.0003 Prob		

4.3. Tests on the Model Quality

4.3.1. Histogram–Normality Test

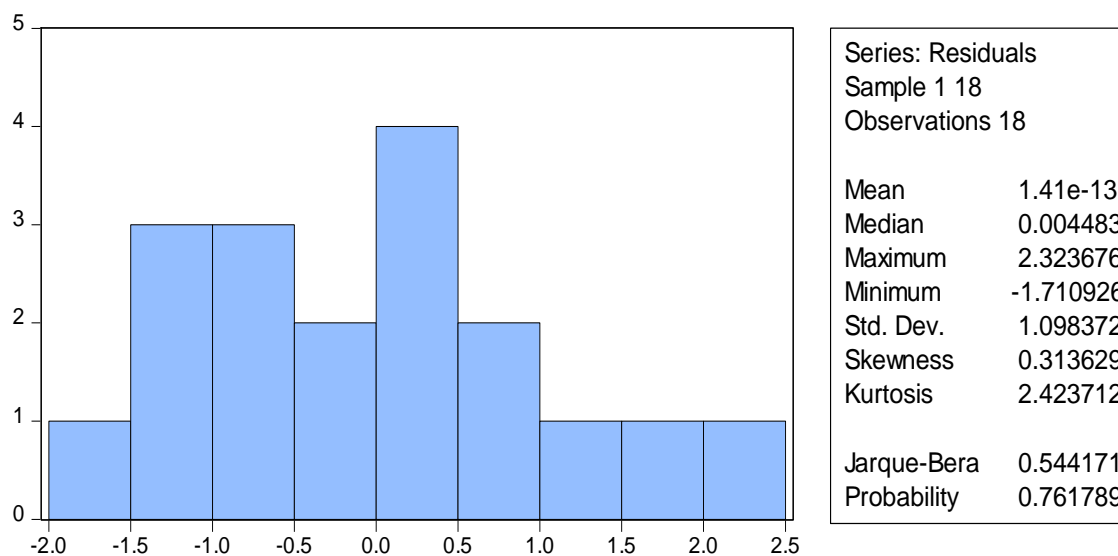|	
Series: Residuals	
Sample 1 18	
Observations 18	
Mean	1.41e-13
Median	0.004483
Maximum	2.323676
Minimum	-1.710926
Std. Dev.	1.098372
Skewness	0.313629
Kurtosis	2.423712
Jarque-Bera	0.544171
Probability	0.761789

Figure-21. Results of histogram–normality test.

The study used the histogram–normality test to examine the normal distribution of residuals. The results indicate that p-value and Jarque–Bera are greater than 5%. So, we can accept the null hypothesis that residuals have a normal distribution, and reject the alternative hypothesis that residuals do not have a normal distribution. Therefore, this indicates that the quality of the model is good.

4.3.2. Breusch–Godfrey Serial Correlation LM Test

Table-5. Results of Breusch–Godfrey Serial Correlation LM Test.

F-statistic	0.244721	Prob. F (1,11)	0.6305
Obs*R-squared	0.391738	Prob. Chi-Square (1)	0.5314

The study used the Breusch–Godfrey Serial Correlation LM Test to examine the serial correlation between residuals. The results indicate that p-value is greater than 5%, so we can accept the null hypothesis that there is no serial correlation between residuals, and reject the alternative hypothesis that there is serial correlation between residuals. Therefore, this indicates that the quality of the model is good.

4.3.3. Heteroskedasticity Test

Table-6. Results of Heteroskedasticity Test.

F-statistic	0.327894	Prob. F (5,12)	0.8866
Obs*R-squared	2.163605	Prob. Chi-Square (5)	0.8261
Scaled explained SS	0.684522	Prob. Chi-Square (5)	0.9838

Source: by Author Using EViews 8.

The study used the heteroskedasticity test to examine the variance differentiation between residuals. The results indicate that p-value is greater than 5%, so we can accept the null hypothesis that there is no variance differentiation between residuals, and reject the alternative hypothesis that there is variance differentiation between residuals. Therefore, this indicates that the quality of the model is good.

4.4. Results

The results show the explanatory level of the model as R-squared is equal to 0.935, which means that the independent variables are able to explain about 93.5% of changes in the growth rate of gross domestic product, and the rest are due to other factors, including random errors.

The results show the overall significance of the model is that the value F-statistic is equal to 43.85 and is statistically significant, which means rejecting the null hypothesis that the estimated regression model is not significant, and accepting the alternative hypothesis that the estimated model is significant. This indicates that the independent variables have a significant effect on the growth rate of gross domestic product in Egypt.

Moreover, the results show the partial significance of the model where parameters are statistically significant, so these parameters differs substantially from zero, which reflects importance of the independent variables.

The results indicate that the value of the Durbin–Watson coefficient is equal to 2.45, and by examining the corresponding tabular value, it indicates that there is no false slope and the estimated model is free of a linear correlation problem between the independent variables. In addition, the results indicate these estimated coefficients are consistent with the economic theory.

There is an inverse relationship between the brain drain variable and the GDP variable, as an increase in talent migration by 1% leads to a 5.7% decrease in GDP, and this relationship is the most important. The capital accumulation positively affects GDP as a 1% increase in the variable of capital accumulation leads to an increase of 3.2% in GDP, and the human capital positively affects GDP as a 1% increase in the human capital variable leads to an increase of 4.4 % in GDP. These are consistent with the economic theory that increasing the capital leads to increased rates of economic growth.

5. POLICIES TOWARDS TALENT MIGRATION IN EGYPT

The theoretical studies on brain drain suggest a set of incentives that can be offered to competent immigrants, such as holding scientific conferences and workshops in which qualified immigrants participate and giving financial incentives for worker remittances abroad to encourage them to invest in the country (Migration Policy Institute, 2018).

There are many factors that encourage migration from Egypt, such as limited job opportunities, low wage levels, an increase in population, and an increase in university graduates, in addition to factors such as a lack of sufficient resources for scientific research and an inadequate number of researchers and academics in their anticipated scientific and social positions.

Some of the measures that Egypt can take to benefit from competency migration are as follows:

1. A tax on migrant competencies: A tax can be imposed on migrant competencies, whether it is applied as a fixed percentage of competency income or it is a variable rate (progressive or descending). This tax should be much less than what is paid by residents within the state; this is because immigrants actually pay taxes within the countries they work. Morocco, in fact, has already applied this type of taxing regarding migrant competencies.

2. Economic development policies: Economic development is a way of reducing brain drain, including high average per capita income, reduction in poverty and unemployment rates, and fair distribution of resources.

3. The balance of sectors in the economy: In addition to rural development in general, the focus should be on the agricultural sector, in particular its productivity.

4. Formulate investment policies to attract foreign investments and remittances: Helping Egyptian migrants carry out development projects in Egypt to invest their remittances.

5. Make material concession grants a priority: These include grants, loans, and land grants for investment, as well as financing scientific research for competencies in Egypt.

5.3. Appropriate Educational Policies

Investing in the education sector has become a necessity to reconcile the outputs of the educational system with the needs of the labor market. Furthermore, cooperation between the public and private sectors is required to direct resources towards education, especially at the higher level.

6. CONCLUSION

The study concludes that there are positive and negative effects associated with the brain drain in Egypt, the positives being the remittances of workers abroad and the transfer of technology and investments through migrants who continue to have an association with Egypt, and the negatives being the decrease in human capital and the migration of talents leading to a decrease in economic growth and productivity.

The study indicates that Egypt is greatly affected by its migration of talents abroad and does not succeed in reducing the rate of talent migration or even benefitting from it. Therefore, the study has introduced some policies that could help decision makers deal with talent migration in Egypt. The study's suggestions could be realized by future researches who may explore this topic using different methods.

REFERENCES

Beine, M. (2010). Brain drain and economic growth: Theory and evidence. *Journal of Development Economics, Amsterdam: Elsevier, 64*(1), 275-289.

Bijwaard, G. E. (2013). Return migration of foreign students, Discussion Paper Series. Berlin: Institute of Labor Economics.

CAPMAS. (2019). Central Agency for Public Mobilization and Statistics Database (2019). CAPMAS, Retrieved from: https://www.capmas.gov.eg/Pages/SemanticIssuesPage.aspx?page_id=6113.

Capuano, S. (2015). African brain drain and its impact on source countries: What do we know and what do we need to know?. . *Journal of Comparative Policy Analysis: Research and Practice, Berlin: Institute for Employment Research, 15*(4), 297-313.

Csonto, B. (2015). International migration recent trend economic impacts and policy implications. . Working Paper, Washington D.C: International Monetary Fund. 12

Deshingkar, P. (2015). Internal migration and development: A global perspective. Working Paper, Geneva: International Organization for Migration, No.19.

Docquier, F. (2017). Skilled migration: The perspective of developing countries. Discussion Paper Series, Berlin: Institute of Labor Economics, No.2873.

Dumont, J. C. (2017). Who bears the cost of integrating refugees. Working Paper, Paris: International Migration Division-OECD, No.13.

Emara, A. M. (2013). Brain drain and its impact on economic growth in Egypt. *Arab Economic Research Journal, Center for Arab Unity Studies, 64*(1), 214-235.

Goldin, C. (2014). *Human capital.* Berlin: Springer Verilog.

Kurekova, L. (2013). *Theories of migration: Conceptual review and empirical testing in the context of the EU east-west flows.* Paper presented at the Paper Prepared for Interdisciplinary Conference on Migration Economic Change and Social Challenge, London: University College London.

Mariani, F. (2014). Brain drain, inequality and growth (pp. 10-24). Working Paper No. 1031, Economic Growth Center, Yale University.

Migration Data Portal. (2019). Retrieved from: https://migrationdataportal.org/themes/remittances.

Migration Policy Institute. (2018). International migration statistic. Retrieved from: https://www.migrationpolicy.org/research/brain-waste-immigrants-health-degrees-multi-state-profile.

Millette, J. (2013). *Understanding the brain drain: Growth and development through reversal.* Boston: University of Massachusetts.

Mohapatra, S. (2015). *Impact of migration on economic and development: A review of evidence and emerging issues.* Paper presented at the Working Paper, Prepared to Unit World Bank for the Civil Society Days of the Global Forum on Migration and Development, Washington D.C: World Bank.

OECD. (2019). International migration database. Retrieved from: https://stats.oecd.org/Index.aspx?DataSetCode=MIG.

Page, J. (2015). Do international migration and remittances reduce poverty in developing countries? *World Development Journal, 33*(10), 1645-1669.

Righard, E. (2016). *Theories and typologies of migration: An overview and a primer.* Paper presented at the Working Paper in International Migration and Ethnic Relations, Stockholm: Malm Institute for Studies of Migration, Diversity and Welfare.

The Institute for Employment Research IAB. (2019). Brain drain data. Retrieved from: https://www.iab.de/en/daten/iab-brain-drain-data.aspx.

The International Labor Organization. (2018). Retrieved from: https://www.ilo.org/inform/online-information-resources/databases/lang--en/index.htm.

The International Monetary Fund. (2020). Migration to advanced economies can raise growth. Retrieved from :https://blogs.imf.org/2020/06/19/migration-to-advanced-economies-can-raise-growth/.

The International Organization for Migration. (2019). Retrieved from: https://www.iom.int/countries/egypt.

United Nation. (2019). International migrant stock the 2019 revision. Retrieved from: https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates19.asp.

United Nations. (2017). *International migration and development report.* New York: United Nations Population Division Department of Economic and Social Affairs.

World Bank. (2019). *Migration and remittances factbook 2019.* Washington D.C: The World Bank.

World Bank Data Base. (2020). Retrieved from: https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?view=chart.

Zanker, J. H. (2011). Why do people migrate? A review of the theoretical literature. Working Paper Series, Berlin: Munich University Library, No.28197.