

Determinants of the Migration of Highly Skilled Algerians to Developed Countries

AMIR Farid^{1,*}, Dr AKERKAR Arezki²

¹ Department of economic sciences, Faculty of economic, Commercial and Management Sciences, University of Bejaia, Algeria, farid.amir@univ-bejaia.dz

² Department of economic sciences, Faculty of economic, Commercial and Management Sciences, University of Bejaia, Algeria, arezki.akerkar@univ-bejaia.dz

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Summary: The international migration of highly qualified scientists is an old phenomenon. It represents one of the most significant characteristics of international relations. Nowadays, all countries are affected by this phenomenon of international mobility of scientists. Like all these countries, Algeria is witnessing the phenomenon of the international mobility of scientists.

This article aims to examine the migration of Algerian scientists to developed countries. It focuses specifically on high-level scientists holding degrees such as doctorates in medicine, magister's, and research doctorates (PhDs), namely teacher-researchers, researchers, physicians, and doctoral students in various scientific disciplines.

The central question addressed concerns the determinants of the international migration of Algerian scientists to developed countries. Our approach is empirical; it is based on a questionnaire survey conducted among teacher-researchers, researchers working in research centers, physicians, and doctoral students. The questionnaire was distributed online via Facebook and by email. The analysis of the questionnaire data allowed us to observe that the mobility of scientists is explained by economic and social determinants, scientific factors, and other institutional factor.

Keywords: International migration; emigration; migration of scientists; highly skilled migration; Algeria.

Jel Classification Codes : J61, C8

* AMIR Farid, farid.amir@univ-bejaia.dz

I- Introduction :

In a global economy increasingly integrated through trade, international investment, and financial flows, there has naturally been a growing mobility of highly skilled individuals such as professionals, scientists, international executives, information experts, and others (Solimano & Pollack, 2004). While globalization has enabled the free circulation of goods, capital, and information, the free movement of people remains far from reality. Indeed, at a time when the mobility of all other production factors is widely accepted, the movement of people continues to be questioned. The case of unskilled migration is a striking example, as low-skilled migrants are often rejected in favor of skilled ones. The phenomenon of scientific emigration has become one of the most important features of international relations. Its underlying issue is as old as science itself (Dedijer, 1964). Scientific migration is a long-standing phenomenon that has accompanied the historical development of human civilization. Around the 1950s, the movement of international scientific migration began to gain momentum. In 1963, the term "Brain Drain" appeared for the first time to describe the migration of British scientists and intellectuals to the United States, particularly doctors and researchers in the medical sciences.

The phenomenon of scientist emigration worldwide has become one of the most important characteristics of international relations. All countries are witnessing the emigration of a part of their highly qualified scientific expertise. This issue represents a major challenge and a central concern for policymakers and the international scientific community. It is a field of research that several specialists from different research areas are interested in, who have tried to understand the reasons for international migration and its link with development.

Scientific research aimed at understanding the key factors of international migration, especially which of skilled migrants, occupies a central place in migration studies. Numerous scholars such as Piore, Michael J (Piore, 1979), Zelinsky (Zelinsky, 1971), Massey et al (D. S. Massey, Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A., & Taylor, J. E, 1994), and De Haas (Haas, 02/2008) have proposed various analyses and theoretical frameworks explaining the underlying factors behind international migration. Algeria is not exempt from this reality, which underscores the need to conduct research to understand the motivations that drive these scientific experts to emigrate.

In this work, we focus on the central question of what determines the international migration of Algerian scientists to developed countries: What are the explanatory factors behind the emigration of highly skilled Algerians who move to developed countries?

Our contribution in this article allows us to verify the following hypotheses:

H1: Socioeconomic factors are determinants that explain the choice to emigrate among Algerian scientists.

H2: Scientific motivations influence the decision to emigrate.

H3: Institutional factors influence the choice to emigrate among the Algerian.

I.1. Theoretical Review of International Migration Theories

What are the motivations behind human mobility throughout history? This is the question that has preoccupied researchers across the social sciences. Whether in economics, geography, sociology, anthropology, demography, history, law, or political science, many scholars have focused on this topic in an effort to understand the true reasons behind international migration.

We will attempt to review the different theories that have addressed the topic of migration. We will focus exclusively on the positive theories that explore the determinants of this complex phenomenon. From this perspective, it is important to note that there is no general theory of migration that fully explains the many aspects of human mobility, especially its causes. To study the explanatory theories related to international migration motivations, our attention will focus on two positive theoretical approaches: the macroeconomic or structuralist approach and the microeconomic approach to international migration.

The first approach explains the reasons behind the migration process by emphasizing the external forces that exert pressure on the international mobility of individuals. Three major theories guide this reasoning and perspective: the neoclassical macroeconomic theory, the dual labor market

theory, and the world-systems theory. Each of these offers a different understanding of the macroeconomic determinants of international migration.

The second approach is that of the neoclassical microeconomic theory of international migration. It is based on the notion of individual rationality. This model analyzes international migration through decisions made at the individual level, driven by a rational assessment of the costs and benefits of migration. It follows the core principles of neoclassical microeconomics. This approach views the individual as a rational economic agent seeking to maximize utility. Therefore, the decision to migrate or to remain in the country of origin is a choice made by the migrant. Migration thus involves comparing costs and benefits. This theory also relies on the wage differential principle, which argues that differences in salaries between countries are a significant motivation for international migration. In other words, migrants move from one country to another in search of higher wages. According to this model, migration offers better access to education and labor markets with high wages, thereby ensuring improved future prospects for the migrant and their family.

This approach is guided by three major explanatory theories of international migration: the neoclassical microeconomic model, the new economics of labor migration, and the push-pull model.

1.1.1. Neoclassical Macroeconomic Theory:

The neoclassical macroeconomic approach to international migration explains the phenomenon in economic terms. According to its proponents, migration is closely linked to development. This view is notably found in the work of Lewis (Lewis, 1954) and Harris & Todaro (Harris & Todaro, 1970). The model explains that structural differences between countries, particularly wage disparities, are a key motivation for moving from low-income to high-income countries.

1.1.2 World-Systems Historical-Structural Theory:

The historical-structural theory of world-systems originates from Marxist political economy and world-systems theory. It emerged as a critique of neoclassical models. This school of thought argues that wage differences are not the true drivers of international migration, as claimed by neoclassical macroeconomic theory. Instead, migration is a natural response to the unequal development caused by the expansion of capitalism in developing countries, which tends to exacerbate inequalities, particularly in access to resources (De Haas, 2007). According to Castles (Castles, 1989), the motivations behind the decision to emigrate are primarily socio-historical. This means that migration is not an individual choice. This claim is also supported by Ambrosetti and Tattolo (Elena AMBROSETTI, 2008). The model asserts that the economic development of underdeveloped countries has been obstructed by their disadvantaged position in the global geopolitical structure. It explains that political and economic power is unequally distributed between developed and underdeveloped countries. As a result, individuals in underdeveloped societies do not have the same access to resources as those in developed nations. Advocates of this approach present international migration as a manifestation of macroeconomic imbalances caused by capitalist accumulation in underdeveloped countries. From this perspective, the incorporation of pre-capitalist economies into the capitalist global system necessarily produces international migration. In other words, in this view, migration is no longer a matter of individual choice, as argued by neoclassical theory, but a decision dictated by structural forces that push individuals to migrate.

1.1.3 Dual Labor Market Theory:

The dual labor market theory is based on the structural characteristics of the labor market to explain migration. It highlights the factors related to the labor markets of host countries. According to Piore (J. Piore, 1979), a key proponent of this theory, international migration results from the persistent demand expressed by labor markets in developed countries. Piore (J. Piore, 1979) argues that immigration is not generated by unfavorable conditions in developing countries, such as low wages and high unemployment, but rather by structural factors, particularly the continuous need for foreign labor in host countries. He explains this chronic demand by pointing to specific features of industrialized societies. For citizens in these countries, working in low-skilled jobs means low wages and obstructs their pursuit of upward social mobility. In such societies, income is perceived

as a symbol of social success, prestige, and status. Consequently, nationals tend to reject jobs at the bottom of the occupational hierarchy. Piore (J.Piore, 1979) also discusses the existence of two sectors in the labor market: on one hand, a sector with a high concentration of capital that offers skilled and well-paid jobs; on the other hand, a labor-intensive sector characterized by low-skilled, precarious, and poorly paid jobs, which are less costly for employers. Another explanatory factor Piore highlights is the aging population in developed countries. Additionally, he notes that social changes, such as women's emancipation and the expansion of education, contribute to the need for importing cheap labor, since low-paid and low-skilled jobs once filled by women and youth no longer attract domestic workers.

1.1.4 Neoclassical Microeconomic Theory of International Migrations:

1.1.4.1 Neoclassical Microeconomic Model of International Migration:

While the neoclassical macroeconomic model successfully explains why individuals migrate from poor to rich countries using the wage differential argument, it fails to address why, within some poor countries that share the same wage levels, some individuals choose to emigrate while others choose to stay. Similarly, it does not explain why people remain in countries with similarly low wages. These unanswered questions led to the emergence of the neoclassical microeconomic model in the 1970s. Fundamentally focused on labor markets, this model views the migrant as a rational individual whose goal is to maximize income by moving to a location with a higher probability of being more productive. To better explain migration motivations, this model introduced the concepts of "migration costs" and a "probabilistic approach." We find this proposal in the model developed by Harris and Todaro (Harris & Todaro, 1970), which emphasizes the need to consider the probability of finding a job in the destination country. In this context, the neoclassical microeconomic model explains that the decision to migrate results from a rational cost-benefit evaluation. The more substantial the expected benefits in the host country, the more significant the migration flows become. The costs associated with international migration include travel expenses, language barriers, and lack of income during the job search period in the destination country (Sjaastad, 1962). Additionally, by incorporating human capital analysis, this model emphasizes that investing in education can be a reason to migrate. In other words, migration is seen here as an investment decision.

1.1.4.2 New Economics of International Migration:

The new economics of migration is another microeconomic model used to analyze the determinants of international migration. This theory offers a central and innovative contribution compared to the neoclassical microeconomic model. According to this theory, the decision to migrate abroad is not the result of an individual's personal decision but rather a collective decision made within a unit such as the family. Emphasizing the portfolio choice hypothesis, Stark and Levhari (Stark & Levhari, 1982) note that the emigration of a family member serves as a means to diversify household income sources. In a similar vein, Massey's observations (D. S. Massey et al., 1993) show that such family-level decisions are not solely aimed at income maximization, but also at risk reduction. This means the decision to migrate is made collectively by family members and not in isolation.

1.1.4.3 The Push-Pull Model:

The push-pull model is another neoclassical microeconomic approach in which the decision to migrate is made at the individual level. Like other neoclassical microeconomic models, this theory argues that migration results from a trade-off between the costs and benefits of migration. However, compared to other neoclassical microeconomic approaches, this model significantly broadens its analytical scope. Proposed by Lee (Lee, 1966), this model does not limit its analysis to economic determinants alone. It incorporates other factors, such as the search for better social and professional prospects and the desire to escape dangerous or risky environments. According to this approach, migration determinants are multifaceted. Furthermore, it suggests that migration is not always a voluntary choice. The model explains that international migration results from both positive factors specific to the destination country (which act as pull factors) and negative factors related to the origin country (which act as push factors). The former represent a favorable migration context and serve as attractions, while the latter reflect an unfavorable environment and thus act as repellers.

I. 2. Context and importance of the international migration of highly qualified scientists:

The phenomenon of the international migration of scientists, philosophers, and all those who carry and produce knowledge is not new. However, for more than four decades, it has never ceased to grow. Its scale and upward trends have continued to become increasingly significant. All over the world, states now attach great importance to the mobility of highly qualified individuals. Indeed, these new trends in the international migration of scientists are taking place in a context marked by two major challenges, particularly in developed countries, namely: the need to find a solution to the issue of demographic decline and to adequately meet the demand for skilled labor required by national economies that are increasingly knowledge-based. For example, in Europe, in the vast majority of European countries, states consider foreign workers as an alternative to curb the decline in the working population caused by the aging of European societies (Cerna & Czaika, 2016).

Nowadays, highly qualified migrants represent an important feature of international migration over the past five decades. Having a high level of university education gives each individual a strong likelihood of being able to immigrate compared to those who have not had access to higher education. For developed countries, these highly qualified scientific migrants constitute an important source of innovation and the functioning of an economy increasingly dependent on knowledge. It should be noted that with the rise of the knowledge economy, states have engaged in international competition to attract scientific talent capable of meeting the demand for skilled labor. The ability to attract scientists and retain them provides the host country with a competitive advantage over other countries that are also seeking to attract scientific expertise. In the United States alone, nearly half of the Nobel Prizes have been awarded to researchers born abroad (SHACHAR, 2006).

All developed countries have implemented programs to attract highly qualified scientific migrants. This has become a strategic issue for them in the context of a globalized world economy that is increasingly dependent on knowledge. They have all established selective migration systems in order to attract the best scientific and technical talents. Consequently, we can observe that states recognize the important role of these international migrations for the national economies of developed countries and grant them a central place in their development programs and strategies. They have all introduced migration programs that are favorable to the mobility of highly qualified scientists. In reality, states, as key actors in this race for scientific talent, approach the issue of the international mobility of scientific skills in a more open and favorable manner toward human circulation. It is an approach that presents the international migration of skilled professionals as a game that can be positive for both host and origin countries.

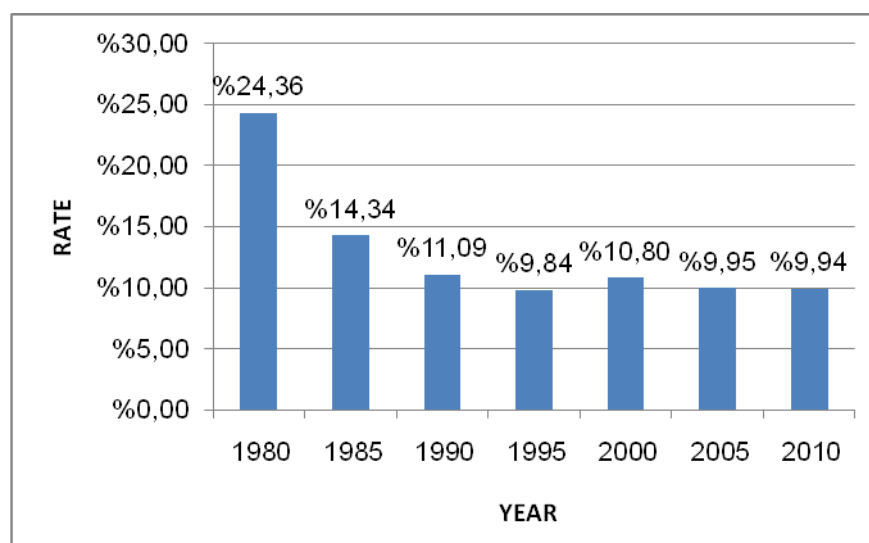
I.3. The Current State of International Migration of Highly Skilled Scientists in Algeria:

Algeria is a country deeply affected by the emigration of highly skilled scientific talent. Since its transition to a market economy is still in its early stages, it is difficult to provide comprehensive statistics to measure this phenomenon. The migration issue often becomes a subject of speculation due to the lack of reliable data. The absence of a specialized body responsible for producing statistics on the international migration of highly skilled scientists makes the issue even more complex. In addition, there is a problem of definitional clarity. For instance, the term “migration of highly skilled scientists” is not clearly defined in a way that would facilitate better understanding. As an illustration, the OECD database provides data on higher-education-level migrants from the Maghreb living in OECD countries, which includes students (OCDE, 2014). However, the term “highly skilled migrants” in this article refers specifically to university lecturers, researchers, medical doctors, and PhD candidates. In Algeria, the national press often cites the figure of 40,000 Algerian researchers living abroad. This category of migrants is poorly documented.

The emigration of highly skilled Algerians is relatively recent. It began in the 1970s and 1980s when the Algerian state adopted a national policy of overseas training that fully covered the education and living expenses of students and teachers. This marked the first wave of skilled migrants who chose to settle in their host countries. Referring to Algerian emigration to North

America, Khelfaoui(KHELFAOUI, 2006) described a small initial wave made up mainly of scholarship students and professionals who stayed in North America after completing their studies. Some of them pursued doctoral degrees at their own expense and went on to become university professors and researchers. In the United States, according to data cited by Salah Ferhi and based on the U.S. Census(KHELFAOUI, 2006), there were 8,752 Algerian nationals living in the country in 2000. This figure does not include Algerians who later acquired U.S. citizenship. In this context, the difficulty of measuring the exact number of Algerian scientists in the U.S. stems not only from the lack of educational-level classification but also from the fact that U.S. statistics do not count those who have naturalized. Consequently, scientists who acquired U.S. citizenship are not included in the figures for highly skilled Algerian migrants in the U.S. It is difficult to provide a comprehensive assessment of the global emigration of highly skilled Algerians due to challenges in accessing accurate and official data. Available statistics do indicate a substantial number of highly skilled Algerians residing abroad. According to statistics cited by Hammouda(Hammouda & in Fargues, 2005), France, the primary destination for Algerian migrants, hosts 7,000 Algerian doctors out of a total of 10,000 foreign doctors. In the United States, the number of researchers is relatively high within a community of approximately 18,000 Algerian nationals. Similar trends are observed in Quebec and some European countries. Additional estimates come from various sources, including government officials and national press reports, as noted by Hocine Labdelaoui(Hocine, 2010). According to these sources, the number of highly skilled Algerians who have emigrated includes 1,500 science researchers, as reported by the Ministry of Higher Education. Labdelaoui noted in a footnote that former Foreign Minister Mourad Medelci declared before the Senate: “More than 15,200 Algerian scientific talents are officially registered with Algerian consulates abroad... It is possible that this figure does not reflect the actual number... 40,000 professionals left the country during the 1990s, including 10,000 doctors now residing in France... In the United States, there are 3,000 Algerian researchers.”Quoting the president of the National Foundation for the Promotion of Scientific Research in Health (FOREM), Labdelaoui (Hocine, 2010) reports a figure ranging from 30,000 to 100,000 Algerian researchers living abroad. This number was cited in a statement published by El Moudjahid on December 30, 2008.Panel data from 1980 to 2010(Brücker, Capuano, & Marfouk, 2013), compiled by Abdeslam Marfouk, shows the evolution of the percentage of skilled emigration from Algeria. The figure below developed from Marfouk’s panel dataset, presents percentage data on skilled emigration in Algeria.

Figure 01: Emigration rates for men and women aged 25 and older, both genders combined. The emigration rate is defined as the total migrant population from a given source country divided by the sum of the migrant and resident populations in that country.



Source: This figure was developed using data from the 1980–2010 panel by Abdeslam Marfouk (2006).

Figure 01 presents the evolution, in percentage terms, of the emigration of skilled labor in Algeria between 1980 and 2010. Three distinct phases can be observed. During the first phase, the emigration rate declined from 24.36% in 1980 to 9.84% in 1995. This period was marked by political and economic reforms undertaken by Algeria. These reforms inherently carried the seeds of improved economic and social prospects. Thus, the decline in the emigration of scientists between 1980 and 1995 can be linked to these improved prospects, made possible by the economic and political reforms that, to some extent, helped to relatively stabilize the trend of emigration among highly qualified scientists. Subsequently, during the period of political and security crisis in the 1990s, particularly from 1995 to the early 2000s, skilled migration began to rise. The second phase corresponds to the period 1995-2000. It can be observed that between 1995 and the early 2000s, the rate of skilled emigration slightly increased, rising from 9.84% to 10.80%. This increase may be explained by the intensity of the political crisis of the 1990s, which has been identified as a major determinant motivating the emigration of scientists.

II– Methods and Materials:

In order to address our research problem, the present study is based on a descriptive and exploratory approach. Our objective is to identify the various determinants that influence the choice or decision to emigrate among highly qualified Algerian scientists. As for the population of our survey, we chose to exclusively target university teachers, researchers working in research centers, physicians, doctors and doctoral students. This choice is justified by the fact that this category of individuals is the one that produces scientific knowledge.

In the absence of a precise database on the number of Algerian scientists established abroad that would allow for their easy identification, we opted for the most appropriate method for this type of research, namely the network sampling method. This method is particularly used in studies focusing on hard-to-reach populations. As part of our survey, we relied on the use of a questionnaire as the main data collection tool. It was distributed online via the social network Facebook as well as by email. Our choice of distribution method is justified by the lack of precise information regarding the settlement of our target population.

The questionnaire was distributed in France, Canada, Germany, and the United States. Due to a lack of information and contacts, we were unable to extend our survey to other countries. The questionnaire was sent to the largest possible number of highly qualified Algerians abroad. We collected a total of 32 responses. Our survey suffers from the limitation of sample size, which remains small. This constraint is explained by the difficulty of accessing this population, which is characterized in particular by its strong geographical dispersion at the international level and a low rate of cooperation with our survey. The questionnaire we developed was structured around three main themes: (a) identification and characteristics of the respondent, (b) information on the decision to migrate, and (c) information on the links and roles of migrants.

III- Results and discussion :

Before beginning the analysis of the determinants of international migration among highly skilled Algerian scientists, it is important to describe the survey population and present the general structure of the sample.

III.1. Description of the Sample:

In Table 1, we present the gender distribution of highly qualified Algerian migrants. The data in this first table provide an initial overview of the demographic composition of our survey sample.

Table No. 01: Distribution of the survey sample by gender

		Gender			
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Male	23	71,9	71,9	71,9
	Female	9	28,1	28,1	100,0
	Total	32	100,0	100,0	

Source: authors, 2022.

This initial overview of the demographic composition indicates that males are predominant, accounting for 71.9%, compared to females who represent only 28.1%. This gender distribution

highlights an imbalance that may point to gender disparities characterizing international migration flows of scientists.

After presenting the gender distribution of the respondents in our survey, we will present in Table 2 the age distribution of our survey population. This second table provides an overview of the classification of respondents by age.

Table N° 02: Distribution of the surveyed population by age

What is your age?					
Age Group		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	30-40	21	65,6	65,6	65,6
	40-50	8	25,0	25,0	90,6
	50-60	3	9,4	9,4	100,0
	Total	32	100,0	100,0	

Source: authors, 2022.

The data collected through our survey and presented in the table above allow us to identify three age groups ranging from 30 to 60 years. The results show that the 30–40 age group is the most dominant, accounting for 65.6%. This is an observation that may reinforce the idea that the international mobility of skills often occurs at the early stages of careers. The second group, aged between 40 and 50, represents 25.0%. However, it is important to note that this second group, along with the last group (only 9.4% in our survey), might reflect higher proportions had our online survey reached more Algerian scientists who emigrated between 1970 and 1990—many of whom are currently residing in North America. The use of Facebook to distribute the questionnaire may partially explain these limitations.

The third table provides a representation of the surveyed population according to academic level. It allows for the classification of our survey respondents based on their educational qualifications.

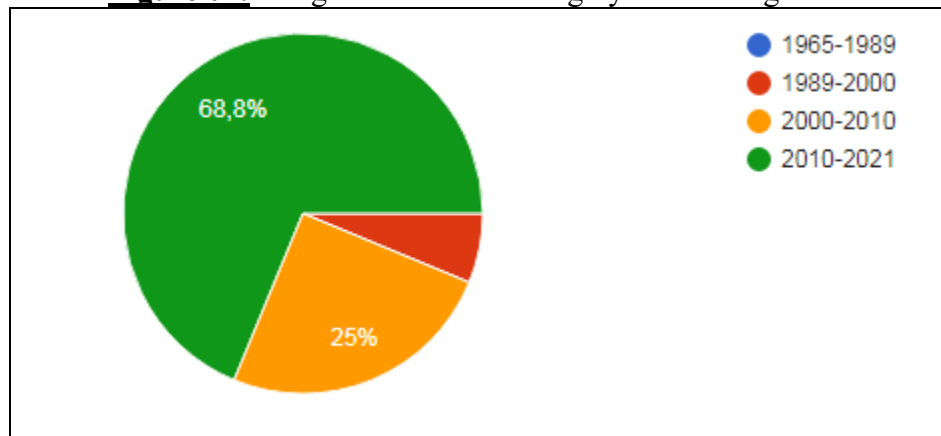
Table N° 03: Survey population by academic level

What is your degree?					
Degree		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Doctorate in Medicine	7	21,9	21,9	21,9
	Doctorate	12	37,5	37,5	59,4
	Magister	13	40,6	40,6	100,0
	Total	32	100,0	100,0	

Source: authors, 2022.

The table above describes the academic level of highly skilled Algerian scientists living abroad. According to the results of our survey, their academic qualifications range from a Doctorate in Medicine to Magister and Doctorate degrees in various scientific disciplines. As seen in the table, migrants holding a Magister degree represent the largest share, with 40.6%, followed by those with a Doctorate. Medical doctors account for only 21.9% of the total survey population. After presenting a classification of respondents by level of education, we will present in the following figure the different periods of emigration of highly qualified Algerian scientists.

Figure 02: Emigration Period of Highly Skilled Algerians



Source: authors, (2022)

Regarding the emigration period of these highly skilled scientists, the survey results indicate that 68.8% of the respondents left Algeria between 2010 and 2021. A further 25% emigrated between 2000 and 2010. Finally, 6.3% left the country between 1989 and 2000. We observe that 25% of Algerian scientists left the country during the period 1989–2000, which corresponded to the difficult conditions that characterized the 1990s. We also observe that the highest proportion, 68.8%, may be explained by difficulties in accessing the labor market, greater opportunities for emigration, and the existence of established contacts abroad that facilitate the emigration process.

III.2. Results and Discussion:

Following the description of the population survey, we now turn to the analysis of our findings. This section is initially devoted to analyzing the determinants of migration among highly skilled Algerian scientists. The types of variables assumed to explain the phenomenon of skilled migration in Algeria are all derived from the appropriate literature review related to international migration studies.

Here, we present the results of the descriptive analyses conducted on the second part of our questionnaire, which focuses on the determinants of the migration of highly qualified Algerians. Our findings reveal three types of determinants that encourage these scientists to emigrate and settle abroad. These three types can be summarized as follows: economic and social determinants, scientific determinants, and other determinants related to institutional factors.

Regarding economic and social determinants, the motivations for international migration identified in our study refer to economic and social conditions perceived as precarious and unsuitable for leading a decent life or successfully pursuing professional and academic projects. As for scientific factors, the determinants of migration relate to study conditions, scientific research, the quality and working conditions, as well as the teaching environment in Algerian universities. The third identified category concerns other institutional conditions.

III.2.1. Results: Determinants of Highly Skilled International Migration in Algeria:

As previously mentioned, the emigration of highly skilled Algerians is driven by three types of determinants: economic and social reasons, scientific reasons, and other reasons. According to the results of our survey, economic and social factors rank first with a percentage of 43.3%. This result aligns closely with what is outlined in the neoclassical theories of migration. Other causes related to institutional factors rank second in answering the central question, accounting for 30% of the responses. Finally, scientific factors motivating highly qualified Algerian scientists to emigrate represent 26.7%. Table 4 illustrates these results.

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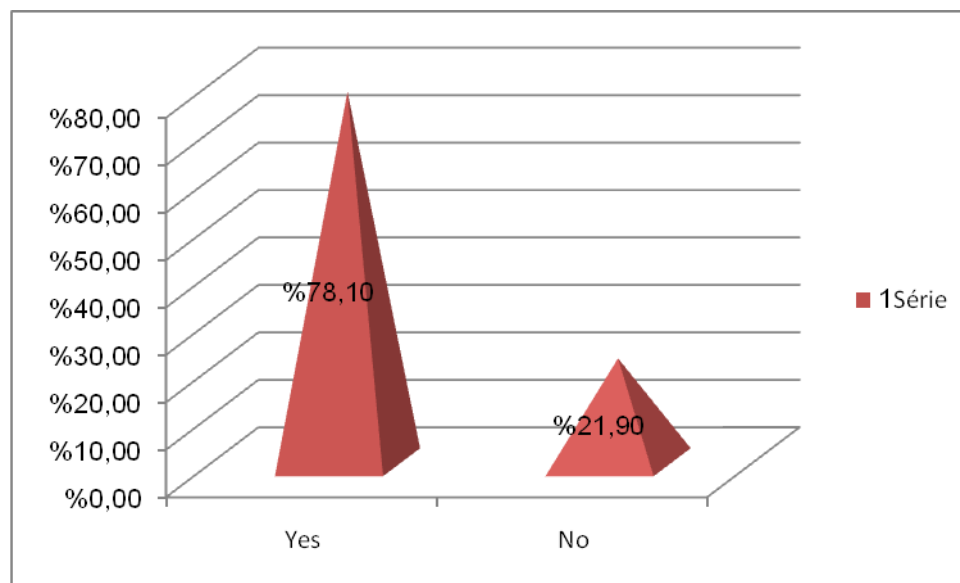
Table N° 04: Determinants of Emigration among Highly Skilled Algerian Scientists

What is your reason for emigration?									
Reason for Emigration		Frequency	Percentage	Valid Percentage	Cumulative Percentage	Bootstrap for Percentagea			
						Bias	Standard Error	95% Confidence Interval	
Valid	Scientific	8	26,7	26,7	26,7	-,1	8,0	Inferior 10,0	Superior 43,3
	Economic and Social	13	43,3	43,3	70,0	,1	9,0	26,7	60,0
	Other	9	30,0	30,0	100,0	,0	8,3	13,3	46,7
	Total	30	100,0	100,0		,0	,0	100,0	100,0

Source: authors, 2022

The trend of departures abroad accelerated beginning in the 1990s. In the context of the economic recovery of the 2000s, skilled migration in Algeria witnessed an upward trend, particularly among young scientists. The vast majority of these scientists pursued their higher education in the host country. Figure 03 shows the percentage of those who attended universities in the host countries. Indeed, the survey results highlight that 78.1% of highly skilled Algerian migrants continued their studies in the host country, while only 21.9% did not pursue further studies abroad.

Figure 03: Percentage of Algerian Scientists Who Continued Their Studies in the Host



Source: authors, 2022.

III.2.2. Discussion:

The survey we conducted as part of this research clearly demonstrates the existence of a hierarchy of determinants of the international migration of scientists in Algeria. The factors that dominate this hierarchy are economic and social in nature, accounting for 43.3%, followed by institutional factors at 30%, and finally scientific determinants at 26.7%. This explanatory framework highlights the diversity of variables influencing the decision to emigrate in the Algerian context.

Indeed, the prominent role of economic and social factors in our survey results, with the highest proportion of 43.3%, confirms the conclusions of neoclassical theories of international migration. These findings indicate that the Algerian scientists we surveyed are leaving a context

marked by unemployment, poverty, job insecurity, low wages, and bureaucratic obstacles, all of which act as drivers of emigration. Although national statistics do not provide a precise picture of graduate unemployment in Algeria, studies such as Feroukhi (2007) have shown that university graduates, particularly in the humanities, face increasing difficulties in labor market integration (Musette, 2010). This helps explain why, even during years of financial prosperity and despite various economic recovery programs, the scientists we surveyed chose to emigrate to developed countries. One respondent stated: "I was a doctor in a local clinic, recruited after five years of unemployment and two years of vocational training. I worked there for eight years, until 2017, the year I emigrated. My salary was 51,000 DZD. Too much stress, bureaucracy, and insecurity, especially for children." This testimony clearly illustrates the professional trajectory and living conditions of an Algerian scientist: a path marked by a sense of powerlessness and uncertainty about the future. The deterioration of social conditions and concerns about an uncertain future, particularly for their children, push these scientists toward emigration. In this sense, migration is perceived by Algerian migrants as a means of improving their economic and social conditions. It is viewed as a response to an unfavorable environment that prevents them from building a suitable standard of living for themselves and their families. In this context, host countries represent a more stable and attractive environment for these scientists seeking better future prospects.

A total of 30% of respondents in our survey mentioned other unfavorable conditions that encourage scientists to emigrate. The search for a stable life and personal fulfillment constitutes an important determinant of the international migration of Algerian scientists. Regarding scientific motivations, 26.7% of respondents highlighted factors related to research conditions. Our analysis indicates that the migration of Algerian scientists is closely linked to the state of higher education and research conditions. This shows that the deterioration in the quality of higher education, poor research conditions, and the lack of scientific and professional career prospects are powerful motivating factors influencing the decision to emigrate. One respondent confirmed: "The lack of applied research in Algeria pushed me to pursue a PhD abroad, where opportunities are more numerous, particularly in R&D within companies." These results are consistent with the conclusions of neoclassical migration theories concerning individual mobility. They also align with the literature on the international mobility of scientists, in which many studies emphasize the importance of the attractiveness of higher education systems in developed countries. The significance of these findings lies in demonstrating that the emigration of Algerian scientists to developed countries does not follow a single explanatory pattern, and that this migratory experience depends on multiple explanatory variables, among which economic and social determinants constitute the dominant dimension.

IV- Conclusion:

The objective of this research is to examine and analyze the determinants of the international migration of Algerian scientists to developed countries. To achieve this, we chose to conduct a questionnaire-based survey administered online. The results of this survey identified three categories of determinants: economic and social factors, scientific factors, and other institutional factors. The findings highlight the predominance of economic and social factors, accounting for 43.3%, followed by institutional factors at 30%, and scientific factors at 26.7%. The results of this study suggest that the international migration of scientists in Algeria is primarily explained by the search for favorable economic and social conditions, institutional factors, and academic opportunities offered in developed countries.

This study has certain limitations that prevent the generalization of its findings. In particular, the sample size is limited, which negatively affects the scope of our results. In terms of future research perspectives, the issue of skilled migration in Algeria requires further scientific

investigation in order to better analyze and understand its trends, dynamics, and determinants, particularly through the use of additional methodologies and larger survey samples.

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