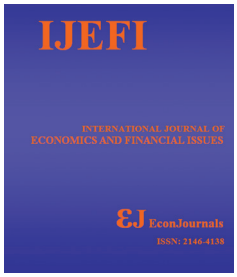

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Determinants of International Migration: An Applied Study on Selected Arab Countries (1995-2017)

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ABSTRACT

The objective of this study is to analyze the pull and push factors as determination of international migration from selected Arab countries (Algeria, Egypt, Iraq, Jordan, Lebanon, Libya, Mauritania, Morocco, Sudan, Syria, Tunisia, Yemen) to western countries (Canada, France, Germany, Britain, USA), using Unbalanced Panel Data For the period of (1995-2017). The study aimed at developing an extended gravity model to investigate economic and non-economic determinants of international immigration using negative binomial regression; this is considered as the most appropriate to estimate the relationship between the number of immigrants as a dependent variable and other explanatory variables in this study. The dependent variable is an example of a count data, which takes positive integers numbers. After examining the hypotheses of the study, the results showed that the economic factor represented by per capita income in the receiving country is the strongest attraction for migrants from Arab countries. In aWddition to the presence of former immigrants from the same immigrant country in the receiving State, the study also found an increase in the number of immigrants from Arab countries since 2011. In contrast, distance between countries and poverty in the Arab countries are the main obstacles to international migration.

Keywords: International Migration, Arab Countries, Negative Binomial, Gravity Model
JEL Classification: J61

1. INTRODUCTION

Individuals making decision of immigration from their countries to another, for different reasons is a phenomenon that has been known since ancient times. This migration continues today and has become one of the main problems of present time. Motives for individuals to migrate today are several and are different from ancient times. There is a growing need to study migration and understand its aspects and restrictions so that decisions makers and policies makers can handle this growth phenomenon in recent years and find solutions to address the negative effects that may ensue. The Arab have known spatial mobility from past time and for many reasons: the geography and the drying climate encourage them to move. Arab migrants appeared in most Arab regions for long time searching for water, pasture and fertile land that is suitable for living and for agriculture. This was to look for alternative resource of livelihood or to escape from invaders and aggressors. At that time, the mobility was in the form of groups representing neighbors and belonging to the same tribe. This mobility has developed with years in our Arabs countries but for reasons that are different from those that forced ancestors to mobility.

This paper is organized as follows: Following the introduction, the second section discusses significance of study and its questions. The third section, reviews literature and theories explaining the international migration. The fourth section, the empirical studies on migration and determinants of international migration. The fifth section concerned with the research methodology, and data sources, while the model estimation and estimation result of our empirical study are reported in the sixth section, the conclusion is provided in section seven.

2. THE SIGNIFICANCE OF THE STUDY AND ITS QUESTIONS

The importance of international immigration emerges as a phenomenon linked to several aspects and this is a matter of high priority in the agenda of the governments and international organizations. This importance stems from the fact that this phenomenon is engaged to the growth, development and security issues in all over the world.

Therefore, researchers, the United Nations and related organizations dedicated their efforts to understand the push and pull factors of this growing phenomenon and they are working to figure its limitations or restrictions. This study is a contribution to search into the motivation of international immigration from the Arab countries, where the numbers of immigrates have increased, in an attempt to understand the reasons behind people's movement.

But despite of the highly importance of international immigration topic, few studies that are related to mobility determinants were found about the Arab world. The majority of international immigration studies focused on some economic variables without analyzing in depth reasons and motivations behind this mobility. There are few examples studying the determinants of international immigration for specific country, such as the study about the immigration to United State of America (Karemera et al., 2000), (Greenwood and McDowell, 1999), the international immigration to the UK (Mitchell and Pain, 2003), to Germany (Vogler and Rotte, 2000), and the study of relationship between international immigration and unemployment in France (Fromentin, 2013).

Therefore, this study raises the following questions: Are the immigration flows responding to the push and pull factors? What is the effectiveness of the determinants in increasing and decreasing the number of immigrants?

This study aims to answer these questions and assumes that there are several factors behind the increase of immigrants which contribute to individual and group of people flows.

3. LITERATURE REVIEW

There are various of international immigration definitions which have been adopted by international institutions and interested researchers in studying this phenomenon.

The World Bank (WB) defined the international migration as "the movement from the country to settle down in another country." It explains people's movement from the mother land to another country whether they were individuals or group of people; the international organization for migration (IOM) defined the immigration as "any person who is moving or has moved across an international border or within a State away from his/her place of residence, regardless of whether the movement is voluntary or involuntary.

As for interested researchers, who are already concerned with migration, they have presented several other definitions such as: Lee (1966) in his book "the theory of migration" stated that migration is "the status of movement and change of residence from a place to another, whether this movement was internal or external, and it includes the origin, destination and overlapping set of constraints that accompany the act of transition. Zaki (1982) added the element of the possibility to staying permanently in his definition for migration, and regarded it as "movement of person or group of persons from a place to another for particular reason" and the migration is voluntary or involuntary; he also stated that the migrant may come back to settle in his mother land or stay permanently in the new home, while Alwan (2014) argued that there is no agreement about the definition to describe human movement and released an alternative name to international migration which is departure in his book (Departure). He states that academic studies continue to devise terms that serve research and applied studies related to migration.

According to (IOM) migration corresponds to anyone who lives away from the usual place of residence regardless of his status in the law, and if his residency is voluntary or involuntary. The united nation (UN) agrees with the definition of (IOM) for the migrant and adds that the limited length of stay in the foreign country should be more than 1 year. Regardless of whether migration is authorized or not authorized. The international union of scientific study of population described the migrant as "the person who changed the place of his usual residence and move to another place at least for one time during the time of movement (departure) and which mostly could be for 1 year, or 5 years or 10 years.

The movement included two directions: the origin country and the destination country. The origin country is the origin of migrant country or the sending country, where the movement started to happen and it is the origin area for migrants, and it's also known as developing countries or southern countries and they are distinguished with low income and high unemployment. It is either the residence place in the beginning of immigration or residence place where the last decision has been taken, while the other side is the destination country or the receiving countries, and it is usually developed country and known as Nordic[1] countries.

The immigrants go to countries with attractive benefits such as job opportunities, high income and the presence of friends and relatives as social supporters.

3.1. The Theories Explaining the International Migration

The significant importance of addressing the international migration theories stems from the possibility of getting the benefits from them to understand and interpret this phenomenon and its results. The involved researchers classified these theories according to level of analysis. There are theories that focused on micro level, which explore the individual aspect when the individual takes the decision to change his residence and move to another country, meanwhile, there are migration theories interested

1 The Nordic countries, according to the United Nations, are developed countries in Europe and North America, in addition to Australia, New Zealand and Japan, while the countries of the south are developing countries and all other parts of the world.

in studying trends of overall migration based on reasons that related to macro level.

Here are the most important migration theories addressed in the literature:

3.1.1. Ravenstein theory of migration

Ravenstein relied on the census of England and Wales in building his theory in 1885 by examining the factors that attracted individuals to move from one place to another, focusing on the migrants' individuals' characteristics, that on the basis of which he formulated a number of generalizations, which were later called Ravenstein's laws.

Here are the seven generalizations of Ravenstein theory of migration (Ravenstein, 1885):

1. Migration often occurs over short distances
2. Individuals migrate from agricultural areas to industrial zones
3. The expansion of large cities came from migration rather than the natural growth of the population
4. Migration evolves with industrial and transportation development
5. Increase in the population comes from the increasing influx of migrants
6. Women migrate to areas with greater geographical proximity than male migration
7. Economic reasons are the main motivate to migration.

3.1.2. Neoclassical migration theories

These theories were built on the fact that migration takes place on the basis of the difference in labor market returns, where individuals respond to employment opportunities with a rewarding income. This neo-classical approach has been adopted and believed that there is a linear relationship between migration and wages inequality (Massey et al., 1993), (Borjas, 1987).

De Hass (2008) mentioned that migration is already linked to an individual's ability to afford movement costs, he believed that the migration rates are increasing when the country's wealth grow, where many individuals are able to immigrate because they can afford the migration costs. While, Kurekova (2011) argues that the continued growth of the country's wealth is contrasting with a decrease in the motivation for international migration, leading to lower rates of migration.

From this theory, that was adopted by the neoclassical, emerged several theories to explain the different aspects of migration.

Sjaastad (1962) presented the human capital theory of migration, he explained migration at a micro level, and pointed out an investment decision of individuals for migration is based on their rational behavior and maximization their benefits. According to the human capital model, the success chances of high skills migrants will be greater than others, in addition the likelihood of migration decreases with age, reflecting the smaller expected lifetime gain from moving for older people (Bauer and Zimmerman, 1999). Lee (1966) was the first to formulate migration in a push-pull factors framework on an individual level, looking at push factors, which are related to origin countries that motivate individuals to leave, and pull factors in the destination country, which attract individuals to migrate, with the existence of obstacles such as geographical distance and regulatory restrictions imposed by States to reduce migration.

According to (Mabogunje, 1970) the social, cultural and economic effects are the main factors for international migration, in addition, migration across borders is closely linked to the concept of networks, because the costs and risks of migration are lowered by social and information networks. This theory considers that migrants have an impact on the various aspects of development at the sending and receiving countries. The presence of migrants in the receiving country encourages the individuals to migrate.

Piore (1979) argued that the immigration is not caused by push factors, but by a permanent demand for immigrant labor that is inherent to the economic structure of developed nations, where the Dual labor Market Theory explains the existence of a dual labor market based on labor intensity in some sectors that suffer from scarcity of capital. At the same time, there are abundant capital sectors with few labors. According to this theory, the demand side is the main determinant of international migration not the supply side (Piore, 1986). On the other hand, World Systems Theory (Wallerstein, 1989) links between the determinants of migration and the structural changes of global markets. The theory focuses mainly on the supply side of labor, so the main base of this theory is standing on the idea of linking between international migration and globalization. This theory observes that developing countries that have transformed to production for export will become countries attracting foreign capital for direct investment, and this affects the patterns of migration, where individuals move to countries where investments originate and become the destination for receiving migrant labor (Gurieva and Dzhioev, 2015).

New Economics Theory of migration is based on the fact that poor families sent one of their family members to work abroad because of immigration-expected returns, where these benefits reduce the poverty situation that families live with as sign of material transformations that families probably are going to face. Thus, this theory denied the individual decision for immigration, but the family also plays a role in making this decision (Stark and Stark, 1991).

Over the historical sequence of immigration theories, it was noted that the immigration theories showed differences in terms of the aspects that have been focused on and even though there are other aspects that were subject of attention of all theories. And this explores that migration patterns have varied over time, and that push and pull factors have included many different factors, and that theories shared that labor is the main catalyst for migration on the demand side of receiving countries, or on the supply side of sending countries. If we assume that labor migration occurs by the transfer of individuals from developing countries to industrialized countries, so how can we explain the migration of labor to developing countries under these theories? For example - the Arab world - it includes receiving countries and sending countries. Therefore, the study raises questions about to what extent these theories are realistic to be adopted by the world's countries?

One must take into consideration the economic, cultural and social differences among countries when studying migration. These differences impose themselves when calculating the flow of migrants, in addition to the new world order led by the world's superpowers that try to redistribute the population in a way that serves the political goals and interests pursued by the major powers.

3.2. The Previous Studies

The role of the determinates of international migration has been long debated in previous literature. Since the publication of Ravenstein Laws in 1885 till the present era economists contributed a lot to migration and its determinants. With the passage of time, economists have specified various factors that affecting of individuals decision making toward international migration. Studies of a different nature have investigated the migration determinants, regardless of different conceptual and methodological point of views. However, discussion has reached to the consensus to find out that which dimensions of the economic indicators matter most. There are several studies that have examined the international migration's phenomenon by analyzing and researching its motives and effects. This study tries to uncover some of them as supporting evidence for the major idea of this study.

Karemera et al. (2000) examine the influence of political, economic and demographic factors on international migration flows to USA and CANADA. They covered (70) origin countries for the time period of (1976-1986). Using a modified gravity model, the results revealed that the population of origin countries and the income of USA and CANADA are the most important determinants of migration.

The attempts to address the relationship between migration and poverty are presented by (Richard and Page, 2003), they used a data set of 74 low- and middle-income developing countries to examine the impact of international migration and remittances on poverty. They found country's distance to USA and OECD countries will reduce the share of migration from that developing countries, and countries with higher levels of poverty do not produce more migrants, because of the considerable travel costs associated with international migration. In addition, they used the demographic, factor, and found that countries with high population density produce large numbers of migrants in contrast to countries with low population densities. Mayda (2005) in her analytical study of the economic and non-economic determinants of international migration, she used annual data for 14 OECD countries, covering the period from 1980 to 1995. The study found that one of the factors attracting migration is the increase in GDP per capita, in a sign that improving income leads to increase rates of migration. On the other hand, it was found that the effect of the push factors was not the per capita share of the total income of the sending country as expected in line with the theories, but rather the greatest impact was on the distance between the sending and receiving countries, as it had a negative impact on international migration. She found evidence of robust and significant pull effects, that is the positive impact on immigrants' inflows.

The same researcher applied study in 2007 on the impact of economic, social, cultural and demographic determinants of migration on OECD countries to measure the impact of migration on the average income in both sending and receiving countries, found that access of labor market and high income in receiving countries as well as less restrictive laws will increase international migration rates.

Based on OECD governments note rising immigration with alarm and grapple with policies aimed at selecting certain migrants and keeping out others, (Hatton and Williamson, 2005**)** found that, the gaps between rich high-wage countries and poor low-wage countries; poverty constraints, and the size of the migrant stock from the sending countries currently residing in the receiving countries are driving South-North migration pressure.

(González et al., 2011) aims to explain the migration of students and for this purpose González et al., worked in an empirical study carried out to determine the factors influencing the migration of higher education students in the Erasmus program[2] using the data of the countries participating in this program, such as the size and the cost of living For the migration of students, which amounted to two million people since 1987. Results also revealed that there are other determinants, like a country's characteristics and time effects, which can affect mobility flows. To highlight the relationship between economic factors and migration (Westmore, 2014) used data of the high-skilled and low-skilled migrant stock between 92 origin and 44 destination countries, the results of his study indicated that the increase in wages for skilled labor in the receiving country is related to the increase in the number of migrants. In addition to the impact of different policies on business and labor markets, stricter policies consider an incentive for highly skilled people to migrate. Finally, the study showed that fair legal systems have a big role in increasing the number of immigrants as well as the differences in wages are the main driver of migration, especially for those with high skills.

Porumbescu (2015) explains the main ideas on which theory of international migration was based on and makes analysis on whether the ideas are still accurate, and have the capacity to explain the evolution of contemporary international migration. The main ideas mentioned in his study, that the decision to migrate is made not only at the individual level, but also with the participation of family's members. where they all work not only to maximize their income but also to reduce the risks that result from the failure of local markets to allocate resources efficiently. This is an area where many economists focused their attention to market imperfections such as high transactions in production and input markets as well as limited access to information and poor telecommunications and transport infrastructure, such local market failures create incentives to send family member abroad. To examines the determinants of long-term international migration to the United Kingdom, (Forte and Portes, 2017) explored the extent to which migration is driven by macroeconomic variables (per income capita, unemployment rate). Their result is in line with theory and the existing literature, and they found large impacts of push GDP in sending country and pull GDP in UK factors, and weak evidence for the impact of the unemployment rate in Origin countries.

2 htt://www.erasmusprogramme.

(De Hass et al., 2018) reviewed trends and drivers of international migration over the post war II. The study focused in some determinates can have important and complex effects on migration such as: examples: non-migration policies, labor market structures, income levels, infrastructure, education and social security. Based on the idea that, migration is the result of two factors: (1) the aspiration to move; (2) the ability to move, (Carling and Schewel, 2018) attempt to answer the question about why individuals decide to migrate, they tend to lay a foundation for new research on global migration in its diverse forms.

4. DETERMINANTS OF INTERNATIONAL MIGRATION USED IN THE STUDY

The study tackles the economic, social, political and geographic factors in addition to the demographic factor to determine which factors are most influential in the decision of international migration.

4.1. Economic Factors

The study adopts the per capita income GDP of both sending and receiving countries as an attraction factor in the receiving country. In contrast, it is considered a push factor in the case of low per capita GDP of the sending country, and has been adopted by many studies in the field of international migration as one of the most important economic factors that enable researchers to study the determinants of migration across countries and is considered one of the fundamental variables in most of the economic literature aimed at to study the determinants of international migration. See (Richard and Page, 2003), (Mayda, 2005) (Gebremedhin and Mavisakalyan, 2013) (Abdmoulah and Laabas, 2015). Some studies have used GDP in studying the relationship between international migration and economic factors (Lewer and Berg, 2008). While, Hatton and Williamson (2005) found that the inverted "U" relationship between per capita GDP and international migration, where believed that increased labor supply resulting from the influx of migrants leads to lower wages in host countries, and it is replacing the accumulation of physical capital as a major source of growth. In the same context, the report issued by the OECD argued that the relationship between GDP per capita and migration is unclear. It should be considered through two basic elements: the ratio of the participation of employed individuals to the total population, and labor productivity (OECD/ILO, 2018).

This study also mentioned the impact of unemployment in sending countries on international migration. Many other empirical studies have looked at the role that unemployment plays in increasing the flow of migrants who search for employment opportunities outside their borders (Karemera et al., 2000). The International Labor Organization (ILO) defines unemployment as the sum of individuals who are able to work but who do not work and looking for work.

The study also includes the Gini index to measure the impact of equity of income distribution on international migration, as (Peridy, 2006) did in his study.

4.2. Non-Economic Factors

Studies of international migration vary in adopting different determinants that influencing the decision of international migration. Among the factors, the study considered the impact of education on the flow of immigrants from Arab countries, and if the educational level is related to the desire to migrate where high wages and opportunities are given to those with qualifications. Some applied studies have used the educational attainment index as measured by years of study in the search for international migration determinants (Westmore, 2014).

In addition, mastering the language of the destination country is considered to be as one of factors encouraging migration. Empirical studies shown that the common language between the two countries or that the language of the receiving country is commonly used in the sending country reduces the psychological cost of the migrant for easy communication with others.

The study like other studies, also does not exclude the social factor, which is represented here by the number of immigrants living in a country, which is called the migrants stock.

When considering the political factor, which is represented by ethnic conflicts, wars, individual liberties and colonial relations, and its impact on international migration. Our study tried to the relationship between the political institutions in the Arab countries and the desire of individuals to immigrate.

The study of Adsera et al. (2016) demonstrated that there is a strong relationship between international migration and political indicators, and supported that individuals make their decisions to stay away from any countries where their survival is in a threat. For example, the Gulf War (1990-1991) contributed to the increase in the number of immigrants from the Arab region, and caused the emigration of 3 million workers, most of them of Arab nationalities. Another example is the war led by America and caused immigration at the time of the largest waves of migration known to the Arabs since the date of 1948, when the flame of sedition and sectarianism started in gulf area during the period 2005-2007 and left two million Iraqi refugees in neighboring countries without shelter (Fargues, 2013).

Political instability and events in the Arab region since early 2011 in the so-called Arab Spring have contributed to the increase of Arab immigrants, as IOM figures show that Arab countries have witnessed a remarkable rise in the number of migrants over the past three decades, with the number of international migrants in 2015 around (34.5) million migrants, 10% of whom are citizens of the Middle East and North Africa.

With regard to geographical factors, a study on the determinants of migration in the literature of economic or social sciences is almost free from the geographical factor, as it uses the common boundaries between the sending and receiving State. The relationship between distance and international migration is negative, to reflect to us that the more distance between the two countries the less international migration. All past experimental studies in this variable distance area measured in kilometers have been adopted. In the same

context, this study is to document the relationship between the flow of migrant numbers and the geographical distance from the country they are visiting.

In order to measure the impact of the demographic factor on international migration, this study does not differ from other studies in inclusion of the total population in both countries of origin and destination. Richard and Page found in their empirical study, that densely populated countries produce large numbers of migrants in contrast to low-density countries.

5. THE METHODOLOGY

The increasing number of international migrants to developed countries over the last five decades take the attention of all interested in this phenomenon. The issue of migration and its impact on various activities in countries - especially receiving countries – continue to receive serious attention, and this has led academics to work on to form a migration model, where international (voluntary) migration is an individual's choice based on specific motivations, and on base of the potential benefits and expected costs to be incurred, the individual makes the decision to migrate in the hope of maximizing his or her benefit. Smith (2012) remarks that it is easy to understand these drivers at a personal level, but it is difficult to study their effects at the country level.

Therefore, the Newton's law of gravity, which is often used to measure trade between countries, was expanded to include the study of international migration. This model is based on the fact that each country has its own characteristics. It may have factors that attract people to migrate to another country or other factors that may drive individuals to stay in home country, as well as bilateral effects between countries such as distance and common language.

Besides that, there are several studies that have adopted theoretical framework of migration models where potential migrants choose the country that provides them with the benefits they desire (Grogger and Hanson, 2011) (Ortega and Peri, 2013). Thus, the migration decision is a function of push and pull factors as follows: (Yashiv and Levy, 2009)

$$m_{ihf} = (w_{if}+t_{if})-(w_{ih}+t_{ih})-c_{ihf} \quad (1)$$

Where m is migrants, (w_{if}), (w_{ih}) refer to the individual wage (i) in the sending country (h) and the receiving country (f).

(t_{ih}, t_{if}): Refers to the advantages granted to the individual in home country (h) and (f) origin country.

(C_{ihf}): Is the cost of migration, where it is assumed that

$$cov(w_{if}, w_{ih}) > 0,\ cov(t_{if}, w_{if}) < 0,\ cov(t_{if}, w_{ih}) < 0$$

The cost of migration can be illustrated as follows:

$$C_{ihf} = c_{hf}(x_{hf}) + z_{ihf} \quad (2)$$

(x_{hf}) includes all direct and indirect costs, while (z_{ihf}) means non-cash costs that relate to the immigrant himself, such as staying away from family and friends.

Borjas (1987) assumes that the wage of an individual depends on the level of his or her skills.

$$w_{if} = \alpha_f + \beta_f s_i\ w_{ih} = \alpha_h + \beta_h s_i \quad (3)$$

Subtracting equations (1), (2), (3) produce the following equation:

$$m_{ihf} = (\alpha_f - \alpha_h) + (\beta_f - \beta_h) + (t_{if} - t_{ih}) - c_{hf}(x_{hf}) - z_{ihf} \quad (4)$$

Consistent whit an individual seeks to maximize his or her utility, he or she will choose to migrate if the m_{ihf} is greater than zero.

We can include a set of variables related to push and pull factors in equation (4) and study the impact of these factors on the decision of the individual to migrate. Many international migration studies have relied on models of maximizing random utility by incorporating different factors into the gravity model. Where it became common in statistical analysis, especially in terms of measuring bilateral flows between two geographic regions, this model was based primarily on the law of gravity between objects developed by physicist Isaac Newton and named after him (Newton's law) in 1687, which states that the forces of attraction between two objects are directly proportional to their size and inversely to the distance between them. This model is no longer limited to the science of physics, but has become used in many sciences, especially the study of many economic phenomena related to the movement of goods, services, capital and individuals, has been comparing spatial interaction law of gravity, the first researchers who used this model in modern economics (Isard and Peck, 1954), (Ullman and Mayer, 1954) and (Tinbergen, 1962). The model of gravity was chosen as a basis for estimating the relationship between determinants of international migration and migratory flows. Cross-sectional data over time allow researchers to estimate based on the gravity equation, and the gravity equation for spatial mobility of individuals is as simple as follows: (Kim and Cohen, 2010).

$$m_{ij} = k(p_i p_j)/d_{ij},\ i \neq j \quad (5)$$

Where m_{ij} is the number of migrants from country i to country j, Pi is the size of country i and Pj is the size of country j, dij is the distance between two countries i and j and k denotes a constant.

The model assumes that countries with large population densities resort to international migration, and a limit to the phenomenon of migration is the distance between the country of origin and destination.

Since this equation (5) cannot be estimated using standard estimation techniques, the empirical research literature estimates the gravity model in its linear form by converting model variables to logarithmic form.

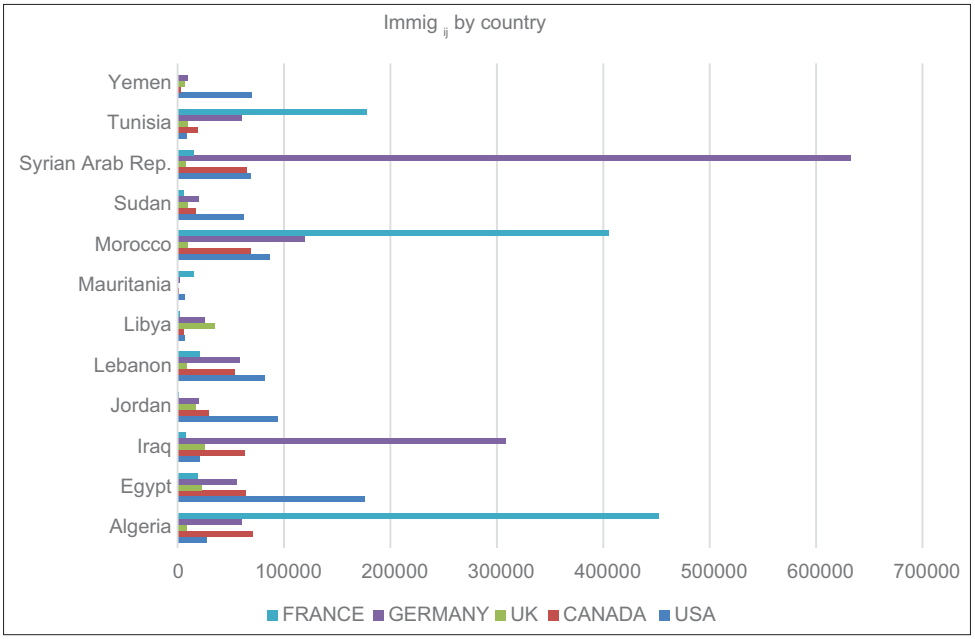
$$Log\ m_{ij} = \beta_0 + \beta_1\ log\ pop_i + \beta_2\ log\ pop_j + \beta_3\ log\ d_{ij} + \alpha_{ij} \quad (6)$$

Table 1: Variables used in the model and their sources

The variables	Symbol	The sources
Migrants flows from the sending countries to the receiving countries	$Immig_{ij}$ $Dep.\ Var$	OECD Stat. (International migration database) + United Nations Division, 2015+United States Census+Office of National Statistics
GDP per capita for both countries	$Gdpcap_i$ $Gdpcap_j$	WDI+Gapminder Indicator[3] (http://www.gapminder.org)
Unemployment rate in the sending countries	Ur_i	ILOSTAT database, 9/2018
Population of both countries	Pop_i Pop_j	WDI
Area for both countries	$Area_i$ $Area_j$	WDI, 10/2018
Inequality index in the income distribution of the sending countries	$Gini_i$	GINI index (World Bank estimate) + WDI+Fred Economic research (FRED)
Poverty index of the sending countries	Pov_i	HDR+WDI+Knoemia corporation (US)

WDI: World Development Indicators, HDR: Human Development Reports, WDI: World development Indicator

Figure 1: *Migration from Arab countries during the study period (Authors)



Empirical model in several studies include other independent variables, which are related both to origin country and to destination country. GDP per capita at origin and destination countries have been used as income estimators.

Based on the theoretical framework, the study considers that migrant flows are the dependent variable and all other variables come as explanatory variables.

We expanded the gravity model by adding to it more independent variables:

$$Immig_{i,j,t} = c_0 + c_1\, Gdpcap_{i,t} + c_2\, ur_{i,t} + c_3\, Polscore_{i,t} + c_4\, Pop_{i,t} + c_5\, Edu_{i,t} + c_6\, Pov_{i,t} + c_7\, Gini_{i,t} + c_8\, Area_{i,t} + c_9\, Gdpcap_{j,t} + c_{10}\, Polscore_{j,t} + c_{11}\, Pop_{j,t} + c_{12}\, Area_{j,t} + c_{13}\, Emmig_{i,j,t} + c_{14}\, Dis_{i,j,t} + c_{15}\, Dcomlang_{i,j,t} + e_{i,j,t}$$

Where c_0 is the equation constant, while c_1 to c_{15} is the equation coefficients to be estimated, $e_{i,j,t}$ shows the random error.

$$i=1,\ldots\ldots,12\ j=1,\ldots\ldots,5\ t=1,\ldots\ldots,23$$

i: sending countries, j: receiving countries, t: years

5.1. Data Sources

The study adopted various sources to establish a database of the sample of the study for a number of Arab countries as Origin countries and a limited number of receiving countries. These data cover a number of (23) years for the period from (1995 to 2017). The symbol (i) was given to denote the Arab countries and the symbol (j) indicates the receiving countries for all model variables. The Table 1 shows the variables used in the model and their sources:

6. MODEL ESTIMATION

6.1. Variables Description

There are many factors that motivate individuals to migrate, some migrate for economic reasons, others seek better jobs, or seek a safe home, and many studies favor the economic motivation as a

3 Gapminder is an independent Swedish foundation with no political, religious or economic affiliations. It produces free teaching resources making the world understandable based on reliable statistic, and collaborates with universities, UN, public agencies and non-governmental organizations, and Foundation is registered at Stockholm County Administration Board.

Table 2: Total migrants (1995-2017)

Countries	USA	Canada	UK	Germany	France	Total
Algeria	27.409	70.455	9.107	60.373	451.870	619.214
Egypt	176.148	64.168	22.683	56.160	18.624	337.783
Iraq	21.445	63.022	25.637	308.069	8.008	426.181
Jordan	93.906	29.802	17.254	19.924	910	161.796
Lebanon	82.105	54.057	8.592	58.453	21.356	224.563
Libya	7.186	6.292	35.125	25.481	1.754	75.838
Mauritania	6.792	1.168	131	2.590	15.625	26.306
Morocco	86.741	68.662	9.437	119.251	404.920	689.011
Sudan	62.522	17.424	10.151	20.184	5689	115.970
Syrian Arab Rep.	68.954	64.798	7.796	632.306	15.232	789.086
Tunisia	8.998	19.440	10.177	60.763	177.741	277.119
Yemen	70.088	3.206	6.745	9.694	489	90.222
Total	712.294	462.494	162.835	1.373.248	1.122.218	3.833.089

*Source: Authors' elaboration on (OECD Stat.)

catalyst for migration in reference to the high per capita income in receiving as well as the political stability that characterize it.

Figure 1 gives a clear picture of the countries that produce the largest numbers of migrants, and shows that most migrants from Algeria, Morocco, Tunisia and Mauritania go to France, while most migrants from Syria and Iraq go to Germany, migrants from Egypt, Jordan and Lebanon Yemen and Sudan emigrate to the United States, and most migrants from Libya emigrate to the UK. There may be many reasons for these choices, which will be tested when estimating the model to see the linkages between country pairs and the motivations inherent in choosing a country. Is it because of the presence of former immigrants from the same sending country or because of the language commonly used in the immigrant's country or the distance factor between the two countries is an impediment to the immigrants going to another country?

The data set that used to estimate the gravity model includes 12 Arab countries; Iraq, Jordan, Egypt, Libya, Algeria, Tunisia, Morocco, Yemen, Syria, Lebanon, Mauritania, Sudan, all these are middle-income countries according to the UN classification for 2018. The model tries to analyze the relationship between the dependent variable and explanatory variables, and identify the most important determinants of international migration in the selected Arab countries.

The Table 2, shows the number of migrants from the Arab countries covered by the study to the five countries, which is considered one of the most attractive countries for migrants. The number of migrants during the study period reached about 4 million people taking into account the existence of missing data during the period of 1995-2017.

Statistical analysis requires of the variables shows that, the standard deviation of the dependent variable, was found to be more valuable compared to the arithmetic mean of the flows of migrants, explaining the dispersion and variation of data (Table 3).

6.2. Estimation Results

The following Figure 2 shows the distribution of the dependent variable data, which shows the concentration of the distribution on the left side of the figure. Negative binomial model is appropriate for the estimation, which is an example of a counting data model.

Table 3: Variables description

Variable	Mean	SD	Min.	Max.	Obs.
$Immig_{ij}$	3157.701	11288.49	0	309699	1275
$Gdpcap_i$	8845.238	5592.258	1960.650	29630.220	1380
Ur_i	12.696	4.41158	6.3550	31.8400	1380
$Polscore_i$	24.1327	20.1619	0	76.3033	1320
Pop_i	22844297	20703563	2327075	97553151	1380
Edu_i	5.412406	2.217847	0.700	10.400	1330
Pov_i	6.777	7.139894	0	40.030	1190
$Gini_i$	37.08924	3.231191	30.900	46.300	1255
$Areai$	865981	827059.2	10230	2381741	1380
$Gdpcap_j$	39607.88	5651.481	28682.34	54225.45	1380
$Polscore_j$	71.492	13.2055	37.37864	95.2381	1320
Pop_j	1.07E+08	96809058	29354000	3.26E+08	1380
$Area_j$	3877363	4286780	241930	9161920	1380
$Emmig_{ij}$	70064.40	193411.2	15	1455276	986
Dis_{ij}	5316.154	2914.730	1340.390	11319.700	1380

*Source: EViews version 9 output

6.3. Poisson Maximum Likelihood Estimator (PML)

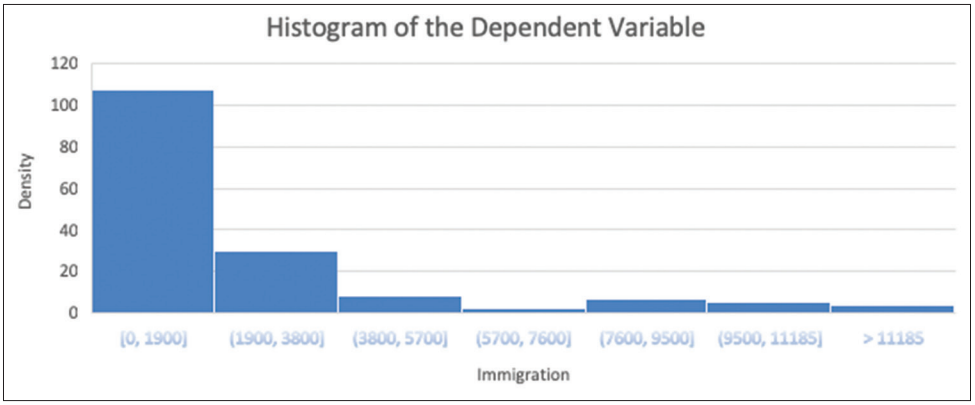
According to problems in estimating the gravity model in trade and spatial mobility by giving the dependent variable in the logarithmic form, the search for an alternative and more appropriate estimation technique for the gravitational model has become necessary. A number of researchers have drawn attention to the quality of using the count data estimator (Poisson Maximum likelihood) to estimate the gravity model. Besides being consistent in the presence of heteroskedasticity, this method also provides a way to deal with zero values of the dependent variable (Silva and Tenreyro, 2006). An additional problem of log-linearization is that it is incompatible with the existence of zeros in trade data or migration data, which led to unsatisfactory solutions, such as elimination of zero-trade pairs.

This method is applied to make estimations when the dependent variable has an integer positive number (0,1,2,3,…….). Dependent variable (migrants' number) takes small values including zero, and when estimating the dependent variable ($immig_{ij}$) not following the logarithmic form will be as following:

$$(Y/X_1, X_2, \ldots\ldots, X_k) = exp\ (\beta_0, \beta_1 X_1 \ldots\ldots, \beta_k X_k) \qquad (7)$$

Equation (7) is a nonlinear equation where the exponential function is a nonlinear function. Greene (2002) considers this method to be the best about assimilating the heterogeneity of cross-sectional data over time. This estimation is also equal to the average variation of

Figure 2: *Distribution of the dependent variable



the data following the Poisson distribution. In statistics, a Poisson distribution is a statistical distribution that shows how many times an event is likely to occur within a specified period of time. It is used for independent events which occur at a constant rate within a given interval of time, where

$$E(y) = u,\ Var(y) = u \tag{8}$$

6.4. Negative Binomial Maximum Likelihood (NBML)

This method is an example of a Poisson estimator but does not follow the same distribution where the dependent variable has counting data that takes positive integers with repeated numbers of zero and small values, when the variance value exceeds the average value {E (Y) <Var (Y)}. The negative binomial distribution occurs, as in the data of the variable of this study, in such a case the Negative Binomial is proposed where the general Poisson estimator is considered inappropriate in this case and gives misleading estimates of the regression parameters and follows the estimation of the parameters of the maximum probability method (Ismail and Jemain, 2007).

The (NBML) can be used in two main cases when: (1) Modelling count data; and (2) If the data has way higher variance compared to the mean - Overdispersion data (Table 4).

α: It refers to the dispersion coefficient, and it should be noted that the interpretation of the regression parameters estimated according to this method is not interpreted directly as in the estimation of other statistical methods, but is interpreted by incidence rate ratio (IRR), which can be obtained from the following exponential equation:

$$IRR = Exp(\beta) = (e^{(\beta_i)} - 1)\% \tag{9}$$

The IRRs represent the factor by which the dependent variable changes with an additional unit of the explanatory variable, see (Sprenger, 2013) (Pavković et al., 2018). After describing the data used in the study, the gravity model is applied after being reinforced by additional variables to see the relationship of different factors between the migrants and explanotary variables.

All studies concur that most of migrants have different reasons to move and search of better live condition. The basic factors which motivate migration classified as "Push Factors" and "Pull Factors."

Table 4: PML and NBML estimator comparison

Model	Distribution	Mean	Variance
Poisson	Poisson	Exp (Xβ)	Exp (Xβ)
Negative binomial	Negative binomial	Exp (Xβ)	(1+α) Exp (Xβ)

*Source: Cameron and Trivedi, 1986

The push factors are factors that enforce an individual to leave home country and go to another country, while The Pull Factors are factors which attract an individual to move to a specific country.

These forces (motivational factors) describe how individuals are pushed by motivational variables into making the migration decision and how they are pulled (attracted) by the destination country (Thet, 2012).

Before starting to review the results of the estimation of the model, we review the study's expectations for the parameters to be estimated. The study expects a positive relationship between the flow of immigrants and attraction factors. In contrast, a negative relationship is expected between the immigration and the push factors, which is shown in the following Table 5:

In the early nineties contributed to the increase in the number of immigrants from the Arab region, and caused the emigration of 3 million workers. The sedition and sectarianism in the period 2005-2007 that made two million Iraqi refugees in neighboring countries. (Fargues, 2013) Political instability and events in the Arab region during the so-called Arab Spring since the beginning of 2011 also contributed in the increase of Arab immigrants. The figures of the International Organization for Migration (IOM) indicate that the Arab countries witnessed a significant increase in the number of migrants during the past three decades, represent 10% of international migrants in 2015; which about (34.5) million immigrants. It seems that the motives of migration and movement from the country of origin to another country are not confined to political reasons or wars only, as it can be seen from Figure 3. Arab countries which are considered senders of migration in the Arab world, but they do not face any uprisings or wars (Algeria, Morocco, Jordan).

6.5. Assessment Results

The purpose of this study is to identify the determinants of international migration in Arab countries. In this context,

Table 5: The sign expectations for the parameters

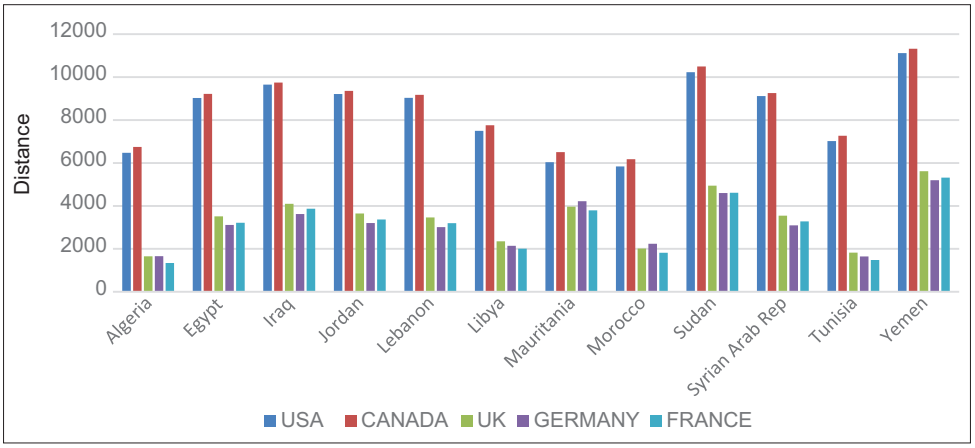
The variable	$limmig_{i,j}$	$lGdpcap_i$	ur_i	$Polscore_i$	$lPop_i$	Edu_i	Pov_i
Expected sign	Dep. Var	−	+	−	+	+	+
The variable	$Gini_i$	$lGdpcap_j$	$lPop_j$	$Polscore_j$	$lEmmig_{i,j}$	$lDis_{i,j}$	$Docmlang_{i,j}$
Expected sign	+	+	-	+	+	-	+

Table 6: Assessment results: Determinants of international migration: Selected Arab countries

Variables	Dep. Variable $Immig_{ij}$					
	NBML (1)	IRR	NBML (2)	IRR	NBML (3)	IRR
$lgdpcap_i$	−0.2290 (0.0116)	−0.204	−0.4752 (0.0395)	−0.378	−0.2398 (0.0063)	−0.213
ur_i	0.0441 (0.0000)	0.045	0.0371 (0.0013)	0.037	0.0386 (0.0000)	0.039
$Polscore_i$	0.0044 (0.0617)	0.004	0.0040 (0.3098)	0.004	0.0064 (0.0057)	0.006
$lpop_i$	0.0339 (0.5983)	0.034	−0.8571 (0.0343)	−0.575	0.1095 (0.0347)	0.115
Edu_i	−0.0184 (0.4761)	−0.018	−0.3781 (0.0000)	−0.314	0.0084 (0.7359)	0.008
Pov_i	−0.0276 (0.0000)	−0.027	−0.0013 (0.9190)	−0.001	−0.0143 (0.0254)	−0.014
$Gini_i$	−0.0284 (0.0120)	−0.028	−0.0250 (0.4189)	−0.024	−0.0356 (0.0007)	−0.034
$larea_i$	0.0526 (0.1044)	0.054				
$lgdpcap_j$	6.5277 (0.0000)	6.828	8.7842 (0.0000)	65.292	3.8111 (0.0000)	44.200
$Polscore_j$	0.0168 (0.0000)	0.0169	0.0096 (0.0000)	0.009	−0.0018 (0.5472)	−0.001
$lpop_j$	−0.4133 (0.0000)	−0.338	−0.6307 (0.0000)	−0.467	−2.3152 (0.0087)	−0.901
$larea_j$	−0.2637 (0.0000)	−0.231				
$lemmig_{i,j}$	0.8235 (0.0000)	1.278	0.7221 (0.0000)	1.058	0.8219 (0.0000)	1.274
$ldis_{i,j}$	0.0160 (0.8980)	0.016	−1.0259 (0.0000)	−0.641	0.0390 (0.7443)	0.039
$Docmlang_{i,j}$	−0.2029 (0.1119)	−0.183	0.1367 (0.2807)	0.146	−0.1376 (0.2604)	−0.128
Dummy, 2011	−0.0601 (0.3976)	−0.058	0.2633 (0.0013)	0.301	0.1980 (0.0077)	0.218
Constant	−58.6256 (0.0000)		−51.9033 (0.0000)		−0.1769 (0.9907)	
R-squared	0.2715		0.3970		0.3225	
Loglikelihood	−6270.367		−6201.509		−6220.574	
Fixed effects included	No		Origin Countries		Destination Countries	
No. Obs.	758		758		758	

*Significant level is shown in parentheses IRR= $(\exp^{\beta}_{i}-1)$ %

Figure 3: *Distance between Arab countries and country of destination (Authors)



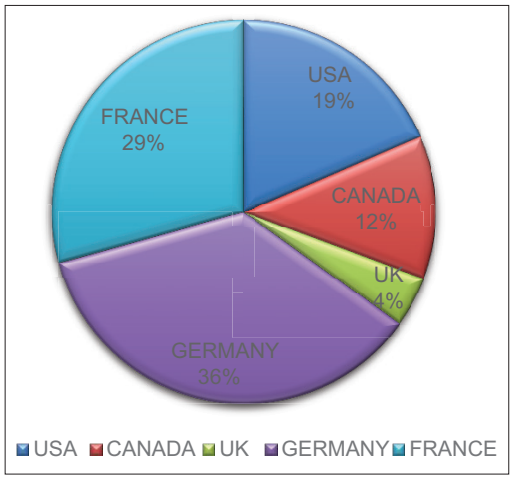
unbalanced panel data of 16 explanatory variables for the period of 1995-2017 was considered in this study. The NBML regression method was used in order to reach this objective.

The Table 6 shows the results of the estimation. The fixed effects of each sending countries are included in the second column, and the fixed effects of the receiving countries in the third column, while the model estimates shown in the first column without fixed effects. When performing gravity equation, the model can allow the parameters to change for both countries and for the time period. A way to deal with this is by adding a fixed effect. The fixed effect treats the observed quantities as if they were non-random, regarding the explanatory variables (Dougherty, 2011). In addition, the Dummy variable (Dummy, 2011) in all cases takes the numbers one or zero; number 1 refers to the years 2011 to 2017 and zero refers to the years before 2011 where 2011 is the date of the Arab uprisings. Political problems after uprisings in Arab countries may trigger outflow of immigrants from these countries (Tunisia, Egypt, Libya, Yemen, Syria).

According to the results of the analysis, it was found that some of independent variables are significant in explaining the

international migration in Arab countries. First of all, with respect to the economic factors, it was identified that there is a negative relationship between per capita income (GDP cap_i) in Arab countries and international migration. It shows that Arab countries with lower per capita income, individuals choose to immigrate to other countries where the (GDP per cap.) is higher. This result is reported in Table 6, where IRR is (−0.20%, −0.37%, −0.21%) respectively. On the other hand, the per capita income in the receiving countries, has positive relation with international migration ($immig_{ij}$). It can be noticed that, the economic factor of (GDP cap_j) can be the most attractive factor that, caused immigration. As the results of previous studies showed, which supports the economic incentive for international migration and supports the theory of random utility. Given the Unemployment rate (Ur_i) is high in Arab countries, people opt for moving to other countries to find a job. In other words, more people will migrate when there is unemployment problem in a country. We found that the higher the unemployment rate in the Arab countries, the higher the incidence of international migration by 0.04%; this is also one of the economic to work in high-income countries. Julie Da Vanzo (1978), provided evidence that job seekers are more likely to migrate based on a standard model that examines the impact of unemployment on migration. Regarding Demography factor, it was found that there is a negative relationship between

Figure 4: *Immigration from Arab countries by country of destination (Authors)



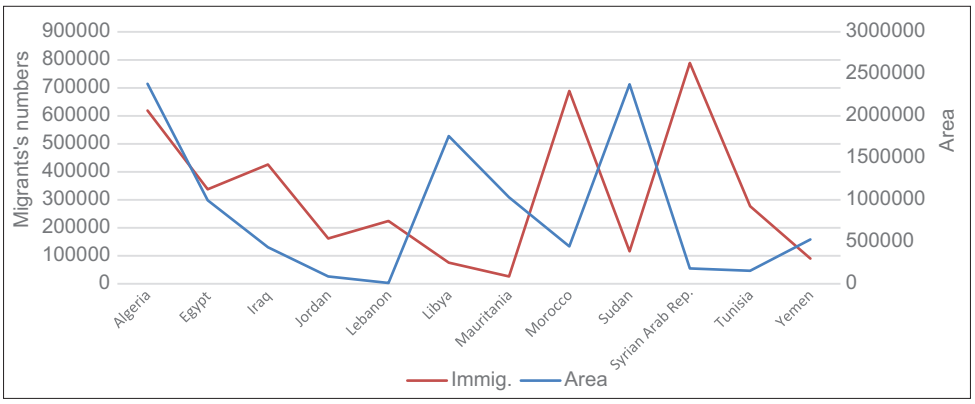
population in receiving countries (pop_j) and international migration. This situation means that when there is a decrease in population in receiving countries, people prefer to move to these countries. The main reason behind this situation is that people think that they can find jobs easily. This result is supported by the study's expectations.

Another important explanatory variable that influences international migration in Arab countries is emigration stock ($Emmig_{ij}$), where are Arab people lives in receiving countries. It was shown that people prefer to immigrate to countries where it has high emigration stock from Arab countries. The main reason is that high emigration form Arab countries is an important social indicator that reduce Psychological cost of migration. The results are shown in Table 6, where the IRR ranged from 1 to 1.3 with high level of significance, this variable was the second largest attraction in receiving countries.

Due to the instability caused by the Arab Spring, it found that it has an impact on the international migration from the Arab region. The results of the estimate support the study's expectations for this dummy variable (Dummy, 2011) as shown in the second and third columns in Table 6, where the analysis showed that IRR is 0.30 and 0.22, respectively, in reference to the increasing incidence of migration from Arab countries during these years from the years before 2011 with a significant level of importance <0.05. However, in the first column where the absence of fixed effects of the pairs of countries the result was contrary to expectations and insignificant. This result is very parallel to the Previous applied studies. For instance, (Fargues and Fandrich, 2012), also reached the similar conclusions in their study.

Political instability score ($polscore_i$) in Arab countries variable is found insignificant in second column, the parameter was estimated with a positive signal, May be the reason for this result referred to the study sample which included the voluntary migration, while political instability is associated with forced migration, where individuals make the decision to forcibly migrate in the absence of political stability in their countries. Moreover, in many Arab countries that are politically stable and at the same time considered to be one of the exporting countries of migration, the Political instability score in the receiving countries ($polscore_j$)

Figure 5: *Migrants from Arab countries/Area (Authors)



supports the study's expectations in the first and second column with significant <0.05.

Many applied studies use distance (dis_{ij}) between the two countries, when estimating the gravity model to illustrate the importance of the geographical factor in the movement of individuals and goods as an expression of material cost. In the case of immigration across countries, it reflects the costs of moving to another country, as well as returning home to visit relatives. With respect to origin fixed effects in second column, the result shows outflows migration was smaller and highly significant, when an origin and destination countries have a long distance between them. It shows that the incidence of international migration from the Arab countries decreases by 0.64% as the distance between the Arab countries and the receiving countries increases by one unit, while the results in the first and third columns differed with a positive signal and did not show any statistical significance.

Figure 3 shows the geographical distance between the Arab countries and the receiving countries, and the Figure 4 shows the immigration by country of destination. Both figures show compatibility with economic theories that the farther away a country is located, the less likely that people will migrate to it.

The Gini coefficient ($gini_i$) and the poverty rate (pov_i) in the Arab countries did not support the study hypotheses. Both of the variables have no systematic relationship with international migration from Arab countries, and the analysis showed that both of them carry the unexpected sign. We may justify explain for this result by the considerable travel cost, while (Cattaneo, 2005), found in his study that, migration from 149 origin developing countries to 23 OECD countries reduce poverty reduction, that there is a positive relationship between poverty and migrants by a considerable flow of remittances, which constitute one of the largest sources of external funding for developing countries, where the role of remittances relies on the fact that they directly benefit the families.

The analysis showed that the education index (edu_i) in the Arab countries did not meet the expectations. It showed the relationship between (edu_i) and international migration in the results shown in the first and second columns. Also (Facchini and Mayda, 2009) found that more educated natives are less likely to favor skilled immigration. In contrast, when the study sample is limited to students that is studying abroad, the results showed that rest of students who migrate from the Arab countries for the purpose of studying in the OECD countries do not return home as in the study by Driouchi (2014).

Expectation of this study that, common language ($docmlang_{ij}$) of the destination country plays a key role on international migration from the Arab countries to another country, this suggests that the ability to speak a foreign language might be an important factor in the migration decision.

Despite, Arabic language is official language in Arab countries, where Table 2 shows that immigration is higher among country whose French language is the most used language in each country, for example for (Algeria, Tunisia, Morocco). According to result in Table 6, it found to be insignificant. The impact of this factors is an interesting area for future research. Despite the Figure 5 shows clear relation between area of origin countries and international migration the relationship between the area and the dependent variable is only studied in the first column, where the estimation results are incompatibility of study expectations.

7. CONCLUSION

In this paper, we examine the determinants of migration flows from the selected Arab countries to five high income countries for the period 1995-2017. To estimate the gravity model for migration flows, we use the NBML estimator. This estimator is appropriate, where the descriptive statistics show that the variance is greater than mean for dependent variable, and has a large percentage of zero values. Using the dataset, we try to study the determinants of immigration flows. The immigration flow data enabled us to account for both country of destination and country of origin effects.

To sum up, the estimations results support hypotheses that there are positive relationship between international migration and pull factors; income, political instability and emigration in destination country, on the other hand one can conclude that there is enough evidence to support study expectation about negative relationship between the international migration and push factors; income and distance between Arab countries and destination countries.

Results show, the main reasons of migration flows are high GDP per capita, former migrants in destination countries, low migration costs combined with their low GDP per capita in origin countries. In addition, the result show that as increase the unemployment rate increase the migrants increase. perhaps the interesting result of this study is that political instability in Arab countries did not show the expected negative result. To reduce the migrant's number from Arab countries, governments should provide the job opportunities and improve the macroeconomic setting. Regarding future directions for research, indicators on quality of governance or other institutional determinants could be included as additional explanatory variables in order to assess the future evolution of international migration from Arab countries. This study is a modest addition to the literature of international migration. while this paper looks at the determinants of international migration, it provides a framework to analyze the impact of migration, on Arab countries economies.

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