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**Migration of higher education students from the North Africa  
region**

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**"Migration of higher education students from North Africa Region"**

**By Prof. Dr. Samia Satti Osman Mohamed Nour**

**(March 19, 2019)**

# "Migration of higher education students from North Africa Region"

Prof. Dr. Samia Satti Osman Mohamed Nour<sup>1</sup>

(March 19, 2019)

## Abstract

This paper uses both the descriptive and comparative approaches to provide overview of migration of higher education students from North Africa region. We fill the gap in the African literature and present a more comprehensive and recent analysis of migration of higher education students from North Africa region using UNESCO recent secondary data on international students mobility in tertiary education. We provide an interesting comparative analysis of migration of higher education students from North Africa region compared to South Africa. A novel element in our analysis is that we examine migration of higher education students from North Africa from both national and regional perspectives; mainly we discuss migration of higher education students for each individual country in North Africa region (Algeria, Egypt, Libya, Morocco, Sudan and Tunisia) and then discuss the total for the entire North Africa region. Therefore, we provide an extremely valuable contribution to the increasing debate in the international literature concerning the increasing interaction between migration and increasing internationalisation of higher education. Our findings support the first hypothesis that from national perspective, the pattern and size of migration of higher education students from the North Africa region increased substantially over the past years but the distribution showed considerable variation across North African countries. Our results corroborate the second hypothesis that the increasing trend of migration of higher education students from the North Africa region is caused by several push-pull factors (e.g. economic, social, political, cultural and educational). Our results support the third hypothesis that migration of higher education students from the North Africa region lead to mixed positive and negative impacts (e.g. transfer of knowledge, brain gain and skill acquisition for returned migrant students, but weak capacity to retain talents and brain drain for non-returned migrant students). Our findings corroborate the fourth hypothesis that skills of migrant higher education students from North Africa region can be better mobilised in their countries of origin by addressing the push-pull factors that determine migration of skills from the North Africa region.

**Keywords:** Migration, higher education students, International student mobility, Internationalisation of higher education, Africa, North Africa region.

**JEL classification:** J60, J61, I23, I25

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# **Migration of higher education students from the North Africa Region**

## **1. Introduction**

This section provides an introduction and gives a brief general overview of the research problem, the importance, relevance, objectives, questions, hypotheses and the general structure of the research.

Since long, the analysis of international migration is receiving increasing interest in the international literature. Mainly, the increasing debates about international migration particularly focuses on the mixed positive and negative impacts related to migration, especially the impact of migration of highly skilled on the economic, social and cultural development of both sending and host countries. In particular, considerable controversy in the international literature appeared around two issues: Does migration lead to development or under-development? Does the migration of highly skilled individuals lead to brain drain, or to brain gain? (Sika, 2015: 151).

The relevance and significance of this research can be realized from the fact that migration of higher education students is very valuable and interesting research topic that can be analyzed from the perspectives of both hosting and sending countries. Since long, migration of higher education students remains an essential issue of concern, since it includes several key cross-cutting thematic related issues that can be analyzed from various perspectives of higher education institutions and policies, globalisation, creation and transfer of knowledge, development, demographic, economic, political, social and cultural issues in both sending and hosting countries. The topic of migration of higher education students remains timely, highly relevant and has become increasingly important issues receiving increasing interest in view of the fact that it involves several parties, including higher education institutions and policies, higher education students, researchers, scholars, practitioners, and policymakers in both hosting and sending countries and in both developed and developing countries. The topic of mobility and migration of higher education students remains largely debated issues in view of the increasing interaction between migration of higher education students and the increasing internationalisation of higher education. Particularly, in recent years, the recent increasing concern about mobility and migration of higher education students is consistent with the recent increasing concern about internationalization of higher education for both the sending and hosting countries. On the one hand, for the hosting countries the increasing importance of migration of higher education students is consistent with the increasing recognition of the importance and the economic potential of higher education institutions for generating national incomes, and for enhancing national competitiveness in the global market. On the other hand, for the sending countries the increasing importance of migration of higher education students is consistent with the growing recognition of potential benefits and contribution to transfer of knowledge, brain gain and skill acquisition for returned migrant students and potential contribution to economic development through remittances and contribution to household economies for non-returned migrants students who preferred to join the labour market in the hosting countries.

Apart from the well-known importance of migration globally for all world countries that has been well documented in the international literature, the importance of migration is also particularly recognized regionally for all North Africa region that has been well documented in the regional literature. For instance, North Africa countries constitute part of the Mediterranean countries and the Middle East countries.<sup>2</sup> The Mediterranean and

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<sup>2</sup> According to the United Nations's definition, the North Africa includes Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia. The Maghreb countries include Algeria, Morocco, Tunisia, and Libya. According to the World Bank classification of world countries (2017), the term Middle East & North Africa (MENA) includes: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Gaza, and Yemen. The Mediterranean countries

Middle East countries constitute probably the most remarkable geographical region of the world with respect to labour migration movements. From the post-World War II discouragement of emigration by Maghrebian and other countries, followed by Europe's 1960s labour immigration from Turkey and the Maghreb, through the oil-financed economic expansion of GCC countries with labour shortages and massive guest worker programmes, later followed by two Gulf crises and mass expulsions of Arab guest workers, and now with surplus labour supplies and high unemployment throughout the MENA region, the migration of peoples has been massive and in continuous flux. We have not even mentioned forced migration, and the large-scale refugee movements, which have impacted on many states in the region. Some studies in the MENA literature discuss the economic aspects of migration in the MENA region and indicate that "Migration has dominated the economic landscape of the MENA countries for the last 40 years or so, although in several different ways. For the Maghreb, emigration was a solution to labour supply growth, which outstripped economic development (Khachani, 2004: 35)". Within this region, though, the two oil-producing countries of Algeria and Libya have not had the economic pressures of their poorer neighbours (World Bank, 2004; UNDP, 2002; 2003). Compared with other developing regions belonging to the middle-income group, based on the World Bank classification, the size of the brain drain is higher in the MENA Region (10.5 percent) than in Latin America (7.5 percent), East Asia and the Pacific (6.1 percent), and Eastern Europe and Central Asia (3.9 percent).<sup>3</sup>

Based on the above this paper aims to discuss migration of higher education students from the North Africa region, from national, regional and global perspectives, to identify the factors that determine migration of higher education students from North Africa and to contribute to recent studies in migration in the African region.<sup>4</sup> This research is particularly consistent with NAI ongoing research project "Migration, mobility and transnational relations". The study is generally motivated by the increasing level of migration from North Africa. The central themes discussed in this research examine the pattern, size, distribution, trend, causes and consequences of migration of higher education students from the North Africa region. In particular, this paper aims to discuss the following questions:

- (1) What are the available evidence concerning the pattern, size, distribution and trend of migration of higher education students from the North Africa region from national, regional and global perspectives?
- (2) What are the major causes "push-pull factors" of migration of higher education students from the region?  
And
- (3) What are the major implications?

We examine four hypotheses; the first hypothesis argues that from national perspective, the pattern and size of migration of higher education students from the North Africa region increased substantially over the past years but the distribution showed considerable variation across North African countries. The second hypothesis argues that the increasing trend of migration of higher education students from the North Africa region is caused by several push-pull factors (e.g. economic, social, political, cultural and educational). The third hypothesis argues that migration of higher education students from the North Africa region lead to mixed positive and negative impacts (e.g. transfer of knowledge, brain gain and skill acquisition for returned migrant students, but weak

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are those that surround the Mediterranean Sea, the Mediterranean countries include: Albania, Algeria, Bosnia-Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, and Turkey.

<sup>3</sup> See Baldwin-Edwards (2005: 2, 23), Khachani (2004: 37), World Bank (2003: 171-172), Gubert and Nordman (2006: 1-2, 9, 10).

<sup>4</sup> For the purpose of this paper, the term North Africa refers to six countries including: Algeria, Egypt, Libya, Morocco, Sudan and Tunisia in view of recent increasing migration from these six countries. The population of the MENA region at its least extent is considered around 223.4 million people, about 18.85% of total Africa population, about 0.03% of the total world population.

capacity to retain talents and brain drain for non-returned migrant students). The fourth hypothesis argues that skills of migrant higher education students from North Africa region can be better mobilised in their countries of origin by addressing the push-pull factors that determine migration of skills from the North Africa region.

Concerning the relevance and contribution, this paper adds to studies in the international literature in the field of migration that examine some economic aspects of migration from developing countries and regions. Few studies in the international literature examine migration of students from developing countries and regions (cf. Nour 2014, 2011). In our view, one merit of this research is that it fills the gap in the African literature concerning the migration of higher education students from the North Africa region by examining recent pattern, size, distribution, trend, causes and consequences of migration of higher education students from North Africa. Different from few earlier studies in the international literature (cf. Nour, 2011; 2014; Gubert and Nordman, 2006; Baldwin-Edwards, 2005) we provide a more comprehensive and an in-depth recent analysis of the pattern, size, trend, distribution, causes and consequences of migration of higher education students from North Africa region using UNESCO recent secondary data on international students mobility in tertiary education.

A novel element in our analysis is that we examine migration of higher education students from North Africa from both national and regional perspectives; mainly we discuss migration of higher education students for each individual country in North Africa region, and then discuss the total for the entire North Africa region. Therefore, we provide an extremely valuable contribution to the increasing debate in the international literature concerning the increasing interaction between migration and increasing internationalisation of higher education.

In our view, another merit is that the objective to address a recent comparative analysis of the size, trend and distribution of migration of higher education students from the North Africa region both within the region and in relation to the rest of the world is quite interesting and relevant. In our view, another innovative aspect of this research is that we provide an interesting comparative analysis of the size, trend and pattern of migration of higher education students from North Africa region compared to South Africa and other world regions.

In our view, another merit is that we discuss very important and key issues with focus on the possible causes (push-pull factors) and consequences of migration of higher education students from the North Africa region. We present an important, relevant and timely work consistent with the growing awareness amongst researchers and policy-makers of the region to improve understanding of the recent development in the region in view of increasing globalization and increasing integration of North African countries in global world economy.

In our view, another merit is that we provide relevant and valuable contribution to the largely debated issues in the international literature, particularly we focus on the increasing interaction between migration of higher education students from North Africa and the increasing internationalisation of higher education, and the causes, and consequences or implications from the perspective of the sending North Africa countries.

In our view, one advantage of our analysis in this paper is that we use a more precise and narrow scope of analysis since we focus only on the internationally mobile students who have crossed the North Africa borders with explicit intention to study abroad. This implies that our scope of analysis is different from the more broad scope of analysis used in earlier studies in North Africa literature that focused on internationally mobile highly skilled or low skilled labours who have crossed the North Africa borders with explicit intention to work abroad. Therefore, our results will contribute to previous studies and debate in the international literature by providing recent analysis to improve understanding about migration of higher education students from North Africa.

Finally, in our view further merit of this research is that our analysis is useful from policy perspective and can be used to substantiate useful policy recommendations for dealing with the mixed positive-negative impacts of migration of higher education students from the North Africa region and hence to achieve inclusive growth and sustainable economic development in the North Africa region.

Regarding research method, we use secondary data and the descriptive and comparative methods to provide an empirical investigation of the pattern, size, trend, distribution, causes and consequences of migration of higher education students from the North Africa region from national, regional and global perspectives. Similar to the studies in the literature (cf. Nour 2014, 2011), we use recent data from UIS-UNESCO, which provides definition of student mobility and data on international/mobile students that are reported by host countries. We use the outbound mobility ratio and inbound mobility ratio to examine the size, trend and distribution of higher education migrant students from the North Africa region compared to South Africa and other world regions.<sup>5</sup>

Concerning the structure, the rest of this paper will be organized as follows: Section 1 provides an introduction and gives a brief general overview of the research problem, the importance, relevance, objectives, questions, hypotheses and the general structure of the research. Section 2 shows the general socio-economic characteristics and economic development challenges in North Africa region. Section 3 presents the literature review. Section 4 discusses the major development concerning the pattern, size, trend and distribution of migration of higher education students from North Africa countries compared to South Africa and world countries, and examines the push-pull factors (economic, political, cultural and educational) causes and consequences of migration of higher education students from the North Africa region. Finally, Section 5 provides the conclusions and policy recommendations.

## **2. General socio-economic characteristics and economic development challenges in North Africa region.**

This section shows the general socio-economic characteristics, economic development challenges and the great diversity amongst the North Africa countries, since the migration of higher education students is often closely linked to economic, political and social factors, as well as both the resources directly devoted to development of higher education and also to the whole economic structure that supports higher education. Before examining the general socio-economic characteristics amongst the North Africa countries, it will be useful to provide definition of the concept North Africa region and show the importance of North Africa region.

We find that the regional and international literature uses different criterions for classification of world countries according to geographical location, income level, and economic structure. In this context, the North Africa region can be studied based on geographical location, income level, and economic structure.<sup>6</sup> The

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<sup>5</sup> According to UIS-UNESCO (2012) Education Digest (2012), the international/mobile students are defined as foreign students who have crossed a national border and moved to another country with the objective to study and for the purpose of education and are now enrolled outside their country of origin. In order to estimate the number of students from a given country who are studying abroad, the outbound mobility ratios as well as regional totals for the most recent year since 1999 are used. The Gross outbound enrolment ratio is defined as the total number of tertiary students from a given country studying abroad expressed as a percentage of the population of tertiary age in that country. As for the mobility ratios, inbound mobility rate is defined as the total number of students from abroad studying in a given country, expressed as a percentage of total tertiary enrolment in that country. Outbound mobility ratio is defined by the total number of students from a given country studying abroad, expressed as a percentage of total tertiary enrolment in that country. Net flow of mobile students is defined as the number of tertiary students from abroad (inbound students) studying in a given country minus the number of students at the same level from a given country studying abroad (outbound students). See UIS-UNESCO (2012) Education Digest (2012), pp. 67-68, 80

<sup>6</sup> North Africa or Northern Africa is the northernmost region of Africa. The United Nations's definition of "Northern Africa" includes Algeria, Egypt, Libya, Morocco, Sudan, Tunisia, and Western Sahara. (Mauritania is included in the United Nations's definition of Western Africa and South Sudan in the definition of Eastern Africa.) The countries of Algeria, Morocco, Tunisia, and Libya are often collectively

regional and international literature uses two different classifications for North Africa countries according to the United Nations classification of world countries and the World Bank classification of world countries. In this paper, we use the classification of North Africa countries based on the United Nations classification of World countries that combines the geographical location and economic classification. In our view for operational and analytical purposes the definition of North Africa countries based on the United Nations classification of World countries is more appropriate for our analysis in this paper, since it provides a more precise definition that seem consistent with our objective to present a more precise analysis of the North Africa region, since this definition considers the North Africa countries as a group of countries sharing some similarities and consistency in terms of geographical location, social and cultural backgrounds and economic development challenges. According to the United Nations classification of world countries, the World Economic Situation and Prospects (WESP) by region, from geographical location perspective the North Africa region is composed of six countries that located in northern part of Africa, includes: Algeria, Egypt, Libya, Mauritania, Morocco, Sudan and Tunisia. According to this definition from economic classification perspective, the North African countries are included in the group of developing economies. According to this definition the classification of economies is defined according to GNI per capita (2012), implies that three or half of the North African countries (namely, Algeria, Libya and Tunisia) are included in the category of upper middle income economies, while the other three or half of the North African countries (namely, Egypt, Morocco and Sudan) are included in the category of lower middle income. According to the United Nation definition the classification by economic structure implies that the majority or four or nearly two third of the North African countries (namely, Algeria, Libya Egypt and Sudan) are included in the group of Fuel-exporting countries, while the other two or nearly one third of the North African countries (namely: Morocco and Tunisia) are not included in the group of Fuel-exporting countries, which implies that they are classified as diversified economies.<sup>7</sup> On the other hand, the World Bank uses the definition of Middle East and North Africa (MENA). According to the World Bank classification of world countries (2017), the term Middle East and North Africa (MENA) includes Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Gaza and Yemen. According to this definition, Sudan is not classified among the MENA countries but included in the group of Sub-Saharan Africa countries. According to the World bank classification of Economies according to GNI per capita (March 2017), two or one third of the North African countries (namely, Algeria and Libya) are included in the group of upper middle income economies, while the other four or majority or two-thirds of the North African countries (Egypt, Tunisia, Morocco and Sudan) are included in the group of lower middle income economies.<sup>8</sup> On the other side, based on the Economic Research Forum (ERF) (1998) classification of Arab countries that used in the Arab literature (cf. Ali 2003; 2004). ERF (1998) the North Africa countries can be classified into three groups: mixed oil economies group includes two countries (Algeria and Libya), diversified economies group includes three countries (Egypt, Morocco, and Tunisia) and primary export economies group includes only one country (Sudan). This classification implies that

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referred to as the Maghreb, which is the Arabic word for "sunset". Egypt lies to the northeast and encompasses part of West Asia, while Sudan is situated on the edge of the Sahel, to the south of Egypt. See [https://en.wikipedia.org/wiki/North\\_Africa](https://en.wikipedia.org/wiki/North_Africa), accessed on 27 April 2017.

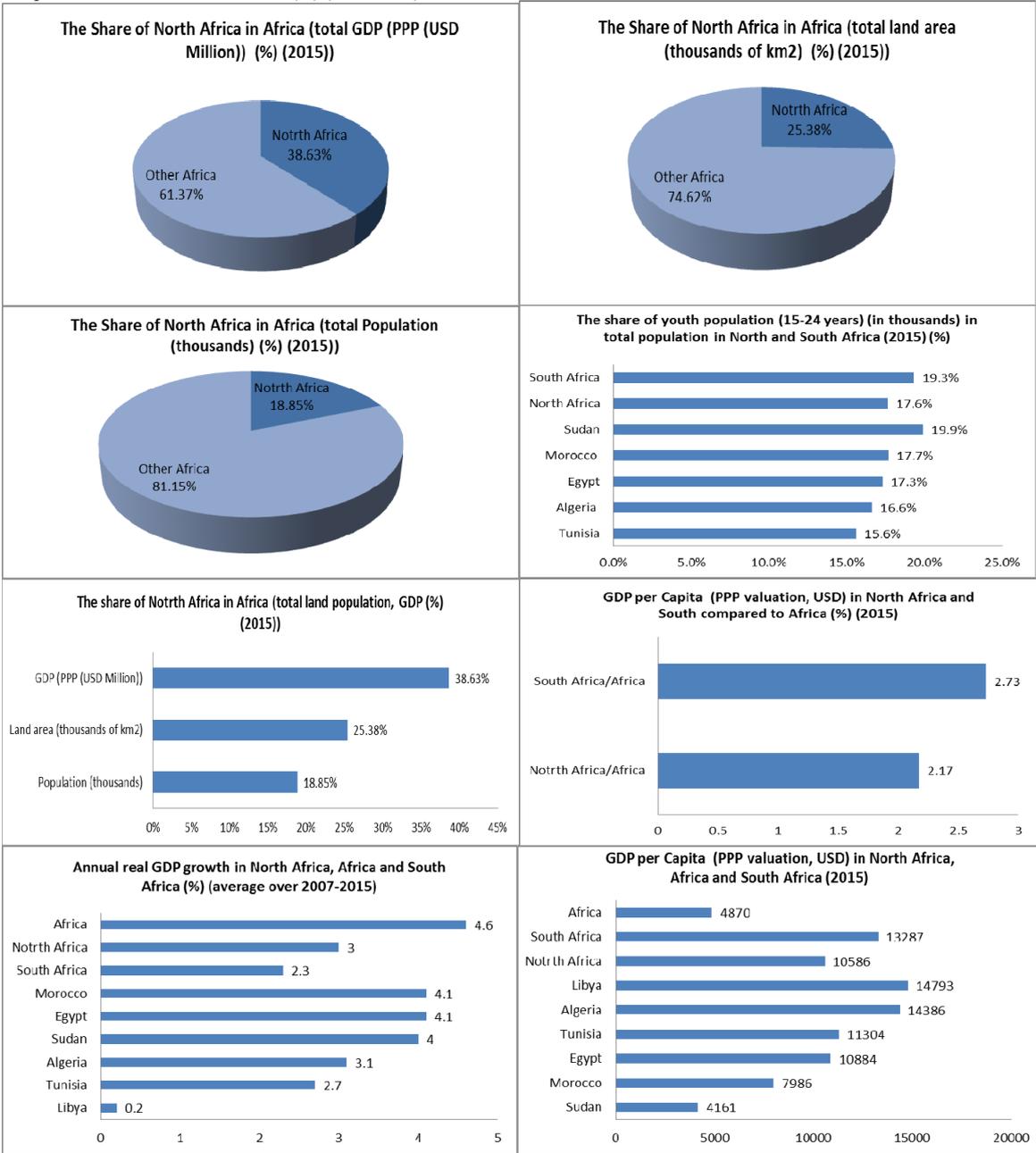
<sup>7</sup> See United Nations the World Economic Situation and Prospects (WESP) (2014: 146-148), UN: World Economic Situation and Prospects: [http://www.un.org/en/development/desa/policy/wesp/wesp\\_current/2014wesp\\_country\\_classification.pdf](http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf), accessed 27 April 2017.

<sup>8</sup> See the World Bank (2017): [databank.worldbank.org/data/download/site-content/CLASS.xls](http://databank.worldbank.org/data/download/site-content/CLASS.xls). Accessed on 27 April 2017. Note: This table classifies all World Bank member countries (189) and all other economies with populations of more than 30,000. For operational and analytical purposes, economies are divided among income groups according to 2015 gross national income (GNI) per capita, calculated using the World Bank Atlas method. The groups are low income, \$1,025 or less; lower middle income, \$1,026–4,035; upper middle income, \$4,036–12,475; and high income, \$12,476 or more.

the majority or half of North Africa countries are amongst the diversified economies and the other half are amongst oil-dependent economies.

Based on the above definition, we find evidences on the economic, geographical, and demographic importance of the North Africa region compared to Africa Continent. For instance, the North Africa region contributes with more than third of total Africa GDP (38.63%), it contributes with more than a quarter of total Africa land area (25.38%), and it contributes (total population 223.4 million people) around nearly fifth of Africa total population (18.85%) (See Figure 1). Our results imply that the North Africa region maintained its strongest position in Africa Continent from different economic, geographical, and demographic perspectives that appears in terms of the share of the North Africa in Africa total GDP, total land area and total populations respectively.

Figure 1- The share in total land area, total GDP, total population, GDP Per capita, GDP Growth Rate, and youth population in North Africa compared to South Africa and Africa (%) (2007-2015).



Sources: Adapted from (1) UNDP (2016, 2015), (2) the World Bank World Development Indicators Data (2017), accessed 22 April 2017, (3) United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects, The 2015 Revision, (4). African Economic Outlook: <http://www.africaneconomicoutlook.org/en/statistics>: accessed on 28 April 2017.

Given the importance of North Africa region as explained above, this section also shows the general socio-economic characteristics and economic development challenges in the North Africa region and World regions including demographic structure/ composition (population size), economic growth as measured by (GNI per capita), and human development indicators as measured by Human Development Index (HDI), life expectancy, mean years of schooling, literacy rate and gross enrolment ratios (see Table 1). Table 1 illustrates the substantial gap between North Africa and other world regions in terms of population, standard of economic development as measured by GDP per capita and HDI. We find that for the entire North Africa region, the total population is accounting for 223.4 thousand million, while, the average GDP per capita is amounting for US\$ 9.865. In general, the North Africa region is characterised by low standards of economic development together with high population numbers and high average population growth rate. For instance, according to UNDP-HDR (2016), the increasing trend in population average annual growth rate in the North Africa region are below only Arab states, Sub-Saharan Africa and Least developed countries, but are above the level of all World regions: Europe and Central Asia, Latin America and the Caribbean, East Asia and the Pacific, South Asia and South Africa (see Table 1). Furthermore, the North Africa region is characterized by high share of youth in total population that raises concern. According to UNESCO – WB-WEDI (2017) demographic situation estimates of the age group under 15 years for the year 2015 amount to the majority, and that nearly third of the population in the North Africa region is under 25 years of age (32.3% of total population). In addition, according to some estimates, nearly one in every five people in the North Africa region is aged between 15-24 years (17.6% of total population). These percentages indicate that the North Africa youth will, for the years or decades to come, put increasing pressure on resources in the North Africa region to provide education, work and social services".<sup>9</sup>

In general, the North Africa region is characterised by high population numbers together with variation in human development index. According to the World Bank classification of economies, all the North Africa countries are classified among medium-income economies. In addition, according to the UNDP-HDR classification of economies, the estimated GNI per capita and average GDP per capita, the other HDI components: average human development index (HDI), average life expectancy, mean years of schooling and expected years of schooling, literacy rate, population with at least some secondary education and gross enrolment ratios in secondary education for the North Africa region is below the World average and the majority of World regions: world high-income group, Europe and Central Asia, Latin America and the Caribbean, and East Asia and the Pacific, but on average above only the level developing countries, South Asia, Sub-Saharan Africa and Least developed countries (see Tables 1-2).

Moreover, North Africa region shows considerable weakness concerning the supply of and demand for higher education reflecting the weakness in higher education systems and institutions in North Africa region. For instance, over the period (2010-2015) the weakness in the demand side appears in terms of the gross enrolment ratios in tertiary education in North Africa that implies that less than one third of students in tertiary education age are enrolled in higher education (28.8%), gross enrolment ratios in tertiary education in North Africa falls far behind advanced Asia countries (Korea (95%), Malaysia (30%), China (39%)), below the World level (35%), and below the majority of world regions: OECD (70%), world high-income group (43%), Europe and Central Asia (55%), Latin America and the Caribbean (44%), and East Asia and the Pacific (37%), Arab states (30%), and developing countries (29%), but on average above only the level of South Asia (23%), Sub-Saharan Africa

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<sup>9</sup> See UNDP-MBAF Arab Knowledge Report (AKR), 2014, p. 13.

(8%) and Least developed countries (9%) (See Table 2 and Figure 3). In addition, over the period (2010-2014) the weakness in the supply side appears in terms of the level of financial resources allocated for education as measured by the level of expenditure on education as % of GDP in the North Africa region (4.6%) is below the World average (5%), below the level of OECD (5.5%), Sub-Saharan Africa (4.8%) and Latin America and the Caribbean (5.4%), but above the level of South Asia (3.4%) and Least developed countries (3.3%) (See Table 2 and Figure 3).

Moreover, poverty remains a very serious problem for nearly a quarter of North Africa population (24%). In addition, unemployment rates and youth unemployment rates in North Africa region are more than twice above the world average and are above all World regions: Arab States, East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, OECD, South Asia, Saharan Africa, developing countries and least developed countries (see Table 1 and Figure 2). Furthermore, political instability and political conflict are serious problems in the majority of North Africa countries, (Egypt, Libya, Tunisia and Sudan). For instance, half of North Africa countries experienced regimes changes over the past years (Egypt, Libya, and Tunisia).

Table 1- General socio-economic characteristics of North Africa compared to other world regions (2015)

|                                       | Population       | Gross national income (GNI) per capita | Human Development Index (HDI) |      | Life expectancy at birth | Expected years of schooling | Mean years of schooling | Poverty Population living below income poverty line (%) | Unemployment             |                     |
|---------------------------------------|------------------|--|-------------------------------|------|--------------------------|-----------------------------|-------------------------|---|--------------------------|---------------------|
|                                       | Total (millions) | (2011 PPP \$)                          | Value                         | Rank | (years)                  | (years)                     | (years)                 | %   | total                    | Youth               |
|                                       | 2015             | 2015                                   | 2015                          | 2015 | 2015                     | 2015                        | 2015                    | National poverty line 2005-2014                         | (% of labour force) 2015 | (% ages 15-24) 2015 |
| <b>North and South Africa</b>         |                  |  |                               |      |                          |                             |                         |   |                          |                     |
| Algeria                               | 39.7             | 13,533                                 | 0.745                         | 83   | 75.0                     | 14.4                        | 7.8 c                   |   | 10.5                     | 28.6                |
| Egypt                                 | 91.5             | 10,064                                 | 0.691                         | 111  | 71.3                     | 13.1                        | 7.1 f                   | 25.2  | 12.1                     | 35.5                |
| Libya                                 | 6.3              | 14,303                                 | 0.716                         | 102  | 71.8                     | 13.4 k                      | 7.3 c                   |   | 20.6                     | 50.0                |
| Morocco                               | 34.4             | 7,195                                  | 0.647                         | 123  | 74.3                     | 12.1                        | 5.0 f                   | 8.9   | 9.6                      | 19.3                |
| Sudan                                 | 40.2             | 3,846                                  | 0.490                         | 165  | 63.7                     | 7.2                         | 3.5                     | 46.5  | 13.6                     | 22.5                |
| Tunisia                               | 11.3             | 10,249                                 | 0.725                         | 97   | 75.0                     | 14.6                        | 7.1 c                   | 15.5  | 14.8                     | 34.5                |
| North Africa                          | 223.4            | 9,865                                  | 0.669                         |      | 71.9                     | 12.5                        | 6.3                     | 24.0  | 13.5                     | 31.7                |
| South Africa                          | 54.5             | 12,087                                 | 0.666                         | 119  | 57.7                     | 13.0                        | 10.3                    | 53.8  | 25.1                     | 50.0                |
| <b>Advanced Asia countries</b>        |                  |  |                               |      |                          |                             |                         |   |                          |                     |
| China                                 | 1,376.0          | 13,345                                 | 0.738                         | 90   | 76.0                     | 13.5                        | 7.6 c                   |   | 4.6                      | 12.1                |
| Korea                                 | 50.3             | 34,541                                 | 0.901                         | 18   | 82.1                     | 16.6                        | 12.2                    |   | 3.7                      | 10.4                |
| India                                 | 1,311.1          | 5,663                                  | 0.624                         | 131  | 68.3                     | 11.7                        | 6.3 c                   | 21.9  | 3.5                      | 9.7                 |
| Malaysia                              | 30.3             | 24,62                                  | 0.789                         | 59   | 74.9                     | 13.1                        | 10.1                    |   | 2.9                      | 10.4                |
| Singapore                             | 5.6              | 78,162                                 | 0.925                         | 5    | 83.2                     | 15.4 d                      | 11.6                    |   | 3.3                      | 7.3                 |
| <b>Human Development Index Groups</b> |                  |  |                               |      |                          |                             |                         |   |                          |                     |
| Very high human development           | 1,350.1          | 39,605                                 | 0.892                         |      | 79.4                     | 16.4                        | 12.2                    |   | 6.8                      | 16.3                |
| High human development                | 2,379.4          | 13,844                                 | 0.746                         |      | 75.5                     | 13.8                        | 8.1                     |   | 5.8                      | 14.4                |
| Medium human development              | 2,622.3          | 6,281                                  | 0.631                         |      | 68.6                     | 11.5                        | 6.6                     |   | 5.2                      | 13.4                |
| Low human development                 | 929.2            | 2,649                                  | 0.497                         |      | 59.3                     | 9.3                         | 4.6                     |   | 7.0                      | 11.4                |
| <b>World Regions</b>                  |                  |  |                               |      |                          |                             |                         |   |                          |                     |
| Arab States                           | 387.6            | 14,958                                 | 0.687                         |      | 70.8                     | 11.7                        | 6.8                     |   | 11.7                     | 29.0                |
| East Asia and the Pacific             | 2,041.6          | 12,125                                 | 0.720                         |      | 74.2                     | 13.0                        | 7.7                     |   | 4.6                      | 12.6                |
| Europe and Central Asia               | 239.4            | 12,862                                 | 0.756                         |      | 72.6                     | 13.9                        | 10.3                    |   | 10.4                     | 19.3                |
| Latin America and the Caribbean       | 629.0            | 14,028                                 | 0.751                         |      | 75.2                     | 14.1                        | 8.3                     |   | 6.4                      | 14.3                |
| South Asia                            | 1,823.0          | 5,799                                  | 0.621                         |      | 68.7                     | 11.3                        | 6.2                     |   | 4.2                      | 10.7                |
| Sub-Saharan Africa                    | 949.5            | 3,383                                  | 0.523                         |      | 58.9                     | 9.7                         | 5.4                     |   | 7.8                      | 12.5                |
| Developing countries                  | 6,071.2          | 9,257                                  | 0.668                         |      | 70.0                     | 11.8                        | 7.2                     |   | 5.7                      | 13.5                |
| Least developed countries             | 954.4            | 2,385                                  | 0.508                         |      | 63.6                     | 9.4                         | 4.4                     |   | 6.2                      | 11.4                |
| OECD                                  | 1,276.4          | 37,916                                 | 0.887                         |      | 80.3                     | 15.9                        | 11.9                    |   | 6.9                      | 14.7                |
| World                                 | 7,349.5          | 14,447                                 | 0.717                         |      | 71.6                     | 12.3                        | 8.3                     |   | 5.9                      | 13.8                |

Source: UNDP (2016), PPP – purchasing power parity. pp. 198-201, 218-219, 222-225, 238-241.

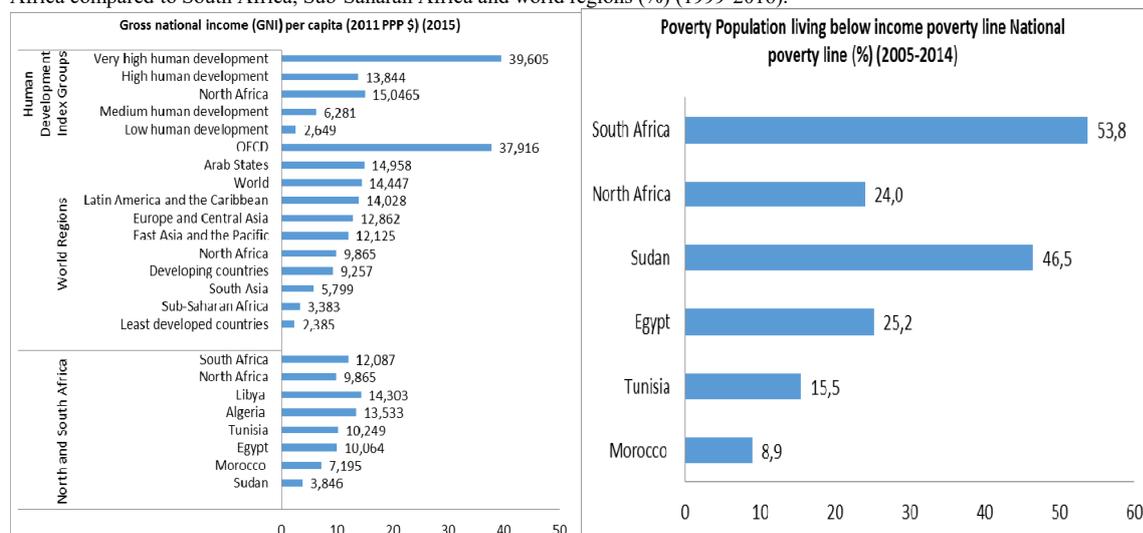
United Nations Development Programme (UNDP) "Human Development Report (2016) "Human Development for Everyone," UNDP: New York, USA. pp. 198-201, 222-225. Note: VHHD refers to very high human development, HHD refers to high human development, MDH refers to medium human development, and LHD refers to low human development.

Table 2 - Literacy and Education in North Africa compared to selected World countries and regions (2005-2015)

|                                       | Literacy rates                                |   | Population with at least some secondary education<br>(% aged 25 and above) | Gross enrolment ratio |           | Government expenditure on education |           | Expected years of schooling<br>(years) | Mean years of schooling<br>(years) |
|---------------------------------------|---|---|--|-----------------------|-----------|-------------------------------------|-----------|--|------------------------------------|
|                                       | Adult Literacy rates<br>(% aged 15 and above) | Adult illiteracy rates<br>(% aged 15 and above) |  | Secondary             | Tertiary  | (% of GDP)                          |           |  |                                    |
|                                       |   |   |  |                       |           |                                     |           |  |                                    |
|                                       | 2005-2015                                     | 2005-2015                                       |  | 2005-2015             | 2010-2015 | 2010-2015                           | 2010-2014 |  |                                    |
| <b>North and South Africa</b>         |   |   |  |                       |           |                                     |           |  |                                    |
| Algeria                               | 80.2  | 19.8  | 34.9   | 100                   | 35        |                                     |           | 14.4                                   | 7.8                                |
| Egypt                                 | 75.2  | 24.8  | 61.4   | 86                    | 32        |                                     |           | 13.1                                   | 7.1                                |
| Libya                                 | 91.0  | 9   | 55.1   |                       |           |                                     |           | 13.4                                   | 7.3                                |
| Morocco                               | 72.4  | 27.6  | 29.4   | 69                    | 25        |                                     |           | 12.1                                   | 5.0                                |
| Sudan                                 | 75.9  | 24.1  | 16.3   | 43                    | 17        |                                     |           | 7.2                                    | 3.5                                |
| Tunisia                               | 81.8  | 18.2  | 43.9   | 88                    | 35        | 6.2                                 |           | 14.6                                   | 7.1                                |
| North Africa                          | 79.4  | 20.6  | 40.2   | 77.2                  | 28.8      | 6.2                                 |           | 12.5                                   | 6.3                                |
| South Africa                          | 94.3  | 5.7   | 74.9   | 94                    | 20        | 6.1                                 |           | 13.0                                   | 10.3                               |
| <b>Advanced Asia countries</b>        |   |   |  |                       |           |                                     |           |  |                                    |
| China                                 | 96.4  | 3.4   | 75.0   | 94                    | 39        |                                     |           | 13.5                                   | 7.6                                |
| Korea                                 | 100   | 0   | 91.4   | 98                    | 95        | 4.6                                 |           | 16.6                                   | 12.2                               |
| India                                 | 72.1  | 27.9  | 48.7   | 69                    | 24        | 3.8                                 |           | 11.7                                   | 6.3                                |
| Malaysia                              | 94.6  | 5.4   | 77.1   | 79                    | 30        | 6.1                                 |           | 13.1                                   | 10.1                               |
| Singapore                             | 96.8  | 3.2   | 78.6   |                       |           | 2.9                                 |           | 15.4 d                                 | 11.6                               |
| <b>Human Development Index Groups</b> |   |   |  |                       |           |                                     |           |  |                                    |
| Very high human development           | 100   | 0   | 88.8   | 106                   | 75        | 5.1                                 |           | 16.4                                   | 12.2                               |
| High human development                | 95.3  | 4.7   | 70.6   | 95                    | 43        |                                     |           | 13.8                                   | 8.1                                |
| Medium human development              | 76.4  | 23.6  | 49.1   | 68                    | 23        | 3.9                                 |           | 11.5                                   | 6.6                                |
| Low human development                 | 60.9  | 39.1  | 20.3   | 40                    | 8         | 3.8                                 |           | 9.3                                    | 4.6                                |
| <b>World Regions</b>                  |   |   |  |                       |           |                                     |           |  |                                    |
| Arab States                           | 80.7  | 19.3  | 47.0   | 76                    | 30        |                                     |           | 11.7                                   | 6.8                                |
| East Asia and the Pacific             | 95.7  | 4.3   | 68.9   | 88                    | 37        |                                     |           | 13.0                                   | 7.7                                |
| Europe and Central Asia               | 98.1  | 1.9   | 81.7   | 98                    | 55        |                                     |           | 13.9                                   | 10.3                               |
| Latin America and the Caribbean       | 93.2  | 6.8   | 58.1   | 95                    | 44        | 5.4                                 |           | 14.1                                   | 8.3                                |
| South Asia                            | 70.3  | 29.7  | 47.9   | 65                    | 23        | 3.4                                 |           | 11.3                                   | 6.2                                |
| Sub-Saharan Africa                    | 64.3  | 35.7  | 29.6   | 43                    | 8         | 4.8                                 |           | 9.7                                    | 5.4                                |
| Developing countries                  | 83.3  | 16.7  | 57.7   | 71                    | 29        |                                     |           | 11.8                                   | 7.2                                |
| Least developed countries             | 63.3  | 36.7  | 25.7   | 44                    | 9         | 3.3                                 |           | 9.4                                    | 4.4                                |
| OECD                                  | 100   | 0   | 85.5   | 104                   | 70        | 5.1                                 |           | 15.9                                   | 11.9                               |
| World                                 | 84.3  | 15.7  | 64.9   | 76                    | 35        | 5.0                                 |           | 12.3                                   | 8.3                                |

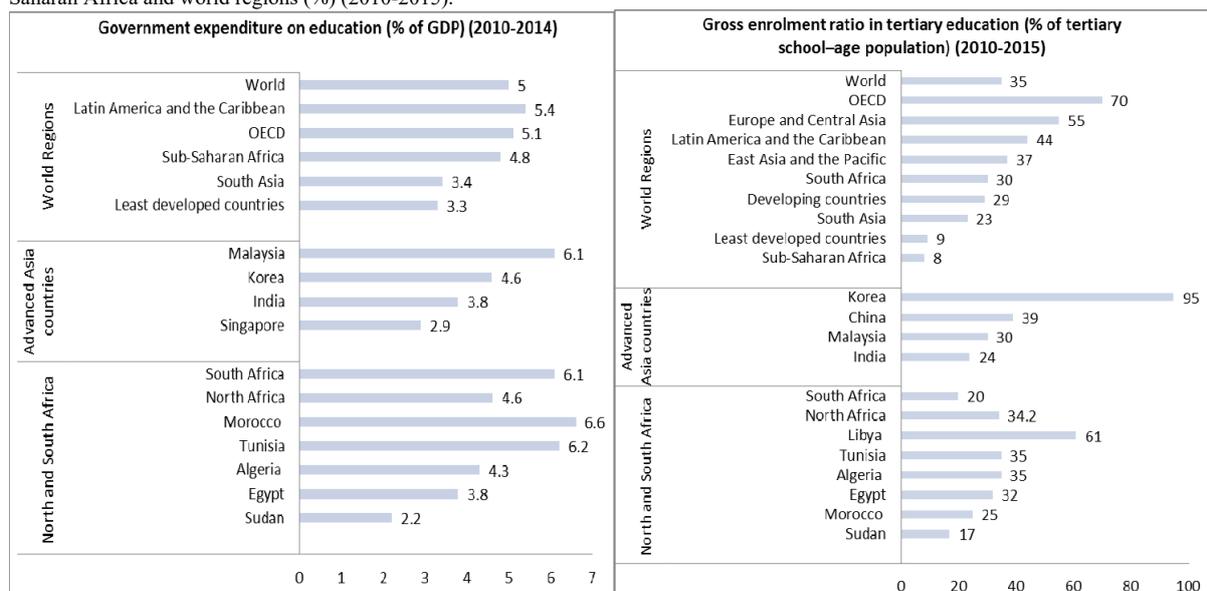
Source: UNDP (2016): United Nations Development Programme (UNDP) "Human Development Report (2016) "Human Development for Everyone," UNDP: New York, USA. pp. 230-233. Note: PPP – purchasing power parity.

Figures 2- General socio-economic characteristics (GNI per capita, poverty, unemployment rates and youth unemployment rates) in North Africa compared to South Africa, Sub-Saharan Africa and world regions (%) (1999-2016).





Figures 3- Government expenditure on education and gross enrolment in tertiary education, in North Africa compared to South Africa, Sub-Saharan Africa and world regions (%) (2010-2015).



Sources: Adapted from (1) UNDP (2016, 2015), (2) the World Bank World Development Indicators Data (2017), accessed 22 April 2017.

Using the classification presented above we observe great diversity amongst North Africa countries in terms of demographic structure and socio-economic and human development indicators. For instance, the distribution of total North Africa population in 2015 implies that the majority of North Africa population are residing in countries with diversified economies (61), followed by mixed oil economies (21), and primary export economies (18) respectively (see Table 2 and Figure 2). In addition, the highest population average annual growth rate is reported in primary export economies, followed by diversified economies and mixed oil economies respectively. During the period (2000/2005-20130/2015) the trend of population average annual growth rate declined in primary export economies but increased in mixed oil economies and diversified economies (see Figure 2). Moreover, the highest share of youth population in total population is reported in mixed oil economies, followed by primary export economies and diversified economies respectively (see Table 2). We find that the distribution of total North Africa GDP in 2012, implies that the diversified economies contributes with nearly two third of total North Africa GDP (63), followed by the mixed oil economies that contributes with nearly third of total North Africa GDP (30), and primary export economies with marginal contribution contributes less than one tenth of total North Africa GDP (7) respectively (see Table 2 and Figure 2). This implies that the North Africa natural resources based economies (North Africa mixed oil economies and primary export economies) contributes with more than one third of total North Africa GDP (38) and more than one-third of total North Africa population (40) as compared to North Africa diversified economies that contributes with nearly two third of total North Africa GDP (63) and nearly two third of total North Africa population (60) (see Table). Similarly, the highest level of GDP per capita in 2012 is reported in mixed oil economies, followed by diversified economies, and primary export economies respectively (see Table 1). Moreover, according to UNDP-HDR (2016) three or half of the North Africa countries are classified among high human development group (Libya, Tunisia, and Algeria), two are classified among medium human development group (Egypt, and Morocco), and one is classified among low human development group (Sudan). This implies that all mixed oil economies and one of the diversified economies of the North Africa countries are classified among high human development group (Libya, Algeria, and Tunisia), the majority of diversified economies are classified

among medium human development group (Egypt, and Morocco), and one the primary export economy is classified among low human development group (Sudan). The observed variation with respect to HDI seems to be largely consistent with the above-observed variation with respect to income level. For instance, the performance of North Africa countries regarding GNI per capita in 2015 implies that the mixed oil economies Libya (14,303), and Algeria (13,533) are ranked at the top place in the North African countries, followed by the diversified economies followed by Tunisia (10,249), Egypt (10,064) and Morocco (7,195), and finally Sudan (3,846) ranked at the bottom place in the North Africa countries respectively. Moreover, the ranking regarding HDI value implies that in 2015, Algeria (83) ranked at the top in the North Africa countries, followed by Tunisia (79), Libya (102), Egypt (111) Morocco (123), and finally Sudan (165) ranked at the bottom place in the North Africa countries respectively. This performance implies that two of the mixed oil economies are ranked at the top three places, while, the primary export economy is ranked at the bottom place in the North Africa countries.<sup>10</sup>

We find that despite, the great heterogeneity in economic and human development indicators across the North Africa countries; it is evident that the migration of higher education students remains an important issue over the past decades for all North Africa countries as we explain below.

### **3. Literature review**

In this section, we present the literature review on migration, mainly, migration of higher education students. We explain that the topics of migration and migration of higher education students are well documented in the international literature from several perspectives. Existing studies in the international literature postulate several explanations of migration of higher education students. In particular, considerable debate arises around three issues regarding the evolution, trend, size, extent, breadth, pattern, and distribution of migration of higher education students; the causes, motivation, determinants and push-pull factors of migration of higher education students; and the impacts, implications and consequences of migration of higher education students. Mainly, the determinants and impacts of migration of higher education students on both sending and hosting countries are well documented in the international literature.

#### *The evolution, trend, size, breadth, pattern, and distribution of migration of higher education students*

The first group of studies in the international literature provides explanation of the evolution, trend, size, pattern, distribution, breadth and extent of migration of international higher education students. Numerous studies in the international literature highlight the evolution and development of migration of higher education students based on the interpretation that the international flow of students is not a new phenomenon. And also based on the argument that since long there is increasing debate about international students mobility in the sending and hosting countries, but the increasing trend has been more visible in most world countries in view of the fact that higher education sector is expanding in most world countries. On the one hand, there is increasing agreement and consensus in the international literature concerning the development and increasing trend, size and breadth and extent of migration of higher education students that appears from the fact that the past decades have witnessed an impressive growth of international student mobility, for instance, several studies in the international literature provide interpretation of increasing higher education student mobility (Brooks and Waters, 2011), some studies provide empirical evidence on increasing international student migration to Germany, one of the most important

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<sup>10</sup> See UNU-HDR (2016).

destination countries for international students worldwide (cf. Bessey, 2012). On the other hand, there is lack of consensus and increasing debate in the international literature regarding the pattern and geographical distribution of migration of higher education students. For instance, while in recent study the investigation of the factors that determine transnational students mobility reveals that cross-national student exchange networks are stable over time; the USA, Great Britain, France, and Germany attract highest shares of students from most remaining countries (cf. Vögtle and Windzio, 2016). By contrast, other recent studies in the international literature find that in the last decade the rise of transnational higher education and education hubs in some Asian countries and emerging economies such as China, India, Singapore, South Korea, Malaysia, Hong Kong and other Middle East economies, has inevitably transformed the patterns of international student mobility and induced intensified competition for students in the world regions (cf. Mok, 2012; Shields and Edwards, 2010, Rivza and Teichler, 2007). The argument in these studies is based on the fact that unlike the patterns of international students mobility in the 1970s and 1980s when most international students mainly chose their study destinations in Europe, the United Kingdom and North America, students have now begun to accept the Asia and Pacific region as a viable alternative choice there has been a fundamental shift of international student mobility patterns (Mok and Ong, 2011, Altbach, 1989). This argument implies that in the past, students were moving from ‘periphery’ (developing economies) to ‘core’ (developed economies) for overseas learning experiences; now more of them are moving from ‘periphery’ to ‘semi-periphery’ (emerging economies). Some studies argue that in recent years the pattern of international students mobility has become much more complex than it was in the past. The rise of new destinations for international students is unlikely to usurp the global dominance of Western developed countries overnight; nonetheless, students movement towards these emerging economies does suggest that competition will increase for the revenues associated with foreign students enrolment (cf. Mok, 2012).

#### *The causes, motivation and determinants or push-pull factors of migration of higher education students*

The second group of studies in the international literature provides a more broad explanation and valuable interpretation of the causes, motivations and determinants of international student mobility from different perspectives and from sending and hosting countries perspectives. To illuminate the causes, motivations and determinants of migration of higher education students the international literature postulates several theoretical explanations including: historical, geographical, cultural, political, institutional, social, and economic (micro-macro explanations and supply-demand explanations), demographic, educational policies and human capital gap, and labour market and wages gap explanations (cf. Brooks and Waters 2011; Findlay et al., 2012; King and Raghuram, 2013). This implies that the determinants of cross-national students mobility are largely debated in the international literature; most research focuses on analyzing the phenomenon from one perspective. Few studies in the literature provide a more comprehensive theoretical explanation of cross-national students mobility by explaining several different perspectives including the micro perspective, macro perspective, and theory of rational choice, globalization or global knowledge economy, human capital approach, critical perspectives, and world culture theory (Shields, 2013; Vögtle and Windzio, 2016).

In the international migration literature the traditional push–pull model of international student mobility (Bessey 2012; Karemera et al. 2000; Mayda 2005), has been widely used as an analytical tool to understand and interpret the reasons, determinants and pull-push factors of migration of higher education students related to the sending and hosting countries. Most existing research on international students mobility use the push–pull model

from sending and hosting countries perspectives to identify the factors that push people to study abroad and those attract them to a particular destination. Within this framework, international migration flows from one country to another are modelled as a function of the characteristics of both countries. For example, some studies in the literature provide demographic explanation and predict that an increase in population in the country of origin and the associated “demographic pressure” (Hatton and Williamson 2001) push more people to go abroad, whereas the cost of mobility reduces migration. Some studies in the literature provide a combination of geographical, economic and political explanations and provide evidence that distance is important for encouraging student mobility and that politically free countries send more students abroad (Bessey, 2012). Some studies focus on the characteristics of countries of origin that can determine the amount of people seeking higher education abroad. For example, some studies in the literature provide a more comprehensive explanation including a combination of several factors related to economic, development and integration in the global economy, implying that the level of economic development in countries of origin correlates negatively with the volume of tertiary student emigration, whereas the degree of participation of the home countries in the global economy correlates positively with student mobility (McMahon, 1992). Some studies focus on institutional and globalization or global knowledge economy aspects. These institutional explanation and globalization or global knowledge economy explanation puts international student mobility in the context of the global knowledge economy; from this perspective, foreign students are perceived as “embodiments of a worldwide trend toward the internationalization of knowledge and research in an integrated world economy” (Altbach 1991: 305.) From institutional perspective, the increase in student mobility is because higher education institutions increasingly see international education as an export activity that yields economic returns and market their tertiary education programmes internationally (She and Wotherspoon, 2013). For most countries, international education reflects the integration process between higher education and the knowledge economy (Kauppinen, 2015).

The economic explanations include various micro-macro explanations, supply-demand explanations, demographic and labour market explanations. The push-pull model explored the determinants of migration of higher education students from a micro-level perspective (cf. Netz 2013). The micro explanation postulate that on the basis of the theory of rational choice or individual rationality, the rationales on the individual level for studying abroad are that students are rational actors investing in their education with the goal of maximizing their lifetime earnings (Rosenzweig 2006; Beine et al. 2014). From micro perspective, the increase in student mobility is the result of individual decisions, the growing internationalisation of education and economies encourages students to be more mobile to develop skills that are considered essential to being competitive in an increasingly global labour market for highly skilled individuals (Tremblay, 2005). The macro-level explanation provides an assessment of supply and demand sides of international students (Findlay, 2010). For instance, the explanation from macro level perspective postulates that the demographic, labour and market changes in the last few decades, combined with a transition to knowledge economy, created demand for high-skilled workers in OECD countries. In this context, the international students have been considered as a significant source of skilled labour for host societies and international education is recognised as an important channel of labour migration (Liu-Farrer, 2014: 185). The OECD countries have increasingly sought to attract international students as part of a strategy to expand their knowledge economies, while students’ source countries have expressed concern about the development consequence of losing human capital (Findlay, 2011). In the most recent decade universities have become key facilitators of skilled migration flows (Hawthorne and To, 2014). Some studies

find that several factors explain a world-wide emerging trend of highly skilled migration. They argue that tertiary education has risen everywhere and numbers of migration-prone graduates are booming; inequalities of income between countries have not receded, and this applies to highly skilled, as well as to low skilled workers; information on employment conditions abroad circulates more than ever, to such extent, indeed, that the labour market is becoming truly global in certain sectors; gaps in education between countries are continuously diminishing, so that skills acquired in one country can be employed in another (Fargues and Venturini, 2015).

The educational policies and human capital gap explanations postulate the gap between the sending and hosting countries in terms of supply and demand for educational opportunities and quality of education. For instance, the educational and human capital gap explanations assume that the motivations for enrolling students in higher education abroad implies that one of the main reasons driving people towards studying abroad is the unsatisfied demand for higher education in their home country (Beine et al., 2013a, 2014; Agarwal and Winkler 1985; Lee and Tan 1984); in addition to the low quality of the higher education supply in the home country (Wilkins et al., 2012); the perceived higher quality of an international programme compared to a local one (Wilkins et al., 2012) and/or the quality difference between foreign and domestic degrees (Aslangbengui and Montecinos 1998; Gordon and Jallade 1996; Mazzarol and Soutar 2002). This explanation implies that student migration occurs because of the inadequacy of educational opportunities in the home country (Beine et al., 2013a; 2014; Rosenzweig 2006). According to this model, when students make the decision to study abroad, they hope to acquire higher quality education and to return to their country of origin after graduation. Hence, an increase in the higher education supply in the countries of origin reduces the number of people seeking education abroad (Rosenzweig, 2006). The human capital explanation assumes that the rise of international student mobility is associated “with an increased demand for technical, specialized, post-secondary education that prompts students to go abroad in search of educational opportunities that are better than those available to them in their home country” (Shields 2013: 610). According to this human capital explanation, students seek higher education outside of their country of origin when the benefits outweigh the costs of studying abroad.

The labour market and wages gap explanations postulate the gap between the sending and hosting countries in terms of labour market opportunities and return to education or wages. For instance, the labour market explanation assumes that studying abroad seems to be connected particularly with the lack of labour market opportunities in the home country (Levatino, 2016). The wages gap explanation envisage that seeking education abroad constitutes a strategy to immigrate permanently to a foreign country to escape from low returns on education in the country of origin, according to this explanation, because of the differences in wages worldwide, an increase in the higher education supply in the countries of origin of international students provokes a rise in the number of people seeking education abroad (Beine et al. 2013a, 2014).

Other explanations include the critical perspective explanation that assumes that power relationships and hegemony are main drivers of cross-national student mobility. Accordingly, those who ultimately benefit most from cross-national student mobility are transnational and national elites who have access to the globally most prestigious universities (Shields 2013: 613). Finally, the cultural explanation focuses on cultural factors for explaining student migration patterns (Bessey 2010; Dreher and Poutvaara 2005; Tremblay 2001; Kondakci 2011). The cultural approach explains the rising number of international students as “driven primarily by cultural values rather than rational choice” and expect cultural factors to determine patterns of international student mobility (Shields 2013: 615; Boli et al. 1985; Boli and Thomas 1997).

### *The impact, implications and consequences of migration of higher education students*

The third group of studies in the international literature provides explanation of the impacts, consequences or implications of migration of higher education students from the perspectives of both sending and hosting countries. Several studies develop a comprehensive understanding of the implications of students movement, mobility, migration and the internationalization of higher education (Brooks and Waters, 2011.) Some studies examine mobility of knowledge and examine the impact of geographical mobility of people and spatial mobility on the production, dissemination, and transfer of knowledge (Jöns, Heffernan, and Meusburger, 2017). Recent studies contribute to further understanding of the labour market outcomes and explore the complex and changing relationship between global mobility of highly-skilled international students and recent changes to immigration policy in the UK that prevent such mobility on the other (Moskal, 2016). Some studies argue that that international highly skilled migration has become more controversial as it has become more frequent. Mainstream policy makers and development specialists in origin countries tend to see migration as brain drain or as brain flight, according to whether they explain migration in terms of the pull effect of the destination countries or the free choice of migrants. Those denouncing brain drain see developing countries as victims of more advanced predator economies, while those blaming brain flight point to collective interest being sacrificed to private ambitions. (Fargues and Venturini 2015)

Numerous studies analyzing the determinants of students outflows migration and the brain drain. Some studies examine African brain drain and find that of all the world's regions, Sub-Saharan Africa has experienced the most serious negative repercussions. It is also a reflection of the complex and shifting interplay of "push" and "pull" factors that motivate individuals to leave one country for another. The impact of the brain drain on Sub-Saharan Africa is complex. There is the well-known migration of highly educated Africans from the continent to other parts of the developed world. Generally, the migration is from poor, politically unstable, and/or conflict prone countries to those that have stronger economies, are politically stable, and offer good security. The brain drain has positive impacts for the losing country, because in some cases, the Diasporas have become significant sources of financial remittances back to the home country. The role of remittances is observed, for instance, the World Bank estimated that remittances to Sub-Saharan Africa in 2007 reached \$20 billion, more than the total foreign direct investment flow and nearly equal to foreign aid. Remittances to North Africa were even higher—about \$35 billion with Egypt, Morocco, and Algeria the leading recipients. There is a long history of African students' migration and movement, for instance, during the colonial period most large population movements were linked to the economic policies of colonial governments. Africans from Francophone countries tended to migrate to France, those from Anglophone countries to the United Kingdom and the United States. Germany and the United States became the preferred destination for scientists and professionals. The brain drain has impacted some areas of specialization much more than others. Shortages have been severe for most countries in medicine, nursing, physical and human sciences, engineering, technology, and computer programming. Regarding the causes of migration and the brain drain, complex push and pull factors determine the severity of the brain drain and migration for any particular country in Africa. Pull factors such as good security and better economic and social opportunities in countries that attract skilled people have essentially the same effect on skilled persons in all of Sub-Saharan Africa. The impact of push factors varies, however, from one country to another. The push factors include many political and security issues: military coups, political persecution, arbitrary arrest, poor human rights practices, intolerance of political dissent, absence of academic freedom, illegal regime change, and

favoritism based on ethnic or religious affiliation add to the brain drain. A host of economic issues is responsible for or at least exacerbates the flight of skilled persons. A country with a weak economy, high unemployment, significant corruption, low wages, periodic famine and/or substantial poverty is a prime candidate for a brain drain. A country that is unable to create a sufficient number of new jobs and has a limited capacity to absorb qualified personnel is especially vulnerable. Low salaries for professionals are often cited as a major reason for the brain drain. A related concern is the lack of professional opportunity, benefits and personal development. This includes issues such as training and research opportunities, morale and job satisfaction, and human resource and management policies. Most countries in Sub-Saharan Africa do not have particularly friendly working environments, strong budgets, clear policies or generous research funds. There is often no national policy for and little investment in science and technology. Some of the problems concern everyday living. Professionals become discouraged if they cannot afford decent housing. Poor supervision and limited career advancement opportunities add to the frustration. Poorly equipped institutions where computers and access to the Internet are limited pose a serious handicap. Libraries that house a modest number of mostly out-of-date books, laboratories with broken or obsolete equipment, and medical personnel without modern equipment add to the brain drain. Inability to access professional literature is another issue. These problems are common to many countries in Sub-Saharan Africa. As for the pull factors, if the push factors are difficult to control, Sub-Saharan African countries have virtually no influence over the pull factors. In most cases, the pull attraction is the opposite of the push factor. If the economy is weak and wages are low in the country losing skilled personnel, the economy tends to be strong and wages high in the gaining country. This is the case for Europe, North America, and even the Gulf States. (Shinn, 2008)<sup>11</sup>

Several studies examine the determinants of students outflows migration and the brain drain in North Africa. For instance, some studies indicate that the determinants and processes driving highly skilled Arab migration at both the sending and the receiving ends in North Africa countries implies that selective destination policies and labour market needs matter more than origin factors in explaining Arab educational profiles abroad and its change over the last generation, unemployment and low returns on education at home explain the rest, in the Maghreb, on the other hand, colonial ties have long triggered the emigration of low skilled workers, not only the lack of economic opportunities in these countries which spur highly skilled migration, there is also the question of unstable and oppressive political regimes, while the social remittances of migrants tend to change the culture of non-migrants in the origin countries (Di Bartomoeol and Fargues, 2015, Tabar (2015).

Analysis of the determinants and processes driving highly skilled Arab migration at both the sending and the receiving ends, implies that selective destination policies and labour market needs matter more than origin factors in explaining Arab educational profiles abroad and its change over the last generation, unemployment and low returns on education at home explain the rest, there is a significant divide between countries, the reasons underlying these geographical differentials is to be found in history and origin-destination ties, in the Maghreb, colonial ties have long caused the emigration, but it has been (stressed that it is not only the lack of economic opportunities (the North Africa) which spur highly skilled migration, there is also the question of unstable and oppressive political regimes cf. Di Bartomoeol and Fargues 2015; Tabar, 2015). While the social

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<sup>11</sup> The British Royal Society coined the term “brain drain” to describe the outflow of scientists and technicians to the United States and Canada in the 1950s and early 1960s. By the 1970s, the brain drain came to be associated with the flow of skilled individuals from the developing world to Western Europe and North America. (See Shin, 2008)

remittances of migrants tend to change the culture of non-migrants in the origin countries, migrant communities are also increasingly engaged in trans-local homeland politics.

In Egypt, highly skilled outflow from Egypt to the OECD and the Gulf countries are a recent phenomenon promoted by the government, a consequence of high graduate unemployment among the educated youth, 53 per cent of returnees consider their experience abroad professionally useful, something that can also improve their career prospects at home. In Egypt governments promoted migration, especially among the highly skilled, as a way to decrease pressures on the Egyptian employment market, to bring down unemployment pressure in the country, and to increase the inflow of much needed remittances. In Egypt, migration brings about development through three different trends. First, migration of highly skilled individuals reduces the high demand for jobs in Egypt, lead to skill development, skill acquisition and attainment of more individual development skills, which increases the probability of introduction of small-scale private businesses when highly skilled Egyptian migrants return to Egypt. Second, the remittances received from highly skilled Egyptian migrants are positive both for individual and country, on the individual level, remittances generate income for households and improve access to better education, healthcare and sanitation services, as to the country level, migration brings in almost 6 per cent of Egyptian GDP, through remittances (World Bank, 2012), In this case, migration has almost the same impact on development, as foreign direct investment, which constitutes 5.83 per cent of Egyptian GDP (ESCWA, 2009). Third, the high level of Egyptian skilled migration has showed itself to be “brain circulation”, brain circulation advances different skills, increases the entrepreneurial skills of a large number of Egyptian migrants, and that leads to higher levels of private small-scale businesses and employment, which in turn, create employment in the Egyptian labour market. (Sika, 2015: 164-165)

In Tunisia, Tunisia invested in higher education producing a notable increase in the number of students and graduates. However, despite an active employment policy, the Tunisian job market has not been able to give jobs to all highly skilled graduates the country has been unable to produce enough jobs for graduates. The introduction of Tunisia’s migration policy to support the emigration of skills was, thus seen as a solution to rising pressure on the labour market and rising unemployment among the better educated (from 2.3 per cent in 1984, to 3.8 per cent in 1994, 10.2 per cent in 2004 and 29.2 per cent in 2011) (Zekri, et al., 2015).

In Algeria, in the last 20 years Algeria invested 25 per cent of its GDP in education, increasing the number of medium and highly educated Algerians, but creating, in the process, an excess supply of highly skilled Algerians. Many of these, rather than remain unemployed at home, emigrated and joined the already substantial Algerians diaspora abroad. In Algeria brain drain remains a major challenge for Algerian authorities, the main reasons for accelerated brain drain and the migration of highly skilled labour from Algeria including: the worsening of the socio-cultural situation among high skilled or intellectual elites: graduates unemployment, the discontent of executives, as executives see limited professional prospects for their children and even the danger of unemployment, at the same time they themselves have seen their standard of living fall through rising inflation, the rise of rentier and speculative market activities (the Algerian elite), in addition to other reasons such as the bureaucratization of research; and the lack of individual and collective freedom, the Arabization of education and teaching reduced job opportunities offered by the international companies, which proliferated after liberalization. Revision of educational policies and the persistence of patronage and nepotism discouraged the return, meanwhile, of expatriates and any real involvement on the part of the diaspora. This implies that the economic, social and cultural situation in Algeria is, in no small part, the result of poor governance, it has been a

major push factors for highly skilled labour and an obstacle to the return and to the mobilization of diaspora skills. (Mebroukine, 2015: 196-208).

In Morocco, highly skilled migration remains a problem for the country and the drain on engineering is perhaps the most damaging form of migration. However, migration is rooted in the complex demography of the country. In Morocco, since the 2000s, the importance of highly skilled migration from Morocco has grown, this form of migration differs from traditional economic migration, which has been, since the 1960s, a major social phenomenon, and earlier economic emigration concerned only the most valuable economic elements and the least educated within the society of origin. The phenomenon is rather complex, brain drain is, in fact, the consequences of occupational, economic, social and political factors. Determinants of the phenomenon imply that brain drain is produced by the conjunction of several different factors. Their cumulative effect seems to lead to a strong propensity to emigrate. The logic that underlie these flows are both endogenous and exogenous (push and pull factors) (Zekri, 2002). The endogenous 'push' factors are of a varied nature and do not have the same intensity. In addition to the economic reasons, which are among the leading causes of migration in all its forms, other factors also encourage skilled personnel to become expatriates, includes, political factors, which imply the failure of the democratic mechanisms ensuring equal opportunities and a meritocracy for all citizens. In addition to professional factors, which implies the inability of the national economy to meet the aspiration of those who have acquired a tertiary qualification? In addition to the social factors, which implies total or partial unemployment, often ascribed to the gap between education policy and employment policy? For instance, implementation of structural adjustment programme in Morocco since the 1980s, led to creation of fewer employment opportunities. This has led many graduates to emigrate and has encouraged those pursuing studies abroad to remain and seek employment there. Moreover, the absence of connection between the university and the economy is worsened by the failure of an entrepreneurial system that is characterized by few resources being given to research and development. In addition to the low funding for research, overall, the total expenditure in Morocco on R&D is estimated at 0.8 per cent of GDP. In addition to other factors like the lack of opportunities for intellectual stimulation (laboratories, libraries, professional associations) and bureaucratic inertia (rigid hierarchical structures in companies and public institutions alike). Moreover, the decision to emigrate is often triggered by exogenic factors. Brain drain has been intensified because of the international demand for skilled labour. Globalization plays a significant role in the acceleration of the exodus of the most highly trained. In fact, the deregulation of economies and opening of markets have significant consequences for work organizations. The restructuring of productive systems generates highly qualified workers. In these new organizational structures, innovation plays a central role, which requires 'a significant pool' of scientific skills (Bouoiyour, 2001). This phenomenon is reinforced by the adoption of policies supporting the recruitment of highly skilled migrants. Other exogenic factors encourage migration of highly qualified workers is due to an environment marked by attractive work conditions and an attractive life (including; the search for excellence in favorable environment for skills deployment; organizational flexibility; competition; prospects for promotion and access for opportunities; and sectoral attractions of new professions in new technologies). These professional factors are supported by other factors of a personal nature (including: wage incentives, promotion schemes and opportunities; powerful social security schemes; and the ability to help family and access to better opportunities for the education of dependent) (Zekri, 2002). For Morocco, the cost of brain drain includes various components, the brain drain implies the socio economic benefit of emigration that is obvious for the individual and his or her

family, but also the brain drain leads to social costs and effects for the families of trained people. Moreover, the brain drain also leads to immense losses for the country of origin, it is disadvantageous for Morocco on at least three levels: the highly qualified represent one of the most precious resources of the country: the departure of high skilled migration (means a degradation of the skills and knowledge reservoir and a block on sustainable development; in addition, the country is sometimes constrained to seek expensive foreign expertise for work that could have been carried out by nationals if they had not left to work elsewhere, and finally, the education of these skilled individuals wastes national resources as it is expensive and time consuming (Khachani, 2009). (Khachani, 2015: 181-195)

In Sudan, brain drain is caused by the difficult economic conditions that prompted the emigration of talents, particularly university professors, thus adding to the number of highly skilled abroad (Assal, 2010). Sudan is now experiencing brain drain in as much as the emigrants leaving the country (especially the university professors) are highly qualified. The total number of university professors (those with PhDs) in Sudan in 2012 was 12,000. Around 10 per cent left the country in the course of that year. In Sudan, highly skilled migration can be seen simultaneously a gain and a drain. The emigration of medical professionals and university professors is used to illustrate the extent of highly skilled migration. The highly skilled migration contribution to development appears in terms of remittances and contribution of household economies (Assal, 2015: 209-223).

#### **4. Pattern, causes and consequences of migration of higher education students from North Africa countries from regional perspective**

This section discusses the major development concerning the pattern, size, trend and distribution of migration of higher education students from North Africa countries compared to South Africa and world countries, and examines the push-pull factors (economic, political, cultural and educational) causes and consequences of migration of higher education students from the North Africa region. This section aims to investigate if the various valuable explanations and interpretations of the causes, motivations, determinants and implication of international students mobility presented in the previous international studies in the international literature as presented in the previous section are also applicable to North Africa.

##### *4.1. Pattern of migration of higher education students from North Africa countries from regional perspective:*

Our results discussed in this section are consistent with the results in the international literature on the evolution and development of migration of higher education students that implies that the international flow of students is not a new phenomenon since long, the North Africa countries like most other world countries experienced highly skilled emigration, and in recent years the trend has been more visible in North Africa and other world countries despite the fact that its higher education sector is expanding in North Africa and other world countries.

The UNESCO– UIS (2017) provides useful indicators on migration of higher education students measured by several mobility indicators, including total outbound mobility ratio, gross outbound enrolment ratio, outbound mobility ratio, inbound mobility ratio and net flow of internationally mobile students (inbound - outbound) for all world countries and regions that allows comparison between North Africa region with other world regions over the period (1999-2015).<sup>12</sup> For instance, data from UNESCO– UIS (2017) implies that the

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<sup>12</sup> Total outbound internationally mobile students is defined as the students who have crossed a national or territorial border for the purpose of education and are now enrolled outside their country of origin. Gross outbound enrolment ratio is defined as the total number of students

total number of both total outbound mobility and total inbound mobility in North Africa are less than all World regions (1999-2015)). For instance, we observe that with a population of 223.4 million people and average GDP per capita of PPP\$ 9,865, the North Africa region is ranked at the bottom place globally in terms of total outbound mobility ratio and migration of higher education students from the North Africa region compared to world regions in 2015. We find that in 2014 the total number of outbound internationally mobile tertiary students studying abroad from low income countries, lower middle income countries, middle income countries, upper middle income countries, high income countries, Sub-Saharan Africa, Africa and developing countries is nearly two times, seven times, twenty times, thirteen times, nine times, two times, three times and more than twenty times above the level of North Africa respectively. (See Tables 3-4 and Figures 4-8).

When comparing between North Africa and South Africa we find that North Africa is similar to South Africa shows increasing trends in terms of total outbound mobility ratio and gross outbound enrolment ratio, Tables 3-5 illustrates the increasing trend in total outbound mobile students from the North Africa region studying abroad over the period (1999-2015) that increased substantially from 75453 in 1999 to 125064 in 2015 for the North Africa region and from 4789 in 1999 to 7395 in 2015 for the South Africa. Table 5 illustrates that total outbound mobility ratio and gross outbound enrolment ratio are nearly doubled over the period (1999-2015), mainly, total outbound students from North Africa studying abroad increased substantially from 17522 in 1999 to 20493 in 2015. We find that different from South Africa in North African outbound mobility ratio show declining trends over the period (1999-2015). We find that in terms of inbound mobility ratio North Africa is lagging behind South Africa (See Tables 3-4). We find that the total number of outbound mobility in North Africa is greater than and nearly doubled South Africa. In 2014 gross outbound enrolment ratio in North Africa (0,97) is above South Africa (0,14), over the period (2000-2014), gross outbound enrolment ratio in North Africa is five times, eight times and seven times above South Africa in 2000, 2010 and 2014 respectively. Similarly, total outbound mobility ratio in North Africa (2,97) is above South Africa (0,71), the gap increased over the period (2012-2014), for instance, gross outbound enrolment ratio in North Africa is 1.6 times, 1.7 times and 1.8 times above South Africa in 2012, 2013 and 2014 respectively. By contrast, inbound mobility ratio in North Africa (1,44) is below South Africa (4,18).

When investigating the intra-regional mobility indicators within the North Africa region, we find considerable intra-regional variation within the North Africa region that appears in terms of various mobility indicators, including total outbound mobility ratio, gross outbound enrolment ratio, outbound mobility ratio, inbound mobility ratio and net flow of internationally mobile students (inbound - outbound) over the period (1999-2015). For instance, the distribution of total outbound internationally mobile tertiary students studying abroad over the period (2000-2015) implies that Morocco (43%) is ranked at the top, followed by Algeria (21%), Tunisia (16%), Egypt (13%), Libya (4%), and Sudan (3%) respectively. The distribution of gross outbound enrolment ratio implies that Tunisia (1.86%) is ranked at the top, followed by Libya (1.48%), Morocco (1.35%), Algeria (0.57%), Egypt (0.29%), and Sudan (0.25%) respectively. The distribution of total outbound mobility ratio over the period (1999-2015) implies that Tunisia (5.37%) is ranked at the top, followed by Morocco

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from a given country studying abroad, expressed as a percentage of the population of tertiary age in that country. Net flow of internationally mobile students is defined as the difference between (inbound - outbound). Outbound and inbound internationally mobile students are students who have crossed a national or territorial border for the purpose of education and are now enrolled outside their country of origin. Inbound mobility ratio is defined as the number of students from abroad studying in a given country, expressed as a percentage of total tertiary enrolment in that country. Outbound mobility ratio is defined as the n number of students from a given country studying abroad, expressed as a percentage of total tertiary enrolment in that country.

(5.35%), Algeria (1.64%), Sudan (1.54%), and Egypt (0.92%) respectively. The distribution of inbound mobility ratio over the period (1999-2015) implies that Egypt (1.88%) is ranked at the top, followed by Tunisia (1.85%), Morocco (1.80%), and Algeria (0.64%) respectively.

Moreover, we observe that the increasing trend in total outbound mobile students from the North Africa region studying abroad over the period (1999-2015) varies enormously across the different North Africa countries as explained below. These results support the first hypothesis that the international students from the North Africa region increased substantially over the past years but this increasing trend varies enormously across the different North Africa countries (see Tables 3-4 and Figures 4-8).

Table 3 –The total number of outbound mobility ratio in North Africa compared to all World regions (1999-2015))

| Country\ Time                    | 1999         | 2000         | 2005         | 2010          | 2011          | 2012          | 2013          | 2014          | 2015          |
|----------------------------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>North and South Africa</b>    |              |              |              |               |               |               |               |               |               |
| Algeria                          | 17522        | 16427        | 24780        | 22847         | 23956         | 24773         | 20827         | 20385         | 20493         |
| Egypt                            | 8632         | 8802         | 9621         | 14320         | 15234         | 16696         | 20007         | 23475         | 24970         |
| Libya                            | 1752         | 1771         | 3603         | 7390          | 7456          | 6795          | 5646          | 7615          | 8209          |
| Morocco                          | 38167        | 42751        | 46016        | 42845         | 43509         | 43999         | 39443         | 42262         | 43148         |
| Sudan                            | ..           | ..           | ..           | ..            | 7196          | 7955          | 9300          | 9755          | 10058         |
| Tunisia                          | 9380         | 10286        | 15038        | 19725         | 19503         | 19026         | 16851         | 17825         | 18186         |
| <b>Total North Africa</b>        | <b>75453</b> | <b>80037</b> | <b>99058</b> | <b>107127</b> | <b>116854</b> | <b>119244</b> | <b>112074</b> | <b>121317</b> | <b>125064</b> |
| <b>South Africa</b>              | <b>4789</b>  | <b>5572</b>  | <b>5655</b>  | <b>6515</b>   | <b>6436</b>   | <b>6348</b>   | <b>7031</b>   | <b>7199</b>   | <b>7395</b>   |
| <b>World Regions</b>             |              |              |              |               |               |               |               |               |               |
| Developed countries              | 594920       | 606484       | 661606       | 730419        | 767626        | 791139        | 810321        | 822143        | ..            |
| Developing countries             | 971301       | 1033288      | 1617095      | 2183331       | 2318921       | 2343225       | 2374405       | 2533945       | ..            |
| Countries in transition          | 158666       | 168842       | 232058       | 329486        | 354868        | 353269        | 380816        | 431320        | ..            |
| Arab States                      | 169833       | 177310       | 219934       | 277602        | 298491        | 326349        | 346535        | 391977        | ..            |
| Central and Eastern Europe       | 216259       | 241882       | 334389       | 409926        | 428193        | 425452        | 421528        | 427342        | ..            |
| Central Asia                     | 57160        | 55742        | 83916        | 133028        | 147245        | 150382        | 174591        | 219683        | ..            |
| East Asia and the Pacific        | 426225       | 438074       | 759333       | 994535        | 1081120       | 1116774       | 1129319       | 1174419       | ..            |
| Latin America and the Caribbean  | 112202       | 124289       | 163720       | 215877        | 212768        | 211388        | 214744        | 227110        | ..            |
| North America and Western Europe | 486915       | 490446       | 490411       | 562626        | 596457        | 618469        | 637490        | 638803        | ..            |
| South and West Asia              | 114655       | 123404       | 234623       | 369058        | 377411        | 365096        | 366009        | 408162        | ..            |
| Sub-Saharan Africa               | 141638       | 157467       | 224431       | 280584        | 299730        | 273723        | 275325        | 299911        | ..            |
| <b>Northern Africa</b>           | <b>75453</b> | <b>80037</b> | <b>99058</b> | <b>107126</b> | <b>109658</b> | <b>111289</b> | <b>102774</b> | <b>111563</b> | <b>..</b>     |
| <b>UNESCO Regions</b>            |              |              |              |               |               |               |               |               |               |
| Africa                           | 227384       | 247958       | 335209       | 400292        | 422074        | 398202        | 392600        | 427311        | ..            |
| Asia                             | 771531       | 791394       | 1286600      | 1752138       | 1877205       | 1927147       | 1987256       | 2145310       | ..            |
| Europe                           | 555103       | 574718       | 639270       | 775453        | 825712        | 845775        | 862940        | 878876        | ..            |
| North America                    | 123013       | 130713       | 171003       | 188598        | 186242        | 188766        | 193437        | 197379        | ..            |
| South America                    | 63228        | 70106        | 90954        | 133352        | 135047        | 131580        | 133546        | 143961        | ..            |
| Oceania                          | 19395        | 20247        | 22914        | 27744         | 28007         | 28461         | 29400         | 29883         | ..            |
| <b>World Bank Regions</b>        |              |              |              |               |               |               |               |               |               |
| Low income countries             | 75776        | 81069        | 111055       | 161023        | 175011        | 162317        | 168701        | 185317        | ..            |
| Lower middle income countries    | 343356       | 378834       | 575437       | 790687        | 814907        | 798096        | 818662        | 904657        | ..            |
| Middle income countries          | 893861       | 958895       | 1551634      | 2096814       | 2235857       | 2264319       | 2312244       | 2504779       | ..            |
| Upper middle income countries    | 550505       | 580061       | 976197       | 1306126       | 1420950       | 1466223       | 1493582       | 1600122       | ..            |
| High income countries            | 789583       | 794752       | 882753       | 1019179       | 1062955       | 1092806       | 1117364       | 1131896       | ..            |

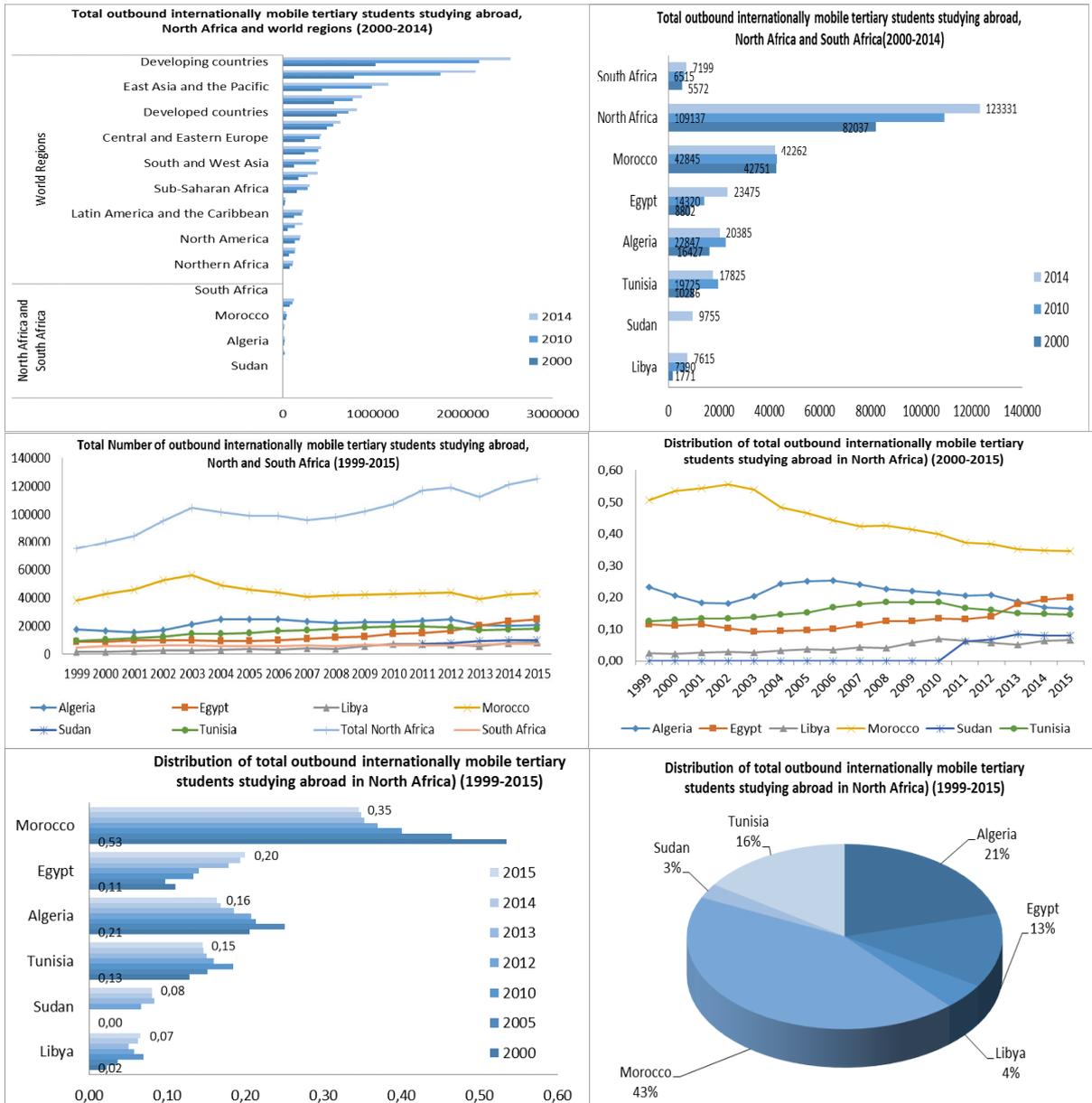
Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

Table 4 – Mobility indicators: gross outbound enrolment ratio, outbound mobility ratio, inbound mobility ratio and net flow of internationally mobile students (inbound - outbound) in North Africa and South Africa (1999-2015) (%)

| Country/Time  | 1999   | 2000    | 2005      | 2010      | 2011      | 2012      | 2013      | 2014      | 2015      |
|---|--------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Gross outbound enrolment ratio</b>                                   |        |         |           |           |           |           |           |           |           |
| <b>North Africa</b>   |        |         |           |           |           |           |           |           |           |
| Algeria   | 0,52   | 0,48    | 0,65      | 0,60      | 0,63      | 0,66      | 0,56      | 0,57      | 0,59      |
| Egypt   | 0,13   | 0,13    | 0,12      | 0,17      | 0,18      | 0,20      | 0,24      | 0,29      | 0,32      |
| Libya   | 0,30   | 0,30    | 0,57      | 1,18      | ..        | ..        | ..        | 1,48      | ..        |
| Morocco   | 1,34   | 1,47    | 1,47      | 1,38      | 1,39      | 1,40      | 1,25      | 1,35      | 1,38      |
| Sudan   | ..     | ..      | ..        | ..        | 0,20      | 0,22      | 0,25      | 0,25      | ..        |
| Tunisia   | 1,02   | 1,10    | 1,46      | 1,87      | 1,88      | 1,87      | 1,71      | 1,86      | 1,95      |
| North Africa  | 0,66   | 0,69    | 0,86      | 1,04      | 0,86      | 0,87      | 0,80      | 0,97      | 1,06      |
| South Africa  | 0,12   | 0,13    | 0,12      | 0,12      | 0,12      | 0,12      | 0,13      | 0,14      | ..        |
| <b>Outbound mobility ratio</b>  |        |         |           |           |           |           |           |           |           |
| <b>North Africa</b>   |        |         |           |           |           |           |           |           |           |
| Algeria   | 3,84   | ..      | 3,13      | 2,00      | 2,02      | 2,05      | 1,66      | 1,64      | 1,59      |
| Egypt   | 0,42   | ..      | 0,41      | 0,54      | 0,68      | 0,73      | 0,81      | 0,92      | 0,87      |
| Libya   | 0,57   | 0,61    | ..        | ..        | ..        | ..        | ..        | ..        | ..        |
| Morocco   | 13,97  | 14,46   | 12,52     | 9,58      | 8,61      | 7,26      | 5,57      | 5,35      | 4,92      |
| Sudan   | ..     | ..      | ..        | ..        | 1,37      | 1,44      | 1,45      | 1,54      | ..        |
| Tunisia   | 6,05   | 5,71    | 4,60      | 5,33      | 5,39      | 5,32      | 4,99      | 5,37      | 5,64      |
| North Africa  | 4,97   | 6,93    | 5,16      | 4,36      | 3,61      | 3,36      | 2,90      | 2,97      | 3,25      |
| South Africa  | ..     | ..      | ..        | ..        | ..        | 0,63      | 0,68      | 0,71      | ..        |
| <b>Inbound mobility ratio</b>   |        |         |           |           |           |           |           |           |           |
| <b>North Africa</b>   |        |         |           |           |           |           |           |           |           |
| Algeria   | ..     | ..      | 0,67      | 0,57      | 0,55      | 0,60      | 0,59      | 0,64      | 0,62      |
| Egypt   | ..     | ..      | 1,31      | 1,85      | ..        | ..        | 1,78      | 1,88      | ..        |
| Libya   | ..     | ..      | ..        | ..        | ..        | ..        | ..        | ..        | ..        |
| Morocco   | 1,53   | 1,52    | 1,35      | 1,92      | ..        | ..        | 1,41      | 1,80      | ..        |
| Sudan   | ..     | ..      | ..        | ..        | ..        | ..        | ..        | ..        | ..        |
| Tunisia   | 1,75   | 1,53    | ..        | 0,60      | 0,56      | 0,53      | 1,85      | ..        | 2,00      |
| North Africa  | 1,64   | 1,53    | 1,11      | 1,24      | 0,56      | 0,56      | 1,41      | 1,44      | 1,31      |
| South Africa  | ..     | ..      | ..        | ..        | ..        | 4,19      | 4,09      | 4,18      | ..        |
| <b>Total outbound mobility ratio</b>                                    |        |         |           |           |           |           |           |           |           |
| <b>North Africa</b>   |        |         |           |           |           |           |           |           |           |
| Algeria   | 17522  | 16427   | 24780     | 22847     | 23956     | 24773     | 20827     | 20385     | 20493     |
| Egypt   | 8632   | 8802    | 9621      | 14320     | 15234     | 16696     | 20007     | 23475     | 24970     |
| Libya   | 1752   | 1771    | 3603      | 7390      | 7456      | 6795      | 5646      | 7615      | 8209      |
| Morocco   | 38167  | 42751   | 46016     | 42845     | 43509     | 43999     | 39443     | 42262     | 43148     |
| Sudan   | ..     | ..      | ..        | ..        | 7196      | 7955      | 9300      | 9755      | 10058     |
| Tunisia   | 9380   | 10286   | 15038     | 19725     | 19503     | 19026     | 16851     | 17825     | 18186     |
| Total North Africa  | 75453  | 80037   | 99058     | 107127    | 116854    | 119244    | 112074    | 121317    | 125064    |
| South Africa  | 4789   | 5572    | 5655      | 6515      | 6436      | 6348      | 7031      | 7199      | 7395      |
| <b>Net flow of internationally mobile students (inbound - outbound)</b> |        |         |           |           |           |           |           |           |           |
| <b>North Africa</b>   |        |         |           |           |           |           |           |           |           |
| Algeria   |        |         | -         | -         | -         | -         | -13424,23 | -         | -         |
|   |        |         | 19437,219 | 16302,671 | 17427,158 | 17561,652 |           | 12432,417 | 12526,231 |
| Egypt   |        |         | 21101,837 | 34691,344 |           |           | 23986,255 | 24340,448 |           |
| Morocco   | -33977 | -       | -         | -         |           |           | -         | -28042,25 |           |
|   |        |         | 38248,857 | 41057,503 | 34241,023 |           | 29492,736 |           |           |
| Tunisia   | -6661  | -       |           | -17521,55 | -         | -         | -         |           | -         |
|   |        |         | 7529,7143 |           | 17470,913 | 17125,167 | 10615,154 |           | 11744,098 |
| North Africa  | -40638 | -       | -         | -33373,9  | -         | -         | -         | -         | -         |
|   |        |         | 45778,571 | 39392,886 | 34898,071 | 34686,818 | 29545,864 | 16134,219 | 24270,329 |
| South Africa  | 29981  | 39805,5 | 44474,277 | 59603,773 | 63992,419 | 35831,924 | 35319,616 | 35395,167 | ..        |

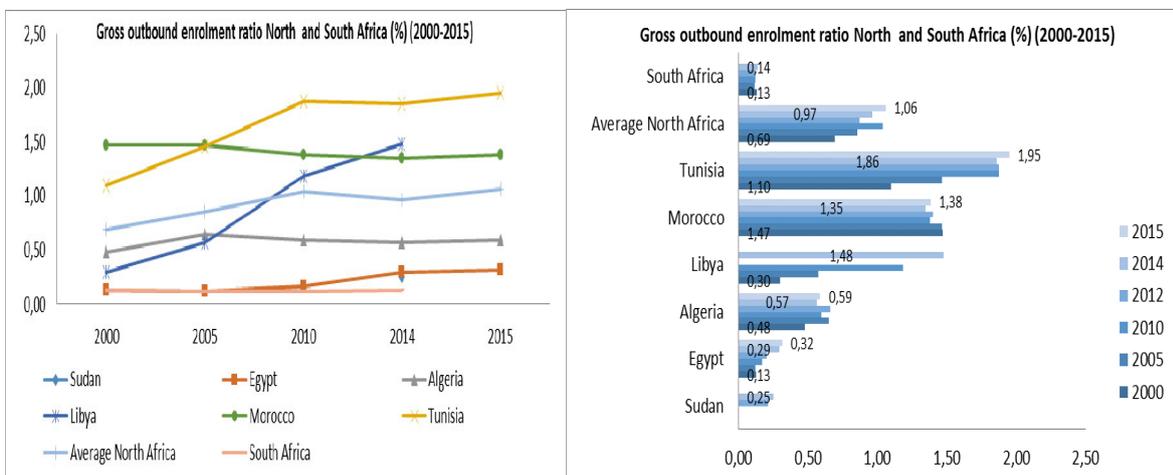
Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

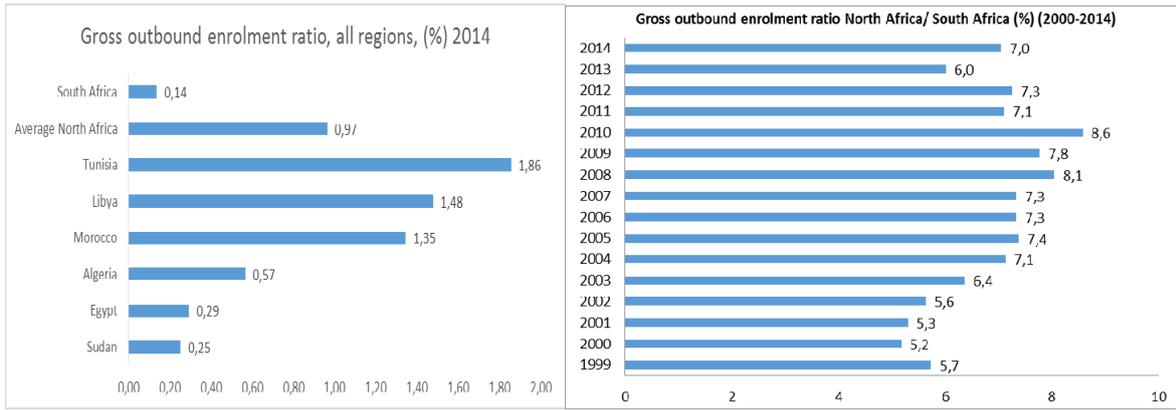
Figure 4 –Total outbound internationally mobile tertiary students in North Africa compared to South Africa and world regions (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

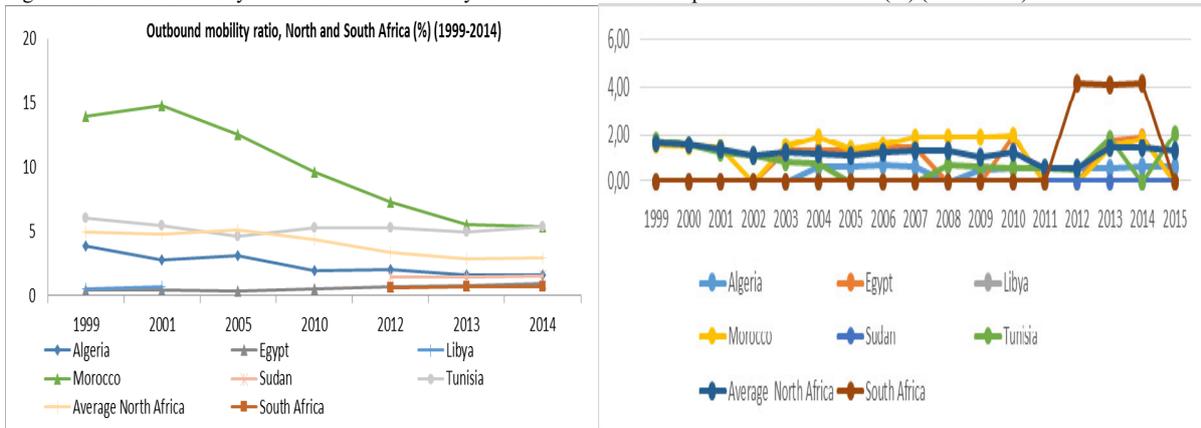
Figure 5 – Gross outbound enrolment ratio in North Africa compared to South Africa (%) (1999-2015)





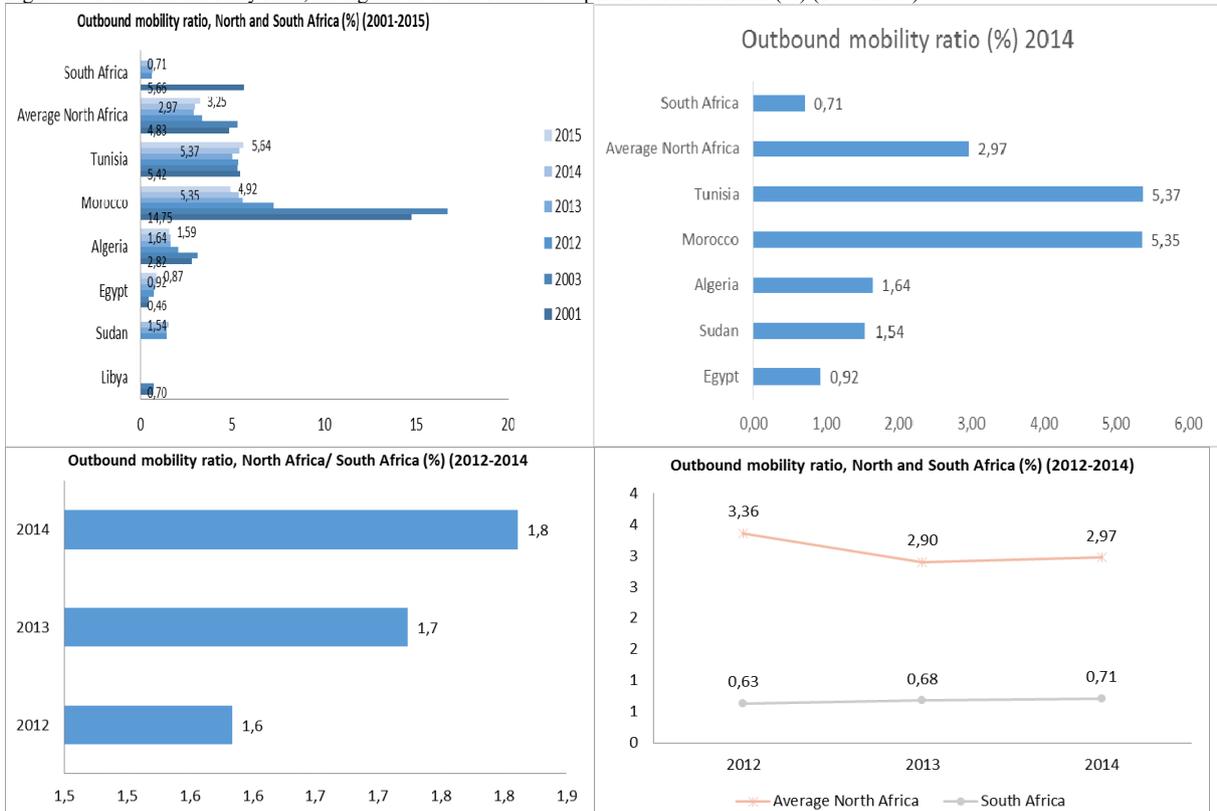
Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

Figures 6- Inbound mobility rate and inbound mobility rate in North Africa compared to South Africa (%) (1999-2014)



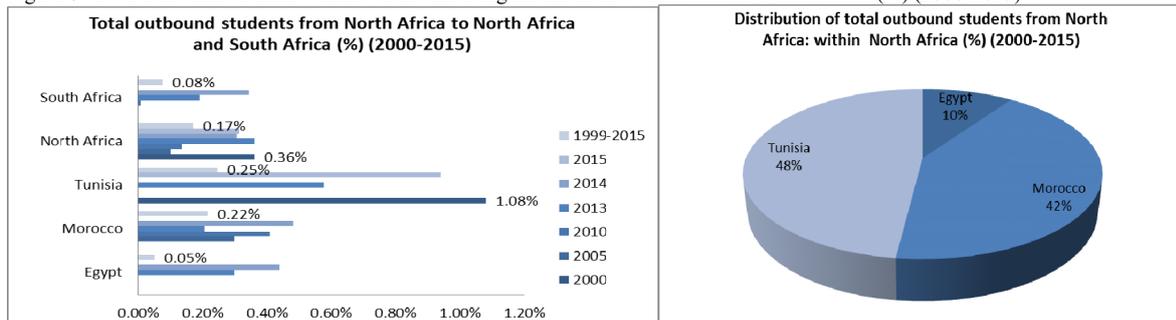
Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

Figure 7 - Outbound mobility ratio, all regions in North Africa compared to South Africa (%) (2000-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

Figure 8- Total outbound students within North Africa region and from North Africa to South Africa (%) (2000-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on 05 April 05, 2017

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from North Africa region and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, the distribution of the international students from North Africa studied and hosted by other World regions over the period (1999-2015) implies heavy concentration of North Africa students studied abroad in few countries, for instance, the majority or more than three quarter (76%) of North Africa students studied abroad studied in eight countries. In particular, the majority of North Africa students studied abroad studied in the OECD (North America and Western Europe and Canada) (76%). This implies that different from South Africa the main destination countries for internationally mobile tertiary students from North Africa includes for instance more than half of North Africa students studied in France (52%), followed by Germany (8), United States of America (5%), Canada (3%), United Kingdom of Great Britain and Northern Ireland (3%), Belgium (2%), Spain (2%), and Italy (2%) over the period (1999-2015) respectively. We observe that few of North Africa students studied abroad studied in other countries, for instance, less than one per cent studied in Asia, Nordic countries (0.3%), North Africa (0.17%) and South Africa (0.08%). We observe limited movement from North Africa to South Africa (0.08) and limited intra-regional movement of outbound mobility within North Africa (0.17) (mainly, Tunisia (0.25%), Morocco (0.22%), and Egypt (0.05%) respectively) that implies that nearly half is concentrated in Tunisia which is ranked at the top (48%), followed by nearly half in Morocco (42%), and tenth in Egypt (10%). We observe that few and less than 1 per cent of North Africa students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from North Africa in the Nordic countries implies that the majority and nearly more than one third studied in Finland (34%), followed by nearly one third studied in Sweden (32%), the other distributed between Norway (12%) and Denmark (12%)(see Table 5 and Figures 9- 10)

On the other hand, the distribution of the international students from South Africa studied and hosted by other World regions over the period (1999-2015) implies heavy concentration of South Africa students studied abroad in few countries, for instance, the majority or more than three quarter (76%) of South Africa students studied abroad studied in ten countries. In particular, the majority of South Africa students studied abroad studied in the OECD countries (USA, Western Europe, Australia, and Canada) and Cuba (74%). This implies that different from North Africa the main destination countries for internationally mobile tertiary students from South Africa includes for instance, nearly one third of South Africa students studied in the United States of America (29%), followed by more than fifth studied in United Kingdom of Great Britain and Northern Ireland (21%), Australia (13%), Cuba (4%), Germany (3), Canada (2%), France (1%), India (1%), Mauritius (1%), and Netherlands (1%), over the period (1999-2015) respectively. We observe that few and nearly 1 per cent of South Africa students studied in the Nordic countries over the period (1999-2015). We observe that few of South

Africa students studied abroad studied in Asia (4%), Nordic countries (1%), and North Africa (mainly, Egypt) (0.03%), and other African countries. We find that the distribution of internationally mobile tertiary students from South Africa in the Nordic countries implies that the majority and nearly more than one third studied in Sweden (37%), followed by nearly one third studied in Norway (27%), followed by more than fifth studied in Denmark (21%), and more than tenth studies in Finland (15%), respectively (see Table 5 and Figures 9-10).

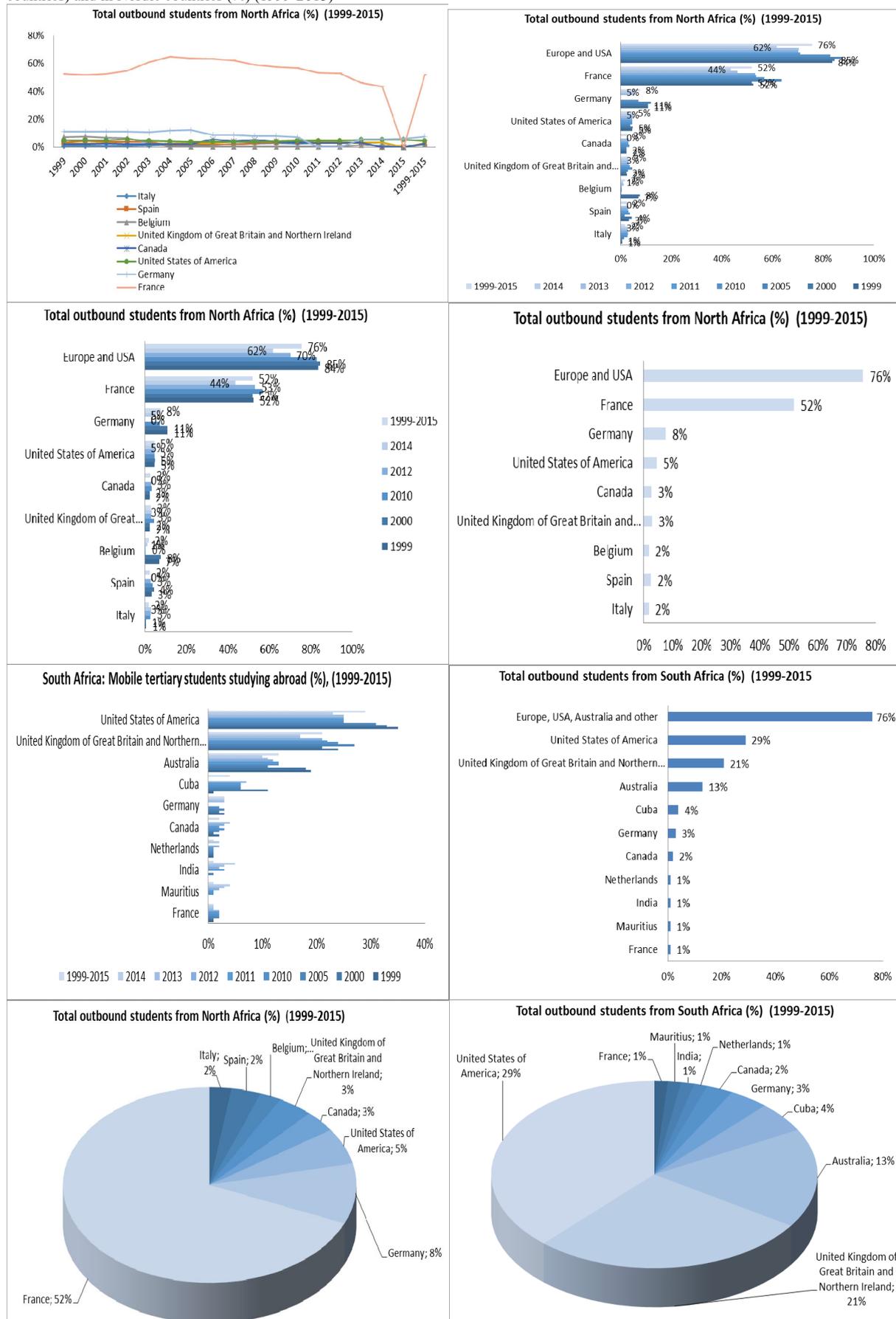
These results support the first hypothesis that the international students from the North Africa region increased substantially over the past years but this increasing trend varies enormously across the different North Africa countries. We find that destination also strongly varies with origin. international students from the Maghreb to OECD countries is strongly concentrated toward Continental Europe, while emigration from the other Egypt and Sudan countries is focused on Anglo-Saxon countries and more recently on Arab Gulf countries. This second stylized fact suggests that past colonial links and common language are strong pull factors.

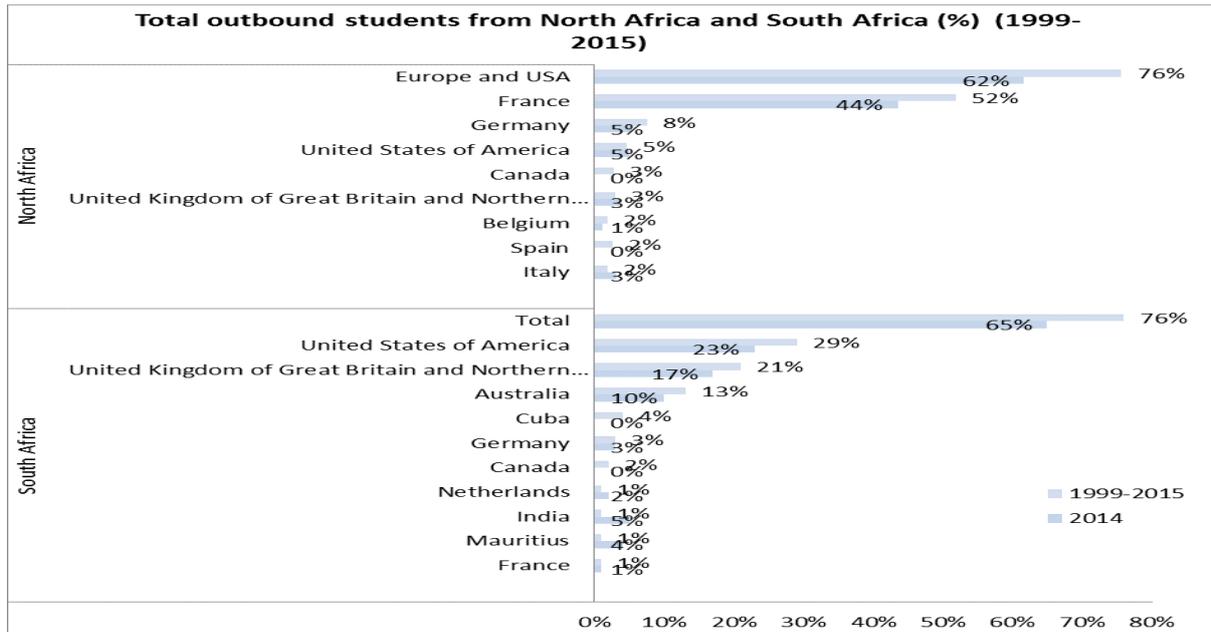
Table 5– Distribution of outbound mobile students within North Africa, from North Africa and South Africa in top destinations (host countries) and in Nordic countries (%) (1999-2015)

|  | 1999 | 2000  | 2005  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 1999-2015 |
|--|------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|
| <b>North Africa</b>  |      |       |       |       |       |       |       |       |       |           |
| <b>Outbound mobile students from North Africa in top destinations (host countries)</b>                             |      |       |       |       |       |       |       |       |       |           |
| France   | 52%  | 52%   | 64%   | 57%   | 54%   | 53%   | 46%   | 44%   |       | 52%       |
| Germany  | 11%  | 11%   | 12%   | 7%    | 0%    | 0%    | 5%    | 5%    |       | 8%        |
| United States of America   | 5%   | 5%    | 4%    | 5%    | 5%    | 5%    | 5%    | 5%    |       | 5%        |
| Canada   | 2%   | 2%    | 2%    | 3%    | 3%    | 3%    | 3%    | 0%    |       | 3%        |
| United Kingdom of Great Britain and Northern Ireland   | 2%   | 2%    | 3%    | 4%    | 4%    | 3%    | 3%    | 3%    |       | 3%        |
| Belgium  | 7%   | 8%    | 0%    | 0%    | 0%    | 0%    | 1%    | 1%    |       | 2%        |
| Spain  | 3%   | 4%    | 2%    | 4%    | 3%    | 3%    | 3%    | 0%    |       | 2%        |
| Italy  | 1%   | 1%    | 1%    | 3%    | 3%    | 3%    | 3%    | 3%    |       | 2%        |
| Total  | 84%  | 85%   | 88%   | 83%   | 71%   | 70%   | 70%   | 62%   |       | 76%       |
| <b>Outbound mobile students within North Africa, from North Africa to Nordic countries and to South Africa and</b> |      |       |       |       |       |       |       |       |       |           |
| Nordic countries   | 0.3% | 0.3%  | 0.2%  | 0.3%  | 0.4%  | 0.4%  | 0.3%  | 0.4%  | 0.2%  | 0.3%      |
| North Africa   | 0.0% | 0.4%  | 0.1%  | 0.1%  | 0.0%  | 0.0%  | 0.4%  | 0.3%  | 0.3%  | 0.2%      |
| South Africa   | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.3%  | 0.3%  | 0.2%  | 0.3%  | 0.0%  | 0.1%      |
| <b>Outbound mobile students from North in Nordic countries</b>   |      |       |       |       |       |       |       |       |       |           |
| Finland  | 36%  | 36%   | 51%   | 28%   | 23%   | 29%   | 32%   | 28%   | 65%   | 34%       |
| Sweden   | 26%  | 34%   | 1%    | 47%   | 58%   | 44%   | 26%   | 40%   | 0%    | 32%       |
| Norway   | 18%  | 18%   | 37%   | 20%   | 13%   | 21%   | 19%   | 14%   | 35%   | 22%       |
| Denmark  | 20%  | 12%   | 10%   | 5%    | 6%    | 6%    | 23%   | 18%   | 0%    | 12%       |
| Total  | 100% | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%      |
| <b>Outbound mobile students within North Africa and from North Africa to South Africa</b>                          |      |       |       |       |       |       |       |       |       |           |
| Egypt  |      | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.30% | 0.44% | 0.00% | 0.05%     |
| Morocco  |      | 0.00% | 0.30% | 0.41% | 0.00% | 0.00% | 0.21% | 0.48% | 0.00% | 0.22%     |
| Tunisia  |      | 1.08% | 0.00% | 0.00% | 0.00% | 0.00% | 0.58% | 0.00% | 0.94% | 0.25%     |
| North Africa   |      | 0.36% | 0.10% | 0.14% | 0.00% | 0.00% | 0.36% | 0.31% | 0.31% | 0.17%     |
| South Africa   |      | 0.00% | 0.00% | 0.01% | 0.30% | 0.26% | 0.19% | 0.34% | 0.00% | 0.08%     |
| <b>South Africa</b>  |      |       |       |       |       |       |       |       |       |           |
| <b>Outbound mobile students from South Africa in top destinations (host countries)</b>                             |      |       |       |       |       |       |       |       |       |           |
| United States of America   | 35%  | 33%   | 31%   | 25%   | 25%   | 25%   | 25%   | 23%   |       | 29%       |
| United Kingdom of Great Britain and Northern Ireland   | 24%  | 21%   | 27%   | 24%   | 22%   | 21%   | 17%   | 17%   |       | 21%       |
| Australia  | 19%  | 18%   | 11%   | 13%   | 13%   | 12%   | 11%   | 10%   |       | 13%       |
| Cuba   | 1%   | 11%   | 6%    | 6%    | 6%    | 7%    | 0%    | 0%    |       | 4%        |
| Germany  | 3%   | 2%    | 3%    | 2%    | 0%    | 0%    | 3%    | 3%    |       | 3%        |
| Canada   | 2%   | 1%    | 2%    | 3%    | 2%    | 3%    | 4%    | 0%    |       | 2%        |
| France   | 1%   | 1%    | 2%    | 2%    | 2%    | 2%    | 1%    | 1%    |       | 1%        |
| India  | 0%   | 0%    | 1%    | 0%    | 3%    | 2%    | 3%    | 5%    |       | 1%        |
| Mauritius  | 0%   | 0%    | 0%    | 1%    | 1%    | 2%    | 3%    | 4%    |       | 1%        |
| Netherlands  | 1%   | 1%    | 1%    | 1%    | 1%    | 2%    | 0%    | 2%    |       | 1%        |
| Total  | 86%  | 88%   | 84%   | 77%   | 75%   | 76%   | 67%   | 65%   |       | 76%       |
| <b>Outbound mobile students from South Africa in Nordic countries</b>  |      |       |       |       |       |       |       |       |       |           |
| Sweden   | 43%  | 53%   | 47%   | 35%   | 29%   | 30%   | 24%   | 27%   | 0%    | 37%       |
| Norway   | 35%  | 19%   | 19%   | 33%   | 37%   | 36%   | 20%   | 18%   | 57%   | 27%       |
| Denmark  | 16%  | 13%   | 23%   | 15%   | 13%   | 11%   | 41%   | 40%   | 0%    | 21%       |
| Finland  | 6%   | 15%   | 11%   | 17%   | 21%   | 22%   | 15%   | 15%   | 43%   | 15%       |
| Total  | 100% | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%      |

Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

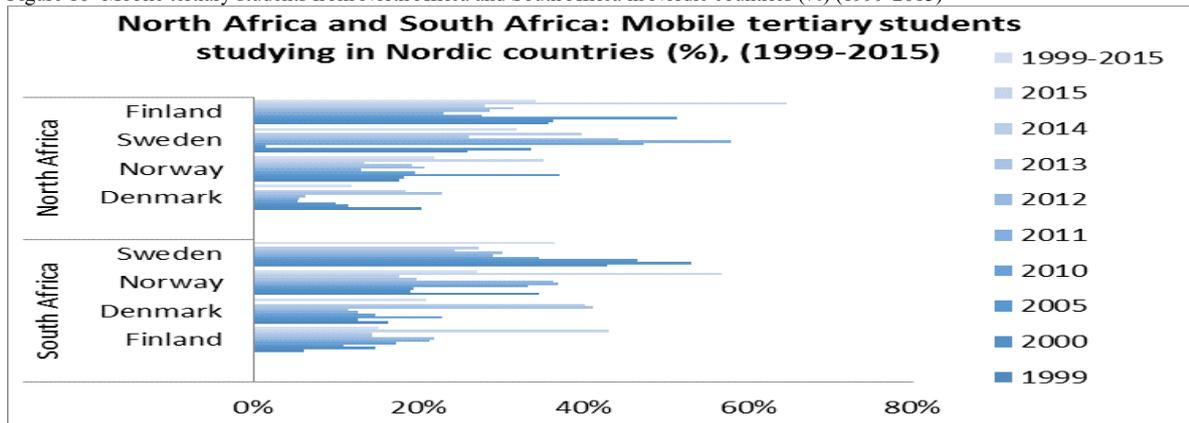
Figure 9 - Distribution of outbound mobile students within North Africa, from North Africa and South Africa in top destinations (host countries) and in Nordic countries (%) (1999-2015)





Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

Figure 10- Mobile tertiary students from North Africa and South Africa in Nordic countries (%) (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

We observe slight decrease in the share of North Africa students studied in North America and Western Europe (71%; 62%) in 2011 and 2014 respectively. These results are consistent with the findings in Nour (2014), which imply that in 2010 the UK, USA, France, Germany, and Australia receive around 77% of international Maghreb students. It is worthy to note that intra-regional mobility of students, between North Africa countries, is significantly weaker than the international mobility of North Africa students (see Table 5). Regional mobility within the North Africa region is generally limited to Tunisia, Morocco and Egypt. For instance, of all North Africa students, only 0.17% move within the North Africa region within North Africa (0.17) (mainly, Tunisia (0.25%), Morocco (0.22%), and Egypt (0.05%) respectively). This implies that in total, only 0.17% are moving in all North Africa countries compared to 76% moving the OECD (North America and Western Europe and Canada). Our results in this paper for 2015 are quite consistent with the earlier results over the periods (2010) and (1999-2004) AND (2010) that discussed in Nour (2011, 2014,) that find that the UK, US, France, Germany, and Australia receive around 82% of international North Africa, mainly, Maghreb students.<sup>13</sup>

<sup>13</sup> See Nour (2014), pp. 14-15, Nour (2011), pp. 412-414.

#### *4.2. Pattern of migration of higher education students from North Africa countries from national perspective:*

##### *Profile of migration of higher education students from North African Countries:*

This section examines the major development concerning the pattern, size, trend and distribution of migration of higher education students from North Africa countries from national perspective.

#### **4.2.1. Algeria**

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from Algeria and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, we find that with a population of 39,667 million and GDP per capita of PPP\$ 14,687, Algeria shows increasing trends in terms of total outbound mobility ratio and gross outbound enrolment ratio, total outbound mobility ratio and gross outbound enrolment ratio are nearly doubled over the period (1999-2015), mainly, total outbound students from Algeria studied abroad increased substantially from 17522 in 1999 to 20493 in 2015. Different from other North African countries in Algeria both inbound mobility ratio and outbound mobility ratio show declining trends over the period (1999-2015) (see Table 6). Globally, as upper-middle income Algeria is ranked below to its peers upper-middle income world countries. Regionally, Algeria is ranked third in terms of outbound mobility ratio, ranked fourth in terms of gross outbound enrolment ratio and inbound mobility ratio, and ranked second in terms of total outbound mobility ratio, Algeria contributes 21% of total outbound students mobility ratio from North Africa region in 2015 (see Figure 11).

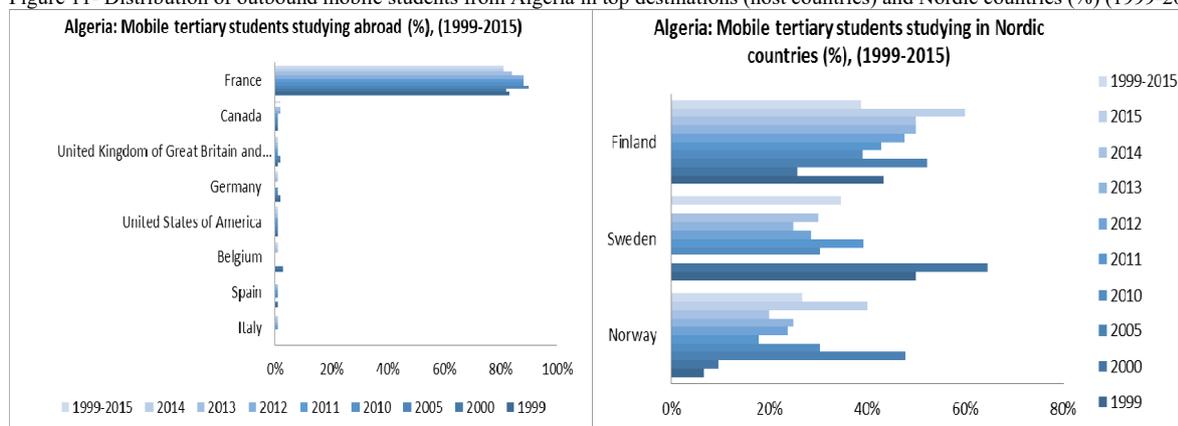
According to UNESCO-UIS (2017), internationally mobile tertiary students from Algeria over the period (1999-2015) implies several stylized facts. For instance, the distribution of the international students from Algeria studied abroad and hosted by other World regions over the period (1999-2015) implies heavy concentration of Algerian students studied abroad in few countries, for instance, the majority or more than three quarter (86%) of Algerian students studied abroad studied in eight countries. In particular, the majority of Algerian students studied abroad studied in the OECD (North America, Western Europe and Canada) (86%). This implies that similar to other North African countries the main destination countries for internationally mobile tertiary students from Algeria includes for instance more than three quarter of Algerian students studied in France (81%), followed by Canada (2%), United Kingdom of Great Britain and Northern Ireland (1%), United States of America (1%), Germany (1), Belgium (1%), Italy (1%), and Spain (1%) over the period (1999-2015) respectively. We observe that few and less than one per cent of Algerian students studied abroad studied in Asia, North Africa (mainly, Morocco, Tunisia and Egypt), and South Africa. We observe that few and less than 1 per cent of Algerian students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from Algeria in the Nordic countries implies that the majority and nearly more than one third studied in Finland (39%), followed by more than one third studied in Sweden (35%), and nearly one third in Norway (27%), respectively (see Table 6 and Figure 11).

Table 6- Distribution of outbound mobile students from Algeria in top destinations (host countries) and Nordic countries (%) (1999-2015)

| Main indicators   |                            |       |           |           |           |           |          |           |           |           |
|---|----------------------------|-------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|
| General socio- economic indicators  |                            |       |           |           |           |           |          |           |           |           |
| Region  | Middle East & North Africa |       |           |           |           |           |          |           |           |           |
| Income level:   | Upper middle income        |       |           |           |           |           |          |           |           |           |
| Total population (in thousands)   | 39,667                     |       |           |           |           |           |          |           |           |           |
| Annual population growth (%)  | 1.9                        |       |           |           |           |           |          |           |           |           |
| Population 15-24 years (in thousands)   | 6,595                      |       |           |           |           |           |          |           |           |           |
| Population aged 14 years and younger (in thousands)                               | 11,320                     |       |           |           |           |           |          |           |           |           |
| % of Population 15-24 years (in thousands)  | 16.6%                      |       |           |           |           |           |          |           |           |           |
| GDP (2015)  | \$164.8 billion            |       |           |           |           |           |          |           |           |           |
| GDP in billions - PPP\$   | 583                        |       |           |           |           |           |          |           |           |           |
| GDP growth (2015)   | 3.8%                       |       |           |           |           |           |          |           |           |           |
| GDP per capita - PPP\$  | 14,687                     |       |           |           |           |           |          |           |           |           |
| Inflation (2015)  | 4.8%                       |       |           |           |           |           |          |           |           |           |
| Government expenditure on education as % of GDP (2008)                            | 4.34                       |       |           |           |           |           |          |           |           |           |
| R&D as % of GDP (2005)  | 0.06,604                   |       |           |           |           |           |          |           |           |           |
| Poverty headcount ratio at 3.10 PPP\$ a day (% of population)                     | ...                        |       |           |           |           |           |          |           |           |           |
| Mobility indicators   |                            |       |           |           |           |           |          |           |           |           |
| Inbound and outbound mobility indicators  |                            |       |           |           |           |           |          |           |           |           |
|   | 1999                       | 2000  | 2005      | 2010      | 2011      | 2012      | 2013     | 2014      | 2015      |           |
| Total outbound mobility ratio   | 17522                      | 16427 | 24780     | 22847     | 23956     | 24773     | 20827    | 20385     | 20493     |           |
| Gross outbound enrolment ratio  | 0,52                       | 0,48  | 0,65      | 0,60      | 0,63      | 0,66      | 0,56     | 0,57      | 0,59      |           |
| Outbound mobility ratio   | 3,84                       | ..    | 3,13      | 2,00      | 2,02      | 2,05      | 1,66     | 1,64      | 1,59      |           |
| Inbound mobility ratio  | ..                         | ..    | 0,67      | 0,57      | 0,55      | 0,60      | 0,59     | 0,64      | 0,62      |           |
| Net flow of internationally mobile students (inbound - outbound)                  |                            |       | -         | -         | -         | -         | -        | -         | -         |           |
|   |                            |       | 19437,219 | 16302,671 | 17427,158 | 17561,652 | 13424,23 | 12432,417 | 12526,231 |           |
| Distribution of outbound mobile students from Algeria in the top destinations (%) |                            |       |           |           |           |           |          |           |           |           |
|   | 1999                       | 2000  | 2005      | 2010      | 2011      | 2012      | 2013     | 2014      | 2015      | 1999-2015 |
| France  | 83%                        | 82%   | 90%       | 88%       | 88%       | 88%       | 84%      | 81%       |           | 81%       |
| Canada  | 1%                         | 1%    | 1%        | 1%        | 1%        | 2%        | 2%       | 0%        |           | 2%        |
| United Kingdom of Great Britain and Northern Ireland                              | 1%                         | 2%    | 2%        | 1%        | 1%        | 1%        | 1%       | 1%        |           | 1%        |
| Germany   | 2%                         | 2%    | 1%        | 1%        | 0%        | 0%        | 1%       | 1%        |           | 1%        |
| United States of America  | 1%                         | 1%    | 1%        | 1%        | 1%        | 1%        | 1%       | 1%        |           | 1%        |
| Belgium   | 3%                         | 3%    | 0%        | 0%        | 0%        | 0%        | 1%       | 1%        |           | 1%        |
| Spain   | 1%                         | 1%    | 0%        | 1%        | 1%        | 1%        | 1%       | 0%        |           | 0%        |
| Italy   | 0%                         | 0%    | 0%        | 0%        | 1%        | 1%        | 1%       | 1%        |           | 0%        |
| Total   | 92%                        | 92%   | 95%       | 93%       | 93%       | 94%       | 92%      | 86%       |           | 87%       |
| Distribution of outbound mobile students from Algeria in the Nordic countries (%) |                            |       |           |           |           |           |          |           |           |           |
|   | 1999                       | 2000  | 2005      | 2010      | 2011      | 2012      | 2013     | 2014      | 2015      | 1999-2015 |
| Finland   | 43%                        | 26%   | 52%       | 39%       | 43%       | 48%       | 50%      | 50%       | 60%       | 39%       |
| Norway  | 7%                         | 10%   | 48%       | 30%       | 18%       | 24%       | 25%      | 20%       | 40%       | 27%       |
| Sweden  | 50%                        | 65%   | 0%        | 30%       | 39%       | 29%       | 25%      | 30%       | 0%        | 35%       |
| Total   | 100%                       | 100%  | 100%      | 100%      | 100%      | 100%      | 100%     | 100%      | 100%      | 100%      |

Sources: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017, (2) The World Bank World Development Indicators (2017).

Figure 11- Distribution of outbound mobile students from Algeria in top destinations (host countries) and Nordic countries (%) (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

#### 4.2.2. Egypt

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from Egypt and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, we find that with a population of 91,508 million and GDP per capita of PPP\$ 10,891, Egypt shows increasing trends in terms of total outbound mobility ratio, gross outbound enrolment ratio and outbound mobility ratio over the period (1999-2015), mainly, total outbound mobility, gross outbound enrolment ratio and outbound mobility ratio more than doubled over the period (1999-2015), mainly, total outbound students from Egypt studied abroad increased substantially by nearly three folds from 8632 in 1999 to 24970 in 2015 (see Table 7). Globally, as lower-middle income Egypt is ranked below to its peers lower-middle income world countries Regionally, Egypt is ranked second in terms of inbound mobility ratio, ranked fifth in terms of both outbound mobility ratio, and gross outbound enrolment ratio, ranked third in terms of intra-regional mobility within the North Africa region, ranked fourth in terms of total outbound mobility ratio, Egypt contributes 13% of total outbound students mobility ratio from North Africa region in 2015 (see Figure 12).

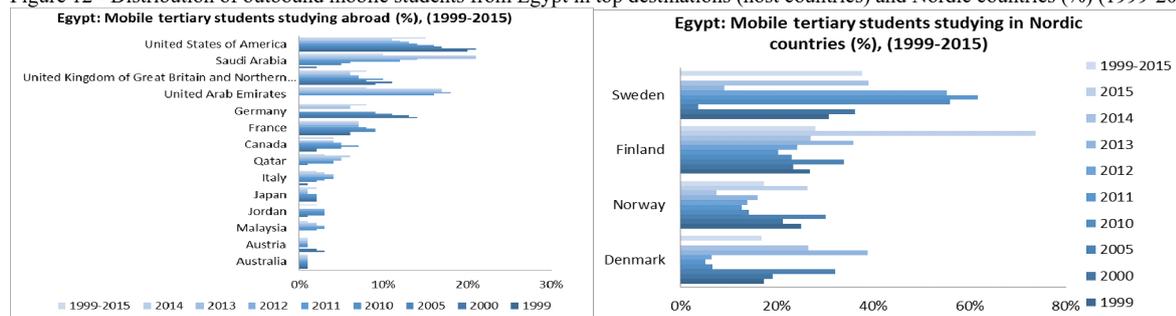
According to UNESCO-UIS (2017), internationally mobile tertiary students from Egypt over the period (1999-2015), implies several stylized facts (see Table 7). For instance, the distribution of the international students from Egypt studied abroad and hosted by other World regions over the period (1999-2015) implies heavy concentration of Egyptian students studied abroad in few countries, for instance, nearly three quarter (72%) of Egyptian students studied abroad studied in fourteen countries. In particular, the majority and nearly half of Egyptian students studied abroad studied in the OECD (North America and Western Europe and Canada and Australia) (46%). This implies that more than tenth of Egyptian students studied in United States of America (15%), followed by one tenth studied in Saudi Arabia (10), followed by United Kingdom of Great Britain and Northern Ireland (8%), United Arab Emirates (8%), Germany (8%), France (7%), Canada (4%), Qatar (3%), Italy (2%), Japan (2%), Jordan (2%), Malaysia (1%), Austria (1%), and Australia (1%) over the period (1999-2015) respectively. We observe that different from other North African countries the main destination countries for internationally mobile tertiary students from Egypt is more diversified implies that the majority or nearly half of Egyptian students studied abroad studied in the OECD (North America and Western Europe and Canada and Australia) (46%); followed by nearly a quarter in Arab countries including Saudi Arabia, United Arab Emirates, Qatar and Jordan (23%), followed by advanced Asia countries including Japan and Malaysia (3%), while few and less than one per cent in North Africa, mainly, Morocco and Tunisia and in South Africa. We observe that few and less than 1 per cent of Egyptian students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from Egypt in the Nordic countries implies that the majority and more than one third studied in Sweden (38%), followed by nearly one third studied in Finland (28%), followed by Norway (17%), and Denmark (17%) respectively. (See Table 7 and Figure 12)

Table 7- Distribution of outbound mobile students from Egypt in top destinations (host countries) and Nordic countries (%) (1999-2015)

| Main indicators   |                            |      |           |           |       |       |           |           |       |           |
|---|----------------------------|------|-----------|-----------|-------|-------|-----------|-----------|-------|-----------|
| General socio- economic indicators  |                            |      |           |           |       |       |           |           |       |           |
| Region  | Middle East & North Africa |      |           |           |       |       |           |           |       |           |
| Income level  | Lower middle income        |      |           |           |       |       |           |           |       |           |
| Total population (in thousands)   | 91,508                     |      |           |           |       |       |           |           |       |           |
| Annual population growth (%)  | 2.1                        |      |           |           |       |       |           |           |       |           |
| Youth population (population 15-24 years (in thousands))                        | 15,843                     |      |           |           |       |       |           |           |       |           |
| Population aged 14 years and younger (in thousands)                             | 30,344                     |      |           |           |       |       |           |           |       |           |
| % of Youth population (population 15-24 years (in thousands))                   | 17.3%                      |      |           |           |       |       |           |           |       |           |
| GDP   | \$330.8 billion            |      |           |           |       |       |           |           |       |           |
| GDP in billions - PPP\$   | 997                        |      |           |           |       |       |           |           |       |           |
| GDP per capita - PPP\$  | 10,891                     |      |           |           |       |       |           |           |       |           |
| GDP Growth  | 4.2%                       |      |           |           |       |       |           |           |       |           |
| Inflation   | 13.8%                      |      |           |           |       |       |           |           |       |           |
| Poverty headcount ratio at 3.10 PPP\$ a day (% of population)                   | ...                        |      |           |           |       |       |           |           |       |           |
| Government expenditure on education as % of GDP (2008)                          | 3.76                       |      |           |           |       |       |           |           |       |           |
| R&D as % of GDP (2014)  | 0.67,868                   |      |           |           |       |       |           |           |       |           |
| Mobility indicators   |                            |      |           |           |       |       |           |           |       |           |
| Inbound and outbound mobility indicators  |                            |      |           |           |       |       |           |           |       |           |
|   | 1999                       | 2000 | 2005      | 2010      | 2011  | 2012  | 2013      | 2014      | 2015  |           |
| Total outbound mobility ratio   | 8632                       | 8802 | 9621      | 14320     | 15234 | 16696 | 20007     | 23475     | 24970 |           |
| Gross outbound enrolment ratio  | 0,13                       | 0,13 | 0,12      | 0,17      | 0,18  | 0,20  | 0,24      | 0,29      | 0,32  |           |
| Outbound mobility ratio   | 0,42                       | ..   | 0,41      | 0,54      | 0,68  | 0,73  | 0,81      | 0,92      | 0,87  |           |
| Inbound mobility ratio  | ..                         | ..   | 1,31      | 1,85      | ..    | ..    | 1,78      | 1,88      | ..    |           |
| Net flow of internationally mobile students (inbound - outbound)                |                            |      | 21101,837 | 34691,344 |       |       | 23986,255 | 24340,448 |       |           |
| Distribution of outbound mobile students from Egypt in the top destinations (%) |                            |      |           |           |       |       |           |           |       |           |
|   | 1999                       | 2000 | 2005      | 2010      | 2011  | 2012  | 2013      | 2014      | 2015  | 1999-2015 |
| United States of America  | 20%                        | 21%  | 17%       | 16%       | 14%   | 13%   | 12%       | 11%       |       | 15%       |
| Saudi Arabia  | 2%                         | 0%   | 5%        | 6%        | 12%   | 14%   | 21%       | 21%       |       | 10%       |
| United Kingdom of Great Britain and Northern Ireland                            | 9%                         | 11%  | 8%        | 10%       | 7%    | 7%    | 6%        | 6%        |       | 8%        |
| United Arab Emirates  | 0%                         | 0%   | 0%        | 0%        | 16%   | 18%   | 17%       | 17%       |       | 8%        |
| Germany   | 14%                        | 13%  | 11%       | 9%        | 0%    | 0%    | 6%        | 6%        |       | 8%        |
| France  | 6%                         | 6%   | 9%        | 9%        | 8%    | 7%    | 7%        | 7%        |       | 7%        |
| Canada  | 2%                         | 2%   | 5%        | 7%        | 5%    | 5%    | 4%        | 0%        |       | 4%        |
| Qatar   | 0%                         | 0%   | 1%        | 4%        | 4%    | 5%    | 5%        | 6%        |       | 3%        |
| Italy   | 1%                         | 0%   | 2%        | 3%        | 4%    | 4%    | 4%        | 3%        |       | 2%        |
| Japan   | 2%                         | 2%   | 2%        | 2%        | 2%    | 1%    | 1%        | 1%        |       | 2%        |
| Jordan  | 0%                         | 1%   | 3%        | 3%        | 3%    | 3%    | 0%        | 0%        |       | 2%        |
| Malaysia  | 0%                         | 0%   | 0%        | 2%        | 3%    | 3%    | 2%        | 2%        |       | 1%        |
| Austria   | 3%                         | 2%   | 0%        | 1%        | 1%    | 1%    | 1%        | 1%        |       | 1%        |
| Australia   | 1%                         | 1%   | 1%        | 1%        | 1%    | 1%    | 1%        | 1%        |       | 1%        |
| Total   | 60%                        | 59%  | 64%       | 73%       | 80%   | 82%   | 87%       | 82%       |       | 72%       |
| Distribution of outbound mobile students from Egypt in the Nordic countries (%) |                            |      |           |           |       |       |           |           |       |           |
|   | 1999                       | 2000 | 2005      | 2010      | 2011  | 2012  | 2013      | 2014      | 2015  | 1999-2015 |
| Denmark   | 17%                        | 19%  | 32%       | 7%        | 5%    | 6%    | 39%       | 27%       | 0%    | 17%       |
| Finland   | 27%                        | 23%  | 34%       | 23%       | 20%   | 24%   | 36%       | 27%       | 74%   | 28%       |
| Norway  | 25%                        | 21%  | 30%       | 14%       | 13%   | 14%   | 16%       | 7%        | 26%   | 17%       |
| Sweden  | 31%                        | 36%  | 4%        | 56%       | 62%   | 55%   | 9%        | 39%       | 0%    | 38%       |
| Total   | 100%                       | 100% | 100%      | 100%      | 100%  | 100%  | 100%      | 100%      | 100%  | 100%      |

Sources: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017, (2) The World Bank World Development Indicators (2017).

Figure 12 - Distribution of outbound mobile students from Egypt in top destinations (host countries) and Nordic countries (%) (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

#### 4.2.3. Libya

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from Libya and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, we find that with a population of 6.278 million and GDP per capita of PPP\$ 14,303, Libya shows increasing trends in terms of total outbound mobility ratio, gross outbound enrolment ratio and outbound mobility ratio over the period (1999-2015), total outbound mobility ratio and gross outbound enrolment ratio increased by nearly five times and nearly eight times in 2014 compared to 1999 respectively, mainly, total outbound students from Libya studied abroad increased substantially from 1752 in 1999 to 8209 in 2014. Globally, as upper-middle income Libya is ranked below to its peers upper-middle income world countries (Table 8). Regionally, Libya is ranked second in terms of gross outbound enrolment ratio, ranked sixth at the bottom place in terms of outbound mobility ratio, ranked fifth or second bottom in terms of total outbound mobility ratio, Libya contributes only 4% of total outbound students mobility ratio from North Africa region in 2015 (see Figure 13 ).

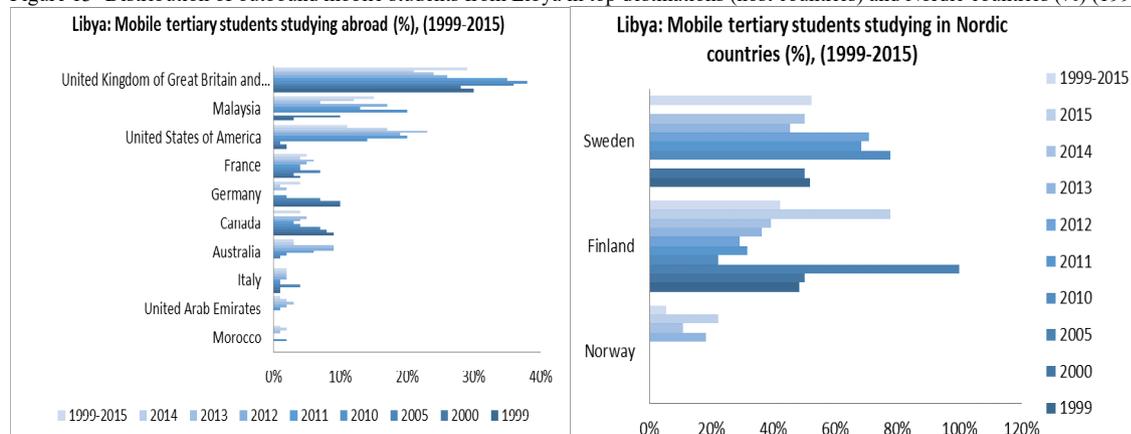
According to UNESCO-UIS (2017), internationally mobile tertiary students from Libya over the period (1999-2015), implies several stylized facts. For instance, the distribution of the international students from Libya studied abroad and hosted by other World regions over the period (1999-2015) implies heavy concentration of Libyan students studied abroad in few countries, for instance, the majority or three quarter (75%) of Libyan students studied abroad studied in ten countries. In particular, the majority and more than half of Libyan students studied abroad studied in the OECD (North America, Western Europe, Canada and Australia) (58%). This implies that nearly third of Libyan students studied in United Kingdom of Great Britain and Northern Ireland (29%), followed by more than tenth studied in Malaysia (15%), followed by United States of America (11%), France (5%), Germany (4%), Canada (4%), Australia (3%), Italy (2%), United Arab Emirates (1%), Morocco (1%), and over the period (1999-2015) respectively. We observe that different from other North African countries the main destination countries for internationally mobile tertiary students from Libya implies that more than half of Libyan students studied abroad studied in the OECD (North America, Western Europe, Canada and Australia) (58%); followed by more than tenth in Asia (including Malaysia and United Arab Emirates) (16%), while few and only one per cent in North Africa, (mainly, Morocco (1%) and Tunisia (1%)) and less than one per cent in Egypt and South Africa. We observe that few and less than 1 per cent of Libya students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from Libya in the Nordic countries implies that the majority and more than half studied in Sweden (52%), followed by nearly half in Finland (42%), and few studied in Norway (5%). (see Table 8 and Figure 13)

Table 8 - Distribution of outbound mobile students from Libya in top destinations (host countries) and Nordic countries (%) (1999-2015)

| Main indicators   |                            |      |      |      |      |      |      |      |      |           |
|---|----------------------------|------|------|------|------|------|------|------|------|-----------|
| General socio- economic indicators  |                            |      |      |      |      |      |      |      |      |           |
| Region  | Middle East & North Africa |      |      |      |      |      |      |      |      |           |
| Income level  | Upper middle income        |      |      |      |      |      |      |      |      |           |
| Total population (in thousands)   | 6.278 million              |      |      |      |      |      |      |      |      |           |
| Annual population growth (%)  |                            |      |      |      |      |      |      |      |      |           |
| Youth population (population 15-24 years (in thousands))                        |                            |      |      |      |      |      |      |      |      |           |
| Population aged 14 years and younger (in thousands)                             |                            |      |      |      |      |      |      |      |      |           |
| % of Youth population (population 15-24 years (in thousands))                   |                            |      |      |      |      |      |      |      |      |           |
| GDP (2011)  | \$34.70 billion            |      |      |      |      |      |      |      |      |           |
| GDP in billions - PPP\$   |                            |      |      |      |      |      |      |      |      |           |
| GDP per capita - PPP\$  | 14,303                     |      |      |      |      |      |      |      |      |           |
| GDP Growth  | -62.1%                     |      |      |      |      |      |      |      |      |           |
| Inflation   | 2.6%                       |      |      |      |      |      |      |      |      |           |
| Poverty headcount ratio at 3.10 PPP\$ a day (% of population)                   | ...                        |      |      |      |      |      |      |      |      |           |
| Government expenditure on education as % of GDP (2008)                          |                            |      |      |      |      |      |      |      |      |           |
| R&D as % of GDP (2014)  |                            |      |      |      |      |      |      |      |      |           |
| Mobility indicators   |                            |      |      |      |      |      |      |      |      |           |
| Inbound and outbound mobility indicators  |                            |      |      |      |      |      |      |      |      |           |
|   | 1999                       | 2000 | 2005 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |           |
| Total outbound mobility ratio   | 1752                       | 1771 | 3603 | 7390 | 7456 | 6795 | 5646 | 7615 | 8209 |           |
| Gross outbound enrolment ratio  | 0,30                       | 0,30 | 0,57 | 1,18 | ..   | ..   | ..   | 1,48 | ..   |           |
| Outbound mobility ratio   | 0,57                       | 0,61 | ..   | ..   | ..   | ..   | ..   | ..   | ..   |           |
| Inbound mobility ratio  | ..                         | ..   | ..   | ..   | ..   | ..   | ..   | ..   | ..   |           |
| Net flow of internationally mobile students (inbound - outbound)                |                            |      |      |      |      |      |      |      |      |           |
| Distribution of outbound mobile students from Libya in the top destinations (%) |                            |      |      |      |      |      |      |      |      |           |
|   | 1999                       | 2000 | 2005 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 1999-2015 |
| United Kingdom of Great Britain and Northern Ireland                            | 30%                        | 28%  | 36%  | 38%  | 35%  | 26%  | 24%  | 21%  |      | 29%       |
| Malaysia  | 3%                         | 10%  | 0%   | 20%  | 13%  | 17%  | 7%   | 12%  |      | 15%       |
| United States of America  | 2%                         | 2%   | 1%   | 14%  | 20%  | 19%  | 23%  | 17%  |      | 11%       |
| France  | 4%                         | 3%   | 7%   | 4%   | 4%   | 5%   | 6%   | 4%   |      | 5%        |
| Germany   | 10%                        | 10%  | 7%   | 2%   | 0%   | 0%   | 2%   | 1%   |      | 4%        |
| Canada  | 9%                         | 8%   | 7%   | 4%   | 3%   | 4%   | 5%   | 0%   |      | 4%        |
| Australia   | 0%                         | 0%   | 1%   | 2%   | 6%   | 9%   | 9%   | 3%   |      | 3%        |
| Italy   | 1%                         | 1%   | 4%   | 1%   | 1%   | 2%   | 2%   | 2%   |      | 2%        |
| United Arab Emirates  | 0%                         | 0%   | 0%   | 0%   | 1%   | 2%   | 3%   | 2%   |      | 1%        |
| Morocco   | 0%                         | 0%   | 0%   | 2%   | 0%   | 0%   | 1%   | 2%   |      | 1%        |
| Total   | 59%                        | 62%  | 63%  | 87%  | 83%  | 84%  | 82%  | 64%  |      | 75%       |
| Distribution of outbound mobile students from Libya in the Nordic countries (%) |                            |      |      |      |      |      |      |      |      |           |
|   | 1999                       | 2000 | 2005 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 1999-2015 |
| Finland   | 48%                        | 50%  | 100% | 22%  | 32%  | 29%  | 36%  | 39%  | 78%  | 42%       |
| Norway  | 0%                         | 0%   | 0%   | 0%   | 0%   | 0%   | 18%  | 11%  | 22%  | 5%        |
| Sweden  | 52%                        | 50%  | 0%   | 78%  | 68%  | 71%  | 45%  | 50%  | 0%   | 52%       |
| Total   | 100%                       | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100%      |

Sources: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017, (2) The World Bank World Development Indicators (2017).

Figure 13- Distribution of outbound mobile students from Libya in top destinations (host countries) and Nordic countries (%) (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

#### 4.2.4. Morocco

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from Morocco and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, we find that with a population of 34,378 million and GDP per capita of PPP\$ 7,821, Morocco shows increasing trends in terms of total outbound mobility ratio, gross outbound enrolment ratio and inbound mobility ratio, by contrast outbound mobility ratio declined substantially over the period (1999-2015), mainly, total outbound students from Morocco studied abroad increased substantially from 38167 in 1999 to 43148 in 2015 (see Table 9). Globally, as lower-middle income Morocco is ranked below to its peers lower-middle income world countries. Regionally, Morocco is ranked second in terms of outbound mobility ratio, ranked third in terms of both gross outbound enrolment ratio and inbound mobility ratio, ranked second in terms of intra-regional mobility within the North Africa region, Morocco is ranked first at top in terms of total outbound mobility ratio, Morocco contributes to nearly half 43% of total outbound students mobility ratio from North Africa region in 2015(see Table 9 and Figure 14).

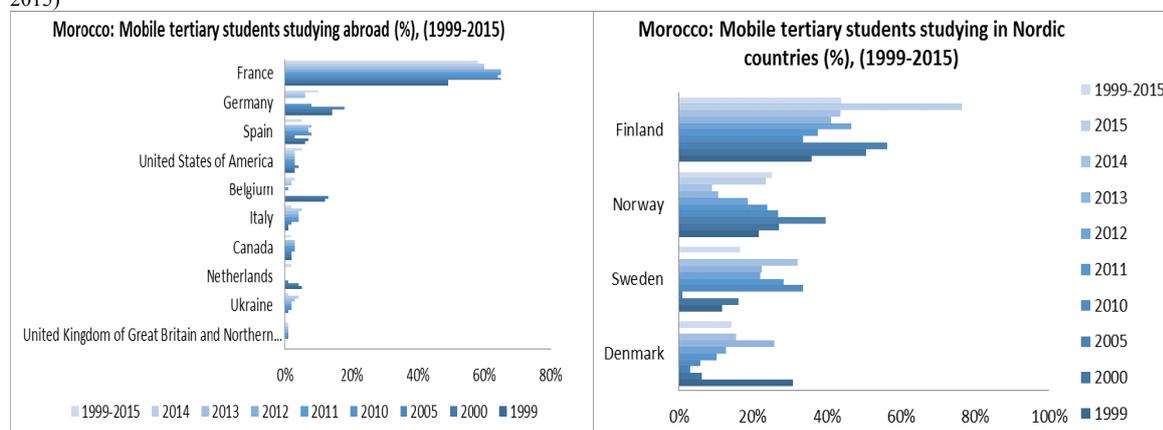
According to UNESCO-UIS (2017), internationally mobile tertiary students from Morocco over the period (1999-2015), implies several stylized facts. For instance, the distribution of the international students from Morocco studied abroad and hosted by other World regions over the period (1999-2015) implies heavy concentration of Moroccan students studied abroad in few countries, for instance, the majority or more than three quarter (89%) of Moroccan students studied abroad studied in ten countries. In particular, the majority of Moroccan students studied abroad studied in the OECD (North America, Western Europe and Canada) (88%); This implies that similar to other North African countries the main destination countries for internationally mobile tertiary students from Morocco includes for instance, more than half of Moroccan students studied in France (58%), followed by Germany (10%), Spain (5%), United States of America (5%), Belgium (3%), Italy (2%), Canada (2%), Netherlands (2%), Ukraine (1%), and United Kingdom of Great Britain and Northern Ireland (1%) over the period (1999-2015) respectively. We observe that few and only one per cent of Moroccan students studied abroad studied in North Africa, (mainly, Tunisian (1%) and less than one per cent in Egypt). We observe that few and less than 1 per cent of Moroccan students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from Morocco in the Nordic countries implies that the majority and nearly half studied in Finland (44%), followed by a quarter studied in Norway (25%), nearly fifth in Sweden (17%), and Denmark (14%) respectively. (See Table 9 and Figure 14)

Table 9 - Distribution of outbound mobile students from Morocco in top destinations (host countries) and Nordic countries (%) (1999-2015)

| Main indicators   |                            |            |            |            |       |       |            |           |       |           |
|---|----------------------------|------------|------------|------------|-------|-------|------------|-----------|-------|-----------|
| General socio- economic indicators  |                            |            |            |            |       |       |            |           |       |           |
| Region  | Middle East & North Africa |            |            |            |       |       |            |           |       |           |
| Income level  | Lower middle income        |            |            |            |       |       |            |           |       |           |
| Total population (in thousands)   | 34,378                     |            |            |            |       |       |            |           |       |           |
| Annual population growth (%)  | 1.3                        |            |            |            |       |       |            |           |       |           |
| Youth population (population 15-24 years (in thousands))                          | 6,080                      |            |            |            |       |       |            |           |       |           |
| Population aged 14 years and younger (in thousands)                               | 9,359                      |            |            |            |       |       |            |           |       |           |
| % of Youth population (population 15-24 years (in thousands))                     | 17.7%                      |            |            |            |       |       |            |           |       |           |
| GDP   | \$100.6 billion            |            |            |            |       |       |            |           |       |           |
| GDP in billions - PPP\$   | 273                        |            |            |            |       |       |            |           |       |           |
| GDP per capita - PPP\$  | 7,821                      |            |            |            |       |       |            |           |       |           |
| GDP Growth  | 4.5%                       |            |            |            |       |       |            |           |       |           |
| Inflation   | 1.6%                       |            |            |            |       |       |            |           |       |           |
| Poverty headcount ratio at 3.10 PPP\$ a day (% of population)                     | 15.5                       |            |            |            |       |       |            |           |       |           |
| Government expenditure on education as % of GDP (2008)                            | 5.26                       |            |            |            |       |       |            |           |       |           |
| R&D as % of GDP (2014)  | 0.71,454                   |            |            |            |       |       |            |           |       |           |
| Mobility indicators   |                            |            |            |            |       |       |            |           |       |           |
| Inbound and outbound mobility indicators  |                            |            |            |            |       |       |            |           |       |           |
|   | 1999                       | 2000       | 2005       | 2010       | 2011  | 2012  | 2013       | 2014      | 2015  |           |
| Total outbound mobility ratio   | 38167                      | 42751      | 46016      | 42845      | 43509 | 43999 | 39443      | 42262     | 43148 |           |
| Gross outbound enrolment ratio  | 1,34                       | 1,47       | 1,47       | 1,38       | 1,39  | 1,40  | 1,25       | 1,35      | 1,38  |           |
| Outbound mobility ratio   | 13,97                      | 14,46      | 12,52      | 9,58       | 8,61  | 7,26  | 5,57       | 5,35      | 4,92  |           |
| Inbound mobility ratio  | 1,53                       | 1,52       | 1,35       | 1,92       | ..    | ..    | 1,41       | 1,80      | ..    |           |
| Net flow of internationally mobile students (inbound - outbound)                  | -33977                     | -38248,857 | -41057,503 | -34241,023 |       |       | -29492,736 | -28042,25 |       |           |
| Distribution of outbound mobile students from Morocco in the top destinations (%) |                            |            |            |            |       |       |            |           |       |           |
|   | 1999                       | 2000       | 2005       | 2010       | 2011  | 2012  | 2013       | 2014      | 2015  | 1999-2015 |
| France  | 49%                        | 49%        | 65%        | 64%        | 65%   | 65%   | 60%        | 60%       | 58%   |           |
| Germany   | 14%                        | 14%        | 18%        | 8%         | 0%    | 0%    | 6%         | 6%        | 10%   |           |
| Spain   | 6%                         | 7%         | 3%         | 8%         | 7%    | 7%    | 8%         | 0%        | 5%    |           |
| United States of America  | 3%                         | 3%         | 4%         | 3%         | 3%    | 3%    | 3%         | 3%        | 5%    |           |
| Belgium   | 12%                        | 13%        | 0%         | 0%         | 1%    | 0%    | 2%         | 2%        | 3%    |           |
| Italy   | 1%                         | 1%         | 2%         | 4%         | 4%    | 4%    | 4%         | 5%        | 2%    |           |
| Canada  | 2%                         | 2%         | 2%         | 3%         | 3%    | 3%    | 3%         | 0%        | 2%    |           |
| Netherlands   | 5%                         | 4%         | 1%         | 0%         | 0%    | 0%    | 0%         | 0%        | 2%    |           |
| Ukraine   | 0%                         | 0%         | 1%         | 2%         | 2%    | 2%    | 3%         | 4%        | 1%    |           |
| United Kingdom of Great Britain and Northern Ireland                              | 0%                         | 0%         | 0%         | 1%         | 1%    | 1%    | 1%         | 1%        | 1%    |           |
| Total   | 92%                        | 93%        | 96%        | 93%        | 86%   | 85%   | 90%        | 81%       | 89%   |           |
| Distribution of outbound mobile students from Morocco in the Nordic countries (%) |                            |            |            |            |       |       |            |           |       |           |
|   | 1999                       | 2000       | 2005       | 2010       | 2011  | 2012  | 2013       | 2014      | 2015  | 1999-2015 |
| Denmark   | 31%                        | 6%         | 3%         | 6%         | 10%   | 13%   | 26%        | 15%       | 0%    | 14%       |
| Finland   | 36%                        | 51%        | 56%        | 34%        | 38%   | 47%   | 41%        | 44%       | 76%   | 44%       |
| Norway  | 22%                        | 27%        | 40%        | 27%        | 24%   | 19%   | 11%        | 9%        | 24%   | 25%       |
| Sweden  | 12%                        | 16%        | 1%         | 34%        | 28%   | 22%   | 22%        | 32%       | 0%    | 17%       |
| Total   | 100%                       | 100%       | 100%       | 100%       | 100%  | 100%  | 100%       | 100%      | 100%  | 100%      |

Sources: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017, (2) The World Bank World Development Indicators (2017).

Figure 14 - Distribution of outbound mobile students from Morocco in top destinations (host countries) and Nordic countries (%) (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on April 05, 2017

#### 4.2.5. Sudan

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from Sudan and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, we find that With a population of 40.2 million and GDP per capita of PPP\$ 4,173, Sudan shows increasing trends in terms of total outbound mobility ratio, gross outbound enrolment ratio and outbound mobility ratio over the period (2011-2015), total outbound mobile students from Sudan studied abroad increased substantially from 7196 in 2011 to 10058 in 2015 (see Table 10). Globally, as lower-middle income Sudan is ranked below its peers lower-middle income world countries (Table 10). Regionally, Sudan is ranked fourth in terms of outbound mobility ratio, ranked sixth at the bottom place in terms of gross outbound enrolment ratio and in terms of total outbound mobility, Sudan contributes only for 3% of total outbound students mobility ratio from North Africa region in 2015 (see Table 10 and Figure 15).

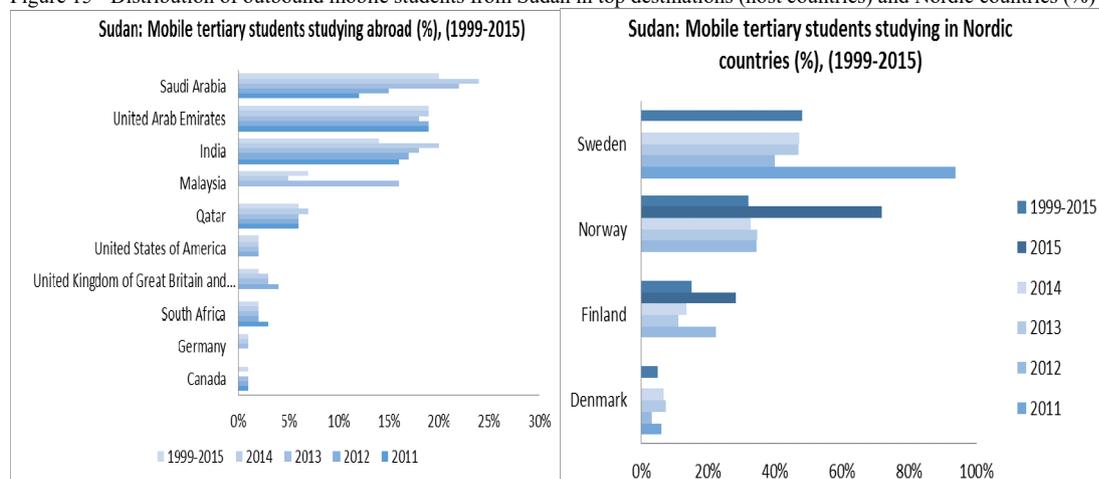
According to UNESCO-UIS (2017), internationally mobile tertiary students from Sudan over the period (1999-2015), implies several stylized facts. For instance, the distribution of the international students from Sudan studied abroad and hosted by other World regions over the period (2011-2015) implies heavy concentration of Sudanese students studied abroad in few countries, for instance, the majority or nearly three quarter (75%) of Sudanese students studied abroad studied in ten countries. In particular, in the Arab countries and advanced Asia countries, for instance, nearly half of Sudanese students studied in the Arab countries (45%). This implies that different from other North African countries the main destination countries for internationally mobile tertiary students from Sudan includes Saudi Arabia (20%), United Arab Emirates (19%), India (14%), Malaysia (7%), Qatar (6%), United States of America (2%), United Kingdom of Great Britain and Northern Ireland (2%), South Africa (2%), Germany (1%), Canada (1%) over the period (1999-2015) respectively. We observe that different from other North African countries the main destination countries for internationally mobile tertiary students from Sudan is more diversified, for instance, nearly half of Sudanese students studied in the Arab countries (45%); followed by nearly fifth studied in Advanced Asia countries (21); while few and less than tenth studied in North America and Western Europe and Canada (6%), and finally Africa (2%) respectively. We observe that few and less than 1 per cent of Sudanese students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from Sudan in the Nordic countries implies that the majority and nearly half studied in Sweden (48%), followed by nearly third studied in Norway (32%), followed by Finland (15%), and Denmark (5%) respectively. (see Table 10 and Figure 15 )

Table 10 - Distribution of outbound mobile students from Sudan in top destinations (host countries) and Nordic countries (%) (1999-2015)

| Main indicators   |                     |      |      |      |      |      |      |      |       |           |
|---|---------------------|------|------|------|------|------|------|------|-------|-----------|
| General socio- economic indicators  |                     |      |      |      |      |      |      |      |       |           |
| Region  | Sub-Saharan Africa  |      |      |      |      |      |      |      |       |           |
| Income level  | Lower middle income |      |      |      |      |      |      |      |       |           |
| Total population (in thousands)   | 40,235              |      |      |      |      |      |      |      |       |           |
| Annual population growth (%)  | 2.2                 |      |      |      |      |      |      |      |       |           |
| Youth population (population 15-24 years (in thousands))                        | 8,016               |      |      |      |      |      |      |      |       |           |
| Population aged 14 years and younger (in thousands)                             | 16,297              |      |      |      |      |      |      |      |       |           |
| % of Youth population (population 15-24 years (in thousands))                   | 19.9%               |      |      |      |      |      |      |      |       |           |
| GDP   | \$97.16 billion     |      |      |      |      |      |      |      |       |           |
| GDP in billions - PPP\$   | 168                 |      |      |      |      |      |      |      |       |           |
| GDP per capita - PPP\$  | 4,173               |      |      |      |      |      |      |      |       |           |
| GDP Growth  | 4.9%                |      |      |      |      |      |      |      |       |           |
| Inflation   | 16.9%               |      |      |      |      |      |      |      |       |           |
| Poverty headcount ratio at 3.10 PPP\$ a day (% of population)                   | 38.9                |      |      |      |      |      |      |      |       |           |
| Government expenditure on education as % of GDP (2008)                          | 2.22                |      |      |      |      |      |      |      |       |           |
| R&D as % of GDP (2014)  | 0.29,844            |      |      |      |      |      |      |      |       |           |
| Mobility indicators   |                     |      |      |      |      |      |      |      |       |           |
| Inbound and outbound mobility indicators  |                     |      |      |      |      |      |      |      |       |           |
|   | 1999                | 2000 | 2005 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015  |           |
| Total outbound mobility ratio   | ..                  | ..   | ..   | ..   | 7196 | 7955 | 9300 | 9755 | 10058 |           |
| Gross outbound enrolment ratio  | ..                  | ..   | ..   | ..   | 0,20 | 0,22 | 0,25 | 0,25 | ..    |           |
| Outbound mobility ratio   | ..                  | ..   | ..   | ..   | 1,37 | 1,44 | 1,45 | 1,54 | ..    |           |
| Inbound mobility ratio  | ..                  | ..   | ..   | ..   | ..   | ..   | ..   | ..   | ..    |           |
| Net flow of internationally mobile students (inbound - outbound)                |                     |      |      |      |      |      |      |      |       |           |
| Distribution of outbound mobile students from Sudan in the top destinations (%) |                     |      |      |      |      |      |      |      |       |           |
|   | 1999                | 2000 | 2005 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015  | 1999-2015 |
| Saudi Arabia  |                     |      |      |      | 12%  | 15%  | 22%  | 24%  |       | 20%       |
| United Arab Emirates  |                     |      |      |      | 19%  | 19%  | 18%  | 19%  |       | 19%       |
| India   |                     |      |      |      | 16%  | 17%  | 18%  | 20%  |       | 14%       |
| Malaysia  |                     |      |      |      | 0%   | 0%   | 16%  | 5%   |       | 7%        |
| Qatar   |                     |      |      |      | 6%   | 6%   | 6%   | 7%   |       | 6%        |
| United States of America  |                     |      |      |      | 0%   | 2%   | 2%   | 2%   |       | 2%        |
| United Kingdom of Great Britain and Northern Ireland                            |                     |      |      |      | 0%   | 4%   | 3%   | 3%   |       | 2%        |
| South Africa  |                     |      |      |      | 3%   | 2%   | 2%   | 2%   |       | 2%        |
| Germany   |                     |      |      |      | 0%   | 0%   | 1%   | 1%   |       | 1%        |
| Canada  |                     |      |      |      | 1%   | 1%   | 1%   | 0%   |       | 1%        |
| Total   |                     |      |      |      | 57%  | 66%  | 89%  | 83%  |       | 74%       |
| Distribution of outbound mobile students from Sudan in the Nordic countries (%) |                     |      |      |      |      |      |      |      |       |           |
|   | 1999                | 2000 | 2005 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015  | 1999-2015 |
| Denmark   |                     |      |      |      | 6%   | 3%   | 7%   | 7%   | 0%    | 5%        |
| Finland   |                     |      |      |      | 0%   | 22%  | 11%  | 13%  | 28%   | 15%       |
| Norway  |                     |      |      |      | 0%   | 34%  | 35%  | 33%  | 72%   | 32%       |
| Sweden  |                     |      |      |      | 94%  | 40%  | 47%  | 47%  | 0%    | 48%       |
| Total   |                     |      |      |      | 100% | 100% | 100% | 100% | 100%  | 100%      |

Sources: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017, (2) The World Bank World Development Indicators (2017).

Figure 15 - Distribution of outbound mobile students from Sudan in top destinations (host countries) and Nordic countries (%) (1999-2015)



Source: Adapted from UNESCO – UIS (2017), based on data accessed on 05 April 05, 2017

#### 4.2.6. Tunisia

The UNESCO– UIS (2017) provides useful indicators on the distribution of internationally mobile tertiary or higher education students from Tunisia and all world regions by host countries for the period (1999-2015), implies several stylized facts. For instance, we find that with a population of 11.254 million and GDP per capita of PPP\$ 11,397, Tunisia shows increasing trends in terms of total outbound mobility ratio, gross outbound enrolment ratio and outbound mobility ratio over the period (1999-2015), total outbound mobility ratio and gross outbound enrolment ratio are nearly doubled over the period (1999-2015), mainly, total outbound students from Tunisia studied abroad increased substantially from 9380 in 1999 to 18186 in 2015 (see Table 11). Globally, as lower-middle income Tunisia is ranked below to its peers lower-middle income world countries. Regionally, Tunisia is ranked first at the top in terms of outbound mobility ratio, gross outbound enrolment ratio and inbound mobility ratio, ranked first at the top in terms of intra-regional mobility within the North Africa region, Tunisia, is ranked third in terms of total outbound mobility ratio, Tunisia contributes 16% of total outbound students mobility ratio from North Africa region in 2015 (see Table 11 and Figure 16).

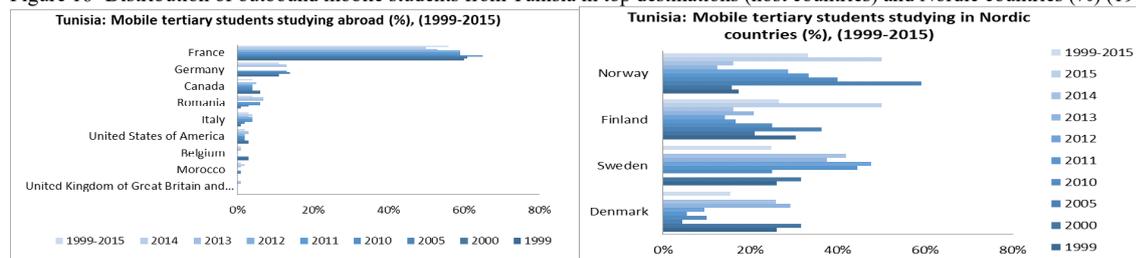
According to UNESCO-UIS (2017), internationally mobile tertiary students from Tunisia over the period (1999-2015), implies several stylized facts. For instance, the distribution of the international students from Tunisia studied abroad and hosted by other World regions over the period (1999-2015) implies heavy concentration of Tunisian students studied abroad in few countries, for instance, the majority or more than three quarter (82%) of Tunisian students studied abroad studied in nine countries. In particular, the majority of Tunisian students studied abroad studied in the OECD (North America, Western Europe and Canada) (81%). This implies that the main destination countries for internationally mobile tertiary students from Tunisia includes for instance, nearly half of Tunisian students studied in France (56%), followed by Germany (11%), Canada (4%), Romania (4%), Italy (3%), United States of America (2%), Belgium (1%), Morocco (1%), and United Kingdom of Great Britain and Northern Ireland (1%), over the period (1999-2015) respectively. We observe that similar to other North African countries the main destination countries for internationally mobile tertiary students from Tunisia is concentrated in few countries, the majority or more than three quarter of Tunisian students studied abroad studied in the OECD (North America, Western Europe and Canada) (81%); while few and only one per cent in North Africa, mainly, Morocco (1%). We observe that few and less than 1 per cent of Tunisian students studied in the Nordic countries over the period (1999-2015). We find that the distribution of internationally mobile tertiary students from Tunisia in the Nordic countries implies that the majority and nearly third studied in Norway (33%), followed by more than a quarter in Finland (27%), followed by nearly a quarter studied in Sweden (25%), and finally Denmark (15%) respectively. (see Table 11 and Figure 16)

Table 11 - Distribution of outbound mobile students from Tunisia in top destinations (host countries) and Nordic countries (%) (1999-2015)

| Main indicators   |                            |            |       |           |            |            |            |       |            |           |
|---|----------------------------|------------|-------|-----------|------------|------------|------------|-------|------------|-----------|
| General socio economic indicators   |                            |            |       |           |            |            |            |       |            |           |
| Region  | Middle East & North Africa |            |       |           |            |            |            |       |            |           |
| Income level  | Lower middle income        |            |       |           |            |            |            |       |            |           |
| Total population (in thousands)   | 11,254                     |            |       |           |            |            |            |       |            |           |
| Annual population growth (%)  | 1                          |            |       |           |            |            |            |       |            |           |
| Youth population (population 15-24 years (in thousands))                          | 1,756                      |            |       |           |            |            |            |       |            |           |
| Population aged 14 years and younger (in thousands)                               | 2,629                      |            |       |           |            |            |            |       |            |           |
| % of Youth population (population 15-24 years (in thousands))                     | 15.6%                      |            |       |           |            |            |            |       |            |           |
| GDP   | \$43.02 billion            |            |       |           |            |            |            |       |            |           |
| GDP in billions - PPP\$   | 127                        |            |       |           |            |            |            |       |            |           |
| GDP per capita - PPP\$  | 11,397                     |            |       |           |            |            |            |       |            |           |
| GDP Growth  | 0.8                        |            |       |           |            |            |            |       |            |           |
| Inflation   | 3.7%                       |            |       |           |            |            |            |       |            |           |
| Poverty headcount ratio at 3.10 PPP\$ a day (% of population)                     | 8.4                        |            |       |           |            |            |            |       |            |           |
| Government expenditure on education as % of GDP (2008)                            | 6.25                       |            |       |           |            |            |            |       |            |           |
| R&D as % of GDP (2014)  | 0.64,103                   |            |       |           |            |            |            |       |            |           |
| Mobility indicators   |                            |            |       |           |            |            |            |       |            |           |
| Inbound and outbound mobility indicators  |                            |            |       |           |            |            |            |       |            |           |
|   | 1999                       | 2000       | 2005  | 2010      | 2011       | 2012       | 2013       | 2014  | 2015       |           |
| Total outbound  | 9380                       | 10286      | 15038 | 19725     | 19503      | 19026      | 16851      | 17825 | 18186      |           |
| mobility ratio  |                            |            |       |           |            |            |            |       |            |           |
| Gross outbound enrolment ratio  | 1,02                       | 1,10       | 1,46  | 1,87      | 1,88       | 1,87       | 1,71       | 1,86  | 1,95       |           |
| Outbound mobility ratio   | 6,05                       | 5,71       | 4,60  | 5,33      | 5,39       | 5,32       | 4,99       | 5,37  | 5,64       |           |
| Inbound mobility ratio  | 1,75                       | 1,53       | ..    | 0,60      | 0,56       | 0,53       | 1,85       | ..    | 2,00       |           |
| Net flow of internationally mobile students (inbound - outbound)                  | -6661                      | -7529,7143 |       | -17521,55 | -17470,913 | -17125,167 | -10615,154 |       | -11744,098 |           |
| Distribution of outbound mobile students from Tunisia in the top destinations (%) |                            |            |       |           |            |            |            |       |            |           |
|   | 1999                       | 2000       | 2005  | 2010      | 2011       | 2012       | 2013       | 2014  | 2015       | 1999-2015 |
| France  | 60%                        | 61%        | 65%   | 59%       | 59%        | 59%        | 53%        | 50%   | 50%        | 56%       |
| Germany   | 11%                        | 11%        | 14%   | 13%       | 0%         | 0%         | 13%        | 13%   | 13%        | 11%       |
| Canada  | 6%                         | 6%         | 4%    | 4%        | 4%         | 4%         | 5%         | 0%    | 0%         | 4%        |
| Romania   | 0%                         | 1%         | 3%    | 6%        | 6%         | 0%         | 7%         | 7%    | 7%         | 4%        |
| Italy   | 1%                         | 1%         | 2%    | 4%        | 4%         | 4%         | 3%         | 4%    | 4%         | 3%        |
| United States of America  | 3%                         | 3%         | 2%    | 2%        | 2%         | 2%         | 3%         | 3%    | 3%         | 2%        |
| Belgium   | 3%                         | 3%         | 0%    | 0%        | 0%         | 0%         | 1%         | 1%    | 1%         | 1%        |
| Morocco   | 0%                         | 0%         | 1%    | 1%        | 0%         | 0%         | 1%         | 2%    | 2%         | 1%        |
| United Kingdom of Great Britain and Northern Ireland                              | 0%                         | 0%         | 0%    | 0%        | 0%         | 0%         | 1%         | 1%    | 1%         | 0%        |
| Total   | 84%                        | 86%        | 91%   | 89%       | 75%        | 69%        | 87%        | 81%   | 82%        |           |
| Distribution of outbound mobile students from Tunisia in the Nordic countries (%) |                            |            |       |           |            |            |            |       |            |           |
|   | 1999                       | 2000       | 2005  | 2010      | 2011       | 2012       | 2013       | 2014  | 2015       | 1999-2015 |
| Denmark   | 26%                        | 32%        | 5%    | 10%       | 6%         | 10%        | 29%        | 26%   | 0%         | 15%       |
| Finland   | 30%                        | 21%        | 36%   | 25%       | 17%        | 14%        | 21%        | 16%   | 50%        | 27%       |
| Norway  | 17%                        | 16%        | 59%   | 40%       | 33%        | 29%        | 13%        | 16%   | 50%        | 33%       |
| Sweden  | 26%                        | 32%        | 0%    | 25%       | 44%        | 48%        | 38%        | 42%   | 0%         | 25%       |
| Total   | 100%                       | 100%       | 100%  | 100%      | 100%       | 100%       | 100%       | 100%  | 100%       | 100%      |

Sources: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017, (2) The World Bank World Development Indicators (2017).

Figure 16- Distribution of outbound mobile students from Tunisia in top destinations (host countries) and Nordic countries (%) (1999-2015)



Source: Adapted from (1) UNESCO – UIS (2017), based on data accessed on April 05, 2017.

Therefore, our findings in this section support the first hypothesis that from national perspective, the pattern and size of migration of higher education students from the North Africa region increased substantially over the past years but the distribution showed considerable variation across North African countries. We find that destination also strongly varies with origin, for instance, the international students from the Maghreb to OECD countries is strongly concentrated toward Continental Europe, while emigration from the other countries including Egypt and Sudan was previously and historically concentrated on Anglo-Saxon countries, but more recently concentrated on Arab Gulf countries and emerging economies in Asia. This second stylized fact suggests that past colonial links and common language of the host country are strong pull factors.

#### *4.3. The determinants and impacts of migration in North Africa countries*

This section discusses the push-pull factors (economic, political, cultural and educational) causes and consequences of migration of higher education students from the North Africa region (see Table 12). This section aims to investigate the relevance of the various valuable explanations and interpretations of the causes, motivations, determinants and implications of international students mobility presented in the previous studies in the international literature as presented in the previous section to North Africa.

We observe that the one stylized fact implies that on the geographical location of the majority of the North Africa countries (mainly, Algeria, Libya, Egypt, Morocco, and Tunisia) is characterised by close location, short geographical distance, and geographical proximity to Europe. This stylized fact suggests that the short geographical distance and geographical proximity to Europe motivated the migration of the majority of higher education students from the majority of the North Africa countries to seek better education opportunities in Europe. For instance, our findings discussed in this section above indicate that the distribution of outbound mobile students from North Africa countries in top destinations (host countries) over the period (1999-2015) showed considerable variation across North African countries. Our results imply that the top destination also strongly varies with origin, for instance, international students from the Maghreb to OECD countries is strongly concentrated toward Continental Europe, while emigration from the other countries including Egypt and Sudan was previously and historically concentrated on Anglo-Saxon countries, but more recently concentrated on Arab Gulf countries and emerging economies in Asia. This stylized fact suggests that the geographical location, the historical past colonial links and common language of the host country are strong pull factors. These findings imply that a combination of geographical, historical and cultural explanations (pull factors) is strongly applicable to the North Africa region.

In addition, we observe that political instability and political conflict is a serious problem in the majority of North Africa countries, (Egypt, Libya, Tunisia and Sudan). For instance, half of North Africa countries experienced regimes changes over the past years (Egypt, Libya, and Tunisia). This implies that the political explanation (push factor) is strongly applicable to the North Africa region.

Our findings explained in section 2 above indicate that all North Africa countries experienced economic development challenges that appear from the unsustainable economic growth, the high inflation rates, the low GNI per capita income in all North Africa countries that is below the World average and the incidence of high poverty, which remains a very serious problem for nearly a quarter of North Africa population (24%). This implies that the economic explanation (push factor) is strongly applicable to the North Africa region.

Our findings explained in section 2 above imply that the North Africa region is characterised by high population numbers and high average population growth rate, which is above the level of all World regions: Europe and Central Asia, Latin America and the Caribbean, East Asia and the Pacific, South Asia and South Africa (see Table 1). Furthermore, the demographic structure/ composition (population size) implies that the North Africa region is characterized by high share of youth in total population that raises concern. For instance, we find that in 2015, the nearly third of the population in the North Africa region is under 25 years of age (32.3% of total population (cf. UNESCO – WB-WEDI (2017), in particular, nearly one in every five people in the North Africa region is aged between 15-24 years (17.6% of total population). These percentages indicate that the North Africa youth will, for the years or decades to come, put increasing pressure on resources in the North Africa region to provide education, work and social services. This implies that the demographic explanation (push factor) is strongly applicable to the North Africa region.

Our results explained in section 2 above imply that the North Africa region is characterised by considerable weakness concerning the supply of and demand for higher education reflecting the weakness in higher education systems and institutions in North Africa region. For instance, over the period (2010-2015) the weakness in the demand side appears in terms of the gross enrolment ratios in tertiary education in North Africa that implies that less than one third of students in tertiary education age are enrolled in higher education (28.8%), below the World level (35%), and below the majority of world regions. In addition, over the period (2010-2014) the weakness in the supply side appears in terms of the limited financial resources allocated for education as measured by the level of expenditure on education as % of GDP in the North Africa region (4.6%), which is below the World average (5%), OECD (5.5%), Sub-Saharan Africa (4.8%) and Latin America and the Caribbean (5.4%). This implies that the supply-demand gap in educational policies and human capital gap explanation (push factor) is strongly applicable to the North Africa region.

Our results in section 2 above explained imply that North Africa region is characterised by high unemployment rates and youth unemployment rates that are more than twice above the world average and are above all World regions: Arab States, East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, OECD, South Asia, Saharan Africa, developing countries and least developed countries (see Table 1 and Figure 2). In addition, several studies in North Africa literature indicate the low return to education in the majority of North Africa countries (notably, Algeria, Egypt, Morocco and Sudan) (see (cf. Mebroukine, 2015; Sika, 2015; Khachani, 2015; Assal, 2015; ESTIME Report, 2007, the World Bank, 2008). This implies that the labour market policies and wage gap explanation (push factor) is strongly applicable to the North Africa region. Table 13 illustrates that the various valuable explanations and interpretations of the causes, motivations, determinants and implication of international students mobility presented in the previous international studies in the international literature as presented in the previous section are also applicable to North Africa. Our result postulates the relevance of several theoretical explanations that presented in the international literature including historical, geographical, cultural, political, institutional, social, and economic (macro explanations and supply-demand explanations), demographic, educational policies and human capital gap, and labour market and wages gap explanations). This implies that the determinants of cross-national students mobility from North Africa are largely consistent with the various valuable explanations and interpretations of the causes, motivations, determinants and implication of international students mobility presented in the previous international studies in

the international literature as presented in the previous section (cf. Brooks and Waters 2011; Findlay et al., 2012; King and Raghuram, 2013; Shields, 2013; Vögtle and Windzio, 2016).

Concerning the impacts of migration of higher education students from North Africa, our results support the third hypothesis that migration of higher education students from the North Africa region lead to mixed positive and negative impacts (e.g. transfer of knowledge, brain gain and skill acquisition for returned migrant students, but weak capacity to retain talents and brain drain for non-returned migrant students) (See Tables 12-13 and Figures 17-18). Several studies in the literature discuss the reasons for the incidence of brain drain in the North Africa countries. For instance, one reason for the brain drain is the poor treatment and remuneration of profession, for instance, exodus is important in Egypt and the Maghreb countries, particularly, Egypt and Algeria are the main countries hit by exodus and where the brain drain has become a massive and structural problem. Because, "the profession is rather poorly treated and the remunerations were dreadfully eroded by price rise; an important emigration takes place continuously; and professionals are often busy with parallel tasks (contracts for teaching or doing research elsewhere) to make their living."<sup>14</sup> Though the situation is less dramatic in Morocco and Tunisia, brain drain is also noteworthy. ... The brain drain trend shows that there is a large S&T potential in Arab countries, and a lot of frustrations among them ... there is a need for more incentives [e.g. financial rewards and personal incentives].<sup>15</sup> Thus, "the evidence suggests that there is a brain drain in Morocco and Tunisia, which would suggest that there is a need for these countries to adopt policies to deal with this loss of human capital." (The World Bank, 2008)<sup>16</sup> Table 13 differentiates two groupings of countries on the basis of their ability to attract or repel national skills and talents. According to the official indicator for measuring human capital flight, the first group, which scored between 3.5 and 7 points and includes six oil-producing Gulf countries and Tunisia, are the countries capable of holding on to innovative national human capital. With the exception of Tunisia five of the North Africa countries including Algeria, Egypt, Libya, Morocco and Sudan that are incapable of persuading human scientific capital to remain in its home country.<sup>17</sup> Moreover, we observe that North Africa shows poor labor market efficiency, poor capacity to retain talent and poor capacity to attract talent, the North is ranked at the bottom places globally compared to South Africa Asia advanced countries and developed countries over the period (2016-2017) (see Figure 17).

We find that the financial remittances sent by North Africa migrants are considered among the most important factors contributing to development and the provision of foreign currency in a large number of impoverished Arab countries. The total sum of financial remittances sent to the North Arab region in 2014 and 2015 measured by personal remittances received (% of GDP) (2014-2015) in North Africa (3,91; 3,46), is above the World average (0,72; 0,76), and above the average for South Africa (0,26; 0,26), and above the average for Sub-Saharan Africa (2,19; 2,58), the Middle income (1,43; 1,57) and above the majority of world regions in 2014 and 2015 respectively (see Figure 18). The personal remittances received (% of GDP) (2014-2015) within the North Africa region implies that Morocco is ranked at the top (7,37; 6,86), followed by Egypt (6,49; 5,54), Tunisia (4,93; 4,58), Algeria (0,14; 0,17), and Sudan (0,62; 0,16) in 2014 and 2015 respectively (see Figure 18).

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<sup>14</sup> See ESTIME Report (2007), pp. 36-37, 51-55.

<sup>15</sup> See ESTIME Report (2007), pp. 36-37, 51-55.

<sup>16</sup> See the World Bank (2008) "New Challenges Facing the Education Sector in MENA," pp, 84-86, 110-111, 266-271, 275-276.

<sup>17</sup> See UNDP-MBA Foundation AKR 2009- pp. 207-209.

Table 12- The determinants and impacts of migration in North Africa countries

| (A) The determinants of migration in North Africa countries |  |  |
|---|--|--|
|   | Push   | Pull   |
| Algeria <sup>(1)</sup>                                      | <ol style="list-style-type: none"> <li>1. Economic (micro) and macro (supply-demand),</li> <li>2. Demographic pressures, structure and composition.</li> <li>3. Educational and human capital differences.</li> <li>4. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> <li>5. The Arabization of education</li> <li>6. Persistence of patronage and nepotism</li> </ol> | <ol style="list-style-type: none"> <li>1. Geographical location</li> <li>2. Historical: old colonial ties</li> </ol>                   |
| Egypt <sup>(2)</sup>  | <ol style="list-style-type: none"> <li>1. Political instability</li> <li>2. Economic (micro) and macro (supply-demand),</li> <li>3. Demographic pressures, structure and composition.</li> <li>4. Educational and human capital differences.</li> <li>5. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Geographical location</li> <li>2. Historical: old colonial ties</li> </ol>                   |
| Libya   | <ol style="list-style-type: none"> <li>1. Political instability</li> <li>2. Economic (micro) and macro (supply-demand),</li> <li>3. Demographic pressures, structure and composition.</li> <li>4. Educational and human capital differences.</li> <li>5. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> </ol>  | <ol style="list-style-type: none"> <li>2. Historical: old colonial ties</li> </ol>   |
| Morocco <sup>(3)</sup>                                      | <ol style="list-style-type: none"> <li>1. Economic (micro) and macro (supply-demand),</li> <li>2. Demographic pressures, structure and composition.</li> <li>3. Educational and human capital differences.</li> <li>4. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Geographical location</li> <li>2. Historical: old colonial ties</li> </ol>                   |
| Sudan <sup>(4)</sup>  | <ol style="list-style-type: none"> <li>1. Political instability</li> <li>2. economic (micro) and macro (supply-demand),</li> <li>3. Demographic pressures, structure and composition.</li> <li>4. Educational and human capital differences.</li> <li>5. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> </ol>  | <ol style="list-style-type: none"> <li>2. Historical: old colonial ties</li> </ol>   |
| Tunisia <sup>(5)</sup>                                      | <ol style="list-style-type: none"> <li>1. Political instability</li> <li>2. economic (micro) and macro (supply-demand),</li> <li>3. Demographic pressures, structure and composition.</li> <li>4. Educational and human capital differences.</li> <li>5. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Geographical location</li> <li>2. Historical: old colonial ties</li> </ol>                   |
| Northern Africa <sup>(6)</sup>                              | <ol style="list-style-type: none"> <li>1. Political instability</li> <li>2. Economic (micro) and macro (supply-demand),</li> <li>3. Demographic pressures, structure and composition.</li> <li>4. Educational and human capital differences.</li> <li>5. Labour market and wages differences: high Unemployment rate and Youth Unemployment and low wages low return to education.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Geographical location</li> <li>2. Historical: old colonial ties</li> </ol>                   |
| (B) The impacts of migration in North Africa countries      |  |  |
|   | Positive Impact  | Negative impact  |
| Algeria <sup>(1)</sup>                                      | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Brain drain and weak capacity to retain talents</li> </ol>                                   |
| Egypt <sup>(2)</sup>  | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> <li>2. Financial remittances.</li> <li>3. Alleviation of poverty.</li> <li>4. Brain gain and skill acquisition for returned migrant.</li> </ol>  | <ol style="list-style-type: none"> <li>2. Brain drain and</li> <li>3. weak capacity to retain talents</li> </ol>                       |
| Libya   | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> <li>2. Financial remittances.</li> <li>3. Alleviation of poverty.</li> <li>4. Brain gain and skill acquisition for returned migrant.</li> </ol>  | <ol style="list-style-type: none"> <li>4. Brain drain and</li> <li>5. weak capacity to retain talents</li> </ol>                       |
| Morocco <sup>(3)</sup>                                      | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> <li>2. Financial remittances.</li> <li>3. Alleviation of poverty.</li> <li>4. Brain gain, brain circulation and skill acquisition for returned migrant.</li> </ol>   | <ol style="list-style-type: none"> <li>6. Brain drain: drain on engineering and</li> <li>7. weak capacity to retain talents</li> </ol> |
| Sudan <sup>(4)</sup>  | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> <li>2. Financial remittances.</li> <li>3. Alleviation of poverty.</li> <li>4. Brain gain and skill acquisition for returned migrant.</li> </ol>  | <ol style="list-style-type: none"> <li>8. Brain drain and</li> <li>9. weak capacity to retain talents</li> </ol>                       |
| Tunisia <sup>(5)</sup>                                      | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> <li>2. Financial remittances.</li> <li>3. Alleviation of poverty.</li> <li>4. Brain gain and skill acquisition for returned migrant.</li> </ol>  | <ol style="list-style-type: none"> <li>10. Brain drain and</li> <li>11. weak capacity to retain talents</li> </ol>                     |
| Northern Africa <sup>(6)</sup>                              | <ol style="list-style-type: none"> <li>1. Decrease pressures on the labour or employment market.</li> <li>2. Financial remittances.</li> <li>3. Alleviation of poverty.</li> <li>4. Brain gain and skill acquisition for returned migrant.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Brain drain and</li> <li>2. weak capacity to retain talents</li> </ol>                       |

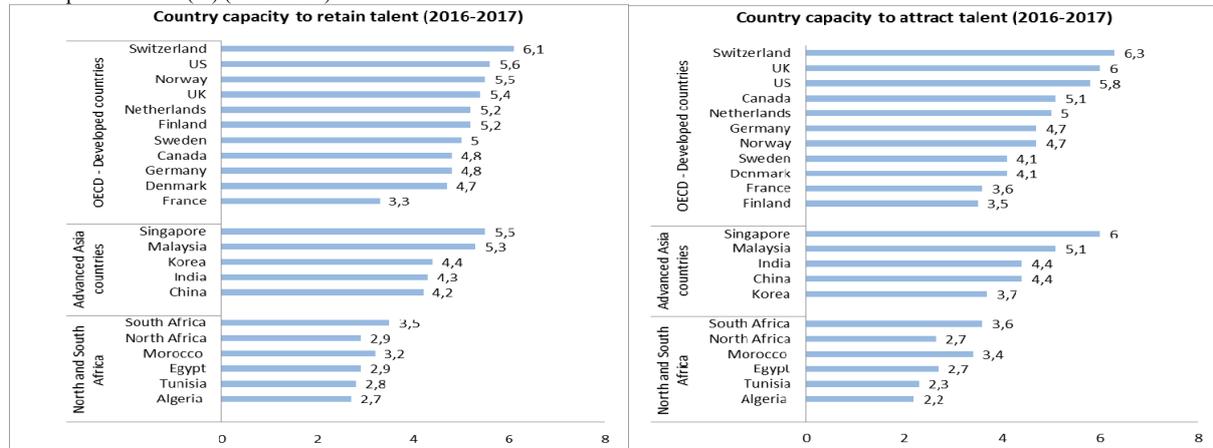
Sources: Adapted from (1) Mebroukine (2015), (2) Sika (2015), (3) Khachani (2015), (4) Assal (2015), (5) Zekri, et.al. (2015), (6) Fargues and Venturini (2015).

Table 13- Human capital flight index in North Africa compared to Arab countries

| Country         | Human capital flight (scale of 1-7) | Most migration |
|-----------------|-------------------------------------|----------------|
| Syria           | 2.3                                 |                |
| Egypt           | 2.3                                 |                |
| Mauritania      | 2.4                                 |                |
| Algeria         | 2.4                                 |                |
| Jordan          | 2.8                                 |                |
| Morocco         | 3.1                                 |                |
| Oman            | 3.9                                 |                |
| Tunisia         | 3.9                                 |                |
| Saudi Arabia    | 4.6                                 |                |
| Bahrain         | 4.7                                 |                |
| Kuwait          | 5.4                                 |                |
| UAE             | 5.6                                 |                |
| Least migration | 5.7                                 |                |
| Qatar           | 5.7                                 |                |

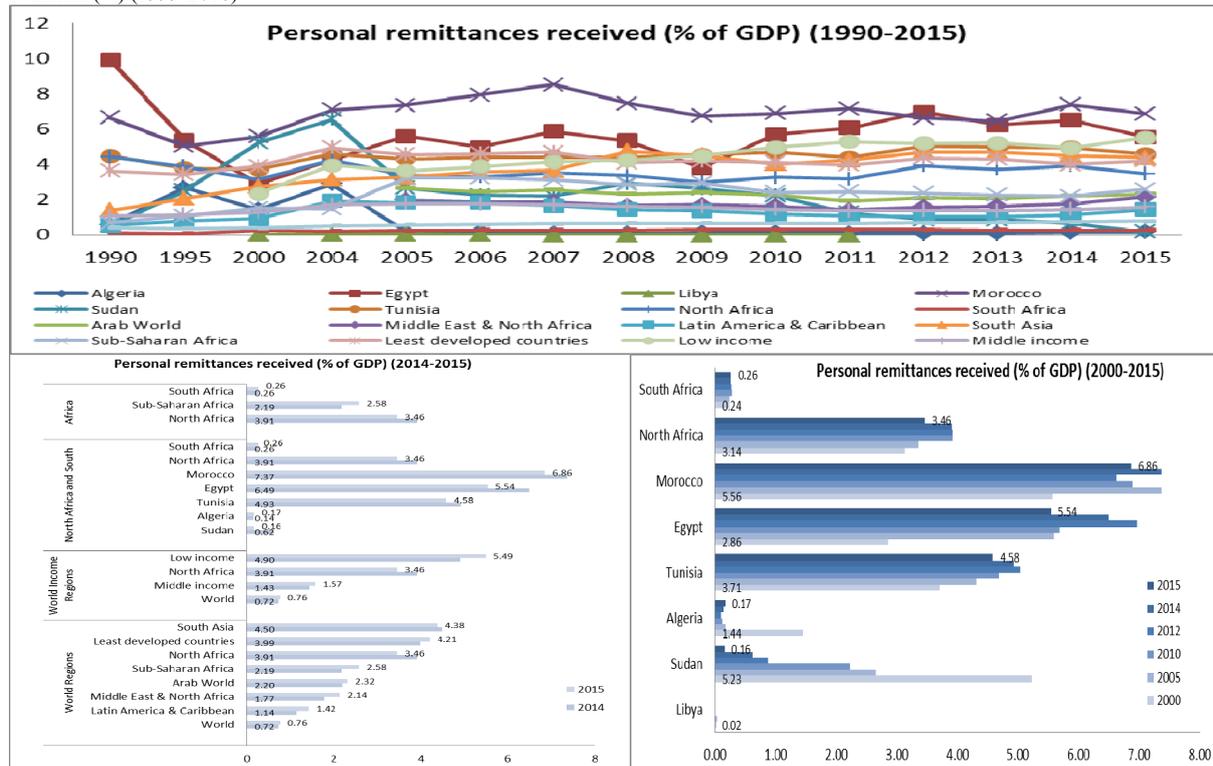
Source: UND-MBRA Foundation AKR (2009), p. 209; World Bank, Knowledge Assessment Methodology (KAM), 2008.

Figure 17- Capacity to retain talent and capacity to attract talent in North Africa compared to South Africa, advanced Asia countries and developed countries (%) (2016-2017)



Source: Adapted from the World Economic Forum -The Global Competitiveness Report (2016-2017)

Figures 18- Personal remittances received (% of GDP) in North Africa compared to South Africa advanced Asia countries and developed countries (%) (1999-2016)



Source: Adapted from the World Bank World Development Indicators (April 2017), accessed on April 17, 2017.

Our results in this paper are consistent with our earlier findings of Nour (2014) which implies that mobilizing skills through utilization of human capital mobility in the North Africa region can be enhanced by addressing several issues related to mobility of higher education students, migration of skill and brain drain. For instance, by strengthen skill level of the local labour by provision of regular training, in addition to promotion of recognition of foreign qualifications, including that of technical degrees to improve the labour market opportunities of students wishing to return to their home countries. In addition to enhancing the national science and economic policies to enable the MENA region to benefit from their substantial human capital, mainly, by encouraging MENA and Arab governments to devote more financial resources towards R&D, and by improving of treatment and remuneration of profession and increasing incentives [financial and personal incentives]. In addition to encouraging the MENA countries to adopt policies to deal with the loss of human capital and improvement of the other factors to improve the general favourable environment ... and through encouragement of the internationally mobile students hosted by the Arab countries to support brain gain and mobilization of skills in the Arab countries. In addition, to mobilizing skill through encouragement of continuing transfer of knowledge via migrants, through the TOKTEN programme to turn “brain drain” into “brain gain.”

Therefore, our results in this section corroborate the second hypothesis that the increasing trend of migration of higher education students from the North Africa region is caused by several push-pull factors (e.g. economic, social, political, cultural and educational). Moreover, our results in this section support the third hypothesis that migration of higher education students from the North Africa region lead to mixed positive and negative impacts (e.g. transfer of knowledge, brain gain and skill acquisition for returned migrant students, but weak capacity to retain talents and brain drain for non-returned migrant students). Our findings in this section corroborate the fourth hypothesis that skills of migrant higher education students from North Africa region can be better mobilised in their countries of origin by addressing the push-pull factors that determine migration of skills from the North Africa region.

## **5. Conclusions and policy recommendations.**

This paper uses both the descriptive and comparative approaches to provide overview of migration of higher education students from North Africa region. We fill the gap in the African literature and present a more comprehensive and recent analysis of migration of higher education students from North Africa region using UNESCO recent secondary data on international students mobility in tertiary education. We provide an interesting comparative analysis of migration of higher education students from North Africa region compared to South Africa. A novel element in our analysis is that we examine migration of higher education students from North Africa from both national and regional perspectives; mainly we discuss migration of higher education students for each individual country in North Africa region (Algeria, Egypt, Libya, Morocco, Sudan and Tunisia) and then discuss the total for the entire North Africa region. Therefore, we provide an extremely valuable contribution to the increasing debate in the international literature concerning the increasing interaction between migration and increasing internationalisation of higher education. Our findings support the first hypothesis that from national perspective, the pattern and size of migration of higher education students from the North Africa region increased substantially over the past years but the distribution showed considerable variation across North African countries. Our results corroborate the second hypothesis that the increasing trend of migration of higher education students from the North Africa region is caused by several push-pull factors (e.g. economic, social,

political, cultural and educational). Our results support the third hypothesis that migration of higher education students from the North Africa region lead to mixed positive and negative impacts (e.g. transfer of knowledge, brain gain and skill acquisition for returned migrant students, but weak capacity to retain talents and brain drain for non-returned migrant students). Our findings corroborate the fourth hypothesis that skills of migrant higher education students from North Africa region can be better mobilised in their countries of origin by addressing the push-pull factors that determine migration of skills from the North Africa region. Our findings imply that migration of higher education students from North Africa remain an essential 'issue of concern', and should be at the top of political agendas for the North Africa countries. Particularly, brain drain from North Africa must become a public policy concern of the sending countries in North Africa and for the receiving countries in Europe and USA. An accurate assessment of brain drain requires the availability of accurate, reliable and detailed data. However, in the case of North Africa, most of these data are either unavailable, or difficult to access, the scarcity of data makes it difficult to discuss this issue adequately.

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