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The Impact of PhD Returnees in Driving Economic Development of Origin Countries: The Case of Jordan

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Abstract Migration of highly qualified is investment in human capital, having costs and rendering returns; such returns may outweigh costs and provide a brain gain to the migrants' country of origin through return migration. This article investigates the effect of foreign human capital formation on international students' enrollment in Jordan universities, as compared to those universities without foreign human capital formation. The essential question is how returned graduate students contribute to the economic development of their home countries. Based on a survey among academic staff at Jordanian universities, the results demonstrate that PhDs achieved from a foreign source have an effect on international students' enrollment in scientific faculties, whereas for other human capital formation variables such effects could not be shown. The outcome of the analysis shows that in the case of Jordan the return on investment in human capital has been converted into higher education exports through returned graduate students.

Keywords: returnees; human capital; higher education export; brain circulation; Jordan

1 Introduction

Education, training and experiences are keys to investment in human capital (Becker 1962, 1993; Mincer, 1974) which has been identified as essential for economic development in research since the work of human capital theory by the so-called "Chicago School" (Shultz, Becker, Mincer and Rosen). Human capital accumulation is acquired lifelong (OECD, 2008a, p.399), being expected to result in private returns, in terms of better employment conditions, higher income, and in positive external effects for society. Migration is a form of investment in human capital involving costs and expected to render returns in terms of improved future income and employment opportunities through increasing productivity of human resources. Migration according to Sjaastad should be viewed as complementary to other investments in human capital, like occupational upgrading, on the job training, and experiences which are at least as important as the migration itself.

Out-migration of skilled individuals can be beneficial to the sending country by acquiring more knowledge than could be provided at home, faster accumulation of human capital, enhancing productivity, complementing initial human capital and, hence, increasing the potential return flows of knowledge, networks and skills (OECD 2008b, p.11). Migration for acquiring higher levels of education is an investment that is likely to increase an individual's lifetime earnings (Levy and Faria, 2002). Training and experiences on the job through accompanying or subsequent employment could also become important contributors to human capital building, as they could also enable students abroad to widen their horizons and to absorb more advanced and sophisticated work experience (Zhang, 2003).

From the sending countries' point of view, the corollary benefits related to the mobility of their highly skilled through the development of their human capital, strengthening of cultural and commercial ties, and transfer of technology, are not guaranteed as there is the risk of final brain drain. The rates of the non-return among students having acquired their PhD degrees in western countries are high. In U.S. for example, the stay rates are estimated to range from one third (Lowell *et al*, 2007) to around two thirds of foreign citizens who achieved their science or

engineering doctorate degrees there (Finn, 2005). The extent of this risk depends in particular on the migrant's family status, the existence of institutional safeguards, and the comparative employment opportunities in the two countries. On one hand graduate students abroad may assist economically less developed countries in their endeavours to strengthen their own human resources; indeed cross-border education can enhance brain drain rather than the circulation of skills between host and home country (Vincent-Lancrin, 2005). Research has identified conditions under which the migration of human capital from one country to another can enhance human capital formation and increase the returns to education, linking the possibility of a "brain drain" to a "brain gain" for the sending country (Mountford, 1997; Fan and Stark, 2007), i.e. human capital gains associated with migration can accrue from returnees who bring back new knowledge and skills acquired abroad. Out-migration of students, academics and other highly skilled professionals increasingly has become temporary instead of permanent (Gaillard and Gaillard 1997; Teferra 2005). Brain circulation of individuals who have returned to their country of origin but at the same time maintain social and professional relationships with their former host countries can also enhance productivity and economic development in the home country (Saxenian 2005). Brain circulation is one step short of the more recent brain reversal or brain gain debate. Returning home after studying abroad can help to transfer technology and know-how in the sending countries; but the further economic gains from returnees are still underestimated (Özden and Schiff, 2007). The returns from studying abroad also extend to economic returns from extracurricular skills gained over the stay in the host country (e.g. language skills or knowledge of the host country) and personal capacities (e.g. initiative or flexibility) (Santiago *et al*, 2008, Wiers-Jenssen 2008).

Jordan has encouraged the out-migration of its students to achieve their higher education degrees from different distinguished western universities worldwide. Between 1954 and 1969 an estimated number of 36,500 Jordanian students received their higher education degrees from different foreign universities.¹ In 1975, around 5,000 students studied in Jordanian universities, while almost 35,000 Jordanians were studied abroad. During 1980 to 2009, between 25,000-16,000 Jordanian students were studying in western universities² compared to 7,000 to 10,000 in Arab countries for the same period. The Jordanian household expenditures on public and private universities in Jordan reached US\$ 245 million and US\$382 million in 2003 and 2006 respectively compared to US\$18 million on universities abroad for the respective years in equal terms.

Jordan has a narrow base of industrialization and the service sector outweighs other productive sectors.³ Jordan's development choices are constrained by its weak natural resources coupled with high unrest situation in the Middle East region, high inflation and unemployment rates⁴ with increases in the incidence of poverty over the last decades of the twentieth century.⁵ Hence, youth in Jordan potentially face a lower risk of long-term unemployment, poverty and exclusion during an economic downturn when they are equipped with higher degrees. Most specifically, those with doctoral degrees are relatively highly esteemed in the Jordanian society and are on high demand. An external observer can easily discover that the Jordanian people strongly value education and believe in it as a key for the future, and higher education is believed to function as a mean to upward social status and as a key for the future. The high ratio of Jordanians seeking higher education, whether inside or outside Jordan, is attributed to the importance of higher education recognized by Jordanian society when it is combined with migration.

¹ Ministry of Higher Education and Scientific Research (different years): Annual statistical report on higher education in Jordan.

² Western Universities in Europe, North America and Asia, excluding Arabic universities.

³ The contribution of service sector to GDP during (1986-2008) was in the range of 67%, agriculture 4%, industry 29% and Manufacturing 17 % (World Bank, 2007; 2009).

⁴ The inflation rate has fluctuated around 14% in 2008 and in 2009; the unemployment rate has been more or less stationary between (13-15%) (Department of Statistics (2009, 2008): Jordan in figures).

⁵ The incidence of poverty increased during the last decade of the twentieth century from 3% to 12% (Masri, 2004, p.5) and reached 21% in 1992 and 33% in 1997 (Hassan and Al-Saci, 2004).

Jordanian parents consider English as the ‘make or break’ for their children’s future (Khuwaileh and Al-Shoumali 2001). Higher education has traditionally received a high priority among the goals of successive Jordanian governments (Masri, 2004; MoPIC *et al*, 2004). The Jordanian government consider investment in human capital as essential to achieve economic development and can contribute to counterbalance Jordan’s modest endowment with natural and financial capital resources. The Jordanian government has encouraged the out-migration of its graduate students through bursaries related policy schemes commenced since 1960s and 1970s which aimed to provide a standard level of support to eligible students based on national assessments as part of attaining a PhD in order to fill positions in state universities. (Scientific Bursaries Laws for 1957, Nr.840 & Nr.16/2005-Article 10⁶).

This paper investigates the question about the contribution of returnees’ human capital to the economic development of their home country by considering its impact on international students’ enrollments in Jordan universities and its spill-over benefits for the economy. The focus is on measuring the returns on investment in human capital. Despite some studies have examined the returns to returning migrants where they have focused on return migration to developed and transitional economies (Özden and Schiff 2007), rather the consequences for developing countries may be different. This article adds new knowledge about how highly qualified returnees might affect the economic development of their origin countries.

The paper continues with a review of the previous research on investment in human capital, migration of highly skilled and their impacts on countries of origin. In section 3 we introduce the theoretical approaches for this study, followed by hypotheses and research question in section 4. In section 5 the methods and materials used are introduced. The empirical results and their discussion are presented in section 6, followed by conclusions and a perspective.

2 State of Research

Returnees may have acquired academic knowledge in the form of general education, science and technical training, and may also have acquired practical business skills from either working in a commercial environment or through having started a business (Dai and Liu, 2009). Returnees can affect the economic prospects of their origin countries through bringing home new skills acquired abroad, maintaining social and professional relationships with the host country, which in turn enhances their productivity in the home country (Williams, 2007). However, no study until now have examined the effect of highly skilled returnees-especially PhD holders- on economic development among Arabic countries in the Middle East region.

The case of Chinese who acquired a foreign PhD and returned home contributed to the internalization of the education process in China, in terms of establishing new courses, new research methods in their universities more than their colleagues of a domestic PhD, and have managed also to transfer more technology than their “short-term sojourners” (Zweig *et al*, 2006). American students who went to Europe in the nineteenth century - especially to Germany- eventually became those returnees who started new institutions such as John Hopkins and Chicago universities, and finally transformed American higher education (Altbach, 1998, p. 49). South Korea served as an exemplary model of a brain gain, because of the high participation rate of individuals seeking higher learning abroad combined with high %age rate of highly skilled returnees through their “brain adaptation” model, where they adapt most of what they learned in the U.S. and apply it back to their national and cultural context in their academic positions in the universities where they employed in (Lee and Kim, 2010). Most of the studies on highly skilled returnees’ effect were clustered among scientists, engineers and entrepreneurs. Over the period

⁶ Jordan Prime Ministry. URL: http://www.lob.gov.jo/ui/bylaws/search_no.jsp?no=840&year=1957 & URL http://www.lob.gov.jo/ui/bylaws/search_no.jsp?no=16&year=2005, 05.02.2010

(1980-2004) scientists from China, Taiwan and Brazil in biotechnologies have returned home from the U.S and contributed to the establishment of high technology firms (Zucker and Darby, 2007).

The brain circulation of expatriate/migrant IT workers from India and China in Silicon Valley setting up high tech businesses in California as well as in China, Taiwan, and India, aided by the lowered transaction costs associated with digitization, have managed in transferring technical and institutional know-how between distant regional economies faster and more flexibly than most large corporations (Saxenian, 2002). This illustrates the great potential of diasporas for development of business at home and their effect on the “transnational innovation systems” to forge connections between these regions (Jonkers and Tijssen, 2008). Several case-studies emphasized how returnees have been an important sources to invest in small businesses, or to take up self-employment ranging from Turkey and Portugal in Europe in the 1950s to 1970s, other examples in a varied settings was in Colombia, Mexico, China and the start-ups in high tech (IT) sectors in countries such as India (Black and Castaldo,2009). The impact of Taiwanese returnees on research and development in computing and in the industrial parks of the Hsinchu region has been profound. Of 289 companies in the Hsinchu Science-based Industrial Park (HSIP), 113(39%) were founded by U.S. educated Taiwanese engineers with experiences in Silicon Valley. These same firms and others in the HSIP actively recruit other Taiwanese from Silicon Valley; indeed some 70 such firms maintain offices in the valley, both to recruit personnel, to gain new ideas and knowledge and to build their businesses (Mattheou, 2010, p. 298). Zweig *et al* (2004, p. 48) found that Chinese returnees in economic zones helped in establishing international projects (31% versus 10% among other researchers who didn’t go abroad for a study).

The international orientation of faculty members - compared to their colleagues who did not study abroad- through their connections with foreign staffs during their study period is often considerable, with returnees forging continuing links with Western universities and collegial networks, and keeping an orientation towards Western scholars. In the same direction Altbach (1989) stated that “having expatriate professors, largely from Western industrialized nations in a developing country has an influence as they are representatives of the prestigious metropolitan academic systems of the West”.

3 Theoretical Frameworks: The Role of Returnees in Development

The combination of international migration and education is an extension of the human capital approach. It was not until the 1960s where the theory of human capital was fully developed and dominated economics of education. Human capital that is embodied in the skills knowledge and competencies individuals possess or develop through education and training, can offer a return in terms of earnings in the labour market and in achieving economic growth. This investment in human skills for economic performance has been identified in the economic analysis since the work of human capital theory by the Chicago School (Shultz, Becker, Mincer and Rosen). Although the explicit focus of human capital theory is on educational level, human capital also includes educational fields, different types of skills, and other individual attributes (Støren and Wiers-Jenssen, 2010). Moreover, the standard human capital theory does not distinguish between foreign and domestic education (Wiers-Jenssen, 2008).

Acquiring human capacities involves costs and benefits and is analyzed within a frame of economic decisions. Costs include direct expenses and earnings foregone by students, trainees and workers engaged in labour mobility (Mincer, 1984). The rate of return on investment in education and training is related to the increase in future income generation. The higher the earnings in the future mean the higher the returns on that investment. For identifying the rate of return for human capital investment, we have to look at it as an investment in physical capital and to establish some form of “Mincerian earnings function” (Buxton *et al*, 1998). The return to human capital investment is linked to enhancing personal skills and earning powers and in increasing the efficiency of economic decision-making both within and without the market economy

Sjaastad (1962) was the pioneer to apply the concept of human capital investment to migration decisions and the key for the development of economic-migration theory was the human capital theory (Fischer *et al*, 1997). According to Sjaastad, migration is treated as an investment having costs and rendered returns and in the end increases the productivity of human resources. The individual costs and returns within the theory of human migration have managed in addressing more important factors affecting an individual's decision to move where they weigh the present discounted value of the expected returns in each alternative destination and compare it to that in their present location. The main conclusion remains that complementary investments like occupational upgrading, on-the-job training, and experience in the human agent are at least as important as the migration itself.

The student decides whether or not to study in a foreign country based on the expected future benefits as compared to the costs. Given the benefits of education outlined by human capital theory, students might decide that the costs of overseas study are worth it (Naidoo, 2007). Hence, the acquisition of tertiary education in a foreign country may yield a higher return in the home country's labour market (Dustmann and Kirchkamp, 2002). In addition, employment in a foreign country and the higher prospective returns to human capital in terms of learning and acquiring skills on the job in the host country raises the level of human capital formed. That means that the average level of human capital in the home country may well be higher under migration than in the absence of migration and may induce individuals' decisions positively in the home country to migrate, increasing in the end of source countries stock of human capital and Knowledge (Fan and Stark, 2007; Di Maria and Stryszowski, 2009).

Countries are indeed benefiting from the knowledge transfers by their graduate students are abroad (Santiago *et al*, 2008) Rather, the migration of people endowed with a high level of human capital-under the nomenclature of the "brain drain" could be detrimental for the country of out-migration (Beine *et al*, 2001) and are of much concern for many economically less developing countries. There have been several shifts in the tone of debate on migration and economic development. Through the years, there have been optimistic and pessimistic proponents, where pessimistic views on the outcome of migration on development in the origin countries have been dominant in the debate, it was only in Papademetriou and Martin (1991) who asserted that migration on balance rarely makes a significant contribution to the economic take-off in migrants' sending areas (Naerssen *et al*, 2008). The literature puts forward positive feedback effects of the brain drain on sending countries in terms of remittances, return migration, diaspora externalities, quality of governance, and increasing returns to education (Docquier,2006). In particular, several studies demonstrated that skilled migration can create more human capital *ex ante* than the *ex post* loss in the source countries, turning the brain drain into a brain gain (Beine *et al*, 2008).

4 Hypotheses and Research Questions

In this study two groups are compared: returnees with foreign human capital and returnees with local or non-foreign human capital. Based on former research and theory presented above, we outline the following eight hypotheses:

H1: PhD foreign

Academic faculty staff with a foreign non-Arabic PhD degree does not affect international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H2: PhD Arabic

Academic faculty staff with a foreign PhD degree from an Arabic country does not affect international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H3: Teaching experience inside Jordan

Academic faculty staff with academic experiences gained from inside Jordan have no effect on international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H 4: Teaching experience outside Jordan

Academic faculty staff with academic experiences gained from outside Jordan have no effect on international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H5: Professional experience inside Jordan

Academic faculty staff with professional experiences gained from inside Jordan have no effect on international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H 6: Professional experience outside Jordan

Academic faculty staff with professional experiences gained from outside Jordan have no effect on international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H 7: Training courses

Academic faculty staff with related training courses have no effect on international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

H8: Working experiences in international organizations

Academic faculty staff with working experiences in international organization have no effect on international students' enrollment in faculties of Engineering (Eng.), Information Technology (IT) and Nursing (Nurs.)

5 Data and Method

Data are drawn from a survey among academic staff at Jordanian universities in the second semester of the academic year 2008/2009. Stratified sampling technique was used to select a sample of 122 academic staff distributed at six Jordanian universities (3 public and 3 private universities) among three scientific faculties: these are Engineering, Information Technology and Nursing. These universities are geographically distributed in different locations from the capital Amman. In the middle of Amman is University of Jordan (UoJ), northern to Amman is Al al-Bayt University and Mut'ah University (MU) in the south. The same geographic distribution applies for private universities, where University of Applied Science (ASU) is in the middle of Amman, Isra Private University (IPU) in the south of the capital and Zarqa Private University (ZPU) is in the north. The inclusion of geographical distribution takes into account different costs of living, different scales of tuition fees, services and infrastructure facilities and even differences in climate. In addition, these universities have varying proportions of international students' enrollment. That is, the highest proportion of international students among public universities - in a descending order-are found in UoJ, AABU and MU respectively and in ASU, IPU and ZPU at private universities.

The survey also contained information on academic staff demographic, educational backgrounds; academic and professional experiences, related training certificates and their experiences in international organizations. The survey is based on a self-administrated questioner. A simple bi-variate analysis is used and the direct regression parameters are estimated by the Ordinary Least Squares (OLS).

Dependent Variables

The dependent variable in the model is international students' enrollment at the selected faculties. International students according to UNESCO (2004, p.144) are defined as those who have crossed a national or territorial border for the purpose of education and are now enrolled outside their

country of origin. Foreign students in higher education are defined as non-citizens or non-residents of the country in which they study or alternatively, those who received their prior education in another country (OECD, 2008a, p. 351). In the American literature, the term ‘international’ is often used, while in the British literature ‘overseas’ is more common, and ‘foreign’ appears mainly in the literature from Australia (Huang, 2008). In the present study, international and foreign students are defined as non-Jordanian students enrolled at a Jordanian higher education institution and who are on a temporary student visas.

Enrollment is the “number of students (head count) officially enrolled in a given grade or level of education within the reference period” (UNESCO, 2004, p.143; OECD, 2004, p.37). Naido (2007, p.220) measured enrollment as the number of international students (the headcount) from country i studying in the destination country j at a particular point of time t. In Chen (2007, p.275) enrollment is used as a measure of student decision enrollment choice. In this study, international student enrollment is the number of international student enrolled at undergraduate level during the academic year 2008/2009 at the specified faculties in the six selected universities. International student enrollment was modelled as a function of academic staff human capital formation variables as in the following equation:

$$\text{Enrll}_i = \beta_0 + \beta_1 X_1 + \epsilon_i \quad (1)$$

Independent Variables

The explanatory variables included measures of human capital formation attributes distinguished by its source as follows:

PhD foreign

Denoted by PhD F: is academic staff PhD country of graduation, and foreign means from a non – Arabic countries.⁷

PhD Arabic

Denoted by PhD A: is academic staff PhD country of graduation from an Arabic countries (excluding Jordan).

Teaching experience inside (Local)

Denoted by Teach. Exp. L: is academic staff teaching experience achieved from an Arabic countries (including Jordan).

Teaching experience outside (Foreign)

Denoted by Teach. Exp.F: is academic staff teaching experience acquired from a non-Arabic countries.

Professional experience inside (Local)

Denoted by Profi. Exp. L: is academic staff professional experience achieved from Arabic countries (including Jordan).

Professional experience outside (Foreign)

Denoted by Profi. Exp.F: is academic staff professional experience acquired from non-Arabic countries.

Training courses

Denoted by Tr.Cert.: are courses and certificates achieved by academic staff that are related to their specialties/fields of study.

⁷ Arabic countries are those whose official language is Arabic.

International experience

Denoted by INT Exp.: is academic staff experience in international organizations such as World Bank, UN,...., and others.

Time Value of Money (TVM)

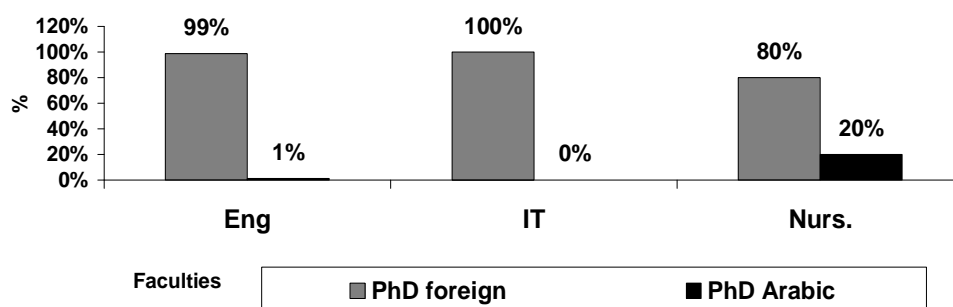
The relevant data for calculating international students' contribution to the Jordanian economy are rarely available, as in countries that do not consider cross-border education as trade in education services as the example of Jordan, and no attempt has been made to date to quantify higher education export revenues. The calculations in this study depend on Jordan Vision 2020⁸ survey estimates which were performed in the middle of the year 2004. The time span that will be covered in this study extends from (1994-2010). The present value concept will be applied in the first period from (1994/1995-2002/2003), and the future value concept will be used for the second period from (2003/2004-2009/2010). As the time frame in this study extends between 1995 and 2010, hence, to enable a comparison of different currencies and times, all monetary data was converted into constant 1995 US\$, as Jordan has operated a fixed exchange rate pegged to the US\$ since 1995 (Maziad, 2006).

6 Results: Academic Staff Human Capital Variables by Source

PhD Source

Figure 1 shows that faculty of IT and engineering have the largest share of academic staffs who have gained their PhDs from a foreign source with 99% and 100% respectively. For faculty of nursing a small percentage of staff with PhDs from Arabic countries existed. In more details, figure 2 shows that Europe and North America are the main destination countries for PhD graduates. Faculty of IT witnessed a high ratio of graduates from Europe (69%), whereas an equal share of both European and North America destinations were among PhDs at the faculty of engineering. Arab countries have a negligible share of PhD graduates. Asia were having a prominent proportion of PhD holders in the nursing speciality(25%), rather still North America was the dominant destination among them (Figure.2).

Figure 1: Surveyed academic staff by PhD sources and faculties (in %)

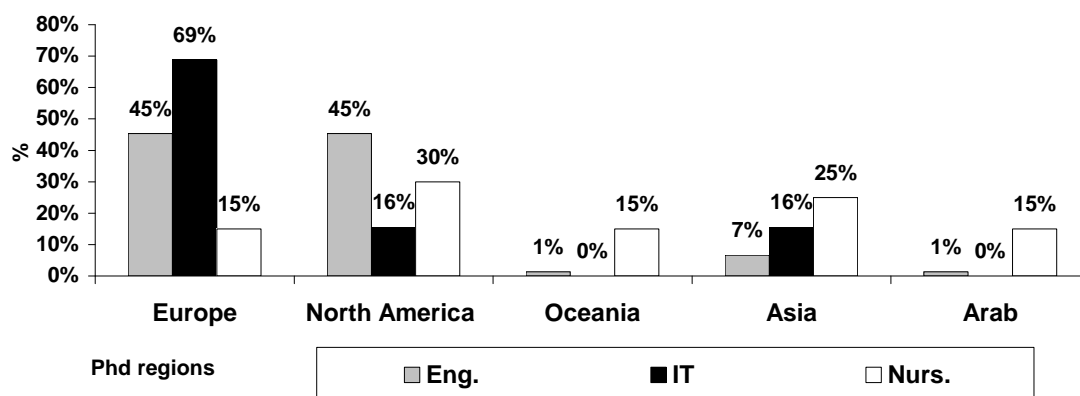


Note: PhD foreign: Europe, North America, Oceania, Asia. PhD Arab: Countries whose official language is Arabic.

Source: Based on the survey results.

⁸ It is a public-private initiative aimed at guiding Jordan's growth and economic development into the 21st century. Higher education sector was recognized as a key vehicle for enhancing Jordan's international competitiveness and the goal was to increase the international demand on Jordanian higher education educational services to 100,000 international students by the year 2020.

Figure 2: Academic staff PhD place of graduation by faculties (in %)



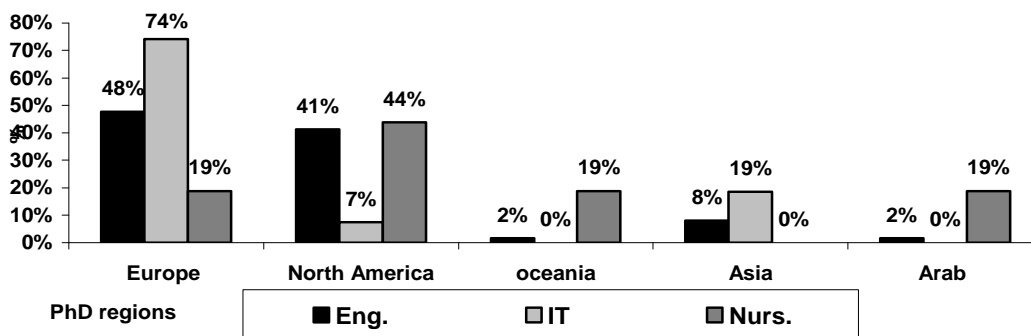
Note: Europe: UK, France, Germany, Ukraine, Russia, Italy, Poland, Cyprus, Greece. North America: USA, Canada. Oceania: Australia. Asia: Malaysia, India, China, Taiwan, Pakistan, Turkey. Arab: Egypt, Iraq.
Source: Based on the survey results.

Teaching Experience

Teaching Experience inside Jordan

Figure 3 shows that Europe and North America were the dominant destination regions for PhD graduates who have also gained teaching experience from higher education institutions from inside Jordan.

Figure 3: Academic staff with teaching experience from inside Jordan by PhD source regions and faculties (in %)

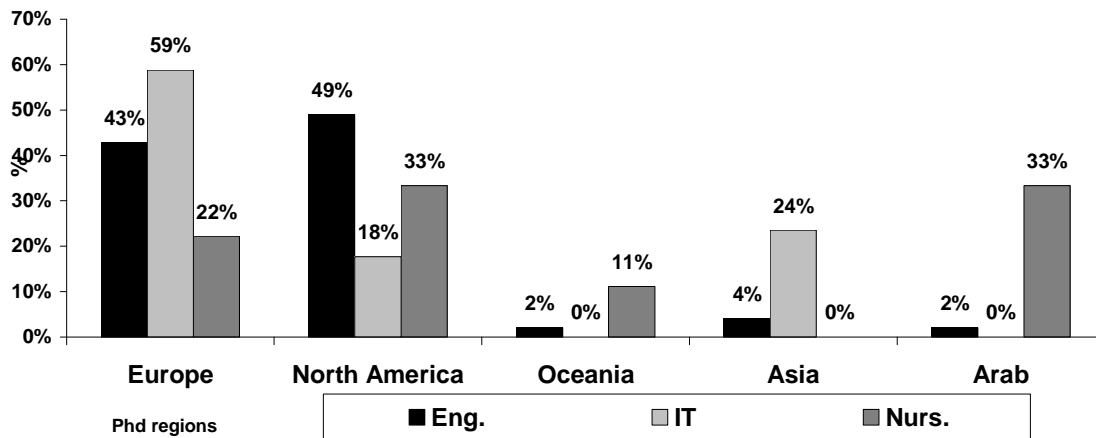


Note: Europe: UK, France, Germany, Ukraine, Russia, Italy, Poland, Cyprus, Greece. North America: USA, Canada. Oceania: Australia. Asia: Malaysia, India, China, Philippine, Taiwan, Pakistan, Turkey. Arab: Egypt, Iraq.
Source: Based on the survey results.

Teaching Experience outside Jordan

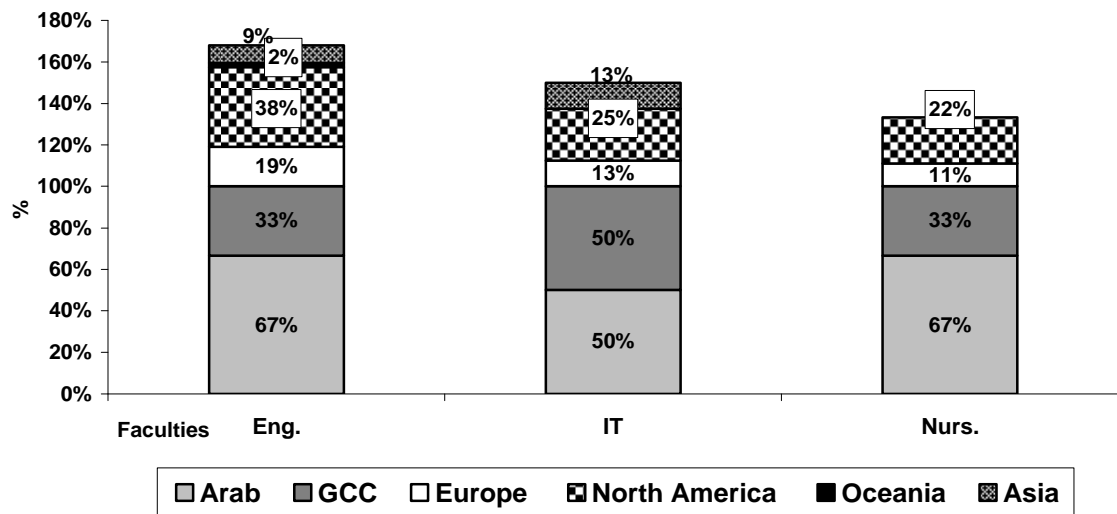
Figure 4 illustrates that Europe and North America were the main destination regions among surveyed PhD staff who have also gained teaching experience from countries outside Jordan. Arabic countries were the main teaching experiences countries for academic staff as seen in Figure 5. The figure also shows that one third of staff teaching experiences at faculty of engineering and nursing were achieved from GCC countries (Gulf Cooperation Council) and half of IT faculty staff have achieved this experience from the same region.

Figure 4: Academic staff with teaching experience from outside Jordan by PhD regions and faculties (in %)



Note: Europe: UK, France, Germany, Ukraine, Russia, Italy, Poland, Cyprus, Greece. North America: USA, Canada. Oceania: Australia. Asia: Malaysia, India, Turkey. Arab: Egypt, Iraq.
Source: Based on the survey results.

Figure 5: Academic staff with teaching experiences from outside Jordan by countries of experience and faculties (in %)



Note: Arab: Iraq, Egypt, Libya, Lebanon. GCC: Saudi Arabia, Kuwait, Oman, Qatar. Europe: UK, Germany, Russia, Ukraine, Cyprus. North America, USA, Canada. Oceania: Australia. Asia: Malaysia, India, Pakistan, Japan, Turkey.
Source: Based on the survey results.

Professional Experience

Professional Experience inside Jordan

Table 1 shows that academic staff who have professional experience from inside Jordan have also achieved their PhDs from abroad, mainly Europe and North America.

Table 1: Academic staff professional experience gained from inside Jordan by PhD source regions and faculties (in %)

<i>PhD countries</i>	<i>Eng.</i>	<i>IT</i>	<i>Nurs.</i>
Europe	46	82	20
North America	46	18	60
Oceania	0	0	20
Asia	9	0	0

Note: Europe: UK, France, Russia, Ukraine, Italy, Greece, Cyprus. North America: USA, Canada. Oceania: Australia. Asia: Taiwan, China, Pakistan.

Source: Based on the survey results.

Professional Experience outside Jordan

As seen in Table 2 the surveyed academic staff who have gained their professional experience from outside Jordan have achieved their PhDs from Europe and North America, especially among staff at faculties of IT and engineering.

Table 2: Surveyed academic staff professional experience gained from outside Jordan by PhD source regions and faculties (in %)

<i>PhD regions</i>	<i>Eng.</i>	<i>IT</i>	<i>Nurs.</i>
Europe	46	60	20
North America	43	30	40
Oceania	0	0	20
Asia	7	10	0

Note: Europe: UK, Ukraine, Cyprus. North America: USA. Oceania: Australia. Asia: India, Taiwan, Turkey.

Arab: Iraq, Egypt.

Source: Based on the survey results.

Professional Experience outside Jordan by Countries of Professional Experience

Table 3 details that academic staff with professional experience from countries outside Jordan has been acquired mainly from Arabic countries such as Iraq, Egypt, Libya and GCC, and were among staff at faculties of engineering and IT. Afterwards come North America as a professional destination region among staff at faculty of IT and nursing.

Table 3: Surveyed academic staffs professional experience gained from outside Jordan by professional experience regions and faculties (in %)

<i>Professional experience regions</i>	<i>Eng.</i>	<i>IT</i>	<i>Nurs.</i>
Europe	14	0	11
North America	29	40	33
Oceania	0	0	22
Asia	4	10	0
Arab	54	50	33

Note: Europe: UK, Russia. North America: USA. Oceania: Australia. Asia: Pakistan Turkey. Arab: Iraq, Egypt, Libya, Kuwait, Saudi Arabia, United Arab Emirates, Oman, Qatar.

Source: Based on the survey results.

Training Courses

Table 4 depicts that surveyed staff who have attended training courses related to their specialities were mainly among staff at both faculties of engineering and IT who have also graduated from European and North American universities.

Table 4: Surveyed academic staff with training courses by PhD source regions and faculties (in %)

<i>PhD source</i>	<i>Eng.</i>	<i>IT</i>	<i>Nurs.</i>
Europe	63	67	20
North America	38	33	60
Oceania	0	0	20

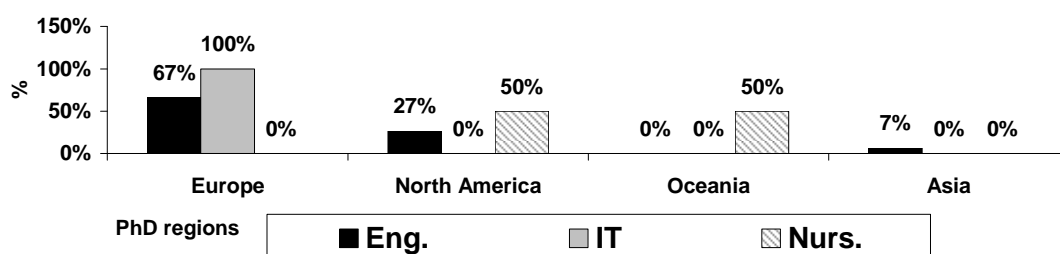
Note: Europe: UK, Greece, Ukraine, Poland. North America: USA. Oceania: Australia.

Source: Based on the survey results.

International Working Experience

Figure 6 displays that academic staffs who have experiences in international organizations such as the World Bank, United Nations organizations and others were among the staff who have also achieved their PhDs from European and North American universities, and were among staff at faculties of IT and engineering.

Figure 6: Surveyed academic staffs with experiences in international organizations by PhD regions and faculties (in %)



Note: Europe: UK, Germany, Italy, Russia, Cyprus. North America: USA, Canada. Oceania: Australia. Asia: India.

Source: Based on the survey results.

The Relationship between Human Capital Variables and International Students' Enrollment

Having achieved different human capital attributes from different sources may have an effect on international students' enrollment. For that purpose, simple linear regression was performed to investigate such relationship. Table 5 shows the results of the three faculties undertaken in the analysis. Starting with faculty of engineering, we see that PhD achieved from a foreign source has an effect on international students' enrollment. For PhDs achieved from an Arabic source, the results could not be computed as there was less than 2 staff in the sample holding PhD from Arabic countries. Regarding other human capital variables like teaching experience whether gained from inside or outside Jordan, professional experience; training courses or experience in international organization they have all showed a non significant effect on international students' enrollment at that faculty. In the second faculty (IT), the results show that only PhD achieved from a foreign source has an effect on international students' enrollments and for PhD from an Arabic source no results were attained as there were no staff in this faculty graduated from Arabic countries, and it was only professional experience achieved from inside Jordan which has an effect on international students' enrollment. For teaching experience inside vs. outside Jordan; professional experience from outside Jordan, training courses and experiences in international organizations) proved to have no effect on international students' enrollments at the faculty of IT. Looking at faculty of nursing, the results show that it is only PhD achieved from a foreign source which has an effect on international students' enrollment. Other staff variables like teaching experience (achieved from inside or outside Jordan), professional experience (gained from inside or outside Jordan), training

courses and experiences in international organizations seemed to have no effect on international students' enrollment.

Table 5: Human Capital Variables and International Students' Enrolment: Simple Linear Regression Estimates

<i>Faculties</i>	<i>Eng.</i>	<i>IT</i>	<i>Nurs.</i>
<i>Human capital parameters</i>	<i>P-value*(Coefficient) Decision about H₀</i>	<i>P-value*(Coefficient) Decision about H₀</i>	<i>P-value*(Coefficient) Decision about H₀</i>
PhD F	0.044 (43.68) R	0.029 (23.533) R	0.048 (-16.500) R
PhD A	(Less than 2 variables) ----	(No PhD Arabic) ----	0.789(7.500) A
Teach. Exp.F	0.121 (- 94.295) A	0.244(- 42.686) A	0.650(-5.333) A
Teach. Exp. L	0.090 (141.661) A	0.202(70.213) A	0.171(33.125) A
Profi. Exp.F	0.132(- 89.685) A	0.230(-47.355) A	0.298(12.200) A
Profi. Exp.L	0.563 (33.944) A	0.027(82.532) R	0.736(4.136) A
Tr. Certificates	0.111(110.044) A	0.333(-61.046) A	0.585(7.164) A
INT Exp.	0.643 (-33.372) A	0.963(-2.931) A	0.740(6.033) A

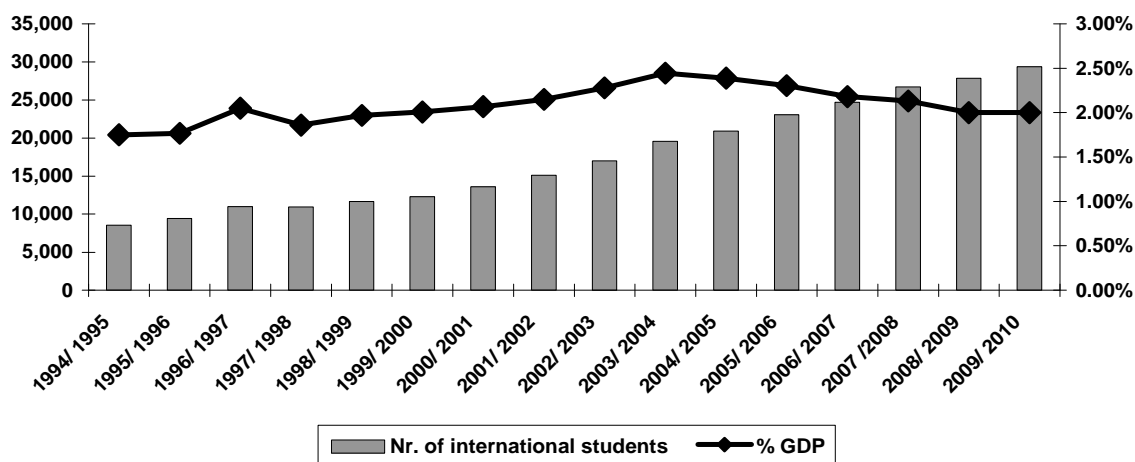
Note: A: accept; R= reject. * $P \leq 0.05$, significance level.

Source: Based on the survey results.

Returnees' Contribution to the Economic Development of Their Home Countries

Higher education export is the demand on higher education services by international students and returns are derived from it by the fees and charges paid by international students. Higher education export is becoming a thriving economic sector that reflects a new source of income, i.e. a billion dollar industry (Knight, 2002); a source of foreign currency earnings (Carrington *et al*, 2007) and playing an increasingly important role for the economic growth of a country (Van der Wende, 2003). The promotion of higher education as an export industry is, however, relatively a recent phenomenon (OECD, 2006, p.26). The earnings from higher education export in Jordan (costs, expenditures and revenues) are calculated based on the theory of Time Value of Money (TVM) (see section Data and methods). Applying the present and future value formulas, the results are presented Figure 7. The number of international students at all levels of higher education (undergraduate and graduate) has increased from less than 9,000 in 1995 to 29,379 in 2009/2010 growing by 8% annually. Higher education export scored 1.75% of GDP in the academic year 1994/1995, increased to 2.05% in the 1996/1997 and continued in this trend until 2003/2004 where it peaked to 2.45% and then 2% of the GDP in 2009/2010.

Figure 7: Growth in International Students and Higher Education Exports during the Academic Years (1994/1995-2009/2010)



Source: Based on present and future value calculations by the author.

Discussion: The Effect of Human Capital Formation Variables on International students Enrollment

In this section, the main results are summed up and discussed. The aim is to link the discussion to some of the topics outlined in the introduction, theory, previous research and hypotheses.

PhD Foreign vs. PhD Arabic

Migration for achieving a higher education degree is an investment in the human capital. The results show that PhD achieved from a foreign source has an effect on international students' enrollment (among scientific faculties), whereas PhD achieved from an Arabic source does not have such effect. Hence, the results does not support hypothesis 1 rather hypothesis 2. The findings resonates with OECD(2006) where international market of education services is a "demand driven" by students from rapidly developing countries and in part connected widely to the recognized qualifications in high-income and English-speaking countries. In developing countries according to Altbach(1991) it is still the "snob appeal" of a foreign degree, and Arabic countries in the Middle East region is no exception.

The underlying results reflect that international student's enrollment is affected by the academic reputation of a particular institutions or programmes and the language of instruction, and are in tandem with OECD (2009); Bourke (2000) where the reputation, perceived quality and images of educational institutions and the education system in the host country compared with the home country is a considerable factor in attracting international students. This is in a like conclusion reached by Bourke (2000) where students started to have confidence in the higher education of countries like: US, UK, Australia and Ireland, due to their good reputation.

Student going abroad usually prefer English-speaking countries, and the decision to go to countries with a language other than their mother tongue tends to be driven by economic motives linked to exploiting language skills in the labour market. The attraction of the Anglo-Saxon countries confirms this hypothesis (OECD, 2001). It is the fact that English language became a *lingua franca* in the economic, business and academic environments in today's increasingly interconnected world (OECD and The World Bank, 2007).The relationship found between international student enrolment and PhD of a foreign source complements the literature and instead

of students' migration to Anglo-Saxon countries, they migrate to countries whom their staffs are graduated from such destinations.

Teaching Experience Inside vs. Outside Jordan

The results show that neither teaching experience from a local (inside Jordan) or from a foreign source (outside Jordan) has an effect on international students' enrollments in any of the three defined faculties, although 96% and 95% of staff inside and outside experiences were achieved by staff who are of a foreign PhD sources (North America, Europe, Oceania and Asia). The non effect can be attributed to the fact that 88% of international students in Jordan higher education institutions are originating mainly from Arabic and Middle Eastern countries such as Saudi Arabia, Yemen, West Bank, Iraq, Oman, Israel, Malaysia, Kuwait and Syria (MoHESR, 2010). Moreover, as stated earlier (Data and method section) they are enrolled at undergraduate level of study, hence they are of much concern with the reputation of the university they are attending more than the articulated experience associated with the academic staff.

Professional Experience Inside vs. Outside Jordan

Academic staff professional experience attained from a foreign source has no effect on international students' enrolment, despite the fact that 94% of them have acquired their PhDs from (North America, Europe and Oceania. One exception was found in the professional experience achieved from a local source (inside Jordan) at the faculty of IT, where 100% of those staff have achieved their PhDs from Europe and North America. It can be argued in this study that graduates' priorities in IT specialities is the practical application in order to log into the labour market, work effectively and meet professional standards. And that goes hand in hand with Soutar and Turner (2002), where the recognition of international students' qualifications by future employers and staff's reputation for quality and expertise were among the factors for international students' choice to study in Australia.

Training Courses

The results show that specific training courses acquired by the academic staff had no effect on international students' enrollment, although 100% of those trained staffs have achieved their PhDs from North America, Europe and Oceania. This may be attributed to the fact that the international students are at their undergraduate level and their primary concern is the reputation and specialty of the university they are enrolling in, regardless of staff competencies and skills.

Experience in International Organizations

The survey results show that having experience in international organizations played no role in affecting international students enrollment despite that 95% of them have achieved their PhDs from foreign sources, particularly from western countries (North America, Europe and Oceania). It seems that international students concern in this study is on having their degrees from a reputational higher education institution regardless of staff international qualifications.

Higher Education Export

We have seen that the total contribution of international students to Jordanian economy -as percentage of Gross Domestic Product (GDP) contributes today to what is equivalent to 2% of Jordan's GDP. Therefore, the economic contribution of the almost 30,000 international students in Jordanian universities answers our research question. During the years under study (Figure 11) there were also variations in this contribution which reflected some of the political turbulence the Middle East witnessed. For example, in the academic years 1996/1997 and 2003/2004 there were a

prominent increase in higher education export revenues which can be attributed to the following factors:

1996/1997 factors: the private universities which were established in 1990/1991- as a consequence to the higher education privatization law in 1990⁹- had just emerged to prove their quality and ability in attracting students, not only Jordanians, but also from the region, depending on the reputation level they have achieved. The number of new private universities established during 1990s was 12 universities. In addition, in the academic year (1996/1997) almost a large number of public universities started to accept international students on a wide scale under the “parallel program”.

2003/2004 factors: the US-invasion to Iraq in 2003 and the increasing number of Iraqi nationals who have left their home country in search for a residence in neighbouring countries, particularly Jordan and Syria, was a main reason for higher education exports surge in 2003/2004. Moreover, an expansion in the number of public and private universities have taken place in 2005 with the establishment of 2 public along with other two private universities which absorbed a large proportion of Iraqi migrants and from other nationalities.

7 Summary and Conclusions

Foreign human capital has its effect on international students’ enrollments among the faculties of engineering, Information technology and nursing. For other human capital attributes, such as teaching, professional experience (except professional experience from a local source in the faculty of IT), training courses and experience in international organizations has no effect on international student enrollments in any of the faculties under study.

That is , the investment in Jordanian human capital through outmigration of graduate students to achieve their PhD degrees from western universities and afterwards retuning back to Jordan as circular migrants have contributed over the years to building a strong reputation of Jordanian universities among Arabic countries in the Middle East region.

Combing investment in human capital, brain circulation, international students and higher education export is unique case of study such as the case of Jordan, where investment in human capital and brain drain curse consequences has a win-win situation effect on origin countries through returnees’ penetration effects.

Hence, it is legitimate to state that the return on investment on the human capital and the brain return of Jordanian PhD graduates (academic staff in universities) have resulted into economic gains to Jordan, through attracting international students, where in the end those international students contributed in transforming Jordan’s higher education sector from development assistance to an export commodity.

8 Austerity and Crisis: Alternate Sources for Development

In a country like Jordan, lacking natural resources, constrained by its geo-political position, and confronted with the consequences of 2008 financial crisis the austerity measures can be felt by universities, academic staffs, students, and parents, and may be manifested by the loss of institutional capacity to respond to change; the loss of academic, the research or other staff, particularly the best staff, lower staff allegiance and morale (due to declining salaries), or the loss of much of the time and attention of teachers or researchers as they are forced to ‘moonlight’ elsewhere to maintain their real wages (Johnstone, 2002). In these situations, countries should

⁹ In 1989, the Council of Higher Education endorsed the first policy document, the private universities Law Nr.19 of 1989, authorizing the establishment of the first private university.

consider investing into their human capital and shape their policies towards achieving sustainable economic benefits from it.

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