

Highly-Skilled Migrants in the Arab Mediterranean: Who, why and what is to be done¹

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Introduction

Highly-skilled migration seems a phenomenon restricted to less developed countries. It is generally seen as being positive for the destination country and, generally, negative for sending countries. There are, it is true, occasions when it can engender education growth in the origin countries and thus produce positive effects⁴. But politicians in countries of origin tend to look askance at the migration of their brightest citizens.

In this paper we will analyse the role played by highly-skilled migration from the Arab Mediterranean. We will compare its characteristics, causes and effects with two groups of countries: more developed northern Mediterranean countries, which have experienced massive migration in the past, namely, Portugal, Spain, Italy and Greece; and less developed Sub Saharan neighbors to the south, which have not yet exhausted their migratory potential.

The definition of highly-skilled migration used in the present volume encompasses migrant graduates and their degrees, be they obtained in the origin or in the destination country. If we adopt the human-capital theory (Gary Becker⁵) or the signal theory (Michael Spence⁶) a worker with a university degree is more productive because, respectively, education has increased his or her productivity or because education is a marker of higher abilities. The highly-educated are, in any case, Becker and Spence allow, more productive. The outflow of highly-skilled migrants has been referred to as 'brain drain': a vivid term for a loss to the nation and for corresponding damage to growth. This contrasts with Oded Stark's 'brain gain', when the positive effect on the aggregate level of education induced in the country of origin is taken into account. In the past and still sometimes now the words 'brain drain' have also been applied to unskilled migrants. The point is that migration is a selective process and that the best migrate: in the case of unskilled migrants, perhaps 'ability drain' would, though, be more appropriate.

The first part of the paper compares highly-skilled Arab migrants from the Mediterranean with southern European and Sub-Saharan migrants. Here we employ data on migrants available from destination countries which refer to the years 1990, 2000 and 2005. We also employ the information available from CARIM

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⁴ See Stark O., Helmenstein C., Prskawetz A., (1997), Mountford A., (1997), Beine M., Docquier F., Rapoport H., (2001).

⁵ G.Becker 1975, Human capital, NBER , NY.

⁶ M.Spence, 1973, Job Market Signaling,

correspondents, set out in a number of papers⁷, and of MPCs⁸ in the sending countries to inquire into recent highly-skilled migration. The second section looks at the use of education in the destination countries (over education and over occupation) comparing the four groups of countries. The third section, meanwhile, inquires into the evolution of the educational system in the origin countries and, in particular, into university enrollment and the quality of a university education there. The fourth part presents some new results on 'brain drain' in the south-eastern Mediterranean noting important differences between the Maghreb and Mashrek. The paper concludes with an evaluation of the emigration of the talented, its development and its likely effects.

1. Many migrant destinations: few highly-skilled migrant destinations

To get some sense of the size and the main characteristics of highly-skilled emigration from the Arab Mediterranean we use information collected in the destination countries. The destination countries alone report migrant education and skill level. The most exhaustive sources are now available from OECD census information, thanks to the efforts of Docquier and Marfouk (DM)⁹ and the OECD team (DIOC).

These datasets also have their weaknesses, however.

The first and most important weakness are time limitations. For many countries the last census is not yet available. Nor is there information available on the effects of the 'Arab Spring', nor, indeed, on the global recession which affected labour demand in the destination countries. On both issues we, happily, have though additional information, which, even if fragmented, we can and that we will exploit to complement and update the general picture.

A second limitation is that different definitions are used in different censuses and, for the update in 2005/2006, the local registers have also been used. In addition, education levels are self reported and no external checks are possible. Being derived from censuses, the information is not in a time-series. It also only covers OECD countries, reducing representativeness. Even if the DM and the OECD datasets are based on the same sources, they go in different directions.

The DM dataset has been extended to include the year of arrival in order to check where the education of the migrant took place. Then, in the 2000 release, in addition to OECD countries, Gulf, African and Latin American states are included as destinations (BDM 2009). This extension is particularly important for south-eastern Mediterranean countries. Unfortunately the quality of the information is not the same and our ability to compare all these different sources is limited. On the other hand, the OECD dataset has been extended by extracting the employment level from censuses. This permits the study of what has been called the 'over education (brain waste) of migrants'. It now goes up to 2005.

All these different sources can be used to build up the best possible picture of graduate emigration from the Arab Mediterranean, in addition, of course, to the information provided by CARIM correspondents.

1.1 The distribution and numbers of stocks by destination

Different aggregate emigration patterns emerge especially among the Arab Mediterranean countries for the year 2000 (see Fig.1 derived from BDM, 2009).

For the Maghreb countries, Europe and in particular France are the main destinations for total migration with just a minority going to Australia, Canada, New Zealand and the USA. For the Mashrek countries, instead, the Gulf countries are the main destination, followed by the non-EU OECD countries: the EU, in fact, is practically irrelevant.

Southern European countries shared their emigrants between Europe, on the one hand, and Australia, Canada, New Zealand and the USA, on the other. Indeed, the stock of migrants for the second group¹ listed is very large, but old and free mobility has favoured the EU, while outflows to the Gulf and to Africa are very limited.

For the Sub Saharan countries, instead, inter-African migration is typically the most important, and when it is not the most important, it is, in any case, more important than emigration to EU countries. Even if there is a systematic underreporting of internal migration among Sub-Saharan African countries – where boundaries are not so well defined and controlled and where the notion of 'international migrant' is only awkwardly applied to citizens of neighboring countries – the total number of emigrants is not particularly important. A notable

⁷ CARIM Consortium for Applied Research in International Migration, <http://www.carim.org/#CARIM>

⁸ Migration Policy Center, <http://www.migrationpolicycentre.eu/>

⁹ See Docquier Marfouk 2006.

exception here is Mali where the number of migrants abroad is very large: 23% of the total labour force; against an average of 3% for neighboring countries.

What also emerges is that countries have a large pool of potential migrants given their demographics: Egypt, Algeria, Sudan and, to a lesser extent, Morocco have large numbers of migrants abroad, but in percentage terms they employ this channel less and in different ways. Egypt, for instance, favoured or accepted temporary migration to Arab countries, keeping the size of the diaspora abroad down to 3.3% of the resident population.

If the information on total migrant flows by main destinations is relatively accurate, the information on the skill level in Africa and in the Gulf countries is much less so. Therefore, in terms of OECD countries we are almost certainly underreporting Mashrek and Sub-Saharan African migration flows.

Table 1 Total and Highly-Skilled Emigration Rate c. 2000					
	Total Emigration Rate	Total Highly-Skilled Emigration Rate		Total Emigration Rate	Total Highly-Skilled Emigration Rate
Tunisia	6.49	15.8	Italy	5.22	7.07
Algeria	6.2	14.8	Spain	3	2.4
Morocco	8.7	14.3	Portugal	15.3	12.21
Libya	2.2	4.5	Greece	7.1	7.56
	Total Emigration Rate	Total Highly-Skilled Emigration Rate		Total Emigration Rate	Total Highly-Skilled Emigration Rate
Sudan	1.01	7.89	Niger	1.06	6.26
Egypt	0.8	5.6	Mauritania	1.63	10.26
Lebanon	12.61		Mali	1.05	14.57
Jordan	2.4	4.7	Senegal	3.45	14.81
Syria	1.81	12.36			
Source OCDE, 2011, DIOC					

Thus, looking at the emigration rate towards OECD countries (Table 1), we are not surprised at finding higher values in the Mashrek: Tunisia (6.46), Algeria (6.2), Morocco (8.7), with the notable exception of Lebanon (12.6)¹⁰, which is much lower: in between 2.4 and 1¹¹. The Maghreb countries have an average 15% share of highly-skilled migration, while, with the exception of Lebanon, the share of highly-skilled migrants in the Mashrek is lower: 5.6% in Egypt, 4.7% in Jordan and 7.9% in Sudan.

Sub-Saharan countries have low general emigration rates (2-3%), but significant highly-skilled migration rates (14%).

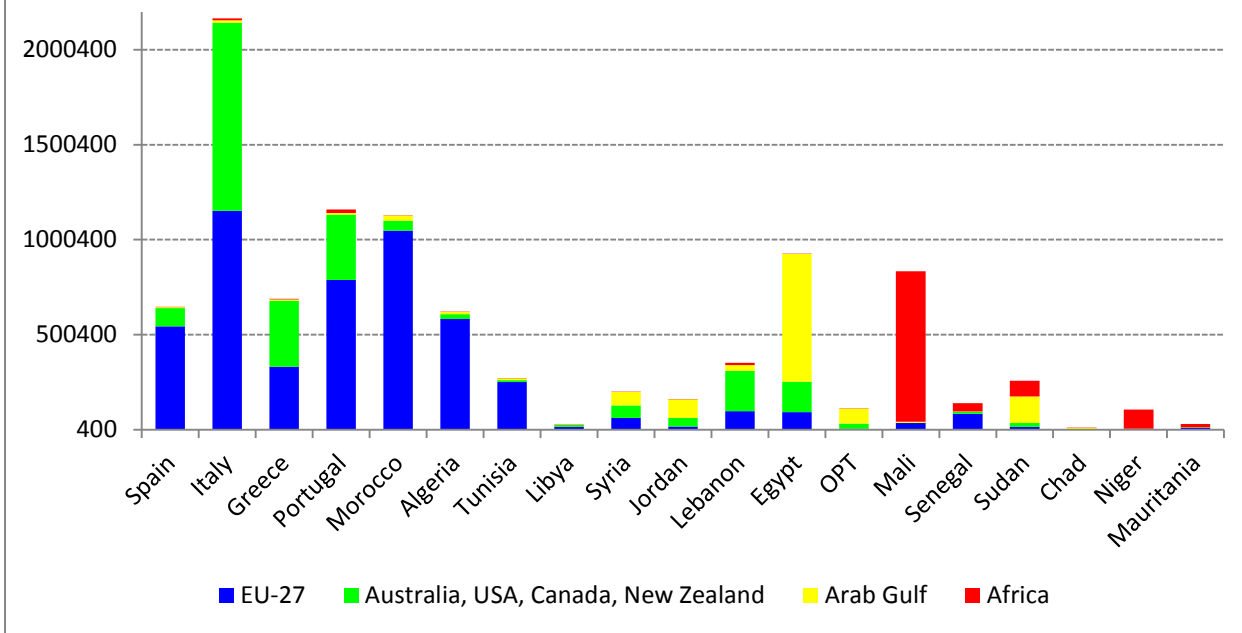
The southern European countries are also emigration countries with Portugal taking the lead both in terms of total emigration (15.3%) and the highly-skilled emigration rate (12%). Greece (7%), Italy (5.2%) and Spain (3%) have similar emigration and highly-skilled emigration rates. In the last decade the recession has spurred southern European emigration with southern Europe taking the lead in the Mediterranean.

¹⁰21% of Lebanese citizens live abroad.

¹¹Source OECD DIOC, 2010, International Migrants in Developed, Emerging and Developing Countries, p.43-45.

Fig.1 Stock of migrants by origin country in main destination areas around 2000

(Source: Beine, Doquier & Marfouk, 2009)



Women are, on average, only 35% (the range is 24%-46%) of the migrant stock, something which points to a less settled community abroad, where male migration still dominates. For the Maghreb countries and for Lebanon and Libya the female share is higher due to an older emigration tradition.

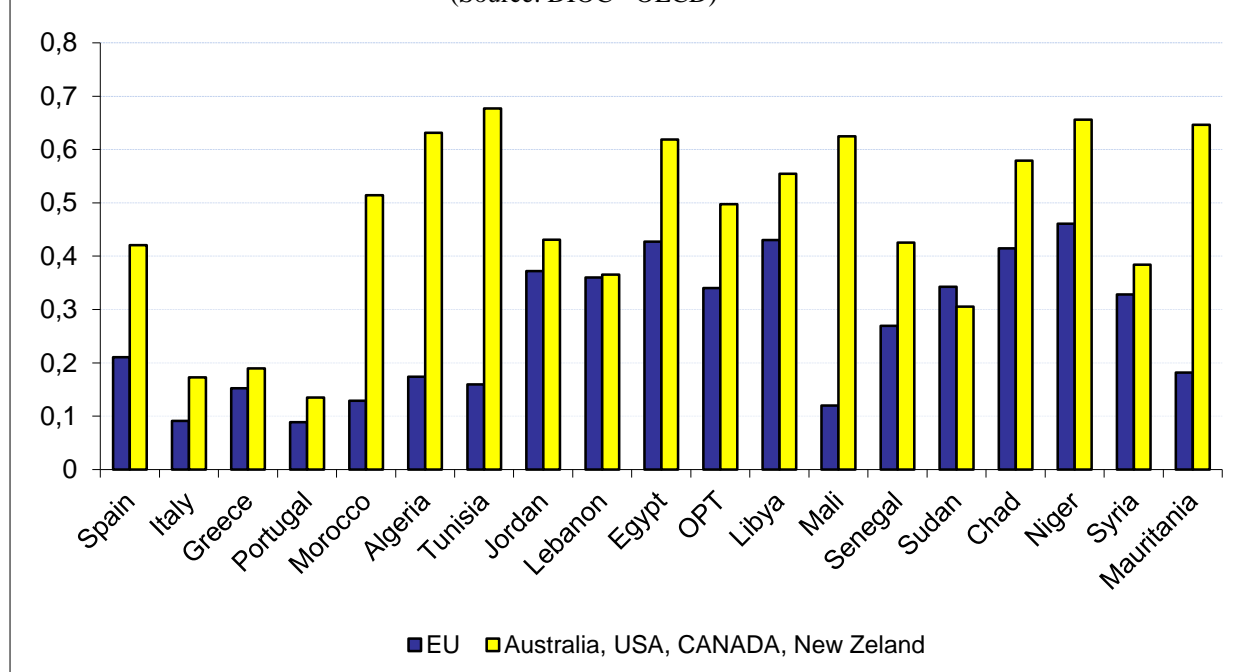
The destination countries not only attract immigrants in different ways. They also select migrants by education level. In Figure 2 (drawn from the DIOC-OECD 2012) we compare the skill composition of outflows from south-eastern Mediterranean countries with southern European Mediterranean countries and with Sub-Saharan African countries. What quickly becomes apparent is the selectivity of emigration to North America, Australia and New Zealand. These were able to attract more highly-skilled than unskilled workers from 'all' origin countries. The European Union, instead, is less competitive in hiring the highly-skilled. While only 30% or fewer immigrants in Europe hold a university degree, in Australia, Canada, New Zealand and the USA the average is 50%.

Migration to other African countries, not reported in the figures are even less skilled than migration to the EU. The important Mashrek outflows to the Gulf include both the highly-skilled and the low-skilled. Heba Nassar (2010) states, in relation to Egypt, that highly-skilled migrants range from 20% to 80% according to destination.

The positive skill composition of the flows relies fundamentally on three main factors: labour demand in the destination countries in terms of jobs available and the wage level offered; the selectivity of migration policy; and the linguistic affinity between destination and origin country, which, when close, helps with the adaptability of human capital.

Fig. 2 Share of highly skilled migrants to main destination areas in 2005

(Source: DIOC - OECD)



On the demand side, Australia, Canada, New Zealand and the US have more jobs on offer for the highly-skilled than European countries. In addition the Anglo-Saxon labour markets hold a higher wage premium which also attracts highly-skilled workers from Europe. According to OECD data on earnings distribution¹², the dispersion between the first and ninth earning deciles in 2007 was: 4.85 in the USA, 3.75 in Canada, 3.59 in UK; while it was 2.91 in France, 3.26 in Germany, and 2.31 in Sweden.

A second reason why Anglo-Saxon countries were able to attract more skilled migrants is their migration legislation. This legislation favours the entrance of skilled immigrants (point systems) and eases the entrance condition for the highly-skilled among immigrants from all countries of origin. In addition, home universities are open to foreign students, who are trained and then work in the destination countries: this fact favours the recruitment of highly-skilled foreign nationals. Last there is the question of language affinities and knowledge, which reduces the cost of emigration and makes human capital more marketable. This explains why highly-skilled migrants from the Maghreb prefer France and Canada, while Egyptians tend to go to the USA or the Gulf. In these destinations, they get a higher return on their human capital and, in addition, for a similar economic return, there is a lower social cost because they tend to know the language.

Our source for the most recent skilled emigration is derived from CARIM and MPC correspondents. Even if the trend which emerges is not directly comparable with the previous dataset, the trend is, broadly-speaking, similar. The emigration outflows continue towards the same preferred destinations: emigrants from the Maghreb countries head mainly towards Europe. Mashrek emigrants, meanwhile, go mainly towards the Gulf. Much less is known about skilled migrants. Egyptian migrants are more educated than non-migrants: indeed, 40% of Egyptian emigrants to Saudi Arabia and 70% to Oman are highly-skilled (Nassar, 2010). Of Moroccan migrants to Canada 36% (2006) are highly-skilled (Kachani M, 2010). Tunisian migrants in France are more highly educated than migrants to recent immigration countries like Italy and Spain (Fourati 2010). In Algeria investments in higher education create a larger pool of educated potential migrants, given the inability of the economy to create appropriate jobs at the same speed (Boukليا, 2011). In Jordan 40% of emigrants are highly-educated, and they are better educated than non-migrants. The share of highly-educated migrants from Lebanon was already very high and is now even higher (Kasparian, 2010). A survey carried out in 2012 by Philippe Fargues and Christine Fandrich (2012) suggests that the propensity to migrate has been even higher since the Arab Spring. Indeed, Fargues claims that uncertainties about job options and the home country's democratic evolution are, in fact, increasing the propensity of potential migrants to leave their country.

In southern Europe the trend towards higher migration is the same, even if less pronounced.

In Sub-Saharan Africa highly-skilled migration is not perceived as an important issue, not least because the total number of highly-skilled migrants is limited. In Mauritania (Sidna, 2010) highly-skilled emigrants make up 22% of all migrants and 10-12% of the highly-skilled labour force. In Mali (Traore, 2010) the share of

¹² OECD 2009 Employment Outlook.

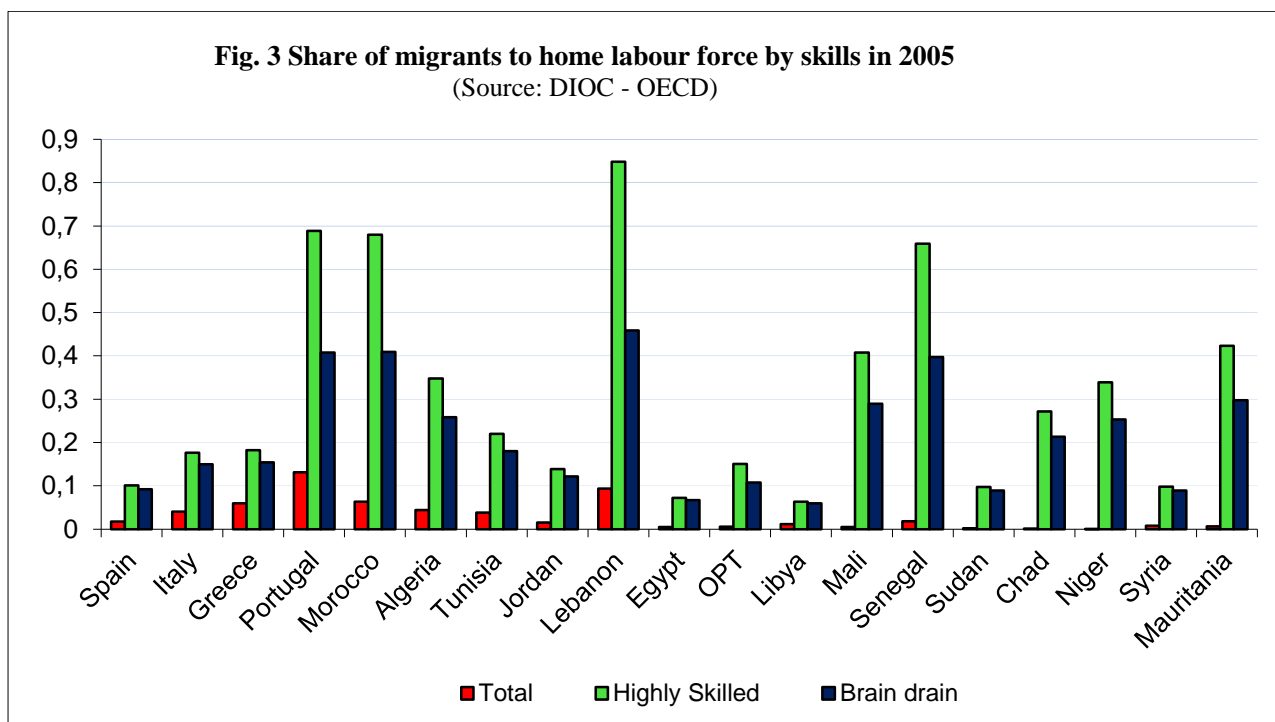
students abroad is high as unemployment among the highly-skilled stands at about 25% (2005). But the beneficial effect of the diaspora is also understood. The same is true in Chad (Djonata, 2010), where the government has tried to attract the student diaspora abroad back home. In Niger two phenomena are mixed: the inflow of foreign nationals that go to make up 0.8% of the population and 5% of the enterprises; and a large share of the highly-skilled among the diaspora (Maga, 2010). Senegal, after a long tradition of emigration to neighboring countries, has seen more intense emigration toward Europe and North America. This change has also altered the composition of emigration flows and has increased the share of the tertiary-educated, including doctors, who are needed in the native health system (Tall, Tadian, 2010).

1.2 Stock of education migrants and brain drain in OECD countries

Unfortunately, it is only possible to inquire extensively into the composition and the type of highly-skilled migrants in OECD countries. This means that we cannot properly understand emigration from the Mashrek. Nevertheless, we focus on similar destination countries where the policy debate is lively and more easily comparable.

The stock of highly-skilled migrants is related to the stock of the highly-skilled population at home and, thus, is related to the phase of human-capital growth in the country. What is usually called 'brain drain', in the economic literature, is measured by the ratio of highly-skilled migrants to the total number of highly-skilled both in the country of origin and in the destination countries¹³. If we limit our emigration analysis to OECD countries, Lebanon is the most exposed. Here the number of highly-skilled workers abroad is about 80% of the stock of the highly-skilled population at home, thus the brain-drain indicator, as defined above, stands at about 50%. For all other countries, even the Maghreb countries, which typically send their migrants to the OECD, the share of the highly-skilled population abroad is only a small share of the highly-skilled stock at home: in Morocco 32%, in Tunisia 19%, in Algeria 25% and, for the other countries, the rate is even lower.

As the comparison with the North Mediterranean countries suggests brain drain is a common phenomenon, not limited to the southern Mediterranean. Portugal and Lebanon, for example, have comparable numbers, numbers that are higher than for other countries.



2. Over-education and over-occupation of migrants in OECD countries

Is there a match between education and employment among migrants in destination countries?

¹³ The Brain Drain index is calculated as the ratio between the number of tertiary-educated migrants and all individuals with tertiary education at home and abroad.

To understand this important issue better we use the OECD-DIOC dataset which only includes OECD countries. The data set, thus, covers the majority of Maghreb emigration, but a much smaller share of emigrants from the Mashrek. As before, we compare these two groups with southern European and Sub-Saharan countries. We have classified education and employment into three categories: high, medium and low. We computed, thereafter, the **index of match**, namely we established whether the ranking of education matches the job ranking in the two main destinations: Europe and the relevant Anglo-Saxon countries (Australia, Canada, New Zealand and the USA).

In Europe foreign nationals have a better education-occupation match than natives (60% versus 52%), while in the Anglo-Saxon countries the match is similar between natives and migrants (53%). The **index of over-education** presented by the OECD (2007) has been revised into two groups: **light over-education**, where the education ranking does not match the job ranking by one rank; and **strong over-education**, where the education ranking does not match the job ranking by two ranks (e.g. a university student doing a manual job). In Europe strong over-education is very limited: 1.5 for natives and 2.9 for foreign nationals. In Anglo-Saxon countries, meanwhile, light over-education is important (26% among natives and 23-25% among foreign nationals) and strong over education (brain waste) is much larger both for natives (2.9%) and for migrants (6.9%).

Foreign nationals can, however, improve their career even without education, thus we also computed a ranking match of both **light and strong over-occupation**. Here there is a symmetry. Where there is less over-education, i.e. in Europe, there is more over-occupation and *vice versa* in the Anglo-Saxon countries.

Table 2: Over-education and Over-occupation of workers in

EU27 destinations

US, Australia, NZ and CANADA

COUNTRIES	Over-occupation		Matching	Over-education			COUNTRIES	Over-occupation		Matching	Over-education		
	Strong	Light		Light	Strong			Strong	Light		Strong		
	-2	-1	0	1	2	all		-2	-1	0	1	2	all
South EU							South EU						
Spain	4.47	18.43	53.43	21.58	2.08	119310	Spain	1.87	14.20	58.77	22.27	2.89	74089
Italy	4.26	19.68	58.43	16.81	0.83	355817	Italy	5.62	20.15	52.12	20.02	2.09	433937
Greece	1.55	23.79	67.57	5.95	1.14	63621	Greece	8.38	21.69	50.89	16.85	2.20	165436
Portugal	3.68	11.99	65.39	17.75	1.20	304949	Portugal	3.87	15.97	58.70	19.65	1.81	222660
Maghreb							Maghreb						
ALGERIA	6.3	22.64	53.91	15.49	1.65	516,759	ALGERIA	0.78	10.17	57.03	23.68	8.33	15,936
MOROCCO	4.4	19.63	61.82	12.33	1.82	600,215	MOROCCO	1.49	13.2	55.92	23.91	5.48	39,599
TUNISIA	7.2	20.42	54	16.73	1.66	127,355	TUNISIA	1.26	9.53	61.91	21.46	5.84	6,813
LYBIA	7.34	32.36	51.58	7.88	0.83	21,323	LYBIA	0.79	11.36	56.53	25.43	5.9	7,492
Mashreq							Mashreq						
JORDAN	2.38	14.22	67.53	12.97	2.91	5,051	JORDAN	1.51	13.19	53.31	25.72	6.27	30,059
LEBANON	3.31	16.45	63.42	14.38	2.44	35,346	LEBANON	3.9	16.08	54.83	21.28	3.91	122,545
EGYPT	3.61	19.52	53.14	18.62	5.1	56,667	EGYPT	1.32	9.16	60.17	22.54	6.81	99,050
PSE	3.24	13.69	67.03	11.98	4.05	2,220	PSE	5.56	15.78	52.81	19.83	6.02	3,257
Sub Sahara							Sub Sahara						
MALI	6.31	16.09	64.02	10.69	2.89	23,052	MALI	0.7	18.3	51.86	21.69	7.45	2,148
SENEGAL	6.14	14.86	66.09	10.65	2.26	57,356	SENEGAL	1.28	14.04	51.64	27.47	5.58	7,423
SUDAN	2.69	13.13	62.91	15.8	5.47	6,031	SUDAN	0.73	10.81	45.2	31.04	12.22	13,586
CHAd	3.5	17.74	58.22	16.96	3.58	2,683	CHAd	0	8.47	40.92	38.5	12.11	413
NIGER	4.21	14.47	58.25	19.82	3.25	1,140	NIGER		12.44	55.32	27.29	4.95	667
SYRIA	3.67	13.84	61.32	17.31	3.86	19,409	SYRIA	2.21	14.11	57.34	21.14	5.2	36,888
MAURITANIA	5.57	14.35	65.36	11.13	3.58	7,059	MAURITANIA	0.61	15.52	54.28	21.18	8.41	1,308
Total mean	4.41	17.75	60.71	14.46	2.66		Total mean	2.33	13.90	54.19	23.73	5.97	
Avg_MENA	4.59	17.79	60.23	14.40	2.98		Avg_Mena	1.66	12.62	53.91	25.07	6.86	
NATIVES	4.7	25.09	51.55	17.17	1.48		NATIVES	1.41	16.43	53.09	26.21	2.87	

Note: Matching if education holds the same rank as occupation, Overeducation "strong" if education is two ranks above occupation rank, Overeducation "light" if education is one rank above occupation rank, Overoccupation "strong" if occupation is two ranks

In Europe the matching among national groups is very similar with values that range from 53% to 67%, both in southern Europe and in the Mashrek, and 53-63% in the Maghreb, while for Sub-Saharan countries it

stands at 58%-66%. The share of strong over-education is similar in all the communities and light over-education is more important among Spanish migrants, 21%, than among other nationals. Also strong and light over-occupation are similar, but stronger among Maghreb and Southern European workers than among other nationals.

A different picture is found in Australia, Canada, New Zealand and the US where the share of strong over-education is less important among southern European workers. It is much more important for migrants from the Maghreb and Mashrek, but also for Sub-Saharan migrants. Light over-education for natives, meanwhile, stands at around 26.21%. Over-occupation is more likely for southern European countries than for other regions.

These results might be surprising to some. In Europe there is less 'brain waste'. Australia, Canada, New Zealand and the USA have more brain waste across all regions studied here and even more among African migrants despite their reputation as being lands of migrant opportunity. The reason for this unexpected result is simple. It is easier to enter the non-European countries with a higher education degree, but it is more difficult to find a job at that level. While in Europe migrant selection is less important, the share of unskilled migrants is much larger and most hold unskilled jobs: this means that brain waste is far smaller. In Europe not only is brain waste smaller, but also the possibility of upgrading, the many forms of over-occupation, is higher: 4.6% and 17.8% *versus* 1.6% and 13%. In Europe entrance into the labour market is essentially from below: in low-educated and low-skilled positions and thus upgrading is more likely. In Australia, Canada, New Zealand and the USA entrance is mainly from above. Brain waste is, therefore, more likely, but it is the result of the entrance type. This pattern is consistent with the native type of over-education and over-occupation (last line in Table 1). It is typical of the structure of the labour market and discourages any discrimination-based interpretation. If we look at the education level match and the destination match for the highly-educated the numbers stand at 46% for Europe and 58% for Australia, Canada, New Zealand and the USA. The match for the low-educated, meanwhile, is 39% in Europe and only 13% in the Anglo-Saxon countries. This, again, suggests two different skill pools attracted to the two areas.

What type of highly-skilled education do immigrants hold? In the OECD-DIOC dataset sampling is limited and so caution is needed.

The 'hard sciences' lose out against the 'humanities' broadly speaking: 34% in sociology, business and law, 9% in the classic humanities and 6% in education; against 20% in engineering and 13% in hard science.

The picture, however, changes if EU and non-EU OECD countries are compared.

In both cases engineering represents about 20%. But in Europe the sciences are less important (6% against 16.65%), while a large share of migrants hold a degree in health and welfare (17% against 9.34%). This last degree is particularly important for migrants from the Occupied Palestinian Territories, Sudan and Syria (more than 30% in Europe and 11% in Australia, Canada, New Zealand and the USA) and from Jordan (in Europe).

The social sciences are more important than science and engineering in Australia, Canada, New Zealand and the USA, while in Europe the two groups have about the same importance.

With the previously mentioned exception, the data do not show national specialization in a single field of education. So a concentration in engineering on the part of Moroccan, Senegali and Malian migrants in Europe has no correspondence among the migrants from the same countries in North America, Australia and New Zealand. Jordan is very important in the health sector in Europe, but in engineering in the Anglo-Saxon countries listed above.

It would be interesting to understand if the education field (humanities, sciences...) play a role in the misuse of education level. Unfortunately the data do not allow a specific answer to this question in terms of employment match. But we can, however, inquire into the possibility of employment by education field and destination area. According to the DIOC dataset engineering and health and welfare offer better employability: they are both above average in Europe and in North America, Australia and New Zealand¹⁴.

3. The Evolution of Education and of Education Quality

The previous section shows that migrants from different countries in our group go to different destinations, but also that they differ in terms of human-capital stock or better that they differ in human-capital

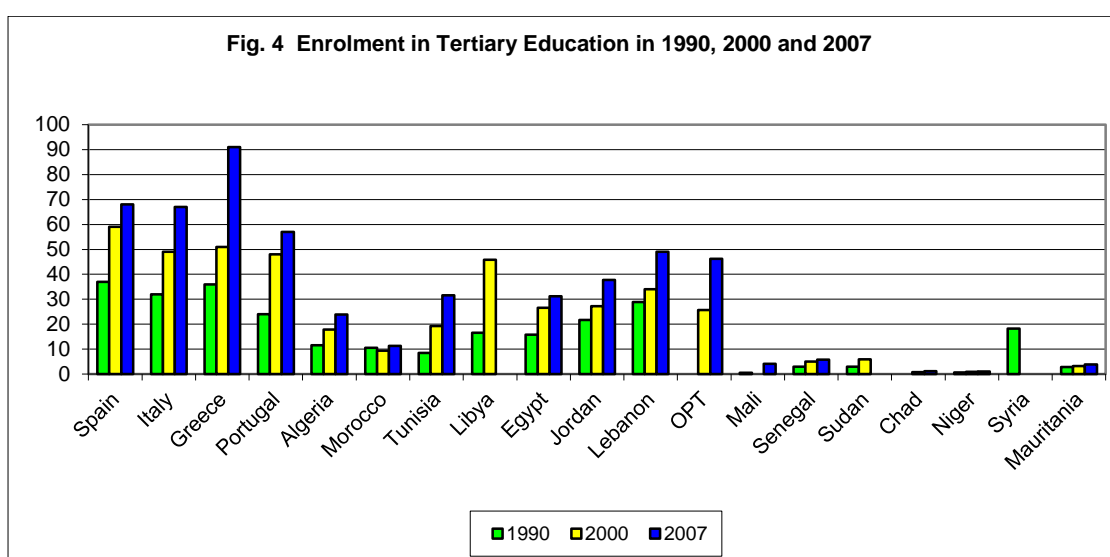
¹⁴ In Europe the share of those employed on the labour force within the specific field of education is 64% and 65% versus a 63% average; in North America, Australia and New Zealand the numbers stand, instead, at 71% and 67.4% versus the average of 67%.

development. Tertiary enrollments represent crucial information for understanding the skilled human-capital reservoir available in the country.

Sub-Saharan countries lag far behind and never reach 30% in **secondary enrollment** country rankings. In Morocco secondary enrollment stood, instead, at 55% in 2007. For all the other countries in the Mediterranean secondary enrollment exceeds 80% and it is just a little lower than southern European enrollment.

The same ranking is replicated in the **tertiary education** stakes, with Morocco in an intermediate position between the lowest group (11%) and the south-eastern Mediterranean countries (see Fig.4). All the countries experienced an increase in tertiary enrollment in the 2000s, but when the starting level is very low, as in Sub-Saharan African countries, the totals do not change significantly. However, we have to emphasize here the recent impressive investment in human capital made by Algeria, Tunisia, Egypt, Jordan, the OPT and Lebanon.

Two cases stand out: Lebanon and the OPT with more than 45% tertiary enrollment: the OPT will be higher now after a spurt of growth, while Jordan lags a little behind with 37%. There has also been an increase in Tunisia, and in Algeria (22%) and Egypt (31%), which were, though, starting from a higher level. Expansion is, naturally, constrained by population size.



The countries in the sample are evidently in different phases of human-capital accumulation. The southern European Mediterranean countries are in a mature stage of human-capital development, with Portugal catching up. Some of the Mashrek countries are in an advanced phase of human-capital accumulation, enrollment in tertiary education is high and one fifth of the population has been to university, with a value which is very close to Portugal's. There is, then, an intermediate group, where between 30% and 20% of the university-age population is attending university. Then there are the Sub-Saharan African countries, still in an early phase of human-capital accumulation, with only a very small fraction of the population (below 10%), with school and university experience.

How important is investment in highly-educated students in comparison to total investment in education?

The **tertiary incidence** is meant to give the incidence of students in tertiary centres as a proportion of all the school levels in terms of quantity (rather than in terms of costs). First of all, the increase in tertiary-educated students against the overall number of student is there in all countries. But in Egypt, Algeria and Tunisia the increase is striking and ranges from 5% or less in 1990 to 13-15% in 2007. Again three groups emerge among the countries studied here. There are the two leaders, Lebanon and Palestine, which had already shown a high value with about 19% of students at university in 2007 (probably also Libya). These are similar to the Southern European numbers: 20% Portugal, 25% Italy and Spain and 33% Greece. Then, there is a second group: Egypt, Jordan, Tunisia and Algeria where around 15% attend university. Then, still other countries have around 7% of students at university. The increase in the share of the tertiary-education represents an important change for the labour force. Among the educated 15% hold a university degree, and society experiences an increase in the share of people able to take on social and political matters. The countries in an initial phase of human-capital accumulation do not, however, invest less than others in education.

On the contrary, **the share of GDP and the governmental budget** invested in education shows a greater interest on the part of policy-makers. In this regard, Morocco, Senegal and also Tunisia invest more than 20%, similar to southern Europe at 20-25%: in Mali and Niger the numbers stand at about 17%, demonstrating a new interest there too.

Special attention should also be devoted to tertiary education, in terms of its **share of the total education budget**: e.g. Tunisia (24.2%), Morocco (16.9%), Chad (18%) and Senegal (23.5%). Here it reaches a larger size than the size of this group in total education. The comparison with the southern European countries shows how size is similar, but how investment duration is far more recent and that, therefore, the aggregate effect is smaller¹⁵.

Public investment in education frequently fails to satisfy the general demand for education. This demand is then satisfied either by private institutions or by students studying abroad. Non-private enrollment shows that there is an important demand for secondary education which is not being satisfied by the public sector and that private institutions fill this gap. This role is particularly important in Sub-Saharan African countries where it represents 16-49% in the general programs and 17-76% in the vocational or technical programs and where Mali has the lead (Traore, 2010). In the same area the large number of students abroad, 18-24%, offers another way to build up human capital in the initial phase of human-capital development. For Sub-Saharan African countries the most popular destinations are France and Europe, but also the USA and Morocco. In Niger (Maga 2010) the growth in demand for private education has been brought about, in part, by the economic and social crisis which has reduced the motivation of teachers and public education performance, in general. In Mauritania (Sidna, 2010, p.5) the government is, instead, supporting private education abroad by integrating the total cost with 36% of the total budget for tertiary education in 2007, while families invest money equal to 80% of the total government budget in tertiary education. This program is now structural, that is to say that it has become a permanent part of the country's educational project.

The countries of origin try to keep in touch with their students abroad to avoid 'brain loss' by having them return home once they have their degrees or by involving them in educational programs like TOKTEN in Mali, Chad and Niger.

In Lebanon private universities have a long tradition and more than 50% are enrolled in these.

An important fact emerges from the research of CARIM and MPC correspondents. Large investments in tertiary education, undertaken by all countries, and increases in the enrollment rates do not, in themselves, guarantee quality in education.

An accurate analysis of quality in education is, of course, difficult. World Bank research (2008) covers only some of the countries in the CARIM network, but the information collected shows that an increase in the number educated is taking place but that there is a likely fall off in quality¹⁶. The teacher-student ratio is not increasing proportionally so classes are growing larger. In addition, it is difficult to retain control over the university degrees provided by private institutions.

The Algerian correspondent complains about the *ordonnance* (05/07) of July 2005 which demands that private institutions adopt the same programs and rules as public ones. So, for example, all lessons have to be in Arabic – Arabic is the sole language used by the public sector. This naturally reduces competition between public and private institutions there (Boukha-Hassane, 2010).

The same issue has been reported by the Mauritanian correspondent (Sidna 2010, *ordonnance* 2006-7), who stresses how Mauritanian students with no knowledge of foreign languages suffer on the job market.

In the Middle East and Northern Africa the time devoted in school to religious and moral education is almost double that found in other advanced and developing countries¹⁷.

The recognition of educational level by immigration country, a problem behind many cases of brain waste, is becoming even more critical with the decline in education quality¹⁸.

Education quality also depends on the faculty that students attend. The humanities and social sciences and business dominate the picture: 45-65%. There is also a low percentage of engineers who are, however, in demand abroad. In the short-term, sending countries, by investing in engineering and similar disciplines, risk, as Khachani (2010, 2010-) pointed out for Morocco, producing still larger outflows.

On this issue Sultana and Watt (2007)¹⁹ of the ETF have a clear-cut position. Instead of increasing academic higher education the MENA countries should channel a larger number of young people into technical vocational

¹⁵ Portugal 18%, Greece 24%, Spain 22% and Italy 26%

¹⁶ The Road not Traveled. Education Reform in the Middle East and Africa, The World Bank.

¹⁷ See World Bank 2008.

¹⁸ See Sabadie *et al.* 2010, ETF pag.65.

education and training. This, they argue, would prove a more effective tool for combating poverty and unemployment.

4. The effect of highly-skilled migration on the human capital of the origin country

The literature on highly-skilled migration has increased in the last 15 years, with a revision in understanding of the role played by highly-educated emigrants advanced by Stark, Helmenstein and Prskawetz, (1997), Mountford, (1997) and Beine, Docquier and Rapoport, (2001). The loss in human capital – brain drain – could be transformed into human-capital growth – brain gain – in the sending country. At least this would be the case if the probability of emigration among the highly-educated to incentivize enrollment in higher education. Emigration being limited, the final result would be an increase in the highly-educated labour force. In terms of endogenous growth theory a larger educated labour force should favour economic growth.

The empirical evidence on this issue is, however, neither straightforward nor uniform.

The model adopted is quite simple.

The change in the stock of human capital in the origin country dHO/H – where HO is the stock of human capital in the origin country, and HF the stock of human capital in the foreign country, and $H = HO+HF$ the total human capital – was caused by highly-skilled migration in addition to other control variables. Highly-skilled migration is here the change in the stock of human capital abroad (dHF/H) (eq.I), plus, the initial level of human capital in the labour force (H/LF) and according to the specification, additional explanatory variables and controls (X)²⁰.

$$\frac{dHO}{H} = \alpha + \beta(H / LF) + (c - 1) \frac{dHF}{H} + \gamma X \quad \text{eq.I}$$

The research of Beine, Docquier and Rapoport (BDR) and of Easterly and Niarko (EN) (2008) is focused on the aggregate effect of highly-skilled migrants on the highly-educated population in the origin country. BDR consider all countries available in the DM dataset, while EN only looks at Sub-Saharan African countries, while employing the same DM source. As we explained before, the DM dataset has only two years, 1990 and 2000. Thus only a cross-sectional approach is possible with a beta-convergence analysis²¹.

The two estimates contrast. In BDR (2008) skilled emigration has a positive and significant effect on the education of the labour force at home. This suggests that brain gain and the initial stock of human capital is significant and negative as expected, indicating that the level of human capital in the country of origin matters. The lower the level of human capital, the larger the growth in education will be. The calculated effect of brain gain or brain drain for the south-eastern Mediterranean countries, in counterfactual terms, has only very limited effects on the highly-skilled labour force. This effect is, though, negative for the Maghreb countries and Lebanon. But when the effect is measured in percentiles of the total highly-skilled labour force, not surprisingly for the majority of the countries studied here the effect is nil or lower than 1%, while the effect is significant and negative only for Lebanon (-3.8%).

These results are not surprising and are in line with the descriptive evidence presented before. The sheer scale of highly-skilled emigration from Lebanon and Palestine is, in itself, a prerequisite for brain loss, which is

¹⁹ Sultana RG, Watt AG Career Guidance in the Mediterranean Region. European Training Foundation, Torino 2007 cited in Seyfried Erwin Quality and Quality assurance in TVET, NEDA-ETE Regional Project, 2008.

²⁰ A problem is the plausible endogeneity of the highly-skilled migration rate. This might be due to a causal relation that exists between the migration rate and human-capital growth, thus the effect of education level on the migration rate has to be tackled by a first-stage regression.

²¹ When the partial correlation between growth in human capital over time and its initial level is negative, there is β -convergence. In other words, a negative sign for the coefficient of the initial value of human capital would indicate convergence or a potential catching-up effect. Thus countries with a human capital rate close (far) to their steady-state level such as Lebanon (Mali) will experience a slowdown (speed-up) in human-capital growth which is commonly referred as conditional convergence. Barro and Sala-I-Martin (1992), Sala-I-Martin (1996), Mankiw *et al.* (1992) are usually referred to as seminal works depicting the β -convergence models from a neo-classical standpoint.

difficult to overcome with an increase in the tertiary-educated population. In Sub-Saharan African countries, instead, the small number of tertiary-educated could be beneficial for the educational system.

A similar test by Easterly and Niarko, limited to African countries, gives different results, the change in highly-skilled migration is not significant and the only significant variable is population growth²². Given the lower average level of tertiary education it might also hide a more pervasive effect on education.

Faini (2003) suggests that the effect of highly-skilled migration reverberates in tertiary, but also in secondary education – secondary education is, after all, a prerequisite for the continuation of studies. The results have been replicated by Docquier and Rapoport (2009). Both sets of results show the positive effect of highly-skilled emigration on secondary enrollment, which is interpreted by Faini (2003) as the pursuit of secondary education to allow a later move abroad to complete tertiary studies. The effect of the tertiary emigration rate on tertiary enrollment is, instead, non significant in the Faini tests and negative in the DR (2009).

These results are a very important stimulus for debate. However, the weakness of the tests rely on the dataset employed more than upon the specification adopted.

As already mentioned, the DM dataset only correctly reports highly-skilled emigrants to the OECD, while highly-skilled migrants from the Mashrek go, in large numbers, to the Gulf countries. Likewise migrants from Sub-Saharan African countries go to neighboring African countries and, indeed, almost everywhere else. A cross-sectional approach mixes countries for which the aggregate skill emigration pattern is well known, i.e. the Maghreb countries, with countries where a large share of the outflow is lacking. Thus the coefficient suffers ‘attenuation bias’ and the empirical results have to be taken with caution, even if the general conclusions of the empirical research are convincing.

BDR conclude from their cross-sectional approach that the smaller the country and the larger the emigration rate (around 20%), the more detrimental the effect of highly-skilled migration will be. And, even without econometric analyses, the picture in Figure 3 shows an instance where the share of educated workers abroad is large. This takes place because the country is small and advanced in educational terms. For larger countries the highly-skilled pool is larger and the effect on the number of the educated will be smaller.

We replicate, for our four groups of countries, the analyses presented above, remembering the limitation of the OECD-DIOC data set, which provides three years: 1990, 2000 and 2005, Table 3.

We first used the same model using area fixed effects²³.

	Log change in tertiary human capital			
			2	3
Cons			0.089	0.127
			0.06	0.077
HSEm.rate	-0.006		0.03	0.066
	0.03		0.03	0.047
HSEducation rate	-0.08*		-0.041*	-0.042*
	0.027		0.0122	0.01
Maghreb	-0.04			
	0.122			
Mashrek	-0.055			
	0.099			
South EU	-0.096			
	0.098			
Sub-Sahara	-0.25			
	0.16			
EmRate Maghreb			-0.1*	
			0.03	

²²The instruments used in the first stage are: dummies for the former colonies of the UK and France, the log distance from the USA, France and the UK and the log of population size. The most powerful instruments seem to be the distance from the USA and population size. In a companion equation Easterly and Niarko present the results of the effects of highly-skilled emigration on growth, and the variable is never significant, while secondary and tertiary enrolment and openness to trade are significant.

²³An important question raised by the authors is the plausible endogeneity of the migration rate. We follow BDR’s choice here and retain the country population size as a proxy of openness on migration and immigration quota aspects; the stocks of emigrants living in OECD area at the beginning of the period capture the network effect; and the Hausman test confirm that these variables were not correlated with unobservable effects.

EmRate Mashrek			-0.05**	
			0.025	
EmRate Maghreb2000				-0.029*
				0.06
EmRate Mashreb 2005				-0.167*
				0.06
EmRate Mashrek 2000				-0.06*
				0.039
EmRate Mashrek 2005				0.057
				0.076
R2				
Wald		166	26	32
N.Obs		38	38	38

Variables: EmRate Skilled emigration rate lagged one period; education *ex ante* proportion of tertiary-educated; Maghreb, Mashrek, southern European, Sub-Saharan dummies and interacted dummies with the emigration rate. Notes: Robust standard errors. White correction for heteroscedasticity

Country differences produce a non-significant coefficient for the emigration rate, col.1 (Table 3) and the only significant variable is the share of the tertiary education which stresses (given the negative sign) a convergence rate on growth among the tertiary educated. This is lower for countries with a high share of tertiary education and higher for countries with a lower share of the tertiary-educated. The introduction of area interacted dummies to allow a better control of the specific effect, in column 2, shows that both for the Maghreb and for the Mashrek the highly-skilled emigration rate has a negative effect on highly-skilled growth. However, the effect is stronger in the Maghreb than in the Mashrek. Brain drain seems stronger where the share of the highly-skilled is lower. In column 3 we divided the effect in the two periods and while, for the Maghreb, the effect is persistent and negative in both periods, for the Mashrek it is negative in the first one but not significant for the second. For Sub-Saharan countries the effect of highly-skilled migration is positive, while it is nil in the case of the southern European countries.

We also replicated the analysis of the effects of tertiary education on tertiary and secondary enrollment. This last was not reported and the only positive effect detected was for Sub-Saharan African countries for both secondary and tertiary education.

What emerges from the empirical analyses is in line with what was expected and with what has already been discussed in the research papers presented. Highly-skilled emigration in Sub-Saharan African countries, which are in an initial phase of human-capital development, do not damage growth in the education sector: on the contrary, highly-skilled emigration from there produces a positive effect on the enrollment rate. More problematic is the effect of highly-skilled emigration on the growth of the tertiary-educated in the Maghreb countries. For the Mashrek the emigration of the highly-educated has a very limited effect in slowing down the growth of the highly-skilled population because the number of tertiary educated is already very high.

CONCLUSION

In this paper we have shown that highly-skilled migration is not limited to less developed countries. On the contrary, it is present in Southern Europe and in countries with different phases of tertiary education development. It is not even related to country size. Larger countries do not have more highly-skilled migrants abroad, though highly-skilled migration can be more serious if not necessarily more damaging in small countries.

Highly-skilled migrants from all origin countries are attracted to Australia, Canada, New Zealand and the USA where, in general, half of the flow is highly-skilled. This depends on the economic system in these countries, which offers highly-skilled jobs, higher remuneration and, last but not least, a migration policy which favours the entrance of highly-educated non-nationals.

This last point has to be kept in mind when we refer to brain waste and over-education. For all countries under study – be they in southern Europe, the Arab Mediterranean or Sub-Saharan Africa – over-education is much worse among emigrants in Australia, Canada, New Zealand and the USA than in Europe. In Europe, instead, over occupation is a bigger issue.

This surprising result is a consequence of the larger number and the larger share of the highly-skilled entering the American, Canadian, Australian and New Zealand labour markets. There is a higher probability of finding highly-skilled jobs, but also a higher chance of downgrading there. In Europe, meanwhile, the low skilled pool is much larger and, therefore, downgrading is less likely. But over education is more common in the social and human disciplines than among the 'hard sciences' (mathematics, engineering etc). This, however, encourages emigration.

The origin countries have, then, a dilemma. They can invest more in education, which means more brain drain. Alternatively, they can favour economic development or find another way to favour development without brain loss.

The origin countries are in different phases of human-capital development. The southern European countries are ahead of the Mashrek, and the Mashrek countries are ahead of the Maghreb and the Sub-Saharan African countries. All countries are investing in tertiary education: the highest share of GNP is 26% in Italy, whereas the average is 20% in other countries. Private investment in education complements public investment, but in all countries there is an increase in the number of university students. The increase is, frequently, obtained at the expense of education quality. However, it is the result of an important effort on the part of states and families which are frequently, though, unable to find adequate returns and this encourages a move abroad. The structure and the evolution of the origin country economy means a decline in public employment accompanied by an inadequate increase in jobs. The mismatch between job demand and the growing supply of skilled workers is, in many cases, induced by political instability, which slows down development and which also discourages the localization of foreign investment.

The emigration of the highly-skilled is a loss for the country of origin, but is it compensated for by human-capital growth? Both the descriptive part of the research and the empirical tests stress that the effect can be different. For Sub-Saharan African countries, brain drain induced by highly-skilled emigration is not perceived as a problem. However, it has to be approached through the creation of more educated workers. The initial phase of human-capital formation is probably reinforced by the return of emigrants through teaching programs like TOKTEN (Fakhouri 2013, Maga, Djonta, Traore, 2010).

For the Middle East, with the exception of Syria, where reliable data is extremely limited, the high level of human-capital formation and the difficulties that the economic system has in creating adequate job opportunities are a result of the political instability there. Instead of producing goods with a high level of human capital the region specializes in the production of highly-skilled workers for emigration. Only a change in the political stability of the region will increase the incentive for FDI creating, in the process, adequate jobs. The empirical section shows a negative emigration effect on human-capital growth, but it is less negative than in the Maghreb.

Political variables are crucial not only in the Middle East, of course. Sudan also suffers from instability as do, in different ways, many countries in Sub-Saharan Africa. On the one hand, other countries push for an increase in tertiary education, including the tertiary education of women. But, at the same time, they implement legislation that discourages FDI and, thus, the local creation of appropriate jobs.

It is in the Maghreb and Egypt that human capital loss is most pronounced, with fewer losses in Egypt because many skilled emigrants adopt 'temporary migration' to the Gulf. All these countries face a dilemma: should they or should they not invest in tertiary education with the certainty of losing a share of their tertiary-educated workers, especially their engineers? We would argue that, yes, they should invest, but that they should also try to get a return in monetary and in human-capital terms by attracting migrants back home.

The same question is asked in southern Europe, where the increase in education and emigration are strongly correlated and where the problem can be solved only through an increase in productivity and job production.

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