
Education mismatch and return migration in Egypt and Tunisia

Migration de retour et inadéquation éducative en Égypte et Tunisie

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Introduction

- 1 For a long time, addressing the migration and education issue came down to the brain-drain phenomenon. However, M. Beine et al. [2011] show that sending countries can experience an increase in human capital as a result of migration and thus highlight the 'brain-gain' phenomenon. In this article, we study a specific channel through which brain gain can occur, namely return migration, and look at whether return migrants are more likely to have jobs that correspond to their education level compared to non-migrants. Using a survey conducted in Egypt and in Tunisia, we also analyse whether different migration profiles are correlated with different outcomes in terms of education mismatch. We provide new measures of education mismatch for the countries and find that returnees are more likely to be overeducated in Tunisia.
- 2 With the steady increase in Middle East and North Africa (MENA) countries' global education indicators, the mismatch between education and job level arises as a crucial issue in some countries. In an extended analysis of the Arab Mediterranean countries (AMCs) labour markets, the European Commission [2010] points out that one of the main problems is the mismatch between the outcomes of the educational system and the qualifications required on the job market. One of the highlighted causes was the high prevalence of employment in the public sector until the 1980s that led the universities to orient their training offer towards humanities and social sciences. The result is a high concentration of graduates in fields for which labour demand barely increased in the last decades and the report stresses the importance of articulating employment policies with education and training policies.

- 3 Education mismatch and particularly overeducation were often studied from the perspective of highly developed countries since it is often associated with a global increase of the average education level and thus an excess supply of highly skilled labour [Freeman, 1976]. Indeed, according to Becker's human capital theory [Becker, 1975] wages should correspond to the worker's productivity, therefore to his education and training, work experience, talent and other unobserved characteristics. N. Sicherman [1991] points out that if discrepancies appear, they are only transitory and overeducation corresponds to the "entry phase" in the labour market. His findings are supported by W.Groot [1996] and W. Groot and H. Maassen van den Brink [2000] who highlight that overeducation is entailed by a lack in work experience and fades with time spent on the labour market.
- 4 The objective of this paper is to shed light on the issue of education mismatch in the context of return migration in Egypt and Tunisia. Egypt and Tunisia provide interesting case studies since their migration profiles are different, Egyptian migrants being often temporary and choosing the Gulf countries as main destination and Tunisian migrants being more oriented towards European countries and spending a significant share of their working-life abroad. This results of course in a differentiated behavior in terms of human capital accumulation and thus a distinct impact of return migration. Using data on both return and non-migrants¹ in both countries, we draw a detailed analysis of the education that migrants and potential migrants [non-migrants] acquire before and during migration and the way their skills are used upon return. We quantify the education-mismatch in both countries and try to analyze some of its determinants, highlighting that Tunisian return migrants are more prone to be overeducated.
- 5 The rest of the paper is organized as follows: section 2 provides an overview of the relevant literature, section 3 introduces the dataset we are using and the methodology and section 4 presents some descriptive statistics and depicts return migrant's skills. Education mismatch is analyzed in section 5 and section 6 concludes.

1. A brief review of the literature

- 6 With a growing literature on return migration, the positive externalities of the migration-education nexus began to emerge. C. Dustmann [1994] argues that human capital accumulation is a push factor for return migration due to higher returns to education in the home country. Building upon this early work, C. Dustmann *et al.* [2011] use a dynamic Roy model² and show that return migration not only reduces brain drain, but creates a "brain-gain" by increasing the skill level in the home country. This argument is supported by M. Dominguez Dos Santos and F. Postel-Vinay [2004] who point out that temporary migration leads to skill-upgrading and results in higher economic growth. The underlying hypothesis is that migrants whose skill level will entail higher returns in home country than in host country, will prefer to return³. It also implies that return migrants' skills are transferable and that they will get a job matching their qualifications. Empirical studies such as C. Y. Co *et al.* [2000], A. Barrett and P. J. O'Connell [2001] or A. Iara [2006] find significant wage premium for returning migrants. In the case of Mexican return migrants, Reinhold [2009] finds that the increase in earnings for returning migrants is due to skill-upgrading. It is therefore crucial to grasp the mechanisms involved in the acquiring and use of skills of return migrants in order to maximize the benefits of return migration.

- 7 A growing number of studies are focused on the labour market outcomes of return migrants, but mainly in relation to capital accumulation abroad and highlighting the entrepreneurial behaviour [Ilahi, 1999; McCormick and Wahba, 2001; Thomas, 2008; De Vreyer et al., 2009; Mahuteau and Tani, 2011; F. Gubert and C. J. Nordman, 2011]. For the specific case of Tunisia, literature remains scarce on this issue. In what is probably the main paper on Tunisian return migration, A. Mesnard [2004] shows that return migrants do not benefit from a phenomenon of human capital accumulation which would entail positive results on the labour market, but their migration does allow them to overcome credit constraints and invest in small businesses upon return. For the Egyptian case, R. Assaad [2007] finds that the Government's policy to guarantee public jobs to upper secondary and university graduates shaped households' education decision towards education levels that have very low returns in the private sector, thus resulting in a low productivity of human resources in the economy. The high unemployment rates for young graduates are a direct result of these mismatches between education outcomes and labour market demands.
- 8 Indeed, Egypt witnessed an important shift in terms of education, going from a share of 40 percent of the new entrants on the labour market having less than primary education in the 1980s to a share of 70 percent of the new entrants having at least a secondary education level in 2005 [Assaad, 2007]. In a study entirely dedicated to job mismatch and its impact on Egyptian wages, F. El-Hamidi [2009] finds evidence of an education-occupation mismatch in the private sector. This results in high returns to over-education. Nevertheless, no particular attention is paid to return migrants and their situation on the labour market. Accordingly to the Employment and Labour Market Panel Survey (ELMPS) 2006, the share of returnees in the public sector is 36 percent, much more important than in the private sector. This is due to a law that allows Egyptians employed by the Government to work abroad for a maximum of two years, without any penalty concerning their position on the labour market [Wahba, 2007]. Furthermore, J. Wahba [2007] shows that return migrants have a higher education level than non-migrants and that returnees earn on average 38 percent more than non-migrants [Wahba, 2007]. In a recent work on return migrants' wages in Egypt, J. Wahba [2014] highlights the importance of taking into account selectivity biases arising from emigration choice, return migration choice, labor force participation choice, and occupational choice following return. She finds evidence of a wage premium for returnees, despite the fact that return migrants are negatively selected among current migrants, in the sense that those who return have lower education and a higher degree of vulnerability on the labour market compared to the migrants who did not return.
- 9 Moreover, these mismatches can result in lower returns to education and thus lower incentives to return for migrants. Among the increasing number of studies on migrations in the MENA region⁴, the most important analysis on the return migrants and their reintegration was provided by J.-P. Cassarino [2008] and the MIREM project or "Collective action to support the reintegration of migrants in their country of origin"⁵. Using this survey, S. Mahuteau and M. Tani [2011] point out the links between skill acquisition and activity choice upon return and F. Gubert and C. J. Nordman [2011] analyze the determinants of entrepreneurship. Despite the rich data and extensive information on the various phases of migration and return, the survey only includes returnees, thus not allowing a comparison with non-migrants.

10 In this article, we use a survey conducted on both returnees and non-migrants in Egypt and Tunisia, thus allowing us to compare their respective educational mismatch. Following the work of W. Groot [1996] and W. Groot and H. Maassen van den Brink [2000], returnees can be considered as "new entrants" in the labour market and could be expected to have a higher incidence of overeducation compared to non-migrants the phase of re-adaptation to their origin country's labour market. We will therefore test this hypothesis in two different contexts of migration. We will also provide measurements for the education mismatch and try to shed light on some of its other determinants.

2. Data source and methodology

11 We use a survey conducted as part of the European Training Foundation (ETF) "Migration and Skill" project, aiming to analyze the skills of migrant flows from sending countries. The survey was carried out between 2006 and 2007 in Albania, Egypt, Moldavia and Tunisia on a sample of approximately 1,000 non-migrants and 1,000 returnees in each country⁶. A two-stage cluster sample was selected. First-stage clusters were a minimum of four to six regions chosen to represent the geographical diversity of the country, and second-stage clusters were villages, towns, or municipalities chosen to represent the geographical diversity of the selected regions. Separate questionnaires were administered to potential migrants and returnees, but parts of the questions were common to both categories. The questions mainly concern the education and skills of migrants, acquired before and after migration, and their subjective usefulness on labour markets in the countries of destination and countries of origin.

12 The non-migrants sample is composed of individuals aged 18 to 40 living in the country at the time of the interview and was intended to be representative of the young population. For the scope of this paper, we will only focus on the Egyptian and Tunisian data. Concerning the representativity of the sample with respect to the national population, the comparison with census data shows that the sample is younger, as per intended, and men are overrepresented, which is not believed to lead to a strong bias of results, given that the labor market is gender segmented and migration is male-dominated [Avato et al., 2010]. Return migrants are individuals that left the home country at the age of 18 or older, lived and worked abroad for at least six months and returned at least 3 months before the interview and within the previous 10 years. The representativity of the returnee population is more difficult to assess, but we compare the education and age distribution of return migrants for to survey to those of return migrants from two recent surveys, the Tunisia Labor Market Survey (TLMPS) and the Egypt Labor Market Panel Survey (ELMPS) and we find almost the same distribution (regarding the sample distribution by education, for Egypt the difference ranges between 1 and 3 percentage points, while for Tunisia, the percentages are exactly the same)⁷.

13 The issue of measuring education mismatch has been widely addressed in the literature and studies such as J. Hartog [2000] and E. Leuven and H. Oosterbeek [2011] offer a complete picture of the proposed approaches. The measures can thus be classified as either subjective, when information on required skill for a given occupation is provided by the worker himself, or as objective, when standard comparisons are used. This latter approach covers two main methodologies, the first one being the job analysis, consisting in an evaluation by job experts of the required level of education for a typical occupation (the Dictionary of Occupational Titles (DOT) for instance), and the second one being the

realized matches, that implies measuring the gap between the worker's education level and the mean⁸ or modal⁹ education level for the given occupation.

- 14 The job analysis measure is used in most studies, such as in N. Sicherman [1991], W. Groot and H. Maassen van den Brink [2000] or A. Chevalier [2003], and in a study comparing the various measures, D. Verhaest and E. Omeij [2006] argue its robustness and reliability as compared to the other methods. Nevertheless, due to the high level of detail on both technologies and skill used in each occupation, it proves to be a very expensive and time-consuming measure, therefore hardly applicable in developing countries. Indeed the choice of one measure over another comes down to the availability of data on education and occupations. J. Herrera and S. Merceron [2013] point out the advantages of using the realized-matches approach for developing countries and estimate the incidence of skill-mismatch and its determinants in Sub-Saharan Africa.
- 15 Unfortunately, in the ETF survey, we do not have data on individual's occupation, only on their job type and job level. We will therefore be using job levels instead of occupations. For consistency reasons, we use the return migrant's job level upon return and compute the mean and median using both samples.
- 16 For an individual i having the job level k , the education mismatch using the mean level is defined as follows:

$$\text{Education mismatch}_i = \begin{cases} 1 \rightarrow \text{Undereducated} & \text{if Education level}_i \leq \text{Norm}_k - \sigma_k \\ 2 \rightarrow \text{Education match} & \text{if } \text{Norm}_k - \sigma_k \leq \text{Education level}_i \leq \text{Norm}_k + \sigma_k \\ 3 \rightarrow \text{Overeducated} & \text{if Education level}_i \geq \text{Norm}_k + \sigma_k \end{cases}$$

where Norm_k is the education norm for a given job level k , as measured by the mean education level using the pooled sample, and σ_k is the standard deviation.

- 17 We test different definitions of skill-mismatch using levels of education and mean or median for a given job level. The results are presented in Table 1. We will use the mean level of education per job level as a norm for skill mismatch and obtain a similar result in terms of over-education as F. El-Hamidi [2009]: an incidence of overeducation in Egypt of 11.4 percent. In addition, the results for Tunisia are the same regarding the norm used.

Table 1: Overeducation incidence

Norm	Egypt	Tunisia
Mean	11.4%	12.2%
	[0.008]	[0.009]
Median	5.1%	12.2%
	[0.006]	[0.009]

The figures are presented as a percentage of the total sample for each country. Standard errors in brackets.

Source: Authors' computation based on the ETF survey

- 18 However, we cannot be sure that the education level we are using for returnees is the education level after the migration since there is no information on their training before leaving the home country. If the education we observe was acquired before migrating

[thus there is no education acquisition during the migration episode], then the impact passes through a higher level job upon return and we would be overestimating their undereducation.

3. What skills do migrant acquire prior to their migration

- 19 In what follows, we will briefly analyze some descriptive statistics of the two samples and then concentrate on the education dimension and evidence of overeducation.
- 20 On average, return migrants are older than potential migrants (Table 2), due to the way the sample was constructed (potential migrants representative for the young adult population). Unfortunately, for return migrants, the survey design does not allow us to distinguish between the education level before and after migration. It implies that the education level we will be using for return migrants includes education that might have been acquired during time abroad. When looking at the education level as measured by the number of years of education¹⁰, there seems to be no significant difference between return and potential migrants in Egypt, while in Tunisia potential migrants appear to be more educated than return migrants (which might be due to the recent significant increase in education levels in Tunisia). The education level statistics give us a better insight on the differences between the two samples. For the Tunisian sample, the education level statistics confirm that return migrants are less educated on average than potential migrants. Two factors could explain this situation: on the one hand, Tunisian return migrants belong to the first waves of labour migration, mainly low-skilled; on the other hand, the education level increased significantly in Tunisia over the last decades [World Bank, 2010], resulting in a young adult population more educated than their elders. The comparison between the two samples also shows a significant difference in terms of attitude towards education with the share of return migrants that considers education to be improving living standards and that is important to invest in education being considerably higher than that of potential migrants.
- 21 Finally, the comparison of the job level between the two samples gives us a first glimpse of the labour market performances of return migrants. As Table 2 shows, the share of return migrants doing a high-level work is significantly more important than the share of potential migrants, especially in Egypt. In return, the share of unskilled workers is substantially higher among potential migrants. Regarding the "Out of labour force" category, the significant difference in Tunisia can be explained, as above, by the return of "early" migrants at the end of their professional life.

Table 2: Characteristics of migrants and non-migrants

	Egypt			Tunisia		
	Non-migrants	Returnees	All	Non-migrants	Returnees	All
Age	25	44	36	28	42	35
Years of education	12	12	12	13	10	11

Education level							
	Did not attend school	3,3%	6,0%	4,8%	0,3%	2,6%	1,4%
	Less than primary	2,5%	5,0%	3,9%	1,1%	5,4%	3,2%
	Primary	2,7%	4,5%	3,7%	11,3%	28,6%	19,9%
	Preparatory/post-primary	6,4%	5,4%	5,8%	12,8%	21,6%	17,2%
	Secondary general	23,3%	2,0%	11,5%	25,2%	22,0%	23,6%
	Secondary vocational	28,8%	31,5%	30,3%	9,2%	4,6%	6,9%
	Post-secondary	3,8%	7,4%	5,8%	4,1%	2,7%	3,4%
	University	29,2%	38,2%	34,2%	36,0%	12,4%	24,3%
Considers education improves living standards		29,8%	87,3%	61,5%	28,6%	83,9%	56,0%
Important to invest in education		0,0%	90,0%	49,7%	2,9%	74,8%	38,5%
Work level							
	Other	0,0%	0,0%	0,0%	1,0%	1,8%	1,4%
	Professional	13,9%	22,9%	18,9%	10,1%	19,2%	14,6%
	High management	4,7%	8,7%	6,9%	3,6%	4,8%	4,2%
	Middle management	9,1%	15,8%	12,8%	10,3%	5,2%	7,8%
	Skilled worker	25,6%	28,8%	27,4%	22,5%	13,0%	17,8%
	Unskilled worker	13,8%	8,6%	10,9%	19,4%	4,2%	11,9%
	Don't know	0,0%	0,0%	0,0%	2,0%	0,2%	1,1%
	not applicable	32,9%	15,2%	23,1%	31,1%	51,5%	41,2%
Obs		812	1000	1812	1019	1000	2019

Source: Authors' computation based on the ETF survey

- 22 Since the rest of the questionnaire is different for return and potential migrants, we will present the remaining descriptive statistics for each category at a time.
- 23 Returnees were asked whether, before going abroad, they attended any training aiming to prepare them for the migration. Only 6 percent of Egyptian returnees answered yes for this question, while they were almost 20 percent in Tunisia. For Egypt, this pre-departure training was formalized through a certificate for only 4.6 percent of them, mainly because

it was necessary to get a job. The share of those that have obtained a certificate for the training is higher for Tunisian returnees (15.3 percent). Even though the returnees that underwent the pre-departure training are mainly concentrated in four destination countries (France, Italy, Germany and Saudi Arabia), this is a characteristic of the whole sample, reflecting the migration patterns, and thus no correlation is observed.

Table 3: Pre-migration training

		Egypt	Tunisia
Pre-departure training		6.0%	19.5%
	Language training	26.7%	21.5%
	Cultural orientation	5.0%	1.1%
	Vocational training	50.0%	44.6%
	University studies	18.3%	32.8%
Has obtained a certificate for this training		4.6%	15.3%
The certificate was useful to get a job		5.2%	15.6%
The certificate was necessary to get a job		3.9%	14.5%
Aware of programmes that help people go abroad		20.4%	24.0%
	Government programs	30.4%	74.6%
	Recruitment companies	58.3%	5.0%
	Both of the above	11.3%	20.4%

The figures are presented as a percentage of the total sample of returnees for each country

- 24 Insofar as human capital accumulation during migration is concerned, almost 28 percent of Tunisian returnees declared having studied or trained abroad, while the percentage is of 9 percent for Egyptian returnees (for details, see Table 8 in the Annex). The lower percentage in the case of Egypt can be interpreted as a result of its migration profile, more oriented towards temporary labour migration. For Tunisia, the migration patterns are slightly more diverse, covering students' migration and family reunification schemes as well as labour mobility, and this is reflected in the reasons invoked for their migration. Furthermore, training during migration mainly concerned workplace training. In terms of employment abroad, most of the returnees worked as salaried workers (71 percent for Egyptian migrants and 67 percent for Tunisian migrants), but the job levels differ between the two countries. Most Egyptian returnees worked as skilled workers (41 percent) or professionals (27 percent) and Tunisian returnees worked mainly as skilled workers (52 percent) and unskilled workers (30 percent). Once more, this can be explained by the different migration patterns, with labour demand from Gulf countries being more oriented towards professional and skilled workers [Hoekman and Sekkat,

2010] and labour demand from OECD countries more concentrated on skilled and unskilled workers [Gubert, Nordman, 2008].

- 25 Upon return, more than half of the Egyptian returnees state that their experience abroad helped them find better work and among the most helpful they consider the experience in general and the skills learned at work. The percentage of Tunisian returnees declaring that their migration experiences contributed to finding a better job upon return is lower (almost 43 percent), but this is due to the fact that a significant share among them did not work since their return (almost half of them declared having return for retirement or because they have saved enough money).

4. Education mismatch and its determinants

4.1. A brief descriptive analysis of educational mismatch

- 26 As previously mentioned, we measure education mismatch by comparing an individual's education level with the norm in his job level, taking into account a confidence interval.
- 27 Using the education mismatch measure discussed earlier, we find that the share of job matching the education level is lower in Tunisia than in Egypt (66.2 percent versus 72.8 percent). As already mentioned, we defined as overeducated those who have an education level above the mean education level within their job level plus a standard deviation. Reciprocally, those qualified as undereducated are those whose education is below the mean education norm within the job level minus a standard deviation. According to these definitions, we find an overeducation incidence of 11.4 percent in Egypt and of 12.2 percent in Tunisia and an undereducation incidence of 15.8 percent and 21.6 percent respectively (Table 4). Nevertheless, we notice that overeducation is lower for returnees relative to non-migrants, while undereducation is higher. A possible explanation for the higher incidence of undereducation would be that returnees use their skill acquisition abroad and their migration experience in order to make up for lower education. They might also make better use of their skills and experience, which would partly explain the lower overeducation levels relative to non-migrants. Another explanation might be that, since the returnee population is older than the non-migrant population and the overall level of education increased significantly over the last decades in both countries, they might appear more undereducated compared to non-migrants due to other characteristics such as age, labor market experience etc.

Table 4: Education match and mismatch incidence

	Egypt		Tunisia	
Undereducation	15.8%	[0.010]	21.6%	[0.012]
Non-migrant	14.3%	[0.015]	17.2%	[0.014]
Returnee	16.9%	[0.013]	27.8%	[0.020]
Skill match	72.8%	[0.012]	66.2%	[0.014]
Non-migrant	73.4%	[0.019]	68.4%	[0.018]

	Returnee	72.4%	[0.015]	63.1%	[0.022]
	Overeducation	11.4%	[0.010]	12.2%	[0.010]
	Non-migrant	12.5%	[0.014]	14.4%	[0.013]
	Returnee	10.7%	[0.011]	9.2%	[0.013]

The figures are presented as a percentage of each sample for each country. Standard errors in between brackets.

- 28 If we focus on return migrants (see Table 5)¹¹, the overeducated are more often trained during their migration suggesting that skills acquired abroad might not have been entirely transferable, thus resulting in an education excess. However, the difference is significant only for Tunisia. Again, this is mainly linked to the significant share of Tunisians who migrate in order to acquire higher education, but also to a different profile of jobs in destination countries for Tunisian migrants, which are more likely to provide workplace training.
- 29 Furthermore, in Tunisia, the overeducated returnees were more often involved in government migration schemes thus implying that participating in a public programme does not guarantee an efficient use of skills acquired abroad. Surprisingly, Egyptian overeducated returnees are more inclined to say that experience abroad helped them find a better job than undereducated return migrants, despite spending more time finding a job upon return. In turn, Tunisian overeducated return migrants spend less time looking for their first job when returning than the undereducated returnees. Regarding post-return degree of content, on average, overeducated returnees are slightly more satisfied than the other categories, especially in Egypt. This observation is in line with F. El-Hamidi [2009] results on a positive return to overeducation. In other words, the fact of undergoing downgrading is not necessarily translated in a loss of welfare. This is also reflected in the returnees' intention to migrate again. We can see that the overeducated do not necessarily have higher migration intentions and, for those who want to migrate, their reasons are not significantly different from those of the other categories.

Table 5: Education matched and mismatched characteristics

	Egypt			Tunisia		
	Undereducation	Skill match	Overeducation	Undereducation	Skill match	Overeducation
Trained during migration						
Yes	6%	9%	10%	21%	25%	51%
No	94%	91%	90%	79%	75%	49%

Participation on migration schemes						
Government program	20%	38%	19%	43%	56%	70%
Government program	20%	38%	19%	43%	56%	70%
Private recruitment company	12%	25%	38%	9%	4%	7%
Both of the above	0%	0%	0%	4%	2%	4%
No	68%	37%	42%	43%	38%	19%
Experience abroad help find better job						
Yes	72%	79%	80%	86%	85%	86%
No	28%	21%	20%	14%	15%	14%
Months before finding a job upon return	1.4	2.2	2.4	5.3	5.8	4.9
Better off than before migration						
Much better off	13%	17%	25%	38%	37%	31%
Better off	66%	68%	58%	36%	33%	47%
About the same	17%	13%	13%	22%	25%	20%
Worse off	4%	2%	2%	2%	3%	2%
Much worse off	1%	0%	1%	2%	2%	0%
Intention to migrate again						

Yes	22%	21%	22%	11%	14%	16%
No	78%	79%	78%	89%	86%	84%

Source: Authors' computation based on the ETF survey

4.2. Determinants of education mismatch

4.2.1. Methodological approach

- 30 Building on the work of J. Herrera and S. Merceron [2013], we analyze the determinants of the observed educational mismatch for each country sample (Table 6). We use a multinomial logit model in order to capture the effect of each variable on undereducation and overeducation separately. Nevertheless, the effects should be interpreted as relative to the skill match situation. Among the determinants of the skill mismatch, we consider socio-economic factors such as various individual characteristics and we also try to capture employment aspects using the sector of activity and structural factors by introducing regional controls. Since migration is a selective phenomenon, we try to correct the potential selection bias through a two-step procedure à la Heckman, by computing the inverse Mills ratio and introducing it into the multinomial logit¹², which has the education-match situation as a reference. In order to identify the return migrants, we use the interest expressed by individuals towards emigration and we proxy this interest using a variable on the awareness of the existence of public and private schemes aimed at helping individuals to go abroad. Both returnees and non-migrants were asked this question and for returnees it was asked in the pre-migration period. The intuition would be that individuals who had a higher level of awareness of these schemes, were also more prone to have migrated. A potential concern for the exclusion restriction would be that those who had a higher probability of experiencing skill mismatch would also be those who searched for possibilities to emigrate, and those who are more aware of migration schemes. However, we put forward that this particular question was asked about awareness in general and individuals were separately asked if they had made inquiries about migration programs, therefore the awareness question is less likely to contain elements of migration intentions, that might have been fueled by job mismatches. Indeed, this variable has a strong influence on migration all else being equal in the first stage migration decision probit. We believe it can be used as an exclusion restriction in the second stage skill mismatch equation because, if it may impact the skill mismatch, the only potential channel could be through the migration experience.
- 31 The results show that Mills ratio is significant only for Egypt, indicating that a non-corrected model would produce upwardly biased estimates. The positive coefficient implies that there are unobserved characteristics which decrease the probability of selection into migration and decrease the probability of experiencing an education mismatch. For instance, having a strong social network in the home country would have a negative influence on the probability to migrate [through an attachment effect] and it would also act as a safety net helping individuals to find the appropriate job for their skills.
- 32 Among the determinants of the education mismatch, we consider socioeconomic factors such as various individual characteristics (age, sex, household size) and we also try to

capture employment aspects using the sector of activity and structural factors by introducing regional controls. The experience is proxied by the number of years since entering the labour market.

4.2.2. Results

- 33 Table 6 presents the odd ratios for the determinants of education mismatch by country, with and without a subset of endogenous control variables. First of all, the results show that return migrants have significantly higher chances of being overeducated in Tunisia. Indeed, given that a high share of Tunisians migrates to European countries in order to pursue higher education, the positive coefficient for the return migration variable in the overeducation model might signal that they cannot benefit from the additional human capital acquired. We notice that when we add potentially endogenous controls such as the intention to migrate and wealth scores, the coefficient for return migration remains significant and increases (see columns 7 and 8). This increase in coefficient is probably due to the positive correlation between the wealth scores and the probability of being a return migrant. In Egypt, being a return migrant has no significant impact on the education mismatch. Again, this might be due to the different profile of Egyptian migrants, which, according to the descriptive analysis, rarely migrate for their studies and few of them participate in trainings during their stay abroad. Finally, this result might seem contradictory with the previous results in terms of incidence of under- and overeducation, which showed that returnees have a higher incidence of undereducation compared to non-migrants. We argue that when we take into account the individual characteristics such as cohort, age and experience, the correlation between return migration and the probability of being undereducated disappears.
- 34 Furthermore, the probability to be undereducated decreases with age, while age increases the probability to be overeducated¹³. Being a male increases the probability of education mismatch, but only in Egypt and this is probably explained by the low levels of education and formal work for women. As expected, there is positive effect of experience on the probability to be undereducated and a negative effect on the probability to be overeducated. Our results support the findings of N. Sicherman [1991], who state that individuals make up for low levels of education with experience. We also control for cohort effects, in order to lower the bias due to the sample selection, and we find that being in a younger cohort decreases the probability of being undereducated and increased the probability of being overeducated. This can be explained by the lower education levels for a given job level when the elderly cohort entered the labour market, reflecting a lower supply of educated labour force than more recently.

Table 6: Odd ratios for the determinants of skill mismatch

	Egypt				Tunisia			
	Under-E		Over-E		Under-E		Over-E	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Returnee	0.65	0.63	1.58	1.46	0.78	0.71	1.64*	1.85**

	(0.23)	(0.23)	(0.63)	(0.59)	(0.24)	(0.23)	(0.46)	(0.55)
Inverse Mills ratio	0.37**	0.53	3.95***	2.40**	0.78	0.87	1.24	0.96
	(0.16)	(0.27)	(1.39)	(1.02)	(0.22)	(0.31)	(0.34)	(0.32)
Age	0.60***	0.62***	3.22***	3.02***	0.60***	0.61***	1.51***	1.44**
	(0.09)	(0.10)	(0.53)	(0.50)	(0.09)	(0.09)	(0.23)	(0.21)
Age square	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male	0.26***	0.32***	9.15***	6.53***	0.52	0.57	1.69	1.48
	(0.10)	(0.14)	(4.10)	(3.02)	(0.28)	(0.31)	(0.77)	(0.70)
Experience	1.50***	1.57***	0.39***	0.37***	1.85***	1.85***	0.68***	0.68***
	(0.03)	(0.05)	(0.03)	(0.03)	(0.12)	(0.12)	(0.07)	(0.07)
Cohort								
Middle-age cohort	0.29**	0.33**	4.07***	3.64**	1.00	1.04	0.43	0.40
	(0.15)	(0.18)	(2.15)	(1.92)	(0.60)	(0.64)	(0.34)	(0.31)
Young cohort	0.26*	0.35	13.55***	9.05***	1.46	1.69	0.33	0.26
	(0.20)	(0.28)	(10.00)	(7.01)	(1.16)	(1.37)	(0.30)	(0.24)
[Ref. Elderly cohort]								
Household size	1.08	1.09	1.10	1.12*	0.84**	0.84**	1.09	1.06
	(0.06)	(0.07)	(0.07)	(0.08)	(0.06)	(0.06)	(0.07)	(0.07)
Intention to emigrate		1.08		1.47		0.71		1.72**
		(0.31)		(0.41)		(0.22)		(0.46)
Assets score		1.30**		0.85		0.99		0.94
		(0.14)		(0.10)		(0.09)		(0.09)
Income score		1.08		0.88		1.01		1.21**
		(0.15)		(0.11)		(0.11)		(0.12)
Observations	1,393	1,393	1,393	1,393	1,134	1,134	1,134	1,134
Pseudo R2	0.397	0.403	0.397	0.403	0.398	0.402	0.398	0.402

Controls for districts, sector and marital status are not presented in this table.
 Robust standard errors in parentheses.
 *** p<0.01, ** p<0.05, * p<0.1.

- 35 Concerning the endogenous controls, the willingness to migrate is positively correlated to the probability of being overeducated, but only in Tunisia. However, we are aware that there might be a reverse causality bias since those who cannot fully benefit from their education, might be more prone to declare that they want to emigrate in search of better job opportunities. Finally, the indicator of owned assets appears positively correlated with the undereducation incidence in Egypt, while, for Tunisia, the overeducation probability increases with the income score. A potential explanation for these apparently inconsistent correlations is that, in the case of Egypt, the wealth level indicates a higher social position, which might compensate for the lower level of education. While, in the case of Tunisia, where the number of private universities, and thus of university graduates, increased exponentially over the last decades, the positive correlation suggests that wealthier individuals acquire higher levels of education, from which they cannot benefit due to the over-supply of skills [Mahjoub, 2010].
- 36 In order to better capture the impact of the variables specific to migration, we run the regressions on each of the two samples separately, return migrants and non-migrants. The results for non-migrants are similar to those found for the whole sample, but with a lower significance (see Table 10 in the Annex). We will briefly discuss here the results of the determinants of education mismatch of return migrants (Table 7). We notice that the influence of age and experience is still the same as for the whole sample. Concerning the wealth indicators, we find no correlation between the income indicator and educational mismatch, but we find evidence of correlation between the assets indicator and educational mismatch, especially for Egypt. The sign of the correlation appears to be similar as for the model on the full sample, with the probability of being undereducated increasing when the assets score increases.

Table 7: Odd ratios for the determinants of education mismatch, return migrants

	Egypt		Tunisia	
	Under-E	Over-E	Under-E	Over-E
	(1)	(2)	(3)	(4)
Age	0.53***	2.98***	0.56***	1.68
	(0.07)	(0.56)	(0.09)	(0.55)
Age square	1.00	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)	(0.00)
Male	0.79	19.23**	1.87	2.09
	(0.78)	(24.75)	(1.85)	(1.98)
Experience	1.58***	0.37***	2.05***	0.58**

	(0.06)	(0.04)	(0.22)	(0.16)
Intention to re-emigrate	1.24	1.17	0.50	1.02
	(0.40)	(0.45)	(0.34)	(0.58)
Assets score	1.24*	0.60***	1.38*	0.95
	(0.15)	(0.11)	(0.26)	(0.12)
Income score	0.97	0.91	1.22	0.81
	(0.17)	(0.15)	(0.20)	(0.17)
Studied abroad	1.60	0.58	1.29	2.18*
	(0.76)	(0.26)	(0.66)	(0.94)
Experience abroad helped find job	0.68	0.87	1.14	1.28
	(0.22)	(0.32)	(0.65)	(0.71)
Duration of stay abroad [years]	1.02	1.05*	0.99	0.97
	(0.03)	(0.03)	(0.04)	(0.04)
Europe	1.73	1.81	0.59	0.68
	(0.80)	(0.72)	(0.31)	(0.26)
Constant	35.59	0.00***	58.08	0.00*
	(117.26)	(0.00)	(189.25)	(0.00)
Observations	848	848	443	443
Pseudo R2	0.396	0.396	0.492	0.492

Controls for districts, sector and marital status are not presented in this table. Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

- 37 We find that having studied abroad increases the incidence of overeducation, but only in the Tunisian sample. This corroborates our justification for the return migration effect on overeducation and it is an important finding, especially when one considers the significant number of Tunisian youth who want to study abroad, expecting a better professional status upon return. It thus appears that the Tunisian labour market still has obstacles that prevents return migrants from fully using the skills acquired abroad. However, it seems there is no effect of acquiring experience abroad and education mismatch in the home country. Furthermore, our results suggest that emigrating in Europe does not impact the incidence of education mismatch in any of the two countries. Finally, we find a significant, but small effect of the migration duration on the probability

of being overeducated, but only for Egyptian returnees. A possible interpretation would be that, since Egyptian migration is largely labour related and towards Gulf countries, where the duration is limited, those who have longer migration episodes might be those who migrate for other reasons, and probably for studies, thus a higher overeducation prevalence upon return.

Conclusion

- 38 The importance of diaspora and return migrations for a country's economic development is widely acknowledged and governments' interest in the programmes oriented towards their migrant residents is growing. A returning migrant brings not only financial capital to be invested in his home country, but also his experience and skills acquired abroad. It is thus important to design frameworks for integrating the return migrants and maximizing the benefits they can bring. Using the ETF survey on potential and return migrants in Egypt and Tunisia, we highlight the skills that individuals acquire before migration (for those who want to migrate) and during their time abroad and how these skills are used in the origin country.
- 39 We find evidence of education mismatch, especially in Tunisia. When looking into the determinants of education mismatch on the Egyptian and Tunisian labour markets we find a significant positive effect of return migration on the probability of being overeducated. Our results, especially on the effects of experience on education mismatch, are in line with the literature on the subject. In terms of contribution to the literature, our article is complementary to the papers showing that a significant share of returnees become entrepreneurs. While they highlight the importance of this specific activity choice for the economic development of origin countries, we study the case of returnees that have not chosen to set up a business and, therefore, are more exposed to the constraints of the local labour market. One of the implications of our results on the positive correlation between return migration and overeducation is that returnees might prefer to turn to entrepreneurship in a context where their expectations in terms of use of skills are not met.
- 40 Among the limits of this study is the lack of data on wages and incomes, which narrows the possibilities to carry an in-depth analysis of labour market outcomes. Also, the measure we use for education mismatch can be improved and data on occupations and required skills would be needed in order to upgrade the under- and overeducation benchmarks. However, this study offers an insight on the missing elements for the design of policies aiming to attract and re-integrate return migrants.
- 41 In countries with high emigration rates of the educated youth, such as North African countries, return migration can mitigate the brain drain phenomenon and even reverse it if return migrants bring back augmented local skills and have the opportunity to use them. Our results indicating that return migration increases the probability of education mismatch signal that there are obstacles to returnees using their human capital to its full extent. This translates into a lost opportunity in terms of increasing the quantity and quality of local human capital and thus a lost opportunity for economic development.

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APPENDIXES

Table 8: Descriptive statistics for return migrants

	Egypt	Tunisia			Egypt	Tunisia
Migration duration (years)	7.4	11.7		Time since return (years)	4.2	4.0
Reason for migrating				Did experiences abroad help find better work since return		
Had no job / could not find job	32.1%	21.8%		Yes	66.2%	42.9%
Nature of work unsatisfactory	0.1%	2.6%		No	18.6%	7.3%
To improve standard of living	30.5%	32.7%		Not applicable	15.2%	49.8%
To get married / just married	3.5%	9.0%		Most helpful experience abroad		
To accompany/ follow spouse or parent	1.2%	4.5%		Experiences in general	37.0%	36.4%
To get education	0.5%	3.2%		Formal education/ training	2.4%	0.9%
Did not like living in this country	0.2%	4.3%		Skills learned at work	26.8%	5.2%

Wanted to go abroad	1.1%	5.4%		Not applicable	33.8%	57.5%
No future here	1.0%	5.6%		Better off than before migration		
Higher salary	26.9%	0.7%		Much better off	19.0%	36.5%
Study or train abroad				Better off	63.6%	28.5%
Yes	9.0%	27.9%		About the same	14.2%	24.1%
No	91.0%	72.1%		Worse off	2.6%	6.1%
Type of study or training				Much worse off	0.6%	4.8%
University	1%	6%		Work type since return		
Orientation training	0%	2%		Employer	31.9%	18.1%
Language training	1%	4%		Self-employed	3.6%	11.9%
Qualification equivalence	0%	1%		Salaried worker	40.4%	16.7%
Workplace training	6%	15%		Casual worker	8.5%	4.6%
Other	0%	0%		Unpaid family worker	0.1%	0.2%
Not applicable	91%	73%		Not applicable	15.5%	48.5%
Longest job level abroad				Longest job level since return		
Professional	27%	6%		Professional	22.9%	19.2%
High management	7%	3%		High management	8.7%	4.8%
Middle management	11%	7%		Middle management	15.8%	5.3%
Skilled worker	41%	52%		Skilled worker	28.8%	13.0%
Unskilled worker	14%	30%		Unskilled worker	8.6%	4.2%
Not applicable	0%	2%		Not applicable	15.2%	53.5%

Source: Authors' computation based on the ETF survey

Table 9: Selection model

	Returnee

Scheme awareness	0.80***
	(0.10)
Age	-0.12*
	(0.07)
Age squared	0.00***
	(0.00)
Male	0.80***
	(0.15)
Experience	0.03***
	(0.01)
Intention to migrate	-0.60***
	(0.09)
Assets score	0.18***
	(0.03)
In(ome score	0.02
	(0.04)
Household size	-0.03
	(0.02)
Constant	-2.60**
	(1.12)
Observations	2,210
Pseudo R2	0.521

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Controls for districts, sector, cohort and marital status are not presented in this table.

Table 10: Odd ratios for the determinants of education mismatch, non-migrants

	Egypt	Tunisia

	Under-E	Over-E	Under-E	Over-E
	[1]	[2]	[3]	[4]
Age	0.42**	4.69***	0.83	1.81**
	[0.15)	[1.84)	[0.27)	[0.44)
Age squared	1.01	1.00	0.99	0.99
	[0.01)	[0.01)	[0.01)	[0.00)
Male	0.36*	3.31**	0.47	1.50
	[0.20)	[1.94)	[0.29)	[0.76)
Experience	1.80***	0.26***	1.85***	0.73**
	[0.12)	[0.05)	[0.16)	[0.09)
Intention to emigrate	0.97	14.06**	1.76	2.98**
	[0.83)	[15.31)	[1.02)	[1.52)
Assets score	1.47**	0.88	1.07	1.02
	[0.27)	[0.13)	[0.12)	[0.09)
Income score	1.54*	0.95	0.91	1.34**
	[0.39)	[0.17)	[0.18)	[0.16)
Propensity to migrate	0.86	0.68	0.80	0.90
	[0.21)	[0.16)	[0.12)	[0.11)
Constant	24.84**	0.00***	16.36	0.00***
	[11.55)	[0.00)	[90.95)	[0.00)
Observations	545	545	685	685
Pseudo R2	0.499	0.499	0.389	0.389

Controls for districts, sector and marital status are not presented in this table.

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

NOTES

1. Individuals that are currently living in the survey country and are representative of the young adult population.
 2. A. D. Roy [1951].
 3. C. Dustmann et al. [2011] also show that individuals with low skill levels choose not to migrate, while those with high skill levels choose to migrate and stay permanently in the host country.
 4. See F. Marchetta [2012] for a detailed review.
 5. For details see <http://rsc.eui.eu/RDP/research-projects/mirem/>
 6. For more details on the ETF project see J. Sabadie et al. [2010].
 7. The tables are available upon request.
 8. Developed by C. C. Clogg [1979] and C. C. Clogg and J. W. Shockey [1984].
 9. Developed by A. De Grip et al. [1998].
 10. Imputed from the declared highest education level.
 11. For the sake of brevity, only striking result are presented here.
 12. See table 9 in the Annex for the results of the selection equation.
 13. J. Herrera and S. Merceron [2013] obtain similar results.
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ABSTRACTS

The objective of this paper is to shed light on the issue of education mismatch in the context of return migration in Egypt and Tunisia. Using data on both return and non-migrants in Egypt and Tunisia, we analyze the skills that migrants acquire before and during migration and the way these skills are used upon return. We find evidence of education mismatch, especially in Tunisia. Finally, we estimate the determinants of education mismatch on the Egyptian and Tunisian labour markets and find a significant positive effect of return migration on the probability of being overeducated.

L'objectif de cet article est d'apporter un éclairage sur la question de l'inadéquation éducative dans le cadre de la migration de retour en Egypte et en Tunisie. En utilisant à la fois des données sur les migrants de retour et sur les non-migrants en Egypte et en Tunisie, nous analysons les qualifications que les migrants acquièrent avant et pendant la période de migration et la façon dont ces compétences sont utilisées à leur retour. Nos résultats confirment l'existence d'un fort degré d'inadéquation éducative, en particulier en Tunisie. Enfin, nous examinons les déterminants de l'inadéquation éducative sur les marchés du travail égyptien et tunisien et trouvons que la migration de retour a un effet positif significatif sur la probabilité d'être sur-éduqué.

INDEX

Mots-clés: migration de retour, inadéquation éducative, marché du travail, éducation, Tunisie et Égypte

Keywords: return migration, education mismatch, labor market, Tunisia and Egypt

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