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Selection, selection, selection: the impact of return migration

Jackline Wahba

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Abstract The evidence on the impact of return migration on the sending country is rather sparse, though growing. The contribution of this paper is in addressing various selectivity problems while quantifying the impact of return migration on wages of returnees using non-experimental data. Using Egyptian household-level survey data, I estimate the wages of return migrants controlling for several selectivity biases arising from emigration choice, return migration choice, labor force participation choice, and occupational choice following return. The findings provide strong evidence that overseas temporary migration results in a wage premium upon return, even after controlling for the various potential selection biases. However, the estimates underscore the significance of controlling for both emigration and return migration selections. Ignoring the double selectivity in migration would overestimate the impact of return migration on the wage premium of returnees, as migrants are positively selected relative to non-migrants, but returnees are negatively selected among migrants.

Keywords International return migration · Wages · Developing countries

JEL Classifications F22 · J24 · O15 · O53

1 Introduction

International migration has become a central feature of the current world economy, and this has led to many public debates on the costs and benefits of migration. For many developing countries, emigration has resulted in substantial financial flows in the form of remittances, yet concerns have also been expressed regarding the emigration of the skilled and the resulting brain drain in the countries of origin, while in the receiving countries there are increasing anti-immigration sentiments among public voters, in

Responsible editor: Klaus F. Zimmermann

J. Wahba (✉)
Economics Department, School of Social Sciences, University of Southampton, Southampton SO17 1BJ, UK
e-mail: j.wahba@soton.ac.uk

particular during the recent financial crisis. Consequently, many policymakers have been advocating temporary migration as a panacea for both receiving and sending countries; however, little is known about the impact of temporary migration, and in particular return migration, for developing countries of origin.

Return migration may affect the economic prospects of the origin countries through, at least, two main channels. Firstly, emigrants may accumulate savings while overseas which, given the capital market distortions prevailing in many less developed countries, may not have been possible without migrating. A few studies, for example Dustmann and Kirchkamp (2002), Mesnard (2004) and McCormick and Wahba (2001), have found that returnees are likely to become entrepreneurs upon return. Secondly, overseas work may enable emigrants to acquire new skills and accumulate human capital, see for example, Mayr and Peri (2009) and Dustmann et al. (2011). Yet, the small existing empirical literature tends to examine these two channels independently, and more importantly, it does not take into account all the various biases emerging due to selectivity associated with return migration.

The question of interest in this paper is to what extent migration impacts on human capital and therefore affects wages upon return. Comparing returnees to non-migrants without taking into account selection into emigration and emigrant selection into return migration is likely to bias the estimates of the impact of return migration depending on whether returnees are positively or negatively selected among migrants. Furthermore, given that the previous literature finds that returnees are more likely to become employers and self-employed rather than waged workers, the waged employment decision also needs to be addressed when comparing the wages of returnees and non-migrants. Hence, this paper aims to provide evidence on the impact of temporary migration/return migration on human capital accumulation by studying the labor market outcomes of return migrants while controlling for various selection biases.

The contribution of this paper is in addressing the selectivity problem while quantifying the impact of temporary migration on wages of returnees using household-level survey data. To our knowledge, this is the first paper which controls for both emigration and return migration selectivity using non-experimental nationally representative household-level data. In addition, it also controls for labor market participation and occupational choice, which have not previously been addressed within the literature simultaneously and which, if ignored, would bias the estimates on the returns to temporary migration.

Addressing the problem of selection in the migration literature has become an important pursuit. For example, Gibson et al. (2010 and 2013) took advantage of a randomized lottery in the choice of migrants to New Zealand. Comparing the incomes of Tongan migrants to those who applied to migrate to New Zealand but whose names were not drawn in the ballot, Gibson et al. (2010) found evidence of positive selection. Gibson et al. (2013) examined the impact of international emigration and remittances on incomes and poverty in the sending areas; however, they do not study return migration or its outcomes. On the other hand, hindered by lack of data, other studies that examined the impact of return migration using non-experimental data tended to control for migration and return at the same time, i.e., controlled for selection into return migration, but did not take into account the initial emigration selection. This is problematic since returnees might be a select group among migrants, but migrants as a whole are a select group among the population of the sending country. A recent study

that tried to control for the migration double selection is Ambrosini et al. (2012) who constructed measures of selection across skill groups and estimated the average and the skill-specific premium for migration and return for three typical destinations of Romanian migrants using census data from Romania and its main destinations. In contrast, I rely on rich household-level nationally representative data, where information on current migrants, return migrants, and non-migrants are collected in order to deal with the triple/quadruple potential selections.

Whether migrants acquire human capital while overseas is an important question for the economic development of the home country since earlier studies on emigration emphasized the resulting brain drain for developing sending countries. A few studies have examined the impact of overseas experience on the human capital accumulation of the migrants by focusing on the returns to returning or more specifically, the wage premium of return migrants compared to non-migrants. Migrants may have a positive wage premium compared with non-migrants because they have acquired new skills overseas that enhance their human capital; however, it is also possible that return migrants may have a negative wage premium if they have had to downgrade their occupations overseas and hence their skills may depreciate. It may also be that exiting the domestic labor market is negatively rewarded, as a migrant quitting a public sector job or being overseas for a period of time may slow down the promotion process. This paper takes into account whether return migrants withdraw from the labor market upon their return since if they do not participate in the labor market, this would potentially reduce the gains from the migrants' human capital investment. It also controls for whether return migrants are more likely to become waged workers or entrepreneurs, as the occupational choice of returnees is likely to be different to that of non-migrants.

This paper focuses on Egypt, which has been a major labor exporting country since the early 1970s. Around 10 % of the labor force, both educated and uneducated, were working overseas during the peak of migration and there were around 3.7 million emigrants in 2010. I use data from the Egyptian Labor Market Survey of 2006,[1] a source of rich household-level data which includes information on current migrants, return migrants, and non-migrants. Egypt presents an interesting case study since it is a populous developing country with substantial flows of migration which make it one of the top 10 emigration countries. The majority of the migration is temporary in nature and is not confined to the educated.[2] This makes it an interesting case where the impact of return migration may be examined, and most importantly, the impact of selection that may bias any estimates of the effect of temporary migration can be disentangled by controlling for selection into emigration and selection into return migration, as well as for participation of returnees in the labor market and their occupational choice.

I estimate structural simultaneous models taking into account the various mentioned selections. First, I focus on the occupational choice to establish the importance of the entrepreneurship–waged work decision and find that returnees are more likely to become entrepreneurs rather than waged workers. Then, I take that into account when estimating the earnings return from overseas experience. The findings show that overseas temporary migration leads to a wage premium upon return. The estimates show that return migrants earn around 16 % more than non-migrants on average if all

[1] It should be noted that this data pre-dates the recent political events in Egypt.
[2] See for example Binzel and Assaad (2011).

selection biases are corrected for, rather than a 46 % premium that is firstly observed when individual characteristics and selectivity are ignored. Although half of the difference in observed wages between returnees and non-migrants is due to observable characteristics, such as age and education, unobservable characteristics account for another quarter of this wage difference. Hence, only a quarter of the observed wage premium is due to the impact of overseas migration experience. In fact, controlling only for return migration and ignoring the emigration decision overestimates the impact of return migration since we find evidence that migrants are positively selected relative to non-migrants, while returnees are negatively selected among migrants. This emphasizes the significance of selectivity in return migration. One important practical implication of our paper is in highlighting the benefits of collecting data on both current and return migrants within standard household surveys, thereby enabling researchers to address selection to better quantify the impact of migration on the home country.

The remainder of the paper is organized as follows: the next section reviews the previous literature on the impact of return migration on the labor market outcomes of returnees. "Egyptian migration and the data" section provides an overview of Egyptian migration and describes the unique features of the data used. "The effects of return migration on occupational choice" section examines the impact of return migration on entrepreneurship choice, controlling for several selectivity biases, before "The effects of return migration on wages" section estimates the impact of return migration on wages taking into account all the aforementioned selectivity biases. The main conclusions are presented in "Conclusions" section.

2 Previous literature

The evidence on the impact of temporary migration on human capital accumulation of migrants has been limited but is growing. Dustmann and Glitz (2011) provide a detailed review of the relationship between migration and education, and they set up a simple model of how temporary migration can affect optimal human capital investment profiles and the implications for migrants' earnings. A number of studies have examined the indirect effect of migration on human capital accumulation, or the brain gain as it is commonly referred to within the literature, where migration prospects encourage individuals to invest in education, for example, Beine et al. (2008) and Batista et al. (2012).[3] Others have focused on the productivity of returnees relative to non-migrants. For example, Gibson and McKenzie (2012) quantify the gains from migration and return migration of the best and the brightest, while Gaulé (2014) focuses on academic scientists and their productivity premium after return.[4]

An important question which has attracted limited attention is: what are the returns to overseas work experience? Although there is a handful of studies which have looked at the returns to returning migrants by examining the wage premium of return migrants compared to non-migrants, for example Co et al. (2000), Barrett and O'Connell (2001), Barrett and Goggin (2010), and De Coulon and Piracha (2005), focusing on transitional

[3] See also Docquier and Rapoport (2012) for a survey of the brain drain and brain gain literature

[4] Sun (2013) examines the productivity difference between domestic venture capitalists and their foreign educated counterparts in China.

economies or developed countries they have found mixed results, while they do not control for the various potential selections. Turning their attention to this issue in developing countries of origin, a handful of studies find evidence of positive premium for overseas experience. Lacuesta (2010) finds an 11 % wage gap between returning migrants and observationally equivalent non-migrants in Mexico, but argues that this premium is the result of pre-migration differences in ability and not human capital gains derived from migration from Mexico. Reinhold and Thom (2013) also find the labor market experience accumulated in the USA increases earnings of return migrants in Mexico. Wahba (2007) examines the case of Egypt, based on earlier data (for 1988 and 1998), and finds stronger evidence that overseas employment and temporary migration result in a wage premium upon return; on average, return migrants earn around 38 % more than non-migrants. De Vreyer et al. (2010) examine labor market outcomes for returnees to seven capital cities in West Africa and find that experience abroad results in a substantial wage premium for migrants returning from an OECD country. A main limitation in the previous studies is in not accounting for the double selection of migration: who migrates and who returns. Although some of these studies control for return migration selection, as I show in this paper, ignoring the emigration decision is problematic since by not controlling for both migration and return selections, the estimates of the wage premium will be biased.

Few studies have focused on the occupational choice of returnees, and in particular on entrepreneurship and self-employment, among returnees, for example Mesnard (2004), Dustmann and Kirchkamp (2002), and McCormick and Wahba (2001). Overall, these previous studies have examined how temporary migration, through savings, provides access to credit which then enables returnees to become self-employed and entrepreneurs, but have focused solely on return migrants. More recent papers, for example Piracha and Vadean (2010) and Wahba and Zenou (2012), have examined the occupational choice of returnees, comparing returnees to non-migrants and attempted to control for the selection bias associated with return migration, but again not for the emigration decision which is likely to introduce biased estimates.[5]

Indeed, none of the previous literature, unlike this paper, has examined the returns to returning after controlling for selection for both emigration and return migration and, also, for the subsequent occupational choice of returnees upon return.

3 Egyptian migration and the data

3.1 The case of Egypt: a brief background

International migration has played an important role in the Egyptian economy over the last three decades. Egypt has been a major labor exporter since the early 1970s, exporting both educated and uneducated labor. It has become the largest labor exporter in the Middle East and North Africa (MENA) region.

The majority of Egyptian migrants go to the Gulf States and to other Arab countries as, after the oil boom of 1973, the Gulf oil exporting countries found that their development

[5] See Marchetta also (2012) who studies the survival of the entrepreneurial activities of returnees versus non-migrants, again controlling for the endogeneity of return migration but not for the selection into emigration.

plans were constrained by labor shortages and so embarked on importing large numbers of workers from neighboring countries. At the peak, Gulf States were importing 90 % of their labor force, and, between 1975 and 1995, 5 million foreign workers migrated to the Gulf States.[6] During the 1970s and 1980s, neighboring Arab countries were the main labor exporters to the Gulf Co-operation Council (GCC) countries, and even in the 1980s and 1990s when Asians replaced Arab workers, the outflow of Egyptian workers continued, although on a lower scale. In the mid-1990s, Egyptian workers were the second largest migrant group after Indian nationals in Saudi Arabia. The Gulf States have been a locus for huge inflows of migrants, given their high demand for overseas labor and the temporary nature of the contracts offered. Emigration to the Gulf States and to neighboring countries has been affected by oil prices and by the political conditions in the region, and Egypt has a substantial proportion of return migrants who have previously worked overseas.[7] As noted by Lucas (2008), all migration to the Gulf States is temporary in nature, with a mean migration duration of around 4 to 5 years and acquisition of citizenship being effectively impossible for anyone.

According to the 2006 census, there were 3.9 million Egyptians living abroad. In 2000, according to the Egyptian Central Agency for Public Mobilisation (CAPMAS) estimates, around 0.8 million Egyptians resided in OECD countries with almost half of these located in North America.[8] However, since 2000, the USA is no longer the main Western destination of Egyptian migrants but rather it is Western Europe, in particular Italy and Greece, which have become the most popular choices among recent Egyptian migrants. Recently, a rise in migration to Europe, mostly irregular (especially to Italy and Greece), has been recorded, but to a large extent this has also been temporary in nature.[9] Official recorded remittances also reflect the importance of migration as Egypt is one of the top ten recipient countries of remittances, receiving around $7.7 billion in 2010.[10]

3.2 Data

The analysis in this paper is based on the Egypt Labor Market Panel Survey of 2006 (ELMPS 06) which was carried out by the Economic Research Forum (ERF) in cooperation with CAPMAS, the main statistical agency of the Egyptian government. I use the 2006 round of the ELMPS which was undertaken from January to March 2006 and had a sample size of 8349 nationally representative households.[11] The questionnaire has three major sections: (1) a household questionnaire administered to the head of the household or his or her spouse, requesting information about basic demographic characteristics of all household members, ownership of durable goods and assets, and housing conditions, services, and facilities[12]; (2) an individual questionnaire administered to every individual in the household, age 6 and above; and (3) a household

[6] See Girgis (2002).
[7] See Nassar (2008) for an overview of temporary migration in Egypt.
[8] The estimates of Egyptians residing in OECD countries by receiving countries differ from the estimates by CAPMAS; in some cases, they are about a third of CAPMAS estimates. See Zohry and Harrell-Bond (2003).
[9] See Di Bartolomeo et al. (2010).
[10] See The World Bank (2011) Migration and Remittances Factbook 2011, The World Bank, Washington DC.
[11] For details about the data collection and methodology, see Barsoum (2009).
[12] A household is defined as individuals who live under the same roof and eat from the same cooking pot. A current migrant is an absent member of the household who lived in the same dwelling before migration.

enterprise and income module that collects information on enterprises operated by the household, as well as all income sources. This section includes information on current migrants, remittances, and transfers.

The ELMPS 06 has a number of distinctive features. First, it has rich retrospective information on employment characteristics, including location, which provides us with labor mobility and migration information for return migrants as well as non-migrants. Secondly, and more importantly, a unique feature of this survey is that it collected information from existing household members about absent members of the households who were abroad at the time of the survey, including, among other data, their year of migration, country of migration, education, employment, and occupation overseas. Earlier rounds of the ELMPS (1998 and 1988) did not collect this valuable information; however, one potential problem with the ELMPS 06 data is that households which have migrated in their entirety would not be observed. Given that extended families are common in Egypt, it is unlikely that the whole household would have emigrated as Egyptian migration is temporary and predominately male, see for example, Assaad and Binzel (2011) and Nassar (2008), and as mentioned by Zohry and Harrell-Bond (2003), "Most temporary Egyptian migrants are males who leave their families behind."[13] Although, given the nature of Egyptian migration, the possibility that we might be missing households where the entire household has migrated is rather small, the implications of that are that if migrants are positively selected, but returnees are negatively selected, then our estimates would be a lower bound, while if returnees are positively selected among migrants then our estimates would be an upper bound. Finally, as around 80 % of current migrants have visited the households recorded in the survey during the previous 2 years, this provides relative reassurance regarding the reliability of the information provided by interviewed households.

The analysis in this paper is restricted to males of working age (25–65 years old) at the time of the survey since over 90 % of migrants in our sample are males. A migrant/returnee is defined as an individual who has migrated overseas for work purposes for 6 months or more. It is important to note that we can rule out returns to overseas qualifications rather than work experience as the survey defines migrants as those who migrated for work purposes and worked abroad for 6 months or more. Our sample comprised 396 current migrants, 400 returnees, and 7503 non-migrants.

Table 1 provides descriptive statistics for returnees and non-migrants within our sample, and it is noticeable that returnees possess different characteristics relative to non-migrants at the time of the survey. Returnees are older by around 6 years than non-migrants, and are more likely to be married and to be heads of households, which is not surprising given that they are older. In addition, return migrants are on average more educated than non-migrants: 63 % of returnees are highly educated compared to 53 % among non-migrants.[14] Also, the share of employers and self-employed is higher among returnees relative to non-migrants, suggesting that returnees are more likely to become entrepreneurs than waged workers. A joint test, of being employers and self-employed, shows a significant difference at 5 % between returnees and non-migrants, while the difference in probability of being a waged worker is insignificant, though this is found when we are not controlling for individual characteristics. Interestingly,

[13] Zohry and Harrell-Bond (2003) p. 48.
[14] Significant at 1 % level.

Table 1 Characteristics of returnees and non-migrants

Variables	Return migrants	Non-migrants	*P* value
Age (years)	45.52	39.83	0.00
Married (%)	95.33	82.67	0.00
Head of household (%)	94.63	75.42	0.00
Educational level (%)			
None	14.5	21.43	0.00
Reads and writes	10.25	8.44	0.21
Elementary school	9.00	11.28	0.16
Middle school	3.75	5.40	0.15
Secondary school	41.50	33.96	0.00
University and higher	21.00	19.50	0.46
Employment status (%)			
Waged	56.98	61.28	0.19
Employer	18.42	17.31	0.13
Self-employed	13.95	9.23	0.04
Unemployed	2.30	2.50	0.41
Unpaid family worker	0.89	3.29	0.00
Out of LF	7.31	6.20	0.35
Region of residence (%)			
Greater Cairo	10.25	14.08	0.00
Alexandria and Canal Cities	8.75	11.57	0.08
Lower urban	18.75	13.30	0.00
Upper urban	13.50	17.43	0.04
Lower rural	32.25	24.22	0.00
Upper rural	16.50	18.67	0.28
Sample size	400	7503	

P value reports the results of a *t* test of H_o: Return migrants=Current migrants

although returnees seem to be more likely not to participate in the labor force relative to non-migrants, the difference is not statistically significant.

Comparing returnees and current overseas migrants, Table 2 shows that there is no evidence that current migrants are more educated than returnees. Not surprisingly, the majority of current migrants migrated in the 2000s. In terms of destination, Saudi Arabia has been the most attractive country for both current migrants (38 %) and returnees (35 %), which is consistent with the national statistics.[15] However, the proportion of current migrants in Europe and North America is higher than that of returnees, in particular from North America, although it should be noted that these are very small proportions.[16] On average, return migrants spent 6.6 years overseas while

[15] Note that the high proportion of returnees from Iraq and almost nil share among current migrants reflect the political situation in Iraq. However, there is no statistical difference in the characteristics of Egyptian migrants to Iraq compared to Egyptian migrants to other Arab countries such as Jordan or Libya.

[16] It has to be remembered that even using the higher estimates of the number of Egyptians residing abroad in the West, they would still be a very small proportion of the Egyptian population.

Table 2 Characteristics of Current and Return Migrants

Variable	Current migrant	Return migrant	*P* value
Educational level (%)			
None	21.48	14.5	0.01
Reads and writes	7.93	10.25	0.26
Elementary school	5.88	9.00	0.10
Middle school	2.56	3.75	0.34
Secondary school	39.90	41.50	0.64
University and higher	22.25	21.00	0.67
Region of residence[a] (%)			
Greater Cairo	8.33	10.25	0.35
Alexandria and Canal Cities	5.80	8.75	0.11
Lower urban	14.90	18.75	0.15
Upper urban	12.63	13.50	0.72
Lower rural	25.25	32.25	0.03
Upper rural	33.08	16.50	0.00
Year of migration (%)			
1970–1979	0.51	16.05	0.00
1980–1989	3.54	46.55	0.00
1990–1999	23.48	30.61	0.03
2000–2006	72.22	6.07	0.00
Country of destination (%)			
Saudi Arabia	38.40	35.00	0.44
Libya	13.14	10.50	0.30
Iraq	0.26	28.00	0.00
Kuwait	12.89	5.75	0.00
Jordan	14.48	12.75	0.64
North America	2.02	0.50	0.15
Europe	2.06	1.75	0.35
Migration history/characteristics			
Migration duration (years)	5.5	6.6	0.01
Duration since return (years)	–	9.4	–
Sample size	396	400	

P value reports the results of a *t* test of H_o: Return migrants=Non-migrants

[a] For current migrants, the region of residence refers to that of their household in Egypt at the time of the survey

current migrants have been overseas for 5.5 years, suggesting that current migrants have not yet completed their migration activity.

Focusing on waged workers, at the time of the survey, and distinguishing between returnees and non-migrants, Table 3 indicates that one important distinction is in the real hourly wage between the two groups. On average, returnees earn 46 % more than non-migrants; in the rest of the paper, I examine the extent to which this wage premium

Table 3 Characteristics of waged workers

Characteristics	Return migrants	Non-migrants	*P* value
Age (years)	45.68	37.98	0.00
Married (%)	94.51	83.12	0.00
Head of household (%)	95.60	75.53	0.00
Real hourly wage (£)	5.13	3.51	0.00
Job tenure (years)	12.28	12.85	0.05
Father was waged worker	55.84	54.37	0.18
Educational level (%)			
None	6.93	15.12	0.00
Reads and writes	6.93	7.21	0.88
Elementary school	8.23	10.88	0.17
Middle school	4.33	5.29	0.49
Secondary school	50.22	37.99	0.00
University and higher	23.38	23.53	0.97
Occupation (%)			
Technical, scientific, and management	8.40	4.99	0.00
Professionals	21.07	18.90	0.10
Technical and associate professional	22.22	11.47	0.00
Clerks	12.64	4.89	0.00
Services	8.11	17.72	0.00
Skill agriculture	6.00	8.37	0.25
Crafts	11.73	19.52	0.00
Plant and machinery operation	8.10	10.86	0.31
Elementary	1.73	3.29	0.15
Sector (%)			
Government	57.14	38.02	0.00
Public enterprise	5.92	9.47	0.10
Private	32.98	50.38	0.00
Informal sector (%)	20.04	34.56	0.00
Economic activity (%)			
Agriculture	8.54	9.70	0.89
Mining and manufacturing	14.53	17.76	0.00
Utilities	2.08	1.73	0.59
Construction	7.53	10.68	0.35
Trade	5.79	8.55	0.12
Tourism	2.07	3.24	0.66
Transport	6.00	10.80	0.00
Finance	0.82	1.70	0.51
Real estate	1.34	1.55	0.98
Public administration	26.29	14.83	0.00
Education and health	22.27	14.93	0.00
Other	3.02	3.66	0.89

Table 3 (continued)

Characteristics	Return migrants	Non-migrants	*P* value
Region (%)			
Greater Cairo	7.73	16.50	0.00
Alexandria and Canal Cities	5.97	9.87	0.12
Lower urban	15.15	9.58	0.00
Upper urban	12.77	14.06	0.30
Lower rural	44.52	29.51	0.00
Upper rural	13.95	20.49	0.16
Sample size	231	4579	

P value reports the results of a *t* test of H_o: Return migrants=non-migrants

survives after controlling for individual characteristics and for the various potential selectivity biases. In terms of job characteristics, returnees at the time of the survey are more likely to be employed in the public sector and less likely to be working informally, i.e., without a job contract or social security contribution, relative to non-migrants. It is also worth noting that return migrants are on average more likely to be engaged in skilled occupations relative to non-migrants. Indeed, 56 % of return migrants have experienced an occupation upgrade compared to their own pre-migration occupation, i.e., they have moved up the occupation ladder on their return relative to their pre-migration occupation.

The next section will establish the importance of occupational choice taking into account the double selection of migration and return, and the labor market participation decision, before estimating the wage premium associated with overseas experience, taking all those various choices and selections on board in "The effects of return migration on wages" section.

4 The effects of return migration on occupational choice

4.1 Methodology

Before estimating the returns to overseas experience, I examine the occupational choice and find, in agreement with previous literature, that returnees are more likely to become entrepreneurs rather than waged workers upon return. Our outcome of interest in this section is the occupational choice of workers, i.e., the probability of being an entrepreneur (either employer or self-employed) versus a waged employee. Our estimations use a multi-equation mixed system that utilizes a conditional mixed process estimator which fits a Seemingly Unrelated Regressions (SUR) simultaneous equation model whereby endogenous regressors appear on the right side of other equations,[17] and their errors can be correlated through sharing a multidimensional distribution. Parameters within the SUR system can be consistently estimated equation-by-equation, and

[17] Roodman (2011).

simultaneous estimation takes into account the full covariance structure, thus in general this is more efficient (see Roodman 2011). Moreover, not all the regressors appear in all the equations.

I model two interrelated decisions: the probability of being an entrepreneur (1a) and the probability of being a return migrant (2a). At the same time, I take into account selection into labor market participation (1b) when considering the entrepreneurial occupational choice (1a) and selection into emigration (2b) when modeling the return migration decision (2a). Hence, in essence there are four decisions: occupational choice, labor market participation, return migration, and emigration, which are estimated simultaneously using Full Information Maximum Likelihood as follows.

First, the Entrepreneurship decision (employer/self-employed) is denoted by E and is observed when the unobservable latent variable measuring the propensity to be an entrepreneur is $E^* > 0$. This is our first outcome of interest and the first equation in our model:

$$E = S\alpha + \omega \quad E = \begin{cases} 1 & \text{if } E^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{1a}$$

At the same time, the entrepreneurship choice is only observed if the individual participates within the labor market, i.e., E=observed if $P > 0$.

The labor market participation (P) decision is only observed when the unobservable latent variable measuring the gains from participation is positive, i.e., $P^* > 0$:

$$P = H\varphi + \eta \quad P = \begin{cases} 1 & \text{if } \mathrm{P}^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{1b}$$

The second decision is return migration (R), which is observed only when the latent variable R^* measuring the propensity to be a return migrant is positive:

$$R = x\beta + \varepsilon \quad R = \begin{cases} 1 & \text{if } R^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{2a}$$

Given the selection for emigration, only migrants can return, hence R is only observed if an individual has emigrated, i.e., $M > 0$.

The overseas emigration decision (M) is observed when the unobservable latent variable measuring the gains from migration is positive, i.e., $M^* > 0$.

$$M = z\delta + v \quad M = \begin{matrix} 1 & M^* > 0 \\ 0 & \text{otherwise} \end{matrix} \tag{2b}$$

The four equations above are estimated simultaneously using Conditional Mixed Process so that all the errors are correlated ($\omega, \eta, \varepsilon, \nu$) and each of the above equations vary by observation. In other words, sample selection is modeled for the full data set and the dependent variable for the subset with complete observations. S, H, X, and Z are controls and exclusion restrictions.

Using data from ELMPS 06 enables us to control for who migrates and who returns, since information on current migrants as well as on return migrants is available. To our knowledge, this is the first paper within the migration literature to control for both selections, emigration and return migration, when estimating the returns from returning using nationally representative data. There may be an emigration selection bias if those

who have migrated are not a random sample but instead are self-selected; for example, such individuals are more motivated or are risk-takers relative to the non-migrants. Secondly, there may be a second bias resulting from the return migration if those who return are not a random sample but, for example, are negatively selected individuals among migrants, as found by Borjas and Bratsberg (1996).[18]

4.2 Identification

The proper identification of this full structural model requires valid exclusion restrictions for the emigration decision, return decision, and labor market participation choice. For the emigration decision, we use average real international oil prices since the majority of Egyptian migrants migrate to the Gulf States where demand for imported labor is highly correlated with oil prices (see Lucas 2008; World Bank 2009) and it is a buyer market (see McKenzie et al. 2014). Therefore, oil prices should provide a good indicator of the overseas labor demand for Egyptian workers, see Wahba and Zenou (2012). Examining the destination of the returnees in our sample, we find that over 95 % of migrants had migrated to Arab countries where oil prices play an important role in the demand for foreign labor directly, as in the Gulf States, or indirectly as replacement workers in non-oil Arab countries, such as Jordan and Lebanon. Since the average age at the time of migration among returnees in our sample is 26 years old, I use average real international oil prices for when an individual is this age.[19] This age also corresponds with the age at which males would have finished their university education and obligatory military service and then enter the labor market. One limitation of our dataset is that it does not include the age of current migrants but we do know their year of migration. Consequently, for current migrants I use the real average international oil prices for their year of migration, i.e., I assume they migrated at the age of 26, the average age of migration for our return migrants. I also checked the robustness of this by using the oil price for the year of migration for returnees. I argue that historic real oil prices should affect the probability of emigration but should not be correlated with the other outcomes of interest.

The first potential concern about the validity of this exclusion restriction may be that the oil price at the time of migration might affect migration duration and therefore return migration. It is important to underscore that it is well documented that Egyptian migration is temporary in nature, and secondly, the relationship between migration duration and oil price at the time of migration is not significant. The median duration of migration is 5 years for both educated and uneducated workers. McKenzie et al. (2014), studying Filipino emigration where a significant number of migrants go to the Gulf States, find that changes in destination country GDP have a large impact on changes in Filipino migrant flows, but no impact on migrant wages or migration duration. The second potential concern would be that the oil price may be correlated with the labor force participation or the occupational choice (waged/entrepreneurship). The identifying assumption here is that oil prices when the individual is aged 26, in a non-dependent oil economy, are not correlated with the labor market participation or the

[18] See Heckman (1979) and Tunali (1986) for a discussion on sample selection and its correction.
[19] For robustness, we also used oil prices at age 25 and 27 years.

entrepreneurship choice of male non-migrants, or returnees, whose mean age is 38 or 46 years old, respectively, when we observe them at the time of the survey.

In order to identify return migration, I use exogenous shocks that have led to the return of Egyptian migrants. I construct a variable that captures exogenous shocks such as wars and political conflicts. The first shock took place in 1990–1991 and captures Iraq's invasion of Kuwait and the first Gulf War, which led to the return of many migrants from the Gulf. The second took place in 2001–2002 when there was an anti-Middle Eastern sentiment following the 9/11 attacks, which created a potential push factor for migrants in the USA and Europe.[20] I find evidence of the effect of these shocks on return migration: 11 % of our returnees returned in 1990–1991 and 6 % returned in 2001–2002. The third shock is related to Libya. The relationship between Egypt and Libya has been turbulent, so in 1977 there was a Libyan–Egyptian war, and in 1985 and again in 1995, Egyptian migrants were expelled from Libya. The fourth shock is related to Lebanon: the Israeli invasion of Lebanon in 1982. I construct a "shocks" variable capturing those conflicts/wars. One important issue for our exclusion restriction is that our identification works through the interaction between time and location as these shocks affected migrants overseas in specific countries. For example, the first shock affected migrants in Iraq and Kuwait, resulting in almost 58 % of all returnees in 1990 and 1991 being from those two countries. It is also important to note that during the shock years, the incidence of migration was not affected, rather the destination of migration differed. For example, in 1990–1991 the proportion of out-migration in our sample is 2.4 %, which is slightly lower than the median annual proportion of out-migration in our total sample of 2.6 %, but the difference is not statistically significant. It is documented that with the outbreak of the Gulf War in 1990, hundreds of thousands of migrants that had been working in Iraq and Kuwait returned home. However, the governments of Jordan, the Palestinian territories, Sudan, and Yemen sided with Iraq at the beginning of the conflict, and this resulted in GCC countries (most notably Saudi Arabia) tightening their migration policies against natives of these countries. It is estimated that around 800,000 Yemenis, 200,000 Jordanians, 150,000 Palestinians, and nearly all Sudanese were effectively expelled from Saudi Arabia in response to their native countries' support for Iraq. Ironically, this increased the demand for Egyptian workers in Saudi Arabia to replace those who had left (Richards and Waterbury 2007); hence, the 1990–1991 shock led to the return of migrants from Kuwait and Iraq but did not affect potential migration to other countries.

One main potential threat to the validity of this exclusion restriction with respect to the labor market outcomes (participation and occupational choice) would be if one of the shocks, for example the strongest in impact, i.e., the first Gulf war, led to mass return migration which would put pressure on the labor market affecting participation and occupational choice. However, since individuals were able to migrate to unaffected destinations and the first Gulf war was 16 years earlier, it is highly unlikely that the effect, if there was one, would be everlasting.

Finally, to control for selection into labor market participation, I rely on the heterogeneity of the household composition, by exploiting the number of dependents at the household level, namely the number of young (less than 15 years of age) and old

[20] The first shock, the Gulf war, lasted from August 1990 to February 1991. The second shock, the 9/11 attacks in the USA, took place in September 2001.

(65 years of age) members of the household at the time of the survey. This household characteristic is assumed not to be correlated with migration which is undertaken by young males, and it would not affect the return migration decision. Furthermore, the number of dependents is not correlated with the occupational choice (self-employment/employer).

4.3 Controls

The full set of controls used in each equation will be briefly described. For the entrepreneurship decision (1a), H is comprised of exogenous individual characteristics, such as age in years and education, as well as local labor market conditions, such as unemployment rate in the governorate (province) in the previous year, and the growth in public sector jobs over the previous decade (1996–2006) within the governorate. I also control for regional fixed effects.

For the labor market participation decision (1b), S is a vector of individual and regional characteristics. I also control for local labor market effects using lagged labor force participation by governorate in 2005 to capture regional patterns of participation. I also use the receipt of non-labor income, such as rent or interest excluding pension payment and remittances payments, as another control.

For the return migration decision (2a), I control for the country of destination as this affects whether the migration is temporary or permanent. Migrants to the Gulf tend to be temporary in nature while those to the USA and Europe may be permanent. As noted by Lucas (2008), all migration to the Gulf States is temporary in nature with a mean migration duration of around 4 to 5 years and acquisition of citizenship being effectively impossible for anyone. Therefore, I use a dummy if a migrant traveled to an Arab country. In addition, in order to capture heterogeneity at the time of migration I control for the decade of migration. I also control for individual characteristics.

As for the migration decision (2b), I capture the prevalence of migration by past migration rates within the Qism[21] almost 20 years earlier in 1988. Past migration networks can provide information for prospective migrants about jobs and destinations. Finally, z contains individual and regional characteristics.

4.4 Occupational choice and selection

In order to establish the need for correcting for the various potential selections, a simple probit of return migration with sample selection for emigration is estimated (Table A1, panel A) shows a significant negative correlation coefficient between the two error terms, thereby suggesting that applying the selection model is appropriate. The estimates display the significance of the exclusion restriction in the migration equation: oil prices. Similarly, the correlation coefficient between the error terms in the entrepreneurship equation and the labor market participation equation is negative and significant indicating the need for correcting for selection into work (Table A1, panel B). Moreover, the coefficient of the exclusion restriction variable in the labor market

[21] Qism is an Egyptian sub-district (neighborhood) and is the smallest administrative unit. Data are from the 1988 Labor Force Sample Survey

participation decision, the number of dependents, is positive and significant. Furthermore, using a simple IV regression of the determinant of entrepreneurship, I instrument return migration using shocks to provide further evidence of the significance of that instrument (Table A2, panel B).

The estimates of the determinants of occupational choice are presented in Table 4. Here, our outcome of interest is the probability of entrepreneurship defined as either being self-employed or an employer. I describe several models, beginning with the simplest. Model 1 presents the probability of labor participation without any selection correction and shows that returnees are more likely relative to non-migrants to become employers or self-employed after controlling for individual characteristics, such as education and for local labor market conditions.

Model 2 displays the probability of entrepreneurship while controlling for selection into labor market participation and shows that returnees are more likely, relative to non-migrants, to become employers or self-employed. The exclusion restriction for labor market participation, the number of dependents, is positive and significant. Also, the correlation between the error terms in these two equations is negative and significant, suggesting that the unobservable factors that affect labor market participation negatively affect the probability of entrepreneurship positively. For example, necessity or desperation, which is unobserved, is negatively related to participation but is positively related to becoming an entrepreneur if it pushes individuals to take risk.

Model 3 shows the entrepreneurship decision while controlling for labor market participation and return migration. The exclusion restriction for return migration (shocks) is significant. It is important to note here that the correlation coefficient between the error terms of return and entrepreneurship is positive and significant, suggesting perhaps that the same observables that push individuals to migrate temporarily push them to become entrepreneurs. On the other hand, the correlation between returnees and labor market participation is negative, though not significant.

Model 4 is our full structural model controlling for all three selectivity biases and is estimated in a consistent and efficient manner. All our exclusion restrictions are found to be significant, and our estimates show that there is a significant negative correlation coefficient between emigration and return, suggestive of negative selection. This is important since it shows that returnees are negatively selected among migrants. There is a positive correlation between the error term in the return migration and entrepreneurship equations. Based on these results, the predicted probability of a return migrant becoming an entrepreneur is around 36 %, while that of a non-migrant is 34 %. Hence, return migrants are more likely (by about 6 %) to become either employers or self-employed compared to non-migrants. Although this predicted probability is smaller than that previously found, for example by Wahba and Zenou (2012), this is because entrepreneurship here refers only to being employer and self-employed and does not include the setting up of businesses. Finally, there is no significant evidence that returnees are more likely to withdraw from the labor market after return once individuals' characteristics and the various selections have been controlled for.

Table 4 Occupational choice models

	Model 1	Model 2	Model 3	Model 4
1. Probability of entrepreneurship				
Individual characteristics				
Return migrant	0.164	0.175	0.329	0.224
	(0.070)**	(0.079)**	(0.150)**	(0.079)***
Father waged	−0.464	−0.501	−0.500	−0.492
	(0.034)***	(0.037)***	(0.037)***	(0.042)***
Father illiterate	−0.102	−0.144	−0.143	−0.138
	(0.038)***	(0.041)***	(0.041)***	(0.040)***
Age	0.004	0.015	0.014	0.014
	(0.002)**	0.175	(0.002)***	(0.002)***
Education				
Reads and writes	−0.149	−0.245	−0.250	−0.222
	(0.061)**	(0.067)***	(0.079)***	(0.072)***
Elementary school	−0.359	−0.377	−0.379	−0.379
	(0.059)***	(0.065)***	(0.065)***	(0.065)***
Middle school	−0.456	−0.456	−0.457	−0.461
	(0.079)***	(0.085)***	(0.085)***	(0.084)***
Secondary school	−0.872	−1.030	−1.035	−0.643
	(0.129)***	(0.136)***	(0.136)***	(0.082)***
University and higher	−0.981	−1.104	−1.109	−0.897
	(0.082)***	(0.089)***	(0.089)***	(0.097)***
Local labor market				
Public 96-06	−0.030	−0.022	−0.022	−0.026
	(0.007)***	(0.008)***	(0.008)***	(0.006)***
Unemployment 05	0.004	0.006	0.006	0.005
	(0.002)**	(0.002)***	(0.002)***	(0.002)***
2. Probability of work				
Number of dependents		0.139	0.139	0.124
		(0.018)***	(0.018)***	(0.017)***
3. Probability of return migration				
Shocks			0.300	0.588
			(0.128)***	(0.145)***
4. Probability of emigration				
Oil price				0.004
				(0.001)***
rho_12		−0.530	−0.588	−0.521
		(0.099)***	(0.138)***	(0.154)***
rho_13			0.096	0.232
			(0.052)**	(0.140)*
rho_23			−0.047	−0.042
			(0.057)	(0.064)

Table 4 (continued)

	Model 1	Model 2	Model 3	Model 4
rho_34				−0.492
				(0.168)***
Log likelihood	−3822.76	−5004.84	−6098.67	−7928.06

Standard errors in parentheses: *significant at 10 %; **significant at 5 %; ***significant at 1 %. Model 1 is probability of entrepreneurship. Model 2 is probability of entrepreneurship with selection into labor market participation. Model 3 is probability of entrepreneurship with selection into labor market participation and return migration. Model 4 is the probability of entrepreneurship with selection into labor market participation and probability of return migration with selection into emigration. All equations have a full set of controls

5 The effects of return migration on wages

5.1 Methodology

Having shown the importance of selection for emigration, return migration and labor participation, and the higher probability of returnees becoming employers and self-employed, I take this on board when estimating the impact of return migration on wages. When considering earnings, an additional equation is added to our multi-system which uses a conditional mixed process estimator to estimate this multi-stage simultaneous equation model as follows.

Earnings Y is measured as the log real hourly wage rate, while I is a vector of individual characteristics, such as age, age squared, education, current job tenure in years, private sector, informal sector (based on the lack of a job contract and social security coverage), and region of residence. Y is observed only for waged workers, i.e., Y=observed if WE >0.

$$Y = I\gamma + \kappa \tag{3}$$

Earlier, the occupational choice decision focused on the entrepreneurial (E) decision. An employed person can be either a waged worker (WE) or an entrepreneur (E). Given our interest in wages, I model the waged employment decision (WE), which is observed when the unobservable latent variable measuring the difference between the wage and the reservation wage is WE* >0.

$$WE = s\theta + \varpi \quad WE = \begin{cases} 1 & \text{if } WE^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{1a'}$$

At the same time, the waged employment choice is only observed if the individual participates within the labor market, i.e., WE=observed if P >0.

The labor market participation (P) decision is only observed when the unobservable latent variable measuring the gains from participation in the labor market is positive, i.e., P^* >0.

$$P = H\phi + \eta \quad P = \begin{cases} 1 & \text{if } P^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{1b}$$

As before, the decision of return migration (R) is observed only when the latent variable R^* measuring the gains from return migration is positive.

$$R = x\beta + \varepsilon \quad R = \begin{cases} 1 & \text{if } R^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{2a}$$

Given the selection for emigration, only migrants can return, hence R is only observed if an individual has emigrated, i.e., $M > 0$.

The overseas emigration decision (M) is observed when the unobservable latent variable measuring the gains from migration is positive, i.e., $M^* > 0$.

$$M = z\delta + v \quad M = \begin{cases} 1 & \text{if } M^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{2b}$$

The five equations above are estimated simultaneously using Conditional Mixed Process so that all the errors are correlated $(\varpi, \eta, \varepsilon, \nu)$ and each of the above equations varies by observation. In other words, sample selection is modeled for the full data set and the dependent variable for the subset with complete observations. As above, I, s, H, x, and z are controls and exclusion restrictions.

5.2 Further identification

I use the same exclusion restrictions discussed above for Eqs. 1b, 2a, and 2b. Note that our survey took place between January and March 2006. The exclusion restriction used to identify emigration is average real international oil prices at age 26. I argue that historic oil prices are not correlated with current wages in 2006. In terms of wage setting, the Egyptian government plays an important role as a main employer in setting public sector wages which the private sector follows.[22] Hence, fluctuations in oil prices play no role in the wage setting in the Egyptian economy which is not an oil-dependent economy. Similarly, the exclusion restriction for return migration, shocks associated with previous wars/conflicts, has no direct effect on observed wages in 2006. Given the time lag between the shocks and the observed wages, even if a mass return migration took place, the impact on wages will not be permanent. As for labor force participation, we rely on the number of dependents (young and old) at the household which is not correlated with individual wages.

In addition for waged employment (1a′), I use father's main employment (waged worker or non-waged worker) when an individual was 15 years of age as an exclusion restriction. I argue that there is a correlation between the father's and son's type of employment. To ensure that father's employment is not capturing ability, I also control for father's education. I do not find any correlation between a father's main employment when an individual was 15 years of age and the probability of migration. It should be kept in mind that within our sample both educated and uneducated workers migrate.

[22] See Assaad (1997) on wage setting in Egypt.

5.3 Selection and wages

Before discussing the estimates of our structural models, I briefly establish, using simple Heckman selection (Table A1, panel C), that there is positive selection between waged employment choice and wages, suggesting that those who select into waged employment might have higher reservation wages compared to those who select into entrepreneurship. Also, using a simple IV regression of wages, I instrument return migration using shocks to provide further evidence of the significance of that instrument in Table A2, panel A.

The results for Model 1 shown in Table 5 present a simple ordinary least squares (OLS) estimate of log hourly wages while controlling for individual characteristics, demonstrating that returnees earn more than non-migrants. Model 2 presents a Heckman selection of waged employment only, while Model 3 controls for selection for waged employment and labor market participation. Estimates resulting from both models show a wage premium for returnees. Interestingly, there is a positive correlation between waged employment and wages, and a negative one between labor market participation and wages. Therefore, unobserved factors that make labor market participation more likely tend to be associated with lower wages, but the unobservables that are positively related to waged work such as ability might also be positively related to wages.

Finally, Model 5 in Table 5 presents the full model with the four selections. This shows the correlation coefficients and indicates the importance of controlling for the various selections discussed. It is important to note that all our exclusion restrictions are significant. Furthermore, it is important to note that the correlation coefficient between emigration and return migration is negative as found earlier suggesting that returnees are negatively selected among migrants.

5.4 Discussion of the findings

In order to be able to quantify the impact of return migration on wages, Table 6 provides the predicted log hourly wages for returnees and non-migrants. If no selection is controlled for, but controls for individual and regional characteristics are included, there is a wage premium of 24 % for returnees. Therefore, almost half of the observed wage premium differential between returnees and non-migrants is due to observables such as age and education. Controlling for waged employment, labor market participation and return migration (without controlling for emigration) increases this premium by about 10 %. However, once all the selectivity biases discussed are controlled for, i.e., emigration, return migration, labor participation, and waged employment participation, then the wage premium experienced by the returnees is reduced by 10 percentage points to almost 16 %. In particular, the main drivers here are the selectivity of emigration and that of return migration. Controlling for return migration only, provides an overestimate of the wage premium as it does not capture the full selectivity of the emigration and return migration decisions given the negative selection into return and the positive selection into emigration. Consequently, ignoring emigration selectivity and controlling only for return migration captures the positive selection of migrants but not the fact that returnees tend to be negatively selected among migrants. This may explain the findings of earlier studies which do not control for both decisions and report

Table 5 Wage models

	Model 1	Model 2	Model 3	Model 4	Model 5
1. Wage determinants (OLS log hourly wage)					
Individual characteristics					
Return migrant	0.143	0.143	0.124	0.220	0.163
	(0.061)**	(0.061)**	(0.054)**	(0.116)*	(0.082)**
Age	0.024	0.024	0.032	0.033	0.010
	(0.012)**	(0.012)**	(0.013)**	(0.013)***	(0.012)***
Age squared	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)*	(0.000)***
Tenure	0.006	0.006	0.006	0.006	0.006
	(0.002)***	(0.002)***	(0.001)***	(0.001)***	(0.001)***
Private	0.111	0.111	0.115	0.116	0.111
	(0.032)***	(0.032)***	(0.031)***	(0.031)***	(0.031)***
Informal	−0.155	−0.155	−0.127	−0.126	−0.152
	(0.035)***	(0.035)***	(0.034)***	(0.034)***	(0.032)***
Education					
Reads and writes	0.068	0.057	0.161	0.159	0.065
	(0.051)	(0.052)	(0.056)***	(0.056)***	(0.049)
Elementary school	0.096	0.077	0.280	0.279	0.121
	(0.044)***	(0.045)***	(0.050)***	(0.050)***	(0.047)***
Middle school	0.150	0.129	0.358	0.359	0.154
	(0.057)***	(0.058)***	(0.064)***	(0.064)***	(0.058)***
Secondary school	0.304	0.266	0.638	0.637	0.287
	(0.077)***	(0.078)***	(0.088)***	(0.088)***	(0.048)***
University and higher	0.680	0.640	1.038	1.047	0.666
	(0.057)***	(0.060)***	(0.068)***	(0.068)***	(0.059)***
2. Probability of waged work					
Father waged worker		0.444	0.414	0.414	0459
		(0.034)***	(0.037)***	(0.038)***	(0.101)***
3. Probability of work					
Number of dependents			0.177	0.177	0.126
			(0.018)***	(0.018)***	(0.017)***
4. Probability of return migration					
Shocks				2.001	0.380
				(0.142)***	(0.042)**
5. Probability of emigration					
Oil price					0.004
					(0.004)***
Sigma_1		0.684	0.804	0.804	0.692
		(0.015)***	(0.022)***	(0.022)***	(0.014)***
rho_12		0.899	0.794	0.794	0.437
		(0.015)***	(0.035)***	(0.034)***	(0.127)***
rho_13			−0.134	−0.137	−0.058

Table 5 (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5
			(0.054)**	(0.055)***	(0.030)**
rho_14				−0.118	−0.035
				(0.070)*	(0.019)*
rho_23			−0.125	−0.124	0.293
			(0.117)	(0.123)	(0.143)**
rho_24				−0.097	−0.221
				(0.043)**	(0.101)**
rho_34				0.046	0.049
				(0.055)	(0.341)
rho_45					−0.389
					(0.190)**
Log likelihood	−3936.62	−7810.77	−9042.83	−10,155.24	−12,473.75

Standard errors in parentheses: *significant at 10 %; **significant at 5 %; ***significant at 1 %. Model 1 is OLS of log hourly wages. Model 2 is wage estimates with Heckman selection into waged employment. Model 3 is wage estimates with selection into labor market participation and waged employment. Model 4 is Model 3 plus return migration. Model 5 is a model of wages with waged employment and labor market participation selection and the probability of return migration with selection into emigration. All equations have a full set of controls

much higher returns to returning (see, for example, Wahba 2007).[23] Thus, our main findings suggest that in order to measure the impact of overseas experience, it is insufficient to control only for the return migration selection. The non-randomness of returnees among migrants presents a significant selection bias.

In addition, the findings suggest that as Table 7 shows, the wage premium differs by educational level, with less educated returnees earning 10 % more than non-migrants, while university graduate returnees earn 24 % more. This is an interesting finding that suggests that the high educated acquire more human capital while overseas compared to the less educated. This suggests that the brain drain effects are reduced or even reversed as a result of return migration causing brain gain as the highly educated accumulate more human capital while overseas which they utilize upon their return.

5.5 Robustness: overseas migration duration

In order to check the robustness of our previous results, given that the majority of our migration is to the Gulf States, it can be argued that the return decision is not about whether to return but rather about when to return. Therefore, instead of examining return migration as a binary decision, we estimate the length of overseas migration (migration duration) and control for potential selection arising from this decision. Hence, I replace return migration with migration duration. Table 8 presents the main estimates for the wage model, where Model 1 treats migration duration as exogenous,

[23] Note that Wahba (2007) is based on data from 1998. One major change in the early 2000s was the increase in Egyptian emigration to Europe.

Table 6 Average predicted values

	Returnee	Non-migrant	Difference (%)	*P* value
Probability of employment				
Work	0.877	0.872	0.57	0.87
Entrepreneurship	0.362	0.342	5.82	0.04
Waged employment	0.632	0.646	−2.17	0.04
Predicted log real hourly wages				
No correction	1.107	0.890	24.27	0.00
Waged employment and labor market participation correction	0.782	0.582	21.93	0.00
Waged employment, labor market participation, and return migration corrections	0.983	0.747	26.62	0.00
Waged employment, labor market participation, return migration, and emigration corrections	1.058	0.907	16.28	0.00

P value reports the results of a *t* test of H_o: Return migrants=Non-migrants

while Model 2 treats overseas migration as an endogenous variable that appears in the wage equation. It is interesting to note that although I found earlier that the correlation coefficient between emigration and return equations is negative, not surprising I find that the correlation coefficient here is positive between emigration and overseas duration suggesting positive selection. This might suggest that possibly the same set of unobservable skills that are positively correlated with migration are also correlated with higher migration duration and more importantly higher wages upon return. Based on Model 2, I find that on average, there is a wage premium of about 15.8 % for returnees compared to non-migrants, which is similar in magnitude to our earlier results. Moreover, the findings suggest that the relationship between migration duration and the wage premium of returnees is non-linear. In fact, a 4-year migration duration results in a 20 % wage premium relative to a non-migrant and the wage premium from migration peaks, at 6 years, at 27 % before beginning to decrease.

Although this paper attempts to control for the various selections associated with migration and the labor market, there are potentially other choices/selections such as the destination choice that, although I control for, I do not estimate as an additional choice.

Table 7 Predicted log real hourly wages by education

	Returnee	Non-migrant	Difference (%)	*P* value
Less educated	0.826	0.722	10.94	0.00
High educated	1.193	1.057	14.45	0.00
University graduates	1.520	1.318	23.62	0.00

P value reports the results of a *t* test of H_o: Return migrants=Non-migrants

Table 8 Wage models with overseas duration

	Model 1	Model 2
1. OLS Log hour wage		
Individual characteristics		
Overseas duration	–	0.018
		(0.010)*
Age	0.010	0.006
	(0.012)	(0.014)
Age squared	0.000	0.000
	(0.000)	(0.000)
Tenure	0.006	0.006
	(0.001)***	(0.001)***
Private	0.110	0.112
	(0.032)***	(0.031)***
Informal	−0.152	−0.152
	(0.032)***	(0.032)***
Education		
Reads and writes	0.066	0.067
	(0.049)	(0.049)
Elementary school	0.120	0.132
	(0.038)***	(0.049)***
Middle school	0.153	0.167
	(0.058)***	(0.060)***
Secondary school	0.288	0.311
	(0.048)***	(0.082)***
University and higher	0.668	0.686
	(0.059)***	(0.067)***
2. Probability waged work		
Father waged	0.539	0.184
	(0.039)***	(0.013)***
3. Probability work		
Number of dependents	0.126	0.023
	(0.017)***	(0.003)***
4. OLS migration duration		
Shocks	5.213	5.237
	(0.702)***	(0.680)***
5. Probability emigrate		
Oil price	0.004	0.001
	(0.001)***	(0.001)***
Sigma 1	0.693	0.694
	(0.015)***	(0.016)***
Sigma 4	4.884	4.890
	(0.324)***	(0.248)***
rho_12	0.030	0.028

Table 8 (continued)

	Model 1	Model 2
	(0.010)***	(0.009)***
rho_13	−0.085	−0.085
	(0.085)	(0.085)
rho_14	−0.045	−0.047
	(0.021)**	(0.020)**
rho_23	0.089	0.090
	(0.050)*	(0.050)*
rho_24	−0.075	−0.075
	(0.041)**	(0.040)**
rho_34	−0.032	−0.33
	(0.018)**	(0.017)**
rho_45	0.118	0.108
	(0.052)**	(0.051)**
Log likelihood	−14,317.29	−15,255.05

Standard errors in parentheses: *significant at 10 %; **significant at 5 %; ***significant at 1 %. Both models are structural models of wages with waged employment and labor market participation selections and overseas duration with selection into emigration. All equations have a full set of controls

6 Conclusions

Estimating the impact of return migration is important yet complex given the various potential selection biases involved. Using nationally representative household data from Egypt where current migrants, return migrants, and non-migrants are observed, this paper provides evidence on the role of temporary migration by estimating the returns to returning, and more importantly by controlling for various selection decisions—emigration, return migration, labor market participation, and occupational (waged versus entrepreneur) choice—which has not been done before. Our starting premise is that migrants are non-random sample and furthermore returnees are a select group among migrants. Hence, one needs to account for both the emigration and the return selectivity. In addition, given the potential selectivity of returnees compared to non-migrants, there is a need to account for the occupational choice of returnees, as previous studies find that returnees tend to become entrepreneurs, and for their labor market participation decision.

Our results highlight the importance of returns to overseas work experience by demonstrating the extent to which temporary migration impacts on human capital by affecting occupational choice and the wages of migrants upon return to their home country, even after controlling for selection. The findings provide evidence that temporary overseas migration results in a wage premium upon return. Our estimates show that return migrants earn on average around 16 % more than non-migrants if all selection biases are corrected for. However, controlling only for return migration and ignoring the emigration decision overestimates the impact of return migration by 10 percentage points since migrants are positively selected while returnees are negatively

selected. This finding is important since the previous studies on the returns to overseas work experience do not account for the double migration selectivity. This suggests that failing to control for the double selection into migration and return would lead to biased estimates when quantifying the impact of return migration on occupational choice and wages depending on the type of selection of migrants and returnees, i.e., whether migrants and returnees are positively or negatively selected.

This paper emphasizes the significance of emigration and return migration selections. Consequently, one important implication of the findings is in underlining the need for collecting data on both current and return migrants in nationally representative household surveys and censuses of labor-sending countries to enable future researchers to deal with these selections when quantifying the impact of migration.

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Appendix

Table 9

Table 9 Simple sample selection models

(A) Probit of return migration with selection into emigration		
	(1)	(2)
	Prob return	Prob emigrate
Oil price		0.003
		(0.001)***
Rho	−0.859	
	(0.115)***	
χ^2 (1)=8.60	Prob>χ^2=0.003	
Observations	7445	
(B) Probit of entrepreneurship with selection into labor market participation		
	(1)	(2)
	Prob entrepreneurship	Prob work
Number of dependents		0.134
		(0.017)***
Rho	−0.224	
	(0.044)***	
χ^2 (1)=26.79	Prob>χ^2=0.00	
Observations	7057	
(C) OLS wage regression and Heckman selection		
	(1)	(2)
	Log hourly wage	Prob waged employment
Father waged worker		0.578
		(0.030)***

Table 9 (continued)

lambda		−0.082
		(0.034)**
χ^2 (1)=5.92	Prob>χ^2=0.015	
Observations	7518	

Standard errors in parentheses: *significant at 10 %; **significant at 5 %; ***significant at 1 %

Table 10

Table 10 Simple IV estimates

(A) IV wage regression		
	(1)	(2)
	OLS returnee	Log hourly wage
Shocks	0.871	
	(0.023)***	
Returnee		0.217
		(0.10)**
First stage *F* statistics	111.6	
Prob>*F*	0.000	
Observations	4297	
(B) IV determinants of entrepreneurship		
	(1)	(2)
	OLS returnee	OLS entrepreneurship
Shocks	0.500	
	(0.041)***	
Returnee		0.093
		(0.038)***
First stage *F* statistics	121.68	
Prob>*F*	0.000	
Observations	7122	

Standard errors in parentheses: *significant at 10 %; **significant at 5 %; ***significant at 1 %

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