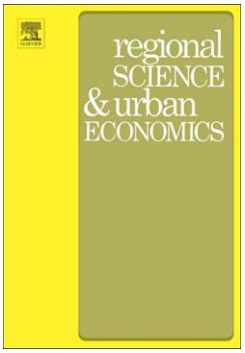


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# Out of Sight, Out of Mind: Migration, Entrepreneurship and Social Capital*

Jackline Wahba† Yves Zenou‡

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**Abstract**

The aim of this paper is to investigate whether return migrants are more likely to become entrepreneurs than non-migrants. We develop a theoretical search model that puts forward the trade off faced by returnees since overseas migration provides an opportunity for human and physical capital accumulation but, at the same time, may lead to a loss of social capital back home. We test the predictions of the model using data from Egypt. We find that, even after controlling for the endogeneity of the temporary migration decision, an overseas returnee is more likely to become an entrepreneur than a non-migrant. Although migrants may lose their social capital, they accumulate savings and experience overseas that increase their chances of becoming entrepreneurs.

**Keywords:** Social capital, entrepreneurship, selection, savings.

**JEL Classifications:** L26, O12, O15,

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# 1 Introduction

What makes an entrepreneur? This question has been the focus of few previous studies, which have tended to analyze the determinants of self-employment in developed countries and transitional economies (see, for example, Blanchflower and Oswald, 1998; Evans and Jovanovic, 1989; Evans and Leighton, 1989; Djankov et al., 2005). Yet, very few papers have attempted to study this question for developing countries. Meanwhile, the wealth and poverty of developing countries are linked to the entrepreneurial nature of their economies. Entrepreneurship plays an important role in economic growth, innovation, and competitiveness as first highlighted by Schumpeter in 1911, but may also play a role in poverty alleviation (Landes, 1998). It is thus crucial to understand what makes an entrepreneur in developing countries.

The rather small literature on this issue has put forward the importance of financial constraints in becoming an entrepreneur. Access to credit is seen as a major obstacle for entrepreneurship (see, e.g., Banerjee and Newman, 1983). Limited personal and family savings and lack of access to credit are seen to severely limit the growth prospects of promising startups in developing countries. Thus, policymakers and international organizations, interested in economic development, have supported micro-credit programs in developing countries as a means to encourage entrepreneurship. More recently, international migration has played an important role in allowing this liquidity constraint to be overcome. Temporary migration has been a conduit through which individuals have the opportunity to accumulate savings that can be used upon their return for setting up businesses.

Several studies have been interested in how international migration provides a channel for accessing credit through overseas savings by focusing on the impact of savings on the occupational choice of returnees and in particular on self-employment and entrepreneurship. Using cross-sectional data from Pakistan, Ilahi (1999) finds that, upon return, savings become a significant factor in the choice of self-employment over waged employment. Mesnard (2004) models migration as a way to overcome credit constraints in the presence of capital markets imperfections. She finds that the majority of entrepreneurial projects started by Tunisian returnees were totally financed through overseas savings.[1] Dustmann and Kirchkamp (2002) develop a model where migrants simultaneously decide on the optimal migration duration and

[1] In another paper, Mesnard and Ravaillon (2006) examine not only the effect of credit constraints (wealth) but also wealth inequality among return migrants in Tunisia.

their after return activities. They find that among Turkish returnees more than half of them are economically active and engage in entrepreneurial activities. McCormick and Wahba (2001) add a different insight by showing that savings matter more than human capital acquisition for the probability of entrepreneurship of illiterate Egyptian returnees. However, for the educated returnees, both access to credit, through overseas savings, and human capital accumulation are significant determinants of entrepreneurship upon return. Woodruff and Zenteno (2007) find that migration networks help overcome capital constraints in Mexico. Using a survey of self-employed workers and small firm owners in Mexico that have access to remittance flows, they estimate the impact of attachment to migration networks on the level of capital investment, the capital-output ratio, sales, and profits of microenterprises.[2] However most of those studies limit their analysis to return migrants only, whilst Woodruff and Zenteno (2007) consider households of migrants receiving remittances rather than return migrants. Yet, one important question is whether return migrants are more likely than non-migrants to become entrepreneurs (set-up businesses). The issue of whether return migrants are more or less likely to become entrepreneur has not been addressed before.

Although physical capital is an important determinant of entrepreneurship and has been seen as an important factor by economists, there are potentially other factors that may impact on the individual's decision of setting up a business. Sociologists have stressed the importance of social capital as a determinant of entrepreneurship: entrepreneurs rely on their contacts for information and services (see, e.g. Greve and Salaff, 2003). This is an issue that has not really been tackled by economists. An exception is the work by Djankov et al. (2005, 2006) who provide suggestive evidence on the role played by social networks on entrepreneurship. They find that individuals whose relatives and school friends are entrepreneurs are themselves more likely to be entrepreneurs. Indeed, several economic studies have examined the role of social networks in migration (see e.g. Munshi, 2003; McKenzie and Rapoport, 2010) and others have studied the role of social networks in job acquisition (see e.g. Wahba and Zenou, 2005). This migration literature has focused on the role played by social networks in the migration decision through reducing migration cost, for example, and in finding jobs upon arrival in the host country. However, the role played by the *origin* social networks in entrepreneurship has not attracted previous attention. Moreover, no one has examined the possible loss of social capital at country of origin as a result of

[2]See also Oswald and Blanchflower (1998) who study who becomes an entrepreneur in the UK.

emigration and whether this impacts on the entrepreneurial decision upon return.

The aim of this paper is to study what makes an entrepreneur and to address the following questions. Are return migrants more likely to become entrepreneurs than non-migrants? Does emigration result in loss of social capital, hence out of sight, out of mind, and thus negatively affect the entrepreneurship decision? As a result, this paper attempts to address this important policy question regarding the determinants of entrepreneurship and whether return migrants are more likely to become entrepreneurs compared to non-migrants. This should impact on policies directed towards encouraging entrepreneurship and providing micro-credit in many developing countries.

To answer the above questions, one needs to control for the potential endogeneity of the migration decision and the entrepreneurial decision upon return. On the one hand, migration might increase the probability of entrepreneurship but, on the other, it could be that individuals planning to be an entrepreneur are more likely to migrate. First, we develop a theoretical search model where we endogenize the migration and the entrepreneurship decisions and show the trade off faced by returnees since overseas migration provides an opportunity for human and physical capital accumulation but, at the same time, may lead to a loss of social capital back home. Then, we test these predictions using the Egyptian Labour Market Survey in 1998 by looking at both overseas returnees and non-migrants. We control for the potential endogeneity between temporary migration and entrepreneurship. We find that, controlling for the temporary migration decision, a returnee is more likely to become an entrepreneur than a non-migrant. Although migrants may potentially lose their social capital, they accumulate savings and experience overseas that increase their entrepreneurship.

The paper is organized as follows. Section 2 develops the theoretical model. In Section 3, we describe the data, whilst the econometric model is presented in Section 4. The empirical findings are examined in Section 5 and further robustness checks are discussed. Finally, Section 6 concludes.

# 2 Theory

## 2.1 The model

Consider a continuum of individuals whose mass is $n$ in a given country (Egypt in the data). Ex ante, individuals are heterogenous in two dimensions: their (innate) entrepreneurship *talent*, which we denote by $t$, and their migration costs $c$. Talent $t$ is drawn from a cumulative distribution $F(t)$, which is continuous on the support interval $\left[\underline{t}, \overline{t}\right]$. The migration cost $c$ is drawn from a cumulative distribution $G(c)$, which is continuous on the support interval $[\underline{c}, \overline{c}]$. We assume that there are no correlations between $F(t)$ and $G(c)$ so that, for example, a very talented person may have a very high migration cost because he/she has a large family and/or because he/she is older.[3]

The timing is as follows. In the first stage, each individual in the home country (Egypt in the data) decides whether to migrate to another country or not without knowing their talent $t$. In our model, as it is the case in our data for Egypt (see below), we are only focussing on *temporary migration*, which means that when an individual decides to migrate, he/she knows with certainty that he/she will return to the home country.[4] Then, those who have migrated return to their home country. We refer to them as *returnees* while those who have never migrated are referred to as *non-migrants*. An individual $i$ is identified with the subscript $i = re$ in the former case and $i = nm$ in the latter. The mass of returnees and non-migrants are denoted by $n_{re}$ and $n_{nm}$, with $n_{re} + n_{nm} = n$. In the second stage, talent $t$ is revealed to each individual $i$ and each of them has to decide whether to become an entrepreneur or a waged worker.

## 2.2 The labor market

We use a standard search-matching model (Mortensen and Pissarides, 1999; Pissarides, 2000) to describe the labor market.

**Matching function** The allocation of jobs is modelled as in the simplest case analyzed in Pissarides (2000, Chapter 1), with an important modification necessitated by the intro-

[3] We could assume that these two distributions are correlated in some way. This would make the analysis easier but also less interesting.

[4] Over 90 percent of Egyptian migration is temporary in nature.

duction of entrepreneurs. Suppose that, at some time $t$, entrepreneurs have created and are managing a total of $m + v$ jobs, with $m$ of them occupied by workers and $v$ of them vacant. There are $m + u$ workers in this market, one in each occupied job and $u$ unemployed. Each of the $m$ occupied jobs produces a constant flow of output $y$ and continues producing this output until a negative shock arrives. When the negative shock arrives, an event that takes place at rate $\delta$, the job is closed down, the worker becomes unemployed and the entrepreneur opens another job to replace it. Workers share the surplus from the job according to the Nash solution to an implicit wage bargaining. There is *no* on-the-job-search since all jobs are identical and therefore (see below) the wage will be the same for all workers.[5] In aggregate, these processes imply that there is a number of contacts per unit of time between the two sides of the market that are determined by the following matching function:

$$M = M(u, v) \tag{1}$$

As in the standard search-matching model (Mortensen and Pissarides, 1999; Pissarides, 2000), we assume that $M$ is increasing both in its arguments, concave and homogeneous of degree 1 (or equivalently has constant return to scale). Given the matching function (1), we can determine the rate at which vacancies are filled. It is equal to: $M(u, v)/v \equiv q(\theta)$ where $\theta \equiv v/u$ is the *labor market tightness*. By using the properties of $M$, it is easily verified that $q'(\theta) \leq 0$: the higher the labor market tightness, the lower the rate at which firms fill their vacancy. Similarly, the rate at which an unemployed worker leaves unemployment is $M(u, v)/u \equiv \theta q(\theta)$. Again, by using the properties of $M$, it is easily verified that $[\theta q(\theta)]' \geq 0$: the higher the labor market tightness, the higher the rate at which workers leave unemployment since there are relatively more jobs than unemployed workers.

**Expected utilities and wages** Agents discount the future at rate $r$, are risk neutral, have rational expectations and live infinitely. In steady-state, the discounted expected utility of employed and unemployed workers are respectively given by:[6]

$$rI_L = w_L - \delta\left(I_L - I_U\right) \tag{2}$$

[5] Even if all jobs are identical, there can be on-the-job-search behavior if firms post wages (Burdett and Mortensen, 1998). This is not the case here since wages are bargained between workers and firms.

[6] $I_L$ and $I_U$ are the steady-state expected utilities of employed and unemployed workers who have decided not to become entrepreneurs. These are the waged workers.

$$rI_U = w_U + \theta q(\theta)\left(I_L - I_U\right) \tag{3}$$

with

$$I_L - I_U = \frac{w_L - w_U}{r + \delta + \theta q(\theta)} \tag{4}$$

By plugging (4) into (2) and (3), we finally get:

$$rI_L = \frac{\delta w_U + \left[r + \theta q(\theta)\right] w_L}{r + \delta + \theta q(\theta)} \tag{5}$$

$$rI_U = \frac{\left(r + \delta\right) w_U + \theta q(\theta) w_L}{r + \delta + \theta q(\theta)} \tag{6}$$

Let us denote by $I_F$ and $I_V$ the intertemporal profit of an entrepreneur with a filled job and a vacancy, respectively. If $\lambda$ is the search cost for the firm per unit of time and $y$ is the product of a match, then, at the steady-state, $I_F$ and $I_V$ can be written as:

$$rI_F = y - w_L - \delta(I_F - I_V) \tag{7}$$

$$rI_V = -\lambda + q(\theta)(I_F - I_V) \tag{8}$$

which implies that:

$$I_F - I_V = \frac{y - w_L + \lambda}{r + \delta + q(\theta)} \tag{9}$$

By plugging (9) into (7) and (8), we obtain:[7]

$$rI_F = \frac{\left[r + q(\theta)\right]\left(y - w_L\right) - \delta\lambda}{r + \delta + q(\theta)}$$

$$rI_V = \frac{q(\theta)\left(y - w_L\right) - \left(r + \delta\right)\lambda}{r + \delta + q(\theta)} \tag{10}$$

Let us now determine the wage. At each period, the total intertemporal surplus is shared through a generalized Nash-bargaining process between the firm (i.e. the entrepreneur) and

[7]Contrary to the standard matching model (Pissarides, 2000), we do not have a free-entry condition $I_V = 0$ that determines the number of jobs created. Here it is determined by $\alpha_i$. See equation (15) in Section 2.5.

the (waged) worker. The total surplus is the sum of the surplus of the workers, $I_L - I_U$, and the surplus of the firms $I_F - I_V$. At each period, the wage is determined by:

$$w_L = \arg\max_{w_L} (I_L - I_U)^{\beta} (I_F - I_V)^{1-\beta} \tag{11}$$

where $0 \leq \beta \leq 1$ represents the bargaining power of workers. By solving (11), we obtain the following sharing rule:

$$(1-\beta)(I_L - I_U) = \beta (I_F - I_V)$$

Using (3) and (8), this can be written as:[8]

$$rI_U = w_U + \frac{\beta}{1-\beta}\theta (\lambda + rI_V)$$

By replacing $rI_U$ by its value in (6), we obtain the following wage:

$$w_L = w_U + \left[\frac{r+\delta}{q(\theta)} + \theta\right] \frac{\beta (\lambda + rI_V)}{1-\beta} \tag{12}$$

Plugging the wage $w_L$ (12) into (10), we obtain:

$$rI_V = \frac{(1-\beta) q(\theta) (y - w_U) - [r + \delta + \beta \theta q(\theta)] \lambda}{(1-\beta) q(\theta) + r + \delta + \beta \theta q(\theta)} \tag{13}$$

We can also calculate $rI_U$ in a similar way and we obtain:

$$rI_U = \frac{[(1-\beta) q(\theta) + r + \delta] w_U + \beta \theta q(\theta) (y + \lambda)}{[(1-\beta) q(\theta) + r + \delta + \beta \theta q(\theta)]} \tag{14}$$

**Lemma 1** *By totally differentiating (13) and (14), we obtain*

$$\frac{\partial I_V}{\partial \theta} < 0 \qquad \frac{\partial I_V}{\partial y} > 0 \qquad \frac{\partial I_V}{\partial w_U} < 0 \qquad \frac{\partial I_V}{\partial \lambda} < 0 \qquad \frac{\partial I_V}{\partial \delta} < 0$$

$$\frac{\partial I_U}{\partial \theta} > 0 \qquad \frac{\partial I_U}{\partial y} > 0 \qquad \frac{\partial I_U}{\partial w_U} > 0 \qquad \frac{\partial I_U}{\partial \lambda} > 0 \qquad \frac{\partial I_U}{\partial \delta} < 0$$

[8] Indeed, (3) and (8) can be written as:

$$I_L - I_U = \frac{rI_U - w_U}{\theta q(\theta)}$$

$$I_F - I_V = \frac{rI_V + \gamma}{q(\theta)}$$

## 2.3 Second stage: The decision to become an entrepreneur

In the second stage, each worker $i = re, nm$ knows his/her type $t$ and has to decide whether or not to become an entrepreneur. Let us explain the way the entrepreneurship decision is made. Each individual $i = re, nm$ can either be an entrepreneur or a waged worker but not both. If individual $i$ decides to become an entrepreneur, then he/she can create and manage $\alpha_i$ jobs. This means that, even if each job corresponds to one worker, an entrepreneur has $\alpha_i$ jobs. In our model, $\alpha_i$ also represents the capacity of individual $i$ to becoming an entrepreneur. We assume that:

$$\alpha_i = t\, H_i + S_i \tag{15}$$

where $H_i$ captures both the human and physical capital of individual $i$ while $S_i$ is the size and quality of his/her *social network*. Let us explain and motivate in more detail equation (15). An individual $i$ who decides to become an entrepreneur has the capacity of creating a number of jobs $\alpha_i$, depending upon his/her talent $t$, his/her human/physical capitals $H_i$ as well as the size and quality of his/her social network $S_i$. Formula (15) implies that, for the determination of employment ability $\alpha_i$, talent $t$ and human/physical capital $H_i$ are complement but human and physical capitals $H_i$ and social capital $S_i$ are independent of each other. This is a particular way of modelling entrepreneurial's job creation. In Section 2.6, we extend our model to the case where $H_i$ and $S_i$ are not anymore independent but are complement and consider a more general formulation than (15).

In equation (15), we are making different assumptions that we would like to discuss now. First, the innate entrepreneurship talent $t$ is not indexed by $i$ since people are born with it and does not depend on any migration decision. We assume that returnees and non-migrants are born with a talent $t$ from exactly the same cumulative distribution of abilities $F(t)$. Second, because returnees have accumulated human capital and savings (physical capital) through their experience abroad, it is assumed that $H_{re} > H_{nm}$. Third, $S_i$ is capturing the social network that individuals have, an important feature of the Egyptian labor market (Wahba and Zenou, 2005). $S_i$ captures both the number and the quality (i.e. human capital, connections, etc.) of the social network.[9] We assume that $S_{nm} > S_{re}$, which captures the idea

[9]We do not model explicitly the social network as, for example, in Calvó-Armengol (2004), Calvó-Armengol and Zenou (2005) and Calvó-Armengol and Jackson (2004) because we do not have this information in our dataset.

that people who migrate lose part of their social network. This is a reasonable assumption since a person who has left a country for say four or five years is less likely to keep all his/her social contacts compared to someone who has not migrated.[10]

In this model, once an individual $i$ has decided to become an entrepreneur or a waged worker, then there is no difference between returnees and non-migrants in terms of productivity, wages, etc. Having migrated or not only changes the $\alpha_i$, the capacity of becoming entrepreneur but then, once a decision has been made, all individuals are assumed to be identical.[11]

There is a start-up cost of a new company, which is denoted by $K$. If individual $i$ becomes an entrepreneur, ex ante he/she will get $\alpha_i I_V - K$ while the expected utility from being a worker is $I_U$.[12]

Among the returnees (i.e. those who have migrated in the first stage and have returned to their home country), an individual $i = re$ will become an entrepreneur if and only if:

$$\alpha_{re} I_V - K \geq I_U \tag{16}$$

Using (15), we can therefore define a reservation value of entrepreneurial talent $\widetilde{t}_{re}$ for type$-re$ individuals as

$$\widetilde{t}_{re} = \frac{I_U + K}{I_V H_{re}} - \frac{S_{re}}{H_{re}} \tag{17}$$

such that all returnees with $t \geq \widetilde{t}_{re}$ will become entrepreneurs while the other returnees will become waged workers. As a result, $F(\widetilde{t}_{re}) n_{re}$ is the number of *waged workers among the returnees* and $\left[1 - F(\widetilde{t}_{re})\right] n_{re}$ is the number of *entrepreneurs among the returnees.*

Similarly, among the non-migrants, an individual $i = nm$ will become an entrepreneur if

[10] In a previous version of this paper, we differentiated between strong and weak ties, assuming that migrants lose their weak ties but not their strong ties when leaving the country. Since we do not have good information on weak and strong ties in our dataset, we have here focused only on the size and quality of the network, assuming that the size reduces when someone leaves a country (which could be interpreted as the fact that the migrant mainly loses his/her weak ties).

[11] Fonseca et al. (2001) model the capacity of individual $i$ of becoming an entrepreneur in a similar way but do not have social networks and do not model the migration decision.

[12] Indeed, this person is still unemployed when he/she makes the entrepreneur decision. If he/she decides to become a worker, he/she will go to the labor market as an unemployed worker and look for a job.

and only if:

$$\alpha_{nm} I_V - K \geq I_U \tag{18}$$

Using (15), we can therefore define a reservation value of entrepreneurial talent $\widetilde{t}_{re}$ for type$-re$ individuals as

$$\widetilde{t}_{nm} = \frac{I_U + K}{I_V H_{nm}} - \frac{S_{nm}}{H_{nm}} \tag{19}$$

such that all non-migrants with $t \geq \widetilde{t}_{nm}$ will become entrepreneurs while the other non-migrants will become waged workers. As a result, $F(\widetilde{t}_{nm}) n_{nm}$ is the number of *waged workers among the non-migrants* and $\left[1 - F(\widetilde{t}_{nm})\right] n_{nm}$ is the number of *entrepreneurs among the non-migrants*. It can easily be verified that:

$$\widetilde{t}_{re} \gtreqless \widetilde{t}_{nm} \Leftrightarrow \frac{S_{nm} H_{re} - S_{re} H_{nm}}{H_{re} - H_{nm}} \gtreqless \frac{I_U + K}{I_V} \tag{20}$$

This inequality highlights the trade off faced by returnees and migrants when deciding to become entrepreneurs. On the one hand, returnees have accumulated more human and physical capital abroad so that $H_{re} > H_{nm}$ but have lost part of their social networks, i.e. $S_{nm} > S_{re}$. As a result, it is not clear if $\widetilde{t}_{re} > \widetilde{t}_{nm}$, in which case non-migrants are more likely to be entrepreneurs than returnees, or $\widetilde{t}_{re} < \widetilde{t}_{nm}$, in which case returnees are more likely to be entrepreneurs than non-migrants.

Equation (17) or (19) is the *job creation equation* that gives a relationship between $\widetilde{t}_i$ and $\theta$. In the Appendix, we show that

$$\frac{\partial \left[\frac{I_U + K}{I_V}\right]}{\partial \theta} > 0$$

which implies that (17) or (19) defines a *positive* relationship between $\widetilde{t}_i$ and $\theta$, for $i = re, nm$ Indeed, when the labor-market tightness $\theta$ increases, it is easier for returnees to find jobs (since $\theta q(\theta)$ increases) and thus they prefer to work rather than to be entrepreneur. As a result, $\widetilde{t}_{re}$ increases, which reduces the fraction of entrepreneurs among the returnees in the economy since $\theta$ affects the same way each type $i$ of individuals.

Denote by $\eta^y_{I_U}$ and $\eta^y_{I_V}$ the productivity elasticity of the utility of the unemployed and firms with a vacant job, i.e.

$$\eta^y_{I_U} \equiv \frac{\partial I_U}{\partial y} \frac{y}{I_U} > 0 \text{ and } \eta^y_{I_V} \equiv \frac{\partial I_V}{\partial y} \frac{y}{I_V} > 0$$

Denote also by $\eta^{\delta}_{I_U}$ and $\eta^{\delta}_{I_V}$ the job destruction elasticity of the utility of the unemployed and firms with a vacant job, i.e.

$$\eta^{\delta}_{I_U} \equiv -\frac{\partial I_U}{\partial \delta}\frac{\delta}{I_U} > 0 \text{ and } \eta^{\delta}_{I_V} \equiv -\frac{\partial I_V}{\partial \delta}\frac{\delta}{I_V} > 0$$

We have the following results:

**Proposition 1** *Returnees are more likely to be entrepreneur than non-migrants,*

- $(i)$ *the higher is $H_{re}/H_{nm}$, the ratio of the human and physical capitals of returnees and non-migrants;*
- $(ii)$ *the lower is $S_{nm}$ (the size of the social network of non-migrants) and/or the higher is $S_{re}$ (the size of the social network of returnees);*
- $(iii)$ *the higher is the start-up cost $K$, the labor-market tightness $\theta$, the unemployment benefit $w_U$, and/or the cost of creating a single job $\lambda$;*
- $(iv)$ *the lower is the workers' productivity $y$ and/or the job destruction rate if $\eta^{y}_{I_U} < \eta^{y}_{I_V}$ and $\eta^{\delta}_{I_U} < \eta^{\delta}_{I_V}$.*

This proposition states that, given that the migration choice has already been made and given that all individuals know their entrepreneurial talent $t$, then the higher is $H_{re}/H_{nm}$, the more likely returnees will be entrepreneurs than non-migrants. Remember that, depending if their $t$ is greater or lower than $\widetilde{t}_{re}$, returnees can be either entrepreneurs or waged workers. The same applies to non-migrants with respect to $\widetilde{t}_{nm}$. So, when $H_{re}/H_{nm}$ is large, meaning that the human and physical capital accumulated abroad by returnees is very important compared to that of the non-migrants, then, for a given difference in social networks between returnees and non-migrants, the former are more likely to be entrepreneurs than the latter since $\widetilde{t}_{re} < \widetilde{t}_{nm}$. The same reasoning applies to the other parameters in $(ii)$, $(iii)$ and $(iv)$.

## 2.4 First stage: The migration decision

Let us now solve the first stage, i.e. the migration decision. As stated above, each individual does not know his/her $t$ when the migration decision is made. He/she only knows his/her migration cost $c$. Observe that a migrant is automatically a returnee since we only focus

on temporary migration, as it is the case in Egypt. As a result, the expected utility of a returnee is given by:

$$\begin{aligned} EU_{re} &= -c + \int_{\underline{t}}^{\widetilde{t}_{re}} I_U \, f(t)dt + \int_{\widetilde{t}_{re}}^{\bar{t}} \left(\alpha_{re} I_V - K\right) f(t)dt \\ &= -c + F\left(\widetilde{t}_{re}\right) I_U + I_V \int_{\widetilde{t}_{re}}^{\bar{t}} \alpha_{re} \, f(t)dt - \left[1 - F\left(\widetilde{t}_{re}\right)\right] K \end{aligned}$$

Using (15), this can be written as:

$$EU_{re} = -c + F\left(\widetilde{t}_{re}\right) I_U + I_V \, H_{re} \int_{\widetilde{t}_{re}}^{\bar{t}} t \, f(t)dt + \left[1 - F\left(\widetilde{t}_{re}\right)\right] \left(I_V \, S_{re} - K\right)$$

or equivalently

$$EU_{re} = -c + F\left(\widetilde{t}_{re}\right) I_U + \left[1 - F\left(\widetilde{t}_{re}\right)\right] \left[I_V \, S_{re} - K + I_V \, H_{re} \mathbb{E}\left(t \mid t \geq \widetilde{t}_{re}\right)\right] \tag{21}$$

since

$$\mathbb{E}\left(t \mid t \geq \widetilde{t}_{re}\right) = \frac{\int_{\widetilde{t}_{re}}^{\bar{t}} t \, f(t)dt}{1 - F\left(\widetilde{t}_{re}\right)}$$

is the expected value of entrepreneurial talent among the returnee entrepreneurs. Indeed, ex ante, each individual does not know his/her $t$ and each returnee, who has migrated, has to pay a migration cost $c$, which is a sunk cost. If it turns out that his/her $t$ is below $\widetilde{t}_{re}$, which occurs with probability $\mathbb{P}\left(t \leq \widetilde{t}_{re}\right) = F\left(\widetilde{t}_{re}\right)$, then this returnee will become a waged worker and have a utility equals to $I_U$. To be consistent with the previous section, we assume that a returnee (but also a non-migrant) has to be first unemployed before finding a job. This is because, in developing countries like Egypt, most jobs are found through word-of-mouth communication and social networks (Wahba and Zenou, 2005). So one has first to gather information about jobs and then find a job.[13] On the other hand, if his/her $t$ is above $\widetilde{t}_{re}$, which occurs with probability $\mathbb{P}\left(t > \widetilde{t}_{re}\right) = 1 - F\left(\widetilde{t}_{re}\right)$, then this returnee will become entrepreneur and thus have a utility equals to $I_V \, S_{re} - K + I_V \, H_{re} \mathbb{E}\left(t \mid t \geq \widetilde{t}_{re}\right)$.

Using a similar argument, the expected utility of a non-migrant is equal to:

$$EU_{nm} = F\left(\widetilde{t}_{nm}\right) I_U + \left[1 - F\left(\widetilde{t}_{nm}\right)\right] \left[I_V \, S_{nm} - K + I_V \, H_{nm} \mathbb{E}\left(t \mid t \geq \widetilde{t}_{nm}\right)\right] \tag{22}$$

[13] It is easily verified that none of our results would be affected if we had assumed that a returnee could find a job directly so that his/her expected utility as a waged worker would be $I_L$ instead of $I_U$.

Consequently, the value of $\widetilde{c}$ that makes an individual indifferent between migrating and not migrating (i.e. $EU_{re} = EU_{nm}$) is given by:

$$\begin{aligned}\widetilde{c} &= \left[F\left(\widetilde{t}_{re}\right) - F\left(\widetilde{t}_{nm}\right)\right](I_U + K) + \left[1 - F\left(\widetilde{t}_{re}\right)\right] I_V \left[S_{re} + H_{re}\mathbb{E}\left(t \mid t \geq \widetilde{t}_{re}\right)\right] \\ &\quad - \left[1 - F\left(\widetilde{t}_{nm}\right)\right] I_V \left[S_{nm} + H_{nm}\mathbb{E}\left(t \mid t \geq \widetilde{t}_{nm}\right)\right] \qquad (23)\end{aligned}$$

This is very intuitive since it says that for an individual, who does not know his/her entrepreneurial talent $t$, to be indifferent between migrating (i.e. returnee) and non-migrating, it has to be that the expected cost of migrating is exactly equal to the expected benefit of migrating. As a result, all workers with a $c < \widetilde{c}$ will migrate and then become returnees while those with a $c \geq \widetilde{c}$ will be non-migrants.[14] The total number of returnees $n_{re}$ is thus equal to:

$$n_{re} = n\, G(\widetilde{c}) \qquad (24)$$

while the total number of non-migrants is: $n_{nm} = n - n_{re} = n\,[1 - G(\widetilde{c})]$.

For example, consider a uniform distribution of $t$ for which $\underline{t} = 0$ and $\bar{t} = 1$. Then $F\left(\widetilde{t}_{re}\right) = \widetilde{t}_{re}$ and $F\left(\widetilde{t}_{nm}\right) = \widetilde{t}_{nm}$. In that case, for $i = re, nm$,

$$\mathbb{E}\left(t \mid t \geq \widetilde{t}_i\right) = \frac{\int_{\widetilde{t}_i}^{1} t\, dt}{1 - \widetilde{t}_i} = \frac{1 + \widetilde{t}_i}{2}$$

and

$$\begin{aligned}\widetilde{c} &= \left(\widetilde{t}_{re} - \widetilde{t}_{nm}\right)(I_U + K) + \left(1 - \widetilde{t}_{re}\right) I_V \left[S_{re} + H_{re}\frac{1 + \widetilde{t}_{re}}{2}\right] \\ &\quad - \left(1 - \widetilde{t}_{nm}\right) I_V \left[S_{nm} + H_{nm}\frac{1 + \widetilde{t}_{nm}}{2}\right]\end{aligned}$$

We have the following proposition:

[14] To avoid uninteresting cases, we assume that $\underline{c} < \widetilde{c} < \bar{c}$, which could be guaranteed by conditions on parameters. We could totally characterize all the possible equilibria such as, for example, when $\widetilde{c} \leq \underline{c}$ (all individuals are non-migrants) or $\widetilde{c} > \bar{c}$ (all individuals are returnees) but this does not correspond to what we observe in the data. As a result, we only focus on interior equilibria.

**Proposition 2**

(*i*) *Consider all individuals with a migration cost c lower than* $\widetilde{c}$*, where* $\widetilde{c}$ *is defined by (23). These are individuals who will migrate and become returnees. Then, among the returnees, those for which* $t < \widetilde{t}_{re}$ *(where* $\widetilde{t}_{re}$ *is defined by (17)) will become waged workers while those for which* $t \geq \widetilde{t}_{re}$ *will become entrepreneurs.*

(*ii*) *Consider now all individuals with a migration cost c higher (or equal) than* $\widetilde{c}$*. These are individuals who will not migrate. Then, among the non-migrants, those for which* $t < \widetilde{t}_{nm}$ *(where* $\widetilde{t}_{nm}$ *is defined by (19)) will become waged workers while those for which* $t \geq \widetilde{t}_{nm}$ *will become entrepreneurs.*

This proposition just states that there will be four different groups in equilibrium: waged-workers returnees (individuals with both $c < \widetilde{c}$ and $t < \widetilde{t}_{re}$), entrepreneur returnees (individuals with both $c < \widetilde{c}$ and $t \geq \widetilde{t}_{re}$), waged-workers non-migrants (individuals with both $c \geq \widetilde{c}$ and $t < \widetilde{t}_{nm}$), and entrepreneur non-migrants (individuals with both $c \geq \widetilde{c}$ and $t \geq \widetilde{t}_{nm}$).

## 2.5 Closing the model

Let us close the model. First, let us determine the number of jobs created in this economy. Each entrepreneur $i = re, nm$ of type $t \geq \widetilde{t}_i$ creates $\alpha_i = t\,H_i + S_i$ jobs (both vacant and filled jobs), i.e. entrepreneurs create jobs up to the maximum they can manage. Hence, the total number of (filled and unfilled) jobs created by returnee entrepreneurs $\Delta_{re}$ is equal to:

$$\Delta_{re} = n_{re} \int_{\widetilde{t}_{re}}^{\bar{t}} \alpha_{re}\, f(t)dt = n_{re} \int_{\widetilde{t}_{re}}^{\bar{t}} \left[t\,H_{re} + S_{re}\right]\, f(t)dt \tag{25}$$

Similarly, the total number of (filled and unfilled jobs) jobs created by non-migrant entrepreneurs $\Delta_{nm}$ is:

$$\Delta_{nm} = (n - n_{re}) \int_{\widetilde{t}_{nm}}^{\bar{t}} \left[t\,H_{nm} + S_{nm}\right]\, f(t)dt \tag{26}$$

since $n = n_{re} + n_{nm}$. As a result, the total number of (filled and unfilled) jobs created in the economy is given by:

$$\begin{aligned} m + v &= \Delta_{re} + \Delta_{nm} \\ &= n_{re} \int_{\widetilde{t}_{re}}^{\bar{t}} \left[t\,H_{re} + S_{re}\right]\, f(t)dt + (n - n_{re}) \int_{\widetilde{t}_{nm}}^{\bar{t}} \left[t\,H_{nm} + S_{nm}\right]\, f(t)dt \end{aligned} \tag{27}$$

Let us now determined the number of (employed and unemployed) workers in the economy. We assumed that there are $n$ individuals (i.e. workers and entrepreneurs). Let us denote by $n_W$ and by $n_E$ the total number of workers (employed and unemployed) and entrepreneurs (with a filled and a vacant job) in this economy so that $n = n_W + n_E$. Observe that

$$n_E = n_{re}\left[1 - F(\widetilde{t}_{re})\right] + (n - n_{re})\left[1 - F(\widetilde{t}_{nm})\right]$$

so that

$$n_W = n_{re}F(\widetilde{t}_{re}) + (n - n_{re})\,F(\widetilde{t}_{nm}) \tag{28}$$

where $n_i\,F(\widetilde{t}_i)$ are the number of (employed ad unemployed) workers of type $i = re, m$ in the economy. If we further denote by $u$ the total number of unemployed workers, we have:

$$n_W = m + u \tag{29}$$

since $m$ is the number of jobs occupied, thus employed workers. Combining (27) and (29), we obtain: $m = n_W - u = \Delta_{re} + \Delta_{nm} - v$, which is equivalent to:

$$\begin{aligned} n_W - u &= n_{re}\int_{\underline{t}}^{\widetilde{t}_{re}} f(t)dt + (n - n_{re})\int_{\underline{t}}^{\widetilde{t}_{nm}} f(t)dt - u \\ &= n_{re}\int_{\widetilde{t}_{re}}^{\bar{t}} \left[t\,H_{re} + S_{re}\right]\,f(t)dt + (n - n_{re})\int_{\widetilde{t}_{nm}}^{\bar{t}} \left[t\,H_{nm} + S_{nm}\right]\,f(t)dt - v \end{aligned}$$

where $v$ the total number of vacancies. Observe that, even if returnee and non-migrant entrepreneurs do not create the same number of jobs, the jobs are exactly the same (in terms of wage, productivity) so that workers of any type are indifferent between working in any type of job. This is why the matching function is written as in (1) and the labor market tightness is equal to $\theta \equiv v/u$.

We now need an equation that determines the flows in the labor market. The evolution of employment in terms of the firm's transition rates is:

$$\dot{m} = v\,q(\theta) - m\,\delta$$

which, using (27), is equivalent to:

$$\dot{m} = \left[n_{re}\int_{\widetilde{t}_{re}}^{\bar{t}} \left[t\,H_{re} + S_{re}\right]\,f(t)dt + (n - n_{re})\int_{\widetilde{t}_{nm}}^{\bar{t}} \left[t\,H_{nm} + S_{nm}\right]\,f(t)dt - m\right] q(\theta) - m\,\delta \tag{30}$$

The evolution of employment in terms of the worker's transition rates is:

$$\dot{m} = u\,\theta q(\theta) - (n_W - u)\,\delta$$

which, using (29), is equivalent to:

$$\dot{m} = (n_W - m)\,\theta q(\theta) - m\,\delta \tag{31}$$

In steady-state, $\dot{m} = 0$, and (30) and (31) are respectively given by:

$$n_{re}\int_{\widetilde{t}_{re}}^{\bar{t}} \left[t\,H_{re} + S_{re}\right]\,f(t)dt + (n - n_{re})\int_{\widetilde{t}_{nm}}^{\bar{t}} \left[t\,H_{nm} + S_{nm}\right]\,f(t)dt = \left(\frac{\delta + q(\theta)}{q(\theta)}\right) m$$

$$m = \frac{n_W\,\theta q(\theta)}{\delta + \theta q(\theta)}$$

By combining these two equations and using (28) and (24), we obtain:

$$\begin{aligned} & nG(\widetilde{c})\int_{\widetilde{t}_{re}}^{\bar{t}} \left[t\,H_{re} + S_{re}\right]\,f(t)dt + n\left[1 - G(\widetilde{c})\right]\int_{\widetilde{t}_{nm}}^{\bar{t}} \left[t\,H_{nm} + S_{nm}\right]\,f(t)dt \\ = & \frac{\left[\delta + q(\theta)\right]\theta}{\delta + \theta q(\theta)}\left\{nG(\widetilde{c})\left[F(\widetilde{t}_{re}) - F(\widetilde{t}_{nm})\right] + nF(\widetilde{t}_{nm})\right\} \end{aligned} \tag{32}$$

The equilibrium is now easy to calculate. There are four equations: (17), (19), (23) and (32) and four unknowns: $\widetilde{t}_{re}$, $\widetilde{t}_{nm}$, $\widetilde{c}$ and $\theta$.

## 2.6 Extension: Human/physical capital and social capital are complement

Let us now extend the model to capture the fact that human/physical capital and social capital are complement and introduce a more general function. For that, we adopt the following formulation for equation (15):

$$\alpha_i = t\,H_i^{\phi} S_i^{\gamma} \tag{33}$$

where $\phi > 0$, $\gamma > 0$. In this new formulation, $H_i$ and $S_i$ are not anymore independent in the job creation of entrepreneur since

$$\frac{\partial^2 \alpha_i}{\partial H_i \partial S_i} = \frac{\partial^2 \alpha_i}{\partial S_i \partial H_i} = t\,\phi\gamma H_i^{\phi-1} S_i^{\gamma-1} > 0$$

This means that human/physical capital and social capital are (strategic) complement, i.e. the higher is the social capital of individual $i$, the higher is the marginal (positive) effect of his/her human capital on the number of jobs he/she can create as an entrepreneur. The decision to become entrepreneur is still given by: $\alpha_i I_V - K \geq I_U$, which is equivalent to:

$$\widetilde{t}_i = \frac{I_U + K}{I_V H_i^{\phi} S_i^{\gamma}} \tag{34}$$

instead of (17) or (19). If we look at the second stage, i.e., the decision of becoming an entrepreneur, it is easily verified that Proposition 1 can now be written as:

**Proposition 3** *Returnees are more likely to be entrepreneur than non-migrants,*

(*i*) *the higher is $H_{re}/H_{nm}$, the ratio of the human and physical capitals between returnees and non-migrants;*

(*ii*) *the higher is $S_{re}/S_{nm}$, the ratio of the size of the social network between of returnees and non-migrants.*

In other words, parts (*i*) and (*ii*) of Proposition 1 are the same. We lose parts (*iii*) and (*iv*) of Proposition 1 because, when comparing $\widetilde{t}_{re}$ and $\widetilde{t}_{nm}$, i.e., $\widetilde{t}_{re} \gtreqless \widetilde{t}_{nm}$, the term $\frac{I_U+K}{I_V}$ cancels out (see (34)) and thus labor-market variables as well as the start-up cost do not affect this inequality. In fact, it is easily verified that this inequality is equivalent to: $(\Delta S)^{\gamma} \gtreqless (\Delta H)^{\phi}$, where $\Delta H = \frac{H_{re}}{H_{nm}}$ and $\Delta S = \frac{S_{re}}{S_{nm}}$.

If we now look at the first stage, i.e., the migration decision, then it is easily verified that the expected utility of migration is now given by:

$$EU_{re} = -c + F\left(\widetilde{t}_{re}\right) I_U + \left[1 - F\left(\widetilde{t}_{re}\right)\right] \left[I_V \, H_{re}^{\phi} \, S_{re}^{\gamma} \, \mathbb{E}\left(t \mid t \geq \widetilde{t}_{re}\right) - K\right]$$

while the expected utility of a non-migrant is equal to:

$$EU_{nm} = F\left(\widetilde{t}_{nm}\right) I_U + \left[1 - F\left(\widetilde{t}_{nm}\right)\right] \left[I_V \, H_{nm}^{\phi} \, S_{nm}^{\gamma} \, \mathbb{E}\left(t \mid t \geq \widetilde{t}_{nm}\right) - K\right]$$

Consequently, the value of $\widetilde{c}$ that makes an individual indifferent between migrating and not migrating is now given by:

$$\begin{aligned} \widetilde{c} \;\; = \;\; & \left[F\left(\widetilde{t}_{re}\right) - F\left(\widetilde{t}_{nm}\right)\right] (I_U + K) + \left[1 - F\left(\widetilde{t}_{re}\right)\right] I_V \, H_{re}^{\phi} \, S_{re}^{\gamma} \, \mathbb{E}\left(t \mid t \geq \widetilde{t}_{re}\right) \\ & - \left[1 - F\left(\widetilde{t}_{nm}\right)\right] \, H_{nm}^{\phi} \, S_{nm}^{\gamma} \, \mathbb{E}\left(t \mid t \geq \widetilde{t}_{nm}\right) \end{aligned} \tag{35}$$

This is very close to expression in (23), the only difference being that $H_i$ and $S_i$ cannot be expressed separately. Proposition 2 will be exactly the same with, however, different values of $\widetilde{t}_{re}$ and $\widetilde{t}_{nm}$ (which are now given by (34) for $i = re, nm$ instead of (17) and (19)) and $\widetilde{c}$ (which is now given by (35) instead of (23)). Finally, the model can be closed as before and an equilibrium with four equations and four unknowns can be found.

The model above provides the theoretical underpinning for our empirical estimations. In particular, we test whether a returnee is more or less likely to become an entrepreneur compared to a non-migrant. We also try to disentangle three possible channels, namely social networks, overseas human capital and overseas savings, through which temporary migration might impact entrepreneurship.

The general idea of the model is that overseas temporary migration provides an opportunity for human and physical capital accumulation but, at the same time, may lead to loss of social capital back home. We have shown in our theoretical analysis that there may be a trade off between those two factors.

# 3 The data

To test this idea, we will use data from a rich survey: Egypt Labor Market Survey 1998 (ELMS1998) carried out by the Central Agency of Public Mobilization and Statistics (CAPMAS) in Egypt. The 1998 ELMS is a nationally-representative household survey that gathered data on a wide range of labor market variables at the household and individual level covering 5,000 households. Each data set consists of three questionnaires: 1) the household questionnaire; 2) the individual questionnaire; 3) the family enterprise questionnaire. Each household has at least one household questionnaire and one individual questionnaire. If any of the members of the household was self-employed or an employer, a family enterprise questionnaire for this household was administrated. Data for the household questionnaire was collected from the head of the household and included the roster of members of the household, each individual's relationship to the head of the household and demographic characteristics of the household. The individual questionnaire collected information from individuals (aged 15 years old or more) themselves. A battery of individual modules was designed to collect data on individual characteristics, employment characteristics, unemployment, mobility and career history, and earnings. We make use of the family enterprise questionnaire, which being

part of a household survey, gathered information on all economic units and establishments regardless of firm size as is common in establishment surveys and thus captured all employment in the economy not just that occurs within fixed establishments of a certain size. The family enterprise module is extremely valuable in providing detailed picture of entrepreneurship. Although the 1998 ELMS is a cross-sectional individual level data, it benefits from collecting very rich retrospective data on labor market mobility and residential mobility. In fact, individuals report previous and pre-previous labor market characteristics including employment status, sector, occupation, economic activity, job stability, and location among others, which enable us to have detailed information for stayers and returnees.

One limitation of this dataset is that we observe only returnees i.e. migrants who are currently overseas are not observed in our survey. However, it is fairly uncommon to observe current migrants when using survey collected at the home country in particular if a whole household is currently overseas. Since we do observe both returnees and non-migrants, we are able to control for the potential selectivity of return migration (see below). Yet, there may still potentially be a selectivity bias if return migrants are different from current migrants. However, this bias should be small in our case study for the following reasons. Firstly, the majority of Egyptian migration is temporary in nature.[15] The bulk of Egyptian emigration is destined towards other Arab countries and the Gulf States. As noted by Lucas (2008), migration to the Gulf States is all temporary in nature with the mean migration duration of around four to five years and acquisition of citizenship being effectively impossible for anyone. Secondly, Egyptian temporary migration flows are comprised of both highly skilled and unskilled, predominately males. Thirdly, the Central Agency of Public Mobilization and Statistics in Egypt (CAPMAS) distinguishes between temporary and permanent migration based on destination. CAPMAS estimates were, in 2000, around 2 million temporary migrants and around 800 thousand permanent migrants mainly in North America, Australia and Western Europe. However, estimates by the OECD (2005) and Docquier and Marfouk (2004) of the Egyptian migrant stock in 2000 in OECD countries were much less, at 254 thousand and 275 thousand, respectively. Finally, in 2006, around 2.5 percent of the population in (15 - 65 years old) have worked overseas previously i.e. are overseas returnees.[16] Thus, although we do not observe current migrants, the majority of them are temporary

[15]See CAPMAS (2003), World Bank (2009, p.16) and Nassar (2008).

[16]See Wahba (2009).

migrants and therefore are likely to return. Thus the selectivity bias we are likely to have is the result of not observing permanent migrants who might be different in characteristics, yet they are a small number relative to returnees given the temporary nature of migration. As a result, in this paper, our focus is on temporary migration: we correct for the temporary migration choice as discussed below.[17]

The analysis in this paper is restricted to males over 25 years of age at the time of the survey. We define an entrepreneur as an employer or a self-employed *owner* of economic unit. We adopt this definition to enable us to study entrepreneurship and business set up. For both groups of entrepreneurs, trade and agriculture seem to be the two most common economic activities of the enterprises. The majority of enterprises are sole ownership and, as seen in Table A1, are very small in size with mean of less than 3 workers.

Table 1 provides descriptive statistics on returnees and non-migrants for the total sample. Table 1 shows that 31% of returnees are entrepreneurs compared to 25% among non-migrants. Overall, returnees seem to be of similar age, but more educated relative to non-migrants.

[*Insert Table* 1 *here*]

# 4 Econometric Framework

In this section, we estimate the determinants of entrepreneurship to examine whether returnees are more or less likely than stayers to become entrepreneurs and if there is a trade off between the loss of social capital and the gain in human and physical capitals as a result of temporary migration. We capture the interdependence between temporary/return migration and entrepreneurship, by using a *seemingly unrelated regression bivariate probit model* where the two decisions are not independent, although this is something we test for later. In addition, one potentially confounding factor is that temporary/return migration and entrepreneurship may be endogenously determined. Individuals migrate temporarily because they plan to become entrepreneurs on their return, whilst, on the other hand, temporary migration might influence the occupational choice of returnees and therefore their prospects of becoming entrepreneurs.[18] We use a recursive bivariate probit model to take care of the

[17] Only 3 percent of our returnees in 1998 migrated to Non-Arab countries (i.e. America and Europe).

[18] One can imagine a more complicated model where also social networks, overseas human capital and overseas savings are all endogeneous. Estimating such a model would require a superior data to instrument

endogeneity between entrepreneurship and return migration decisions, where return migration appears as a regressor in the entrepreneurship equation.[19] This is estimated using full information maximum likelihood estimation (FIML). Formally, we have

$$E_i^* = \psi' X_i + \omega RM_i + \chi_1 H_i + \chi_2 S_i + \chi_3 K_i + \varepsilon_i \tag{36}$$

with

$$\begin{aligned} E_i &= 1 \; if \; E_i^* > 0 \\ &= 0 \; otherwise \end{aligned}$$

$$RM_i^* = \zeta' Z_i + \mu_i \tag{37}$$

with

$$\begin{aligned} RM_i &= 1 \; if \; RM_i^* > 0 \\ &= 0 \; otherwise \end{aligned}$$

where $\mathbb{E}[\varepsilon_i] = \mathbb{E}[\mu_i] = 0$, $Var[\varepsilon_i] = Var[\mu_i] = 1$, and $Cov[\varepsilon_i, \mu_i] = \rho$ and where $E_i$ equals one when an individual is an entrepreneur (business owner) while $RM_i$ equals one if an individual is a returnee. The dependent variables $E_i^*$ and $RM_i^*$ are unobserved latent variables. We observe only a dichotomous variable indicating whether or not an individual is an entrepreneur $E_i$ and whether or not an individual is a returnee $RM_i$. An individual decides to become an entrepreneur ($E_i^* > 0$) if he/she has a minimum level of needed talent for this job. The return migration decision depends on the cost of migration: an individual migrates ($RM_i^* > 0$) if his/her migration cost is below a certain level.

Equation (36) shows that $E_i$, the probability of being an entrepreneur for individual $i$, is a function of $X_i$, a vector of explanatory variables and whether the individual is a returnee ($RM = 1$) or not ($RM = 0$ otherwise). Equation (37) estimates the return migration

for all those channels at the same time. A few papers have examined the endogeneity of one aspect of migration (such as savings or migration duration) and the occupational choice of returnees. See, for example, Mesnard (2004) and Dustmann and Kirchkamp (2002).

[19] See Greene (1998) and Greene (2008) for a further description of recursive bivariate probit models.

decision, which is a function of $Z_i$, a vector of explanatory variables.[20] These two decisions are treated as two interdependent decisions and $\rho$ is the coefficient of correlation between the two error terms. A significant $\rho$ would support this assumption of interdependence. In the theoretical model, we also treated these two decisions (becoming an entrepreneur and migration) as interdependent.

Equation (36) corresponds to (17) or (19) in the theoretical model. Indeed, the probability of becoming entrepreneur in the theoretical model is $1 - F(\widetilde{t}_i) = 1 - F\left(\frac{I_U+K}{I_V H_i} - \frac{S_i}{H_i}\right)$, which is a function of $H_i$, $S_i$ and $K$ as well as $I_U$ and $I_V$ defined by (6) and (10). Unfortunately, we do not have information on $I_U$ and $I_V$ or what affects them, that is, labor-market variables like wages, the job-destruction rate, firms' entry costs, etc. Observe that the probability of becoming entrepreneur is a function of $RM_i$, i.e. if the individual is a returnee ($RM = 1$) or not ($RM = 0$ otherwise), and is captured by the fact that $i = re, nm$ in the theoretical model.

Equation (37) corresponds to (23) in the theoretical model. Indeed, the probability of migrating is $G(\widetilde{c})$, which is a function of the individuals' characteristics. Importantly, in the theoretical model, when someone decides whether to migrate or not, he/she does not know his/her entrepreneurial talent $t$, which means that he/she does not know whether he/she will be an entrepreneur or a waged worker in the future. Since $H_i$ and $K_i$(human and physical capital of individual $i$) and $S_i$ (size and quality of his/her social network) affect entrepreneurs but not waged workers, this implies that, what mainly matters for the migration decision, is the migration cost $c$ (this is known with certainty), which is a function of individual characteristics.

Finally, as observed above, the decision to become entrepreneur and to migrate are not independent decisions and are correlated. In the econometric model, this is captured by $\rho = Cov[\varepsilon_i, \mu_i]$. In the theoretical model, it is captured in Proposition 2. Indeed, depending on whether an individual has migrated (and became a returnee) or not, the decision to become an entrepreneur is different. To be more precise, if this individual has decided to migrate, then he/she will become an entrepreneur if and only if his/her talent $t$ is greater than $\widetilde{t}_{re}$ while, if the same individual has decided not to migrate, he/she will be an entrepreneur only if his/her $t$ is larger than $\widetilde{t}_{nm}$, $\widetilde{t}_{re}$ and $\widetilde{t}_{nm}$ being different (see (17) and (19)).

Although it is sufficient to have variation in the exogenous variables in both equations

[20] We detail them below.

to avoid identification problems,[21] this would heavily rely on the assumption of bivariate normality. Thus, to improve identification of the return migration equation,[22] we impose an exclusion restriction. We use the average real international oil prices[23] when the individual is 28 years since the average age at migration in our sample is 28 years and the majority of the Egyptian migrants migrate to the Gulf States where demand for imported labor is highly correlated with oil prices (see e.g. Lucas, 2008).[24] Examining the destination of the returnees in our sample, we find that over 95% of our sample migrated to Arab countries where oil prices played an important role in the demand for foreign labor directly in the Gulf States, or indirectly as a replacement workers in non-oil Arab countries such as Jordan and Lebanon. Historic real oil prices should affect migration but should not be directly be correlated with entrepreneurship at the time of the survey.

Going back to our outcome of interest, namely entrepreneurship, we examine first the determinants of equation (36). To capture the main effect of *social capital/network*,[25] we use, as our main measure of $S_i$, whether the migrant has had other members of his family migrate with him. If other members of the household have migrated as well, this is likely to lead to a loss of origin social capital for the migrant. Indeed, if the migrant migrates with household members, he will then have fewer strong ties with local knowledge that would help him on his return to set-up a business. We also include another measure of social network $S_i$ namely whether the individual originally lived in small neighborhood (with less than 5,000 inhabitants)[26] to capture tight-knit communities where people tend to know each other. Since individuals might rely on their social networks to obtain information that might help them in setting-up a business, one would expect that, as a result of migration, a migrant is likely to lose contacts with his former contacts, especially if they are not close friends (for example, weak ties). Thus a migrant may not be able to draw on his contacts

[21] See Greene (2008, Sec 23.8.4). Wilde (2000) also shows that exclusion restrictions are not needed provided there is one varying exogenous regressor in each equation.

[22] Monfardini and Radice (2008) show that the use of instruments help obtain results that are more robust to distributional misspecification.

[23] Historic average real international oil prices are from www.inflationdata.com.

[24] We have tried several ages : 25, 26 and 27. Our results are robust to the choice of the mean age in our sample.

[25] Although migrants might develop new social networks in the destination country, we have no information on destination social networks to enable us to capture this effect.

[26] The average population of a neighborhood (qism) is around 11,000 with the median being 6,000 inhabitants. Hence we chose 5,000 since it is slightly smaller than the median size.

as a stayer when it comes to information on setting-up business or knowing all the practical issues related to establishing an enterprise. In addition, we control for whether the returnee has been back from overseas in the last year since we believe that, if individuals lose their social capital, they would be unlikely to start a business in their first year upon return. We check below the robustness of our results by extending the period of return to the previous 2 years.

Djankov et al. (2005, 2006) use as a measure of social networks whether individuals have had entrepreneurs in their family or friends from their childhood and adolescence. We also control for whether an individual's father was self-employed or employer when the individual was 15 years, which we believe can have an effect on the occupational choice of the individual and thus might affect his probability of becoming an entrepreneur. We also control for the current characteristics of the neighborhood of residence using the share of self-employed workers, the share of employers, and the share of unemployed workers, among total employed adult males by "qism" in 1996 using Census data to capture local labor market effects that might affect the probability of entrepreneurship, in addition to including regional fixed effects to capture regional influence.

To capture the potential gain in human capital from overseas work, which corresponds to $H_i$ in the theoretical and econometric model, we use a dummy variable to measure occupational mobility. This dummy variable is equal to 1 if the individual had an unskilled occupation before migration and a skilled occupation overseas, or if the individual was out of the labor force before migrating (i.e. were not working) and then worked whilst abroad. In other words, we proxy gains in overseas human capital as skill enhancement measured by upward occupational mobility whilst overseas relative to the pre-migration status.

We control for whether the entrepreneur who migrated have used personal savings to start up his business (savings correspond to $K$ in the theoretical model). Unfortunately, we do not have data on personal savings for entrepreneurs and non-entrepreneurs, only whether entrepreneurs have used their savings to set up their businesses.

Finally, the vector $X_i$ includes individual characteristics. The individual characteristics are age, marital status and education. Six educational dummies are used: no education (reference group), read and write, less than intermediate, intermediate, higher than intermediate and university education. Experience in the Egyptian labor marker measured in years and its square to capture non-linearity are also used. Experience is calculated as the difference

between the year of the survey and year the individual entered the labor market for the first time, where for returnees also any time spent overseas is deducted.

To explain the determinants of return migration, in addition to the instrument mentioned above, the vector $Z_i$ includes individual characteristics such as age and educational levels. To control for the migration decision, previous job characteristics, occupation and residence are used. For migrants, those refer to the job characteristics (public sector), occupation and urban/rural region of residence prior to migration and for non-migrants these refer to previous job/ residence if they have changed jobs/ residence before or current ones if they have not. For a detailed description of the variables, see Table A1.

Table 2 provides descriptive statistics on entrepreneurs relative to non-entrepreneurs, distinguishing between returnees and non-migrants. First, in terms of our main social network measure, Table 2 shows that around 10 percent of returnee non-entrepreneurs had other family members who migrated compared to 7 percent among returnee entrepreneurs, i.e. returnee entrepreneurs are less likely to have had other members of their family overseas. Also, the proportion of non-migrants entrepreneurs with other social contacts (measured by a variable equals to 1 if the individual has lived previously in a neighborhood with less than 5,000 inhabitants and zero otherwise) are higher than among returnees. The social network measures provide preliminary support for the importance of social capital in entrepreneurship and show that returnee entrepreneurs having lower social capital relative to non-migrant entrepreneurs. In addition, on average, returnee entrepreneurs were overseas for 5.4 years compare to 4.8 years among returnee non-entrepreneurs. The difference between migrant human capital amongst entrepreneurs and non-entrepreneurs look larger although it is not statistically significant. Around 87 percent of returnee entrepreneurs have used their savings to start-up their businesses. In terms of individual characteristics, 14 percent of returnee entrepreneurs were self-employed before migration compared to only 3 percent of returnee non-entrepreneurs. Also more than half of the entrepreneurs among both returnees and non-migrants had a father who was self-employed or employer which supports Djankov et al. (2005, 2006) findings. Thus, the descriptive statistics indicate a potential trade off between social capital on one hand and human and physical capital on the other hand as important determinants of entrepreneurship.

[*Insert Table 2 here*]

# 5 Empirical findings

This section presents the results of the estimation of our empirical models, starting with the simple binary probit estimation, followed by recursive bivariate probit results. First, as a baseline comparison, we estimate a simple univariate probit of the probability of being an entrepreneur (i.e. business owner) at the time of the survey and include a dummy for being returnee but we do not control for the migration decision. The marginal effects are reported in Table 3. We find that returnees are 10 percent more likely than non-migrants to become entrepreneurs.

[*Insert Table* 3 *here*]

Second, we estimate a *recursive bivariate probit model* where the first equation estimates the probability of being an entrepreneur and the second equation estimates the probability of being a returnee, where being a returnee is an endogenous regressor in the first equation. Table 4 displays the results. First, it is worth noting that the correlation coefficient between the probability of becoming an entrepreneur and being a returnee is significant, indicating that the error terms are interdependent. However, the correlation coefficient is negative suggesting that unobservable characteristics affect those two decisions in opposite ways. For example, being a risk taker will not increase both probabilities: it might increase the probability of entrepreneurship but not of return migration, or that entrepreneurs are less likely to become migrants because they prefer non-waged work and migration to the Gulf States is mostly waged work. It is also important to note that the exclusion restriction, average real oil price, is significant suggesting that it is a significant determinant of migration.

Table 4, Col 1, shows the estimates for the baseline *recursive bivariate probit model.* Col 2, introduces two of the channels through which migration affects entrepreneurship namely overseas human capital and origin social networks, whilst in Col 3 we also control for whether the father was employer and finally Col 4 introduces the last channel namely overseas savings. Table 4 shows that, controlling for the endogeneity of the migration decision, a returnee is less likely to become an entrepreneur if members of his family have also emigrated than if he emigrated on his own or is the sole emigrant from his household. This suggests that, when more household members migrate, fewer social ties at home could be used by the returnee to help him set up a business. Also, those who come from "small origin neighborhood" are more likely to become an entrepreneur reflecting the support system from a tight knit community. However, this effect is not significant for returnees, suggesting again that migration leads

to some loss of the social network. It is important noting that we also control for the characteristics of the local neighborhood. Having returned in the last year from overseas has a negative effect on the probability of being an entrepreneur. This might suggest that returnees need time to rebuild their social networks upon return. On the other hand, the effect of overseas human capital is positive and significant, suggesting that acquired overseas skills increase the probability of entrepreneurship. Finally, we find (Col. 4) that savings or credit matter for becoming an entrepreneur for returnees.

[*Insert Table* 4 *here*]

To check the robustness of our results, we conduct several sensitivity checks as shown in Table 5. First, since we only have data on the date of start of business for the last 8 years at the time of the survey, in column 5, we use this information to control for the date of start of business to better capture labor market conditions. We find that our previous results are robust. In column 6, we exclude the entrepreneurs who were self-employed before migration and find that our previous results hold and are not driven by including individuals who were entrepreneurs before migration. In column 7, we vary the length since return by using 2 years instead of one. We find that returning in the last two years has negative, albeit not significant, effect on the probability of becoming an entrepreneur. Furthermore, in column 8, to ensure that our results are not biased by overseas remittances, we exclude from our sample those households/individuals who were receiving remittances. The results are still robust. Finally, we estimate a full bivariate probit model (not SURE) where we include the same controls in both equations plus the instrument in the migration equation to allow for pre-migration characteristics to affect not only the migration decision but also the entrepreneurship decision. We also allow migration to depend on the location of origin by including the small origin neighborhood and the characteristics of the neighborhood. Again, all our previous results hold.

[*Insert Table* 5 *here*]

Overall, our results suggest that temporary migration might lead to a loss of social networks. We also find that human capital and savings matter for becoming an entrepreneur for returnees. The joint probability of being a returnee and entrepreneur is around 19%, and only 14% for being a non-migrant and an entrepreneur. Interestingly, conditional on

being a returnee, the probability of becoming an entrepreneur is almost 50%. This suggests that one needs to control for the endogeneity of the migration decision when studying the entrepreneurship decision.

# 6 Conclusion

This paper examines an important issue for developing countries, namely what factors affect entrepreneurship. We focus on the case of return migrants and develop a theoretical search model that puts forward the trade off faced by returnees since overseas migration provides an opportunity for human and physical capital accumulation but, at the same time, may lead to a loss of social capital back home. We test the predictions of the model using Egyptian data and find that, controlling for the endogeneity of the temporary migration decision, an overseas returnee is more likely to become an entrepreneur than a non-migrant. Our results suggest that social networks increase the probability of entrepreneurship for non-migrants but not for returnees. On the other hand, human capital and savings affect the likelihood of returnees of becoming entrepreneurs. Interestingly, the findings also indicate that, although return migration and entrepreneurship are correlated, there might be a trade off between these two decisions.

This paper sheds light on a very important policy issue for developing countries by showing how entrepreneurship depends on social networks, human capital and credit. Although migrants may potentially lose their social capital, they accumulate savings and experience overseas that increase their entrepreneurship. This, in a way, emphasizes the importance of access to credit as a major obstacle facing by entrepreneurs in developing countries. As a result, policies focusing on access to credit is of paramount importance for investment and thus for economic growth and development. Meanwhile, our findings also support schemes adopted to help return migrants re-integrate back upon their return due to the potential loss of social capital whilst overseas.

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## Appendix

**Proof of Proposition 1**. First, observe that to determine which individual has the highest probability to become entrepreneur, we have to check the following condition:

$$\widetilde{t}_{re} \gtreqless \widetilde{t}_{nm} \tag{38}$$

which is equivalent to:

$$\frac{S_{nm}H_{re} - S_{re}H_{nm}}{H_{re} - H_{nm}} \gtreqless \frac{I_U + K}{I_V} \tag{39}$$

We know that $S_{nm}H_{re} - S_{re}H_{nm} > 0$ and $H_{re} - H_{nm} > 0$ so this inequality can go in both directions.

$(i)$ The inequality (39) can be written as:

$$\frac{S_{nm}\Delta H - S_{re}}{\Delta H - 1} \gtreqless \frac{I_U + K}{I_V}$$

where $\Delta H = \frac{H_{re}}{H_{nm}}$. We have

$$\begin{aligned} \frac{\partial \left[\frac{S_{nm}\Delta H - S_{re}}{\Delta H - 1}\right]}{\partial \Delta H} &= S_{nm}\left(\Delta H - 1\right) - \left(S_{nm}\Delta H - S_{re}\right) \\ &= S_{re} - S_{nm} < 0 \end{aligned}$$

As a result, for a given $\frac{I_U+K}{I_V}$, $S_{nm}$ and $S_{re}$, the left-hand side of (39) is decreasing in $\Delta H$. Thus the higher is $\Delta H$, the higher is the difference in human capital between returnees and non-migrants, the more likely a returnee is an entrepreneur, i.e. $\widetilde{t}_{re} < \widetilde{t}_{nm}$.

$(ii)$ We can do a similar exercise for $S_{mn}$ and $S_{re}$. We have:

$$\frac{\partial \left[\frac{S_{nm}H_{re} - S_{re}H_{nm}}{H_{re} - H_{nm}}\right]}{\partial S_{nm}} > 0 \text{ and } \frac{\partial \left[\frac{S_{nm}H_{re} - S_{re}H_{nm}}{H_{re} - H_{nm}}\right]}{\partial S_{re}} < 0$$

which means the lower $S_{nm}$ and/or the higher $S_{re}$, the more likely a returnee is an entrepreneur, i.e. $\widetilde{t}_{re} < \widetilde{t}_{nm}$.

$(iii)$ Let us now focus on the right hand side of (39). Denote by $x$ any parameter. We have

$$\frac{\partial \left[\frac{I_U+K}{I_V}\right]}{\partial x} = \frac{\frac{\partial I_U}{\partial x} I_V - \left[I_U + K\right]\frac{\partial I_V}{\partial x}}{\left(I_V\right)^2}$$

Now, using Lemma 1, we obtain:

$$\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial\theta}>0$$

$$\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial w_U}>0$$

$$\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial\lambda}>0$$

$(iv)$ For $y$ and $\delta$, the sign is not determined. However, we have:

$$\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial y}\gtreqless 0 \Longleftrightarrow \frac{\partial I_U}{\partial y}\frac{y}{I_U}\gtreqless\left[1+\frac{K}{I_U}\right]\frac{\partial I_V}{\partial y}\frac{y}{I_V}$$

$$\Longleftrightarrow \frac{\eta^y_{I_U}}{\eta^y_{I_V}}\gtreqless 1+\frac{K}{I_U}$$

where

$$\eta^y_{I_U}\equiv\frac{\partial I_U}{\partial y}\frac{y}{I_U}>0 \text{ and } \eta^y_{I_V}\equiv\frac{\partial I_V}{\partial y}\frac{y}{I_V}>0$$

If $\eta^y_{I_U}<\eta^y_{I_V}$, then $\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial y}<0$.

$$\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial\delta}\gtreqless 0 \Longleftrightarrow -\left[I_U+K\right]\frac{\partial I_V}{\partial\delta}\gtreqless -\frac{\partial I_U}{\partial\delta}I_V$$

$$\Longleftrightarrow \frac{\eta^\delta_{I_U}}{\eta^\delta_{I_V}}\lesseqgtr 1+\frac{K}{I_U}$$

where

$$\eta^\delta_{I_U}\equiv-\frac{\partial I_U}{\partial\delta}\frac{\delta}{I_U}>0 \text{ and } \eta^\delta_{I_V}\equiv-\frac{\partial I_V}{\partial\delta}\frac{\delta}{I_V}>0$$

If $\eta^\delta_{I_U}<\eta^\delta_{I_V}$, then $\frac{\partial\left[\frac{I_U+K}{I_V}\right]}{\partial\delta}<0$. ∎

**Table 1: Sample Descriptive Statistics**

| Variable | Returnees | | Non-Migrants | |
|---|---|---|---|---|
| | **Mean** | **Std Dev** | **Mean** | **Std Dev** |
| ***Individual Characteristics at time of survey*** | | | | |
| Entrepreneur (%) | 31.28 | 46.42 | 24.80 | 43.19 |
| Age (years) | 41.81 | 8.19 | 41.57 | 11.62 |
| Married (%) | 89.16 | 31.62 | 78.86 | 40.84 |
| | | | | |
| ***Educational level*** (%) | | | | |
| *None* | 14.04 | 34.78 | 22.67 | 41.87 |
| Read & write | 9.11 | 28.82 | 12.71 | 33.31 |
| Less than intermediate | 14.78 | 35.53 | 18.51 | 38.84 |
| Intermediate | 31.77 | 46.62 | 21.44 | 41.05 |
| Higher than intermediate | 6.90 | 25.37 | 6.98 | 25.48 |
| University | 22.41 | 42.39 | 17.70 | 37.17 |
| | | | | |
| ***Previous Work/Residence Characteristics*** (%) | | | | |
| Urban resident: Previous | 65.71 | 47.59 | 67.83 | 46.72 |
| Waged worker : Previous | 62.56 | 48.46 | 34.06 | 47.40 |
| Public sector worker: Previous | 19.70 | 39.83 | 31.18 | 46.33 |
| | | | | |
| ***Previous Occupation dummies*** (%) | | | | |
| Technical & scientific: Previous | 18.23 | 38.65 | 15.11 | 35.82 |
| Management : Previous | 0.01 | 8.57 | 1.64 | 12.68 |
| Clerical: Previous | 5.91 | 23.61 | 8.18 | 27.40 |
| Sales: Previous | 5.67 | 23.15 | 9.42 | 29.21 |
| Services: Previous | 4.93 | 21.67 | 6.38 | 24.44 |
| Agriculture: Previous | 10.34 | 30.49 | 18.95 | 39.20 |
| Production: Previous | 25.12 | 43.43 | 29.11 | 45.43 |
| | | | | |
| ***Regions of Residence*** (%) | | | | |
| Greater Cairo | 20.20 | 40.20 | 20.45 | 40.34 |
| Alex & Canal Cities | 12.81 | 33.46 | 12.76 | 33.36 |
| Lower Urban | 17.24 | 37.82 | 16.14 | 36.80 |
| Upper Urban | 15.02 | 35.78 | 17.99 | 38.41 |
| Lower Rural | 22.17 | 41.59 | 19.25 | 39.43 |
| Upper Rural | 12.56 | 33.18 | 13.40 | 34.07 |
| | | | | |
| *Real Oil price at age 28* | 43.54 | 20.28 | 39.80 | 21.99 |
| | | | | |
| Sample Size | 406 | | 4342 | |

**Table 2: Data Statistics of Entrepreneurs and Non-Entrepreneurs**

| Variable | Entrepreneurs | | | | Non-Entrepreneurs | | | |
|---|---|---|---|---|---|---|---|---|
| | Returnee | | Non-Migrants | | Returnee | | Non-Migrants | |
| | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| ***Individual Characteristics*** | | | | | | | | |
| Age (%) | 42.84 | 7.90 | 44.74 | 10.45 | 41.34 | 8.29 | 40.53 | 11.79 |
| Married (%) | 96.85 | 17.53 | 90.81 | 28.91 | 85.66 | 35.11 | 74.92 | 43.36 |
| LM experience in Egypt (years) | 19.83 | 10.92 | 29.26 | 13.12 | 18.11 | 10.57 | 22.37 | 14.17 |
| Self-employed bef. migration (%) | 14.17 | 35.02 | | | 2.87 | 16.72 | | |
| Father: employer (%) | 43.79 | 49.59 | 33.12 | 47.11 | 18.31 | 38.75 | 16.87 | 37.45 |
| ***Educational level:*** (%) | | | | | | | | |
| None | 17.32 | 37.99 | 30.86 | 46.21 | 12.54 | 33.18 | 19.96 | 39.97 |
| Read & write | 10.24 | 30.43 | 17.01 | 37.59 | 8.60 | 28.09 | 11.29 | 31.65 |
| < than intermediate | 14.96 | 35.81 | 18.96 | 39.22 | 14.70 | 35.47 | 18.36 | 38.72 |
| Intermediate | 30.71 | 46.31 | 14.22 | 34.94 | 32.26 | 46.83 | 23.83 | 42.61 |
| > than intermediate | 7.09 | 25.76 | 4.93 | 21.65 | 6.81 | 25.24 | 7.66 | 26.59 |
| University | 19.69 | 39.92 | 14.03 | 34.75 | 25.09 | 43.43 | 18.91 | 39.17 |
| ***Social Network*** | | | | | | | | |
| Family migrated (%) | 7.87 | 27.04 | | | 10.03 | 30.10 | | |
| Small origin neighborhood | 3.51 | 18.48 | 9.84 | 29.81 | 1.83 | 35.30 | 8.77 | 28.26 |
| Returned in last year | 3.15 | 17.53 | 0.00 | 0.00 | 4.66 | 21.11 | 0.00 | 0.00 |
| Returned in last 2 years | 5.51 | 22.91 | 0.00 | 0.00 | 9.68 | 29.62 | 0.00 | 0.00 |
| ***Migration Related Characteristics*** | | | | | | | | |
| Overseas Human Capital | 51.75 | 50.19 | | | 55.31 | 49.80 | | |
| Migration duration (years) | 5.36 | 5.02 | | | 4.81 | 4.56 | | |
| ***Savings*** | | | | | | | | |
| Migrant used savings (%) | 87.40 | 33.31 | | | | | | |
| ***District Characteristics*** | | | | | | | | |
| Share of Self employed | 18.71 | 11.16 | 19.37 | 10.72 | 17.92 | 10.45 | 18.45 | 10.20 |
| Share of employer | 7.77 | 6.44 | 7.72 | 8.88 | 8.70 | 8.46 | 6.97 | 7.44 |
| Share of unemployed | 6.81 | 2.72 | 7.22 | 2.98 | 7.09 | 2.62 | 7.31 | 2.99 |
| **Regions (%)** | | | | | | | | |
| Greater Cairo | 15.75 | 36.57 | 14.95 | 35.67 | 22.22 | 41.65 | 22.27 | 41.61 |
| Sample Size | 127 | | 1077 | | 279 | | 3265 | |

**Table 3: Probability of being Entrepreneur**

| | **Marginal Effects** |
|---|---|
| Returnee | 0.102 |
| | (4.22)*** |
| *Individual Characteristics* | |
| LM experience in Egypt | 0.010 |
| | (4.96)*** |
| LM exp. in Egypt Sq. | -0.0001 |
| | (2.29)*** |
| Age | -0.002 |
| | (1.64)** |
| *Educational level ( ref. group: none)* | |
| Read & write | -0.006 |
| | (0.26) |
| Less than intermediate | -0.014 |
| | (0.70) |
| Intermediate | -0.051 |
| | (2.33)*** |
| Higher than intermediate | -0.023 |
| | (0.75) |
| University | 0.005 |
| | (0.20) |
| Pred Prob (at X bar) | 0.238 |
| Sample Size | 4327 |
| Pseudo R2 | 0.0604 |
| Log Pseudo likelihood | - 304.21 |

Notes: Robust t statistics in parentheses. Regional dummies included.
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 4: Bivariate Probit Estimates: Probability of being an Entrepreneur and Probability of being a Returnee**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| *Probability of being Entrepreneur* | | | | |
| Returnee | 1.377 | 1.251 | 1.012 | 0.368 |
| | (9.58)*** | (9.27)*** | (7.02)*** | (1.70)* |
| *Social Network* | | | | |
| Family migrated | | -0.654 | -0.687 | -0.467 |
| | | (3.15)*** | (3.18)*** | (1.38) |
| Small origin neighborhood | | 0.168 | 0.172 | 0.161 |
| | | (2.11)** | (2.16)** | (2.00)** |
| Small origin neighb * returnee | | -0.044 | -0.123 | 0.639 |
| | | (0.09) | (0.23) | (1.27) |
| Returned in last year | | -0.126 | -0.167 | -5.646 |
| | | (0.54) | (0.68) | (16.20)*** |
| *Human Capital* | | | | |
| Overseas Human Capital | | 0.075 | 0.076 | 0.107 |
| | | (1.89)* | (1.99)*** | (2.75)*** |
| *Physical Capital* | | | | |
| Migrant used savings | | | | 0.028 |
| | | | | (35.15)*** |
| *District Characteristics* | | | | |
| Share of Self employed | | 0.250 | 0.209 | 0.281 |
| | | (1.14) | (0.95) | (1.16) |
| Share of employer | | 0.765 | 0.765 | 0.964 |
| | | (1.63) | (1.69)* | (2.44)** |
| Share of unemployed | | 0.016 | 0.016 | 0.018 |
| | | (1.65)* | (1.62) | (2.01)** |
| *Individual Characteristics* | | | | |
| Father: employer | | | 0.515 | 0.316 |
| | | | (5.64)*** | (1.45) |
| Self-empl. before migration | | 0.909 | 0.888 | 1.265 |
| | | (4.03)*** | (3.75)*** | (11.71)*** |
| LM experience in Egypt | 0.031 | 0.033 | 0.033 | 0.043 |
| | (6.74)*** | (7.16)*** | (7.16)*** | (7.88)*** |
| LM exp in Egypt Sq. | -0.000 | -0.000 | -0.000 | -0.000 |
| | (2.19)** | (1.95)* | (1.85)* | (1.82)* |
| Age | -0.009 | -0.011 | -0.011 | -0.017 |
| | (1.29) | (1.48) | (1.33) | (2.01)** |
| *Educational level ( ref. group: none)* | | | | |
| Read & write | -0.022 | 0.032 | 0.026 | 0.025 |
| | (0.38) | (0.45) | (0.35) | (0.34) |
| Less than intermediate | -0.094 | -0.042 | -0.047 | -0.014 |
| | (1.58) | (0.53) | (0.60) | (0.20) |
| Intermediate | -0.318 | -0.269 | -0.277 | -0.260 |
| | (5.24)*** | (3.14)*** | (3.09)*** | (3.47)*** |
| Higher than intermediate | -0.219 | -0.190 | -0.194 | -0.191 |
| | (2.54)** | (1.83)* | (1.86)* | (1.80)* |
| University | -0.151 | -0.091 | -0.098 | -0.011 |
| | (2.07)** | (0.98) | (0.98) | (0.12) |
| Constant | -1.103 | -1.410 | -1.382 | -1.394 |
| | (7.77)*** | (5.82)*** | (5.62)*** | (5.42)*** |

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| *Probability of being Returnee* | | | | |
| Real Oil prices at age 28 | 0.006 | 0.006 | 0.006 | 0.006 |
| | (5.66)*** | (5.30)*** | (5.36)*** | (5.55)*** |
| *Individual Characteristics* | | | | |
| Age | 0.012 | 0.012 | 0.012 | 0.012 |
| | (2.61)*** | (2.37)** | (2.30)** | (2.27)** |
| *Educational level ( ref. group: none)* | | | | |
| Read & write | 0.151 | 0.130 | 0.122 | 0.114 |
| | (1.60) | (1.39) | (1.29) | (1.21) |
| Less than intermediate | 0.263 | 0.214 | 0.208 | 0.221 |
| | (2.22)** | (1.83)* | (1.78)* | (2.00)** |
| Intermediate | 0.705 | 0.689 | 0.681 | 0.664 |
| | (11.07)*** | (12.45)*** | (12.44)*** | (12.01)*** |
| Higher than intermediate | 0.515 | 0.484 | 0.476 | 0.439 |
| | (3.37)*** | (3.27)*** | (3.22)*** | (3.02)*** |
| University | 0.508 | 0.448 | 0.440 | 0.438 |
| | (5.23)*** | (5.12)*** | (4.92)*** | (3.45)*** |
| *Previous Employment Characteristics* | | | | |
| Public sector worker: Previous | -0.907 | -0.913 | -0.910 | -0.903 |
| | (8.22)*** | (7.61)*** | (7.52)*** | (7.57)*** |
| Urban resident: previous | -0.147 | -0.138 | -0.135 | -0.136 |
| | (1.49) | (1.38) | (1.39) | (1.41) |
| *Previous Occupation dummies ( ref: technical, & scientific)* | | | | |
| Management: Previous | -0.663 | -0.629 | -0.638 | -0.697 |
| | (2.96)*** | (2.68)*** | (2.70)*** | (2.92)*** |
| Clerical: Previous | -0.506 | -0.521 | -0.531 | -0.561 |
| | (5.11)*** | (5.24)*** | (5.29)*** | (6.28)*** |
| Sales: Previous | -0.552 | -0.599 | -0.615 | -0.625 |
| | (4.50)*** | (4.80)*** | (4.90)*** | (4.70)*** |
| Services: Previous | -0.445 | -0.456 | -0.456 | -0.486 |
| | (4.81)*** | (4.48)*** | (4.33)*** | (4.46)*** |
| Agriculture: Previous | -0.668 | -0.730 | -0.741 | -0.766 |
| | (6.12)*** | (6.95)*** | (7.13)*** | (7.63)*** |
| Production: Previous | -0.512 | -0.529 | -0.530 | -0.548 |
| | (7.67)*** | (7.37)*** | (7.08)*** | (6.92)*** |
| Constant | -1.677 | -0.730 | -1.611 | (6.92)*** |
| | (8.70)*** | (6.95)*** | (7.32)*** | (6.87)*** |
| Rho | -0.605 | -0.555 | -0.540 | -0. 625 |
| Wald test of rho=0: chi2(1) = | 46.87 | 42.75 | 51.77 | 80.44 |
| Sample size | 3980 | 3980 | 3752 | 3752 |
| Log Pseudo likelihood | -3400.90 | -3194.52 | -3185.97 | -3021.47 |

Notes: Robust t statistics in parentheses. *significant at 10%, ** significant at 5%; ** *significant at 1%.
Regional dummies included.

**Table 5: Further Sensitivity Analysis: Bivariate Probit Estimates: Probability of being an Entrepreneur**

| | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|
| Returnee | 1.068 | 1.004 | 1.011 | 1.014 | 0.640 |
| | (7.93)*** | (7.06)*** | (7.01)*** | (6.46)*** | (2.00)** |
| ***Social networks*** | | | | | |
| Family migrated | -0.816 | -0.739 | -0.695 | -0.670 | -0.630 |
| | (2.87)*** | (3.04)*** | (3.28)*** | (3.14)*** | (2.94)** |
| Small origin | 0.154 | 0.174 | 0.172 | 2.968 | 0.169 |
| neighborhood | (1.92)* | (2.19)** | (2.17)** | (2.91)*** | (1.98)** |
| Small origin neighb * | -0.062 | 0.009 | -0.123 | 0.173 | 0.151 |
| returnee | (0.12) | (0.02) | (0.22) | (0.58) | (0.26) |
| Returned in last year | -1.263 | -0.068 | | -0.156 | -0.115 |
| | (4.61)*** | (0.32) | | (0.64) | (0.45) |
| Returned in last 2 | | | -0.070 | | |
| years | | | (0.43) | | |
| ***Human Capital*** | | | | | |
| Overseas Human Capital | 0.087 | 0.081 | 0.076 | 0.075 | 0.129 |
| | (2.40)** | (2.07)** | (1.98)** | (1.95)* | (2.91)** |

Notes: Robust t statistics in parentheses. *significant at 10%; ** significant at 5%; ***significant at 1%.
Those are the estimates from the first equation in the bivariate probit model. Only selected variables are shown. Model 5 includes dummies for date of start of business. Model 6 excludes those who were self-employed before migration. Model 7 uses 2 years since return dummy. Model 8 excludes households receiving remittances. Model 9 is not SURE: includes the same controls in both equations plus the instrument in the migration equation.

**Table A1: Characteristics of Enterprises**

| Variable | Owned by Returnee | Owned by Non-Migrant |
|---|---|---|
| ***Location of Enterprise (%)*** | | |
| Urban | 53.15 | 48.60 |
| Rural | 29.73 | 32.40 |
| Mobile (not fixed) | 17.12 | 18.99 |
| | | |
| ***Economic Activity*** (%) | | |
| Agriculture | 19.30 | 27.00 |
| Manufacturing | 12.28 | 11.01 |
| Construction | 4.39 | 5.05 |
| Trade | 41.23 | 34.49 |
| Transport & Commerce | 11.40 | 6.99 |
| Services | 7.02 | 10.75 |
| Others | 4.38 | 4.71 |
| | | |
| **Ownership (%)** | | |
| Sole Ownership | 85.96 | 87.68 |
| | | |
| **Number of employees** | | |
| Less than 5 | 90.27 | 91.04 |
| 5 - 9 | 8.23 | 5.84 |
| 10 or more | 1.50 | 3.42 |
| | | |
| **Mean number of employees** | 2.60 | 2.93 |
| | | |
| **Legal characteristics** | | |
| Licence or registration | 68.15 | 48.51 |
| Regular Bookkeeping | 16.81 | 13.95 |

**Table A2: Data Appendix**

| Variable | Definition |
|---|---|
| ***Individual Characteristics*** | |
| Age | Age in years at the time of survey |
| Married | Martial Status at the time of survey |
| LM experience in Egypt | Years of experience in the Egyptian labor market. |
| LM experience in Egypt Sq | Years of experience in the Egyptian labor market squared |
| Father: employer | =1 if the individual's father was employer when the individual was aged 15 years of age. |
| ***Educational level*** | |
| None | =1 if the individual has no education |
| Read & write | =1 if the individual can read and write |
| Less than intermediate | =1 if the individual has less than intermediate education (6 years). |
| Intermediate | =1 if the individual has intermediate education (9 years) |
| Higher than intermediate | =1 if the individual has higher than intermediate educ. (12 years) |
| University | =1 if the individual has university education (16 yrs of education). |
| ***Social Networks*** | |
| Family migrated | Returnee whose household members migrated as well |
| Small origin neighborhood | =1 if individual lived previously (origin) in a neighborhood with < than 5,000 inhabitants |
| Small origin neighb * returnee | =1 if returnee lived prior to emigration in a neighborhood with < than 5,000 inhabitants |
| Returned in last year | =1 if the individual returned from overseas in the last year |
| Returned in last 2 years | =1 if the individual returned from overseas in the last 2 years |
| ***Migration Related Characteristics*** | |
| Migrant used savings | Value of savings used by migrant to start-up business |
| Overseas Human Capital | =1 for returnees who moved up the occupational ladder (from unskilled job prior to migration to skilled occupation overseas) or who were out of labour force before emigrating but worked overseas. |
| ***District Characteristics*** | |
| Share of Self employed in 96 | Share of self employed among total employed adult males in district (qism) in 1996, based on Census |
| Share of Employer in 96 | Share of employer among total employed adult males in district (qism) in 1996, based on Census |
| Share of Unemployed in 96 | Share of unemployed among total employed adult males in district (qism) in 1996, based on Census |
| ***Previous Work/Residence Characteristics*** | |
| Urban resident: Previous | Previous residence: urban dummy |
| Public sector worker: Previous | Previous sector of employment: public sector dummy |
| Self-empl. before migration | Self-employed before migration & returnee dummy |
| ***Previous Occupation dummies*** | |
| Technical & scientific: Previous | Previous occupation: Technical & Scientific dummy |
| Management: Previous | Previous occupation: Management dummy |
| Clerical: Previous | Previous occupation: clerical dummy |
| Sales: Previous | Previous occupation: sales dummy |

| | |
|---|---|
| Services: Previous | Previous occupation: services dummy |
| Agriculture: Previous | Previous occupation: agriculture dummy |
| Production: Previous | Previous occupation: production dummy |
| | |
| ***Regions of Residence*** (%) | |
| Greater Cairo | =1 if individual lives in Greater Cairo at time of survey |
| Alex & Canal Cities | =1 if individual lives in Alexandria & Canal Cities at time of survey |
| Lower Urban | =1 if individual lives in Lower Urban at time of survey |
| Upper Urban | =1 if individual lives in Upper Urban at time of survey |
| Lower Rural | =1 if individual lives in Lower Rural at time of survey |
| Upper Rural | =1 if individual lives in Upper Rural at time of survey |
| | |
| ***Instrument*** | |
| Real oil price at age 28 | Historic real international oil prices when the individual was 28 years of age |
| | |
| ***Dependent variables*** | |
| Entrepreneur | =1 if the individual is an employer or self employed *owner* of economic enterprise |
| Returnee | =1 if the individual is a return international migrant |

- Investigate whether return migrants are more likely to become entrepreneurs than non-migrants.
- Develop a theoretical search model
- Test the predictions of the model using data from Egypt.
- We find that an overseas returnee is more likely to become an entrepreneur than a non-migrant.