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Husbands' return migration and wives' occupational choices
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Abstract

Exploiting the documented effect of migration on occupational choice upon return to their origin country with data from Egypt, I establish a link between return migration of men and their wives' time use through within-couple occupational interdependence. Seemingly unrelated regression model estimates suggest that being married to a migrant who opted for self-employment upon return decreases a woman's likelihood to engage in paid work. It increases her likelihood to engage in family work, subsistence farming and domestic chores, at both the extensive and intensive margins. Results differ by education level, illiterate wives engaging significantly more in paid as well as unpaid work compared to more educated women. Findings are consistent with theoretical models of occupational interdependence between spouses and assortative mating. They highlight the need to buffer potentially depriving migration-induced effects on women's time use, even once migration is complete.

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1   Introduction

The out-migration of a household member has been shown to influence left-behind, non-migrating members' occupations through the receipt of remittances and within-household labour reallocation (e.g. Binzel and Assaad, 2011). There is also evidence that migrants transfer destination country norms, and that their decision-making power is reinforced upon return relative to their spouses' (e.g. Antman, 2011, Bertoli and Marchetta, 2015 or Tuccio and Wahba, 2015). Yet, whether men's returning affects the time allocation of their wives has been left unanswered by the literature. On one hand, individuals' occupational and migration decisions are often made at the household level in developing economies, and local labour markets segregate along gender lines. On the other hand, migration flows tend to alter returnees' choice of occupation. This paper exploits the documented effect of migration on occupational choice upon migrants' return to their origin country to establish a link between return migration of men and their wives' time allocation through within-couple occupational interdependence.

I contribute to the literature on women's occupational choice, specifically in a developing setting with prevalent international migration. Not only instrumental in household livelihood strategies, how women use their time – whether they engage in, or how much time they spent on certain activities – has been found to be a key determinant of their autonomy and bargaining power, both within and outside their household.[1] If return migrants were more likely to set up a firm upon return, demand for labour within returnees' households could increase. In this regard, returnees setting up a family firm could alter women's degree of control over resource allocation, among other household decisions. However, the wealth men gathered abroad could simultaneously be used to start up a business, and free up their wives' time. If this is the case, women could decide not to work, either paid or unpaid, or to reallocate their time to relatively more income-generating activities outside their household. This paper is the first to show and quantify the effect of return migration of men on their wives' choices of occupation.

This analysis uses the 2012 Egypt Labor Market Panel Survey (ELMPS) (ERF and CAPMAS, 2013). With quality data, Egypt provides a good example. Largely dominated by men, migration from Egypt to Arab countries is temporary in nature. It has been found to increase men's propensity to set up businesses upon return to Egypt, and to survive as entrepreneurs (Marchetta, 2012; Wahba and Zenou, 2012; Wahba, 2015). It has also been found that living in a household with a man who migrated to a conservative country increases the likelihood of Egyptian women to internalise traditional gender norms (Bertoli and Marchetta, 2015). At the same time, female labour participation is rather low in Egypt. The labour market is segregated, and women's labour options remain segmented (Sadania, 2017).

Reduced-form estimates of a seemingly unrelated regression (SUR) model show that being married to a migrant who opted for self-employment upon return decreases a woman's likelihood to engage in paid work. It increases her likelihood to engage in family work, subsistence farming and domestic chores, at both the extensive and intensive margins. Results differ by education level, with illiterate wives engaging significantly more in paid as well as unpaid work compared to more educated women. Questioning the idea that their return automatically induces going back to pre-departure within-household time and task allocation, I explain these results by the existence of occupational interdependence between spouses most likely in order to diversify income sources and as a result of assortative mating, along time-use gender differentiation lines. Findings highlight the need to buffer potentially depriving migration-induced effects on women's time use, even once migration is complete.

The rest of this paper is structured as follows. Section 2 reviews possible channels explaining how husbands' migration experience could affect their wives' time allocation through their occupational choice upon return. Section 3 introduces the context of this paper, followed by the estimation strategy in section 4, and the data used in section 5. Section 6 presents estimation results. Section 7 concludes.

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[1]   Female autonomy is defined following Anderson and Eswaran (2009) as 'the ability of women to make choices/decisions within the household relative to their husband.' For a review on the literature on the relationships between women's empowerment, earnings and control over income, or women's empowerment and development/economic growth, see Sadania (2017).

2   Conceptual background

From the literature, four non-mutually exclusive categories of women's time use are identified: household work,[2] subsistence work,[3] unpaid market labour activities and paid ones. Time spent caring for children, the sick or the elderly while doing or not doing other activities is excluded. Household chores, seen as household public goods, do not generate any income. Subsistence work is defined as farming for one's own household consumption; it does not generate income. Unpaid market labour measures the contribution of a household member to a family enterprise, i.e. marketable, and productive labour, from which one does not earn any revenue. Labour force could be hired for such an activity, but family labour, accounting for supervision costs, is seen as cheaper since it does not need supervision. Paid market labour is an income-generating activity, either as self- or wage-employed, outside the household.

In line with the extensive evidence contradicting the unitary models of the household *à la* Becker (1973; 1981), the possibility of bargaining between household members is acknowledged.[4] Getting divorced – suggested as an outside option by cooperative models – might not be realistic in a country like Egypt, where women do not face equal rights regarding divorce,[5] or where the labour market does not ensure the existence of viable outside options for women.[6] For that reason, this paper adopts a non-unitary model of household bargaining, with non-cooperation within marriage as a relevant threat option, more relevant to Egyptian realities, as in Sadania (2017).

However, because data only allow observing the outcome of this bargaining process, I do not provide a theoretical framework of the channels at stake, nor test for the relevance of one model over another. I only assume that intra-family decision-making is to take place collectively, either cooperatively or non-cooperatively. Cooperation might be limited, and complete pooling of resources might not always occur, rendering the hypothesis of joint decision-making inappropriate. In an environment of traditional, strict gender roles, as is the case in Egypt, women may be limited in deciding on how to allocate their time, not only by a 'typical' lack of productive assets,[7] but also by some level of inflexibility attached to how women are allowed to allocate their time. This gender differentiated availability of labour might constrain women's time use to certain activities (Serra, 2009).[8]

This paper thus follows Serra (2009) in accounting for gender-specific constraints and choices in women's time allocation, resulting from prevalent gender-specific role stratification. For instance, if household public goods such as cooked food, cleaning or fuel collection, are key to household production, women tend to take an excessive part in their production, regardless of their participation in other remunerative and more

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[2] Household chores include time spent on shopping for food, clothing and household items; on accompanying family members to their activities; on maintenance activities and helping in construction work for the household for the purpose of one's own household consumption; on cooking, washing dishes, doing laundry, ironing and cleaning one's house; and collecting water, firewood and/or other fuels.

[3] Subsistence work includes time spent on agricultural activities, raising poultry/livestock and producing ghee/butter/cheese for the purpose of one's own household consumption.

[4] For a review of the evidence contradicting the unitary model of the household, see Browning et al. (1994). Unitary theories of family decision-making include different family structure models that assume a family to act 'as if' it were maximising a unique, family utility function. In contrast, bargaining models suggest that household members have individual weight they use in a bargaining process, determined by the existence of threat points – outside options in case of marriage dissolution – that affect household outcomes such as resource allocation. The comparison of each spouse's outcomes within marriage to its breakdown (in cooperative models), or to non-cooperation (in non-cooperative models), determines their degree of bargaining power, and hence their behaviour. Cooperative and non-cooperative models thus take into account intra-family income distribution.

[5] Despite their 2004 modification in favour of women, women's rights have remained unequal to men's regarding divorce. In addition, rather difficult social acceptance and risk of social exclusion leave divorce rate at a low 2,2% in 2012 (Sadania, 2017).

[6] There may not exist labour market options offered to women in case cooperation with their spouses breaks down, as suggested by the World Development Report 2012 that ranked Egypt 124 out of 132 countries in terms of opportunities and economic participation of Egyptian women (World Bank, 2012).

[7] Such as educational, financial and technical assets that can help women to access economic activities of higher return.

[8] Gender-specific time constraints might result from socially sanctioned norms that characterise tasks as being female or male, as well as from the difficulty in substituting market inputs for time inputs, i.e. inefficiency or absence local labour markets.

productive activities. In comparison, men tend to dedicate their time exclusively to income-generating activities. Because of tradition, men and women are assigned distinct tasks, based on their gender. Women are more likely to not only give up leisure time, but also, and of interest in this paper, potentially remunerative activities outside their household. Due to greater constraints on their ability to allocate time between activities, women will be less inclined to engage in relatively time-intensive, albeit remunerative, occupations (Serra, 2009).

Husbands' migration could simultaneously affect the need for, or the offer of, paid, unpaid, subsistence or domestic work upon return, because of some degree of dependence between spouses' occupations, as Parker (2008) suggests, since return migrants have been found to significantly diverge in their occupational choice from non-migrants. Using a simultaneous probit equation system, Parker (2008) finds significant positive business ownership dynamics between spouses, attributed to knowledge transfers.[9] Alternative explanations, with little data support in Parker (2008), can be considered, such as assortative mating,[10] role models,[11] minimising risk[12] or intra-household wealth transfers.[13] Within Parker's (2008) framework of occupational interdependence, how households allocate labour and time between members is understood in the context of a developing economy, where there might be a need to diversify income sources between farm and/or non-farm activities, within non-farm sectors, in terms of location or type of occupation. Households diversify their activities in order to maximise household earnings, subject to limited resources, and to minimise risk, either (i) for accumulation objectives, i.e. 'pull factors'; or (ii) to manage risk to smooth income over time, cope with shocks or escape from activities in stagnation or decline, i.e. 'push factors.' Whether and how households decide to diversify their activities depends not only on their incentives,[14] but also on their capacity.[15] In particular and of interest in this paper, the availability of labour force within a household can allow for diversification across members of the same household[16] (Reardon et al., 2006).

As supported by empirical evidence from Asia, Latin America and sub-Saharan Africa, the participation in multiple activities, 'pluriactivity', tends to occur within a household between members, each one specialising in an activity relatively to the others. Poorer households are expected to diversify in order to manage risk to compensate for few assets, and to survive. With lower risk attached to their (main) activity, wealthier families show a more extensive degree of diversification (Reardon et al., 2006), with specialisation between individuals, some typically specialising in non-farm activities, often highly-paid wage-employment. Wealthy and poor households thus diversify differently. Wealthier, profit-maximising families tend to participate in higher-return activities; more vulnerable families, in an attempt to survive by minimising risk and stabilising income, diversify into labour-intensive, low-return activities. Income diversification can be seen either as signaling households' ability to seize opportunities, or as a survival strategy. In this sense, repatriating savings accumulated abroad could help further diversifying income sources within a household by relaxing budget constraints and facilitating access to financial capital.

In sum, in a context of occupational interdependence between spouses, household income diversification and gender differentiated time allocation, (male) migrants setting up a firm upon return could affect how their wives allocate their time. Specifically:

- Women's participation in *paid* or *unpaid market labour* depends on the type and sector of occupation of their husbands, their households' livelihood strategy, the level of risk their household has to cope with

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[9] Knowledge transfers are defined as business-related information readily shared within couples.

[10] A high level of resemblance across personal features such as education, age or earnings, revealing similar preferences between those who marry each other.

[11] A spouse's occupational choice being influenced by the performance of his/her spouse in a specific activity, so they might follow in their footsteps.

[12] Spouses deciding how each one allocates their time interdependently in order to diversify any risks attached to their income source activities they might face.

[13] A spouse's occupation being influenced by the ability of their wealthy co-spouse to overcome e.g. financial contraints.

[14] Incentives to diversify include prices of outputs and inputs of nonfarm activities relative to farm activities, as well as the relative risks attached to such activities.

[15] Household capacity includes assets such as human, social, financial, organisational or physical capital, that can be public or private, common to all households or specific to a household or a group of households.

[16] See examples from Burkina Faso or the Philippines as cited in Reardon et al. (2006).

and the degree of their observed productivity. For instance, women with a relatively high education level might not only have stronger bargaining power, but might also have 'revealed' they were more efficient working outside their household, on the labour market. Alternatively, husbands working in a rather risky or low-productivity sector might induce women to allocate their time out of their husbands' enterprises, towards less risky activities, even if with low returns, in order to reduce risk and smooth their household income.

- The greater probability of men opting for self-employment upon return could be expected to increase their wives' likelihood to engage in *subsistence work*, because of gender differentiation of men's and women's time use. In developing societies, women tend to take care of food crops for household consumption, whereas men deal with cash crops or more remunerative non-farm activities, sold on the market. Depending on the level of risk attached to the main household occupation – often the first activity of the head of the family, in this case, the husband – women would be expected to engage with, if not invest more time in, household crops. If a migration-induced wealth effect enables families to hire external labour to work on food crops, and so free women from subsistence farming, women can allocate time to other activities. However, it could be that conservative gender norms place a higher time burden on women, with increased time spent on subsistence work.

- The impacts of husbands' migration on their wives' participation in *domestic work* is not clear. On one hand, migration-induced wealth effects could free women from spending time on household chores thanks to the use of domestic gadgets. On the other hand, if outside labour is hired on local labour markets instead of using household members for subsistence farming or to contribute to the family enterprise, their participation in domestic work could increase in relative terms. However, it could be that, in a traditional society with conservative gender norms, the decision to engage in or the number of hours spent on household work is not altered. The wealth men gathered abroad and repatriated could simultaneously be used to start up a business and free up their wives' time. If this is the case, women can decide not to work, either paid or unpaid, which would increase their time spent on domestic chores in relative terms, or to reallocate their time to relatively more income-generating activities outside their household.

- Allocating their time to one activity does not prevent women from engaging in other activities, household work being the best example. In this case, the increased probability of a man who has migrated setting up a business upon return would raise the (work) burden placed on women in more than one activity – the level of diversification of their time – potentially decreasing their outside options.

- These dynamics are expected to differ (i) by *location* since household livelihood strategies, local labour market opportunities and gender norms vary between rural and urban areas; (ii) by *husband's sector of occupation*. Provided that the agricultural sector has a rather traditional structure, marked by a high degree of land fragmentation, a substantial number of individual farmers will work on small, low productivity plots, unable to benefit from economies of scale and likely to tie up available labour supply within a household (Morsy et al., 2014); or (iii) by *women's skill levels*. The higher their level of education is, the higher their bargaining power is within their family, either through a greater control over resources or their competencies acting as 'signal' of their abilities.

3 Migration, entrepreneurship and women's labour participation in Egypt

A survival strategy to escape poor social and economic development (Zohry, 2009), international emigration from Egypt is mainly a function of overseas labour demand. For this reason, it is strongly affected by the economic and political conditions of (Arab) labour-importing countries (Wahba, 2009). Egypt has been a labour exporter since the economic reforms and opening of the country in the 1970s. It is the biggest labour exporter of the Middle East and North Africa (MENA) region (Wahba, 2014). Two main trends

characterized Egyptian emigration: (i) relatively temporary migration to Arab countries, involving male household heads, for four to five years;[17] and (ii) more permanent migration to Western countries, involving the entire nuclear family. Egyptians' first destinations were labour-importing Arab countries, in particular the oil-producing Gulf States, Libya and Iraq, because of labour shortages. Since the 1980s and 1990s, the political instability some experienced and the replacement of Arab with Asian workers have had a significant effect on emigration destinations of Egyptians. Although the majority still migrates to Arab and Gulf States, around 30% of Egyptian migrants were residing in Western countries in 2000 (Wahba, 2009).

On the other hand, micro and small enterprises (MSEs) constitute almost 99% of Egypt's total enterprises, and around 80% of total employment, providing work for about 75% of new entrants into the job market (Ghanem, 2013). Egyptian MSEs are mainly family businesses, with low capital-labour ratios that use simple, traditional technologies, with limited access to financing, infrastructure and public services. It has been shown that return migration is significantly related to entrepreneurship in Egypt. McCormick and Wahba (2001) use the ELMPS to show that overseas savings and the acquisition of skills over a stay abroad is associated with increased propensity to become self-employed of literate returnees; even overseas savings alone raise illiterate returnees' propensity for self-employment. Controlling for the endogeneity of temporary migration, Wahba and Zenou (2012) find that an international migrant has a higher probability of becoming self-employed upon return than a non-migrant, as the accumulation of savings and skills abroad compensates for their potential loss of social capital. Exploiting the longitudinal dimension of these data and controlling for selection in international return migration, Marchetta (2012) finds that being a return migrant increases the prospect of survival of entrepreneurial activities in Egypt.

Furthermore, labour force participation of women in Egypt is one of the lowest, with 19% engaged in paid work in 2010 (World Bank, 2017). The development of male-dominated non-trade sectors over traditional export sectors, combined with the interruption of an employment guarantee scheme for higher education graduates in the 1990s that offered women attractive working conditions,[18] have triggered growing unemployment[19] and led to a de-feminisation of its labour force. The 2008 economic crisis and the economic slowdown following the January 2011 Uprising have accentuated such trends. At the same time, tradition limits women's mobility, and restricts them to the domestic sphere or to small home-based income-generating activities with few opportunities to expand (Sadania, 2017). Not only work characteristics but also social norms attached to specific activities have rendered the Egyptian labour market gender differentiated and, for women in particular, segmented between public sector (44% of Egyptian women engaged in public sector work in 2012), private sector (32) and household work (24). If working in the public sector is accepted by Egyptian society for the most educated, engaging in private work outside the household is in contrast seen as degrading. Contributing to family work, such as their husbands' farms or non-agricultural businesses, often carried out from home, is more accepted for those who cannot join the public sector (Sadania, 2017).

Investigating the determinants of Egypt's low female labour force participation, Binzel and Assaad (2011) find that male out-migration decreases women's participation in wage-work in both rural and urban areas. Those living in a rural household where a male member is currently away are more likely to contribute to family work (as unpaid workers) and to subsistence work. This labour supply response is found to be due to families' need to compensate for the absence of migrants' labour depite the receipt of remittances. Binzel and Assaad's (2011) results are in line with Taylor's (1984) who finds that rural women are in general mostly limited to household work, and traditionally in charge of livestock as well as, to some extent, selling goods on markets. Yet, communities with high migration rates see a greater work load placed on women who have to take over agricultural work, usually perceived as 'male'.

In addition, empirical research on return migration suggests that the return of male heads – husbands – from migration, alters intra-household resource allocation, benefitting boys relatively more than girls. This

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[17] Lucas (2008) indicates that the average length of migration in Gulf countries is about 4-5 years. This might be explained by Arab countries relying on a sponsorship scheme. This system ensures entry visas can only be obtained through a local sponsor (Gardner, 2011).

[18] By providing some flexibility to combine work with family life, in line with Egyptian customs, working in the public sector has been deemed socially acceptable for highly qualified women (Assaad and El-Hamidi, 2009; *in* Sadania, 2017).

[19] Egypt's unemployment rate among women was of 27.1% in 2012; that of men was of 7%.

is evidence of greater authority for the household head, i.e. relative loss of a wife's degree of barganing power upon the husband's return.[20] Living in a household where a man has ever migrated, either before or after marriage, has also been found to affect gender norms. Bertoli and Marchetta (2015) for instance show that couples of which husbands temporarily emigrated to Arab countries, where fertility is higher, have significantly more children. Looking at Jordan, a country with similar migration trends to MENA countries as Egypt, Tuccio and Wahba (2015) find that women living in a household with a man who temporarily migrated to a conservative Arab countrym display a higher internalisation of discriminatory gender norms, upon men's return to Jordan. These empirical findings point to migration as a means for transferring (potentially conservative) destination country gender norms. If this the case, migrants who return from conservative destination countries might prefer stay-at-home wives rather than wives working outside the home. However, it seems difficult to disentangle social, cultural preferences from economic considerations, since returnees' wives might be less likely to engage in outside activities if their husbands have a business they could contribute to as cheap-to-supervise labour, which additionally depends on the risk and productivity attached to these very entrepreneurial activities. That women work outside their household and the degree of dependence between spouses' occupations might be affected by cultural as much as economic preferences since wives' contribution to family work – their husbands' businesses, subsistence farming or domestic chores – might be out of a thoughtful 'cost-befenit' analysis.

4   Estimation strategy

A major analytical issue is the endogeneity of (i) temporary migration and occupational choice, and (ii) husband and wife's occupation and time use. First, migrating is subject to selection biases due to unobservable features, likely to affect occupational choice and business performance upon return (Marchetta, 2012). Those who emigrate and return may do so because they are more endowed, i.e. have innate entrepreneurial skills before departure, than non-migrants. Dynamics between return migration and entrepreneurship may be biased if returnees are genuinely more risk-takers and so initiate riskier business strategies, or if returnees opt for self-employment due to lack of social capital or wage employment opportunities upon return. Apart from omitted variable bias, endogeneity could result from bidirectionality, since emigrating itself could be driven by the desire to set up an enterprise upon return. They could be simultaneous decisions, part of would-be entrepreneurs' business strategies (Wahba and Zenou, 2012; Batista et al., 2017).

Occupation and time allocation within couples are also likely to be interdependent. A wife's occupational choice might both affect and be affected by the occupation of her husband, and *vice versa*. The availability of (potentially) cheap labour supply within a family – of their wives, in this case – might increase the likelihood of men to opt for self-employment, since their wives represent potentially available labour. This labour can be allocated to their business, to subsistence farming or to paid labour outside their households, if the husband's main activity is too risky or not remunerative enough. Their occupations could also be simultaneously affected by omitted variables, and men (women) self-selecting in their choice of spouse, as in the case of assortative mating.

To tackle endogeneity in assessing the effect of husbands' migration on their wives' time allocation through self-employment, a seemingly unrelated regression (SUR) linear probability model is used, since the three decisions – temporarily migrating, being self-employed, and how one's wife uses her time – form a non-recursive model with direct causal paths and correlated disturbances.[21] Ignoring the interdependence in wives' and husbands' occupational choices on one hand, and the husbands' migration experience and occupational choice upon return on the other hand, interdependence, when actually present,[22] could lead to biased estimates. Exclusion restrictions play the role of instrumental variables.

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[20] See for instance Antman (2011) for the case of migration of Mexican men to the United States.

[21] Correlated disturbances assume that corresponding endogenous variables share at least one common omitted explanatory variable.

[22] I.e. estimating this system of equations as single equations, in their structural rather than reduced form.

The main model specification is as follows:

$$Returnee_h = \delta_0 + \delta_1 X_{Rh} + \delta_2 Z_{Rh} + \epsilon_{1h} \tag{1}$$

$$SelfEmployed_h = \alpha_0 + \alpha_1 X_{SEh} + \alpha_2 Z_{SEh} + \alpha_3 Returnee_h + \epsilon_{2h} \tag{2}$$

$$Occupation_{wj} = \gamma_0 + \gamma_1 X_{Ow} + \gamma_2 SelfEmployed_h + \epsilon_{3w} \tag{3}$$

where $Returnee$ is a binary variable taking unity if a working-age (16-64) married man (husband) h has worked at least six months abroad. $SelfEmployed$ is a binary variable taking unity if a working-age married man h is currently self-employed. $Occupation$, with $j = 1, 2, 3, 4$, is alternatively a set of binary variables taking value 1 if a married woman in reproductive age (15-49) (wife) w has been engaged in paid market work, unpaid market work contributing to family work, subsistence work (farming for own consumption) or domestic work in the last seven days, with a corresponding set of continuous variables measuring the number of hours spent in each of these activities. The set of binary variables captures the decision to participate in an activity, i.e. the extensive margin; the set of continuous variables, the intensive margin.

X_R is a vector of individual and household characteristics capturing education, household size, child dependency ratio and whether an individual's mother is literate. Mother's education proxies potential inequalities of opportunities individuals might face based on their family background (Paxson and Schady, 2004; Paxson and Schady, 2007; in Atinc et al., 2005). X_{SE} is a vector of variables thought to influence occupational choice such as vocational training, whether an individual's father was self-employed. This variable is thought to capture the existence of knowledge transfers between self-employed parents and their children, as found in the literature, as in Laband and Lentz (1983) or Dunn and Holtz-Eakin (2000) (Parker, 2008). It reflects a 'family' (cultural) entrepreneurial capital.

X_{SE} also includes a variable capturing whether his first job was self-employed, as a of measure entrepreneurial motivation, years of unemployment,[23] lagged unemployment rate at the governorate level and household level characteristics such as household size and under 15 dependency ratio.[24]

X_O is a vector of variables influencing women's time allocation, such as age, literacy, mother's educational background, family size, under 15 and above 65 dependency ratios, governorate-level lagged unemployment rate, share of agricultural work and public sector work, and proportion of the population with at least secondary education. This set of governorate-level variables is included to take into account the fact that returns to local non-farm activities happen to occur in areas with growth motors (agriculture, mining, tourism, etc.), generating consumption and production dynamics with non-farm sectors, and increasing the demand for non-farm products (Reardon et al., 2006).

Z_R is the interaction of (i) changes in the yearly average of the real exchange rate of the Egyptian Pound to the US dollar[25] at a potential age of emigration, with (ii) the average distance to estimation sample destination countries in 1,000 kilometres is used to obtain an exogenous source of variations in temporary migration.

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[23] Labour force related information are measured over the last four job spells available in the module 6 of the ELMPS.

[24] Because the variable used as instrument to deal with the endogeneity of migration is age-specific, age or age-related variables such as tenure or years of potential work experience were not included in these two first regressions because of multicollinearity. Limiting the estimation sample to working-age married men should reduce a potential omitted variable bias.

[25] Data on official exchange rates in local currency unit per US dollar and consumer price index (CPI) are available on the website of the World Bank. Real exchange rates are obtained by multiplying the official exchange rate by US CPI, and then dividing by Egypt CPI.

Changes in real exchange rates are thought to reflect how much a basket of goods costs in Egypt compared to in the US. The lower Egypt's real exchange rate – the stronger the Egyptian Pound – the cheaper it is for Egyptians to consume in Egypt, hence the lower the incentive to emigrate. Historical, matched exchange rates are assumed to act as a pull factor, reflecting how profitable, in monetary terms, working abroad is. Exchange rates could influence the contemporaneous profitability of some industries more than others, and affect the occupational choice upon return observed in the data. By including both wage and self-employment in all sectors of the economy and matching exchange rates to some potential age of emigration, (past) exchange rates should not be related to the occupational choice upon return observed at the time of the survey (2012). In addition, because emigration to Arab countries is temporary in nature, predicting emigration should suffice to instrument for return migration.

The age at which individuals have to be matched to the exchange rate is selected as in Bertoli and Marchetta (2015) who rely on an optimality criterion to choose out of 11 alternative ages, from ages 18 to 28. Three different measures of exchange rates are used: yearly real exchange rate *per se*, yearly changes in real exchange rates, and a series of central moving average using two to five observations (MA(2) to MA(5)), to deal with potential seasonality in the exchange rate.

The selection of the age, i.e. year of potential emigration, at which an individual is matched to the real exchange rate draws on Bertoli and Marchetta (2015). To do so, equation (1) is estimated, and the strength of this instrument is examined at different matching ages, ranging from ages 18 to 28, by testing for each alternative the null hypothesis that the estimated coefficient on the real exchange rate equals zero through a Wald test, implemented by Stata's *test* command. In line with Cameron and Trivedi (2009, p.196) who note that 'a widely used rule of thumb [...] views an F statistic of less than 10 as indicating weak instruments. This rule of thumb is ad hoc and may not be sufficiently conservative [...]', the age of potential emigration giving the highest F-statistic is selected.

Figure 1 depicts the values of the F-statistics for equation (1), at each age, as well as the 10 F-statistic rule of thumb. The F-statistic is the highest for age 22 for the real exchange rate moving average based on 5 consecutive observations, MA(5), close to Bertoli and Marchetta's (2015) choice of 20 years old using the real price of oil as instrument. The central moving average with 5 observations of the real exchange rate when individuals were 22 is selected as instrument for temporary migration to MENA countries. Table 1 supports the selection of this instrument. It is, on average, statistically significantly lower for return migrants (EGP5.76) than for stayers (EGP6.49), confirming the rationale behind this instrument.[26]

Figure 1: First stage test statistics (F-statistics) for the real exchange rate at different emigration ages

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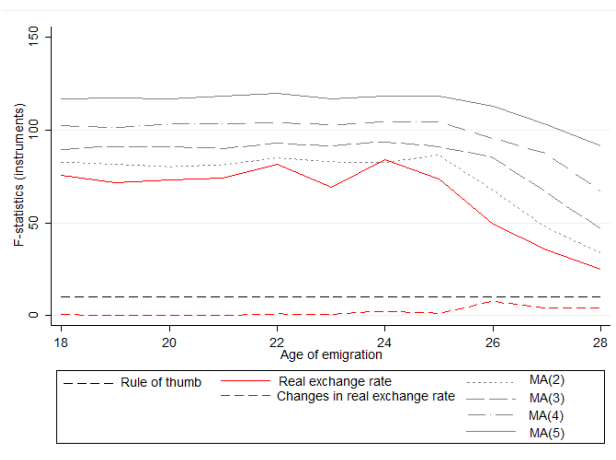
[26] Specifications are also run with historical real prices of oil matched at some potential age of emigration as in Bertoli and Marchetta (2015). The instrument was not strong enough across specifications for the estimation sample considered in this paper.

Following Bertoli and Marchetta (2015), Figure 2 shows the relationship between the share of returnees of the estimation sample and the real exchange rate by cohort of birth, from 1950 to 1990. The proportion of return migrants is the highest, approximately 35% for those born in the mid-1950s and early 1960s. This increase in the proportion of return migrants coincides with a downward trend in the real exchange rate. The proportion of returnees then falls, until the end of the series in 1989, [27] which concurs with an upward trend in real exchange rate.

Figure 2: Share of returnees by year of birth and real exchange rate
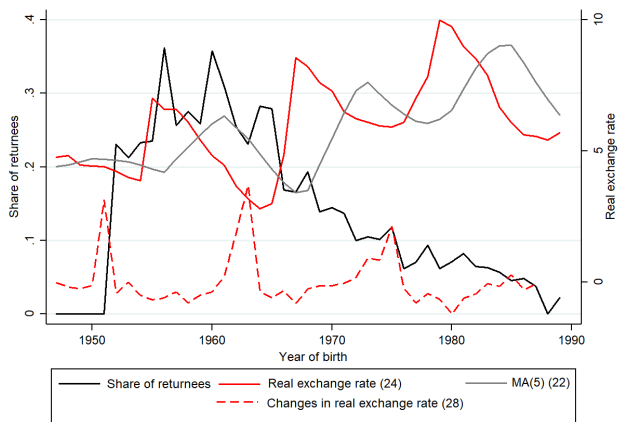
This cohort-based instrument is interacted with the average distance from the capital of a respondent's governorate of birth[28] to estimation sample destination country capitals in 1,000 kilometres.[29] Table A2 provides information on the construction of distances. Migrants are likely to migrate where it is cheaper because of geographical proximity, that is to countries closer to Egypt.[30] Figure 3 presents the average distance to potential destination country capitals by governorate of birth in 1,000 kilometres. The effect of real exchange rates on the probability to temporarily emigrate is thus allowed to differ across governorates through governorate (spatial) heterogeneity in migration costs to each potential destination. This interaction generates variation across time, via the cohort-based exchange rate, and across space, via the average distance from governorate of birth to destinations.

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[27] No return migrants born in 1990 or later were surveyed. The estimation sample thus only includes individuals with no missing information, who were born in 1989 or before.

[28] First level of Egypt's administrative subdivision.

[29] Respondents who were not born in Egypt were assigned an average distance based on their first governorate of residence in Egypt.

[30] The average distance is also weighted by the share, and its inverse, of migrants by destination countries. This yields similar estimates. Estimates are available on request.

Figure 3: Average distance from governorate of birth to potential destination countries in 1,000 kilometers
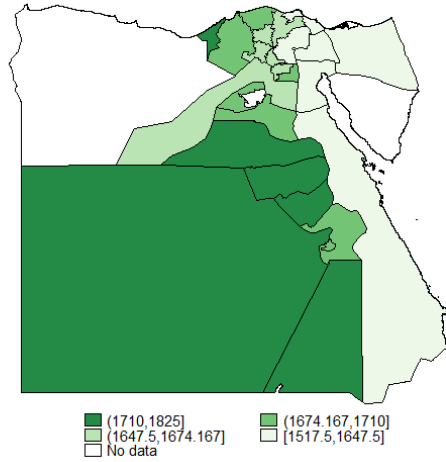
Z_{SE} is a binary variable taking unity if a husband has worked in a micro-firm over his last four job spells, assumed to influence occupational choice through the accumulation of entrepreneurial skills or abilities. It is assumed to influence occupational choice through the accumulation of entrepreneurial skills or abilities. Micro and small enterprises tend to lack complex hierarchical structures, and are less likely to be highly-specialised workplaces. Working conditions give employees the opportunity to perform a variety of tasks. Performing various tasks might then increase their propensity to start up a firm by developing generalistic skills via learning-by-doing (Stuetzer et al., 2013). Table 1 indicates that self-employed are more likely to have worked in a micro-enterprise than employees (69.2 against 43.0%).

X_O includes a set of potential determinants of their time use was added in the *Occupation* equation, such as age, literacy, mother's educational background, family size, under 15 and above 65 dependency ratios, governorate-level lagged unemployment rate, share of agricultural work and public sector work, and the proportion of the population with at least secondary education.

As Z_R, X_{SE}, Z_{SE} and X_O are unique to each structural equation, the above model can be solved and its structural parameters uniquely identified. These three structural model equations can be rewritten as three reduced form equations in the endogenous variables *Returnee*, *SelfEmployed* and *Occupation*, so that each of these variables will depend on the exogenous variables in the entire system as well as on the structural errors. The reduced form is estimated via a generalized simultaneous equations model (GSEM) estimator, with standard errors robust to heterogeneity.[31]

$$Returnee = f(.; Z_R, \delta) \tag{4}$$

$$SelfEmployed = f(.; Z_{SE}, \alpha; Z_R, \beta) \tag{5}$$

$$Occupation = f(.; Z_{SE}, \gamma) \tag{6}$$

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[31] Standard errors could not be clustered at the kism level since, despiste having a relatively large number of clusters (more than 100), cluster size was not balanced, ranging for one observation to more than 130 in a cluster.

By estimating the relationship between a husband being self-employed and having migrated, controlling for the endogeneity of emigration, i.e. the change in the probability of being self-employment in an exogenous change in being a return migrant, the marginal effect of self-employment over return migration is obtained.

$$\frac{\partial SelfEmployed}{\partial Returnee} = \frac{\beta}{\delta} \tag{7}$$

The marginal effect of wives' time use over their husbands' propensity to be self-employed, controlling for within-couple occupational interdependence, i.e. the change in the probability and number of hours of women to spend time in a certain activity in an exogenous change in their husbands' occupations, is obtained by estimating the relationship between women's time allocation and the occupational choice of their husbands:

$$\frac{\partial Occupation}{\partial SelfEmployed} = \frac{\gamma}{\alpha} \tag{8}$$

The effect of return migration of men on their wives' time use through within-couple occupational interdependence, i.e. the change in wives' time use in an exogenous change in their husbands being return migrants, is given by multiplying these two marginal effects:[32]

$$\frac{\partial Occupation}{\partial Returnee} = \frac{\partial Occupation}{\partial SelfEmployed} \cdot \frac{\partial SelfEmployed}{\partial Returnee} = \frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta} \tag{9}$$

5 Data

5.1 Data source

I use the last wave of a longitudinal and nationally representative household survey, the ELMPS, administrated since 1998 by the Economic Research Forum in cooperation with the Central Agency for Public Mobilization and Statistics. The ELMPS is made up of four waves – 1988, 1998, 2006 and 2012 – the last three constituting a three-round panel. The ELMPS contains information on a variety of topics. Modules on labour market outcomes and time use (4-6), women's empowerment (7) and (international) return migration (10)[33] are of particular interest in this paper. This paper uses the 2012 round as a cross-section since some variables only collected in the last wave are used. More details on data collection are available in Assaad and Kraft (2013).

The estimation sample includes married women of reproductive age, i.e. between ages 15 and 49, who have never worked abroad for at least six months, and whose husbands are of working age (16-64) and born before 1990.[34] The sample excludes individuals who changed jobs after the January 2011 Uprising. It is also limited to those whose first destination country was an Arab country, as listed in Bertoli and Marchetta (2015) – Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen. This helps to focus better on the effects induced by temporary migration since (i) Egyptians emigrating to Western countries tend to stay permanently; and (ii) the majority of Egyptians emigrates to Arab countries. In equations (1) and (2), the unit of observation is married men aged 16-64, living in Egypt at the time of the survey. In equation (3), the unit of observation is married women aged 15-49,

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[32] Standard errors of these marginal effects are computed by the delta method.

[33] This paper uses this newly added module on return migration that surveys individuals aged between 15 and 59, who worked abroad for at least six months, to classify individuals as return migrants.

[34] No return migrants are reported in the database for individuals born after 1990. Respondents born in 1990 or after are excluded to avoid potential bias in the use of the identification strategy of this paper.

i.e. of reproductive age, whose husbands are residing in Egypt at the time of the survey. Table 1 presents the estimation sample, obtained after dropping observations with missing information, for the full sample – 6,902 married couples.

Returnee is a binary variable taking unity if a working-age (16-64 year-old) married man (husband) h has worked at least six months abroad. *SelfEmployed* is a binary variable taking unity if a working-age married man is currently self-employed. *Occupation*, with $j = 1, 2, 3, 4$, is alternatively a set of binary variables taking value 1 if a married woman (wife) w has been engaged in paid market labour (1), unpaid market labour contributing to their family enterprise (2), subsistence work (farming for own consumption) (3) or domestic chores (4) in the last seven days. It also includes a corresponding set of continuous variables measuring the number of hours spent on each of these activities. Outcome categories are not mutually exclusive. The set of binary variables captures the decision to participate in an activity, i.e. the extensive margin, whereas the set of continuous variables captures the intensive margin.

5.2   Descriptive statistics

Table 1 shows that 99.1% of Egyptian women of our full estimation sample engage in domestic work; 14.2% carry out paid labour outside their household; 4.1% contribute to their family businesses as unpaid worker; and 18.1% participate in farming for their own household's consumption. These statistics are in line with the developments outlined above. Egypt is a rather traditional, conservative society, and time allocation is gender differentiated, with women more likely to engage in household chores and subsistence farming, than in paid work outside their household. Their relatively low contribution to the family enterprise might be explained by the censored nature of this variable, as slightly less than 25% of sampled men have self-employed activities. On average, women have spent 5.03 hours working outside their household in the last seven days; 1.23 hours contributing to their husbands' enterprises; 1.45 hours on subsistence farming; and, 22.8 hours on domestic chores.[35]

The women in the sample are on average 32 years old. 25.9% are illiterate; 54.3%, literate with intermediate education or less; the rest, literate with more than intermediate education.[36] 21.1% had a mother who was literate at their fifteenth birthday, a proxy for coming from a wealthier family. In contrast, 16.95% of men come from a wealthier family, 18.6% are illiterate, and 59.9% have at least high school education. Households are made of, on average, almost 5 members, the under 15 (child) dependency ratio (37.8%), being much greater than the above 65 (elderly) (1.22). 43.7% of interviewed households lived in urban areas at the time of the survey.

13.1% of sampled men have ever worked abroad for at least six months. Women married to return migrants, either before or after their migration, are, on average, significantly older, less educated and from poorer families than women married to men who have never migrated for work. Similarly, men who migrated are on average significantly less educated and from poorer families than men who did not. Table 1 suggests that women married to returnees are more likely to engage in, and to spend more time on, both paid and unpaid work outside their household, as well as farming for their own consumption.

24.5% of sampled men are self-employed (primary occupation), either as own-account workers or employers, at the time of the survey. Women whose husbands are self-employed are on average older, less educated, and come from less wealthy families than those whose husbands are not self-employed, as are self-employed men compared to wage-employed. Women living in households with family businesses appear less likely to engage in paid activities on the labour market, but more likely to contribute to the family enterprise or to engage in subsistence work, compared to women whose husbands are not self-employed.

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[35] However, these statistics should be interpreted with caution, since they do not account for the censored nature of these variables, as suggested by relatively high standard deviations.

[36] In the ELMPS, below intermediate education includes literacy without diploma, elementary and middle school; intermediate education means general and most of vocational high school; and above intermediate education refers to post-secondary and university education.

Limiting the sample to couples in which husbands have temporarily migrated for work, women whose husbands are self-employed are significantly less educated than those married to employees. So are men who opted for self-employment upon return to Egypt compared to returnees observed as employees. Women living in households with family businesses appear less likely to engage in paid activities on the labour market, but more likely to contribute to the family enterprise or to engage in subsistence work, compared to women whose husbands are not self-employed. They tend to spend more time contributing to their family enterprises, as well as farming for their own consumption, but less on paid, outside work, or domestic chores than women whose husbands migrated but who are not self-employed.

Table 1 thus indicates that women's time allocation is related to their husbands' migration experience and occupational choice. That women married to return migrants and/or self-employed have a greater likelihood to contribute to their family work or to subsistence work suggests a distribution of task between household members. The high percentage of women engaging in domestic work – almost 100% – and the number of hours spent on average – at least 22 hours a week – whichever the status of their husbands, follow the same line and highlight the prevalence of traditional gender norms in Egypt. That women married to men who opted for self-employment upon return have a lower propensity to engage in paid labour outside their family compared to those married to employed returnees suggests that women's time might be somewhat captured by their husbands setting up firms.

It is worth noting the extent of similarities between husbands and wives in terms of education and (original) family background. Women married to return migrants, to self-employed or to migrants who are self-employed upon return, are relatively less educated and come from poorer households than women who are not, as (male) returnees, self-employed and migrants who are self-employed at the time of the survey are compared to (male) stayers, wage-employed workers or returnees who are wage-employed. This is consistent with the existence of assortative mating between spouses as well as household livelihood strategies and time use gender differentiation.

Lastly, it should be noted that the real exchange rate is significantly lower for return migrants compared to non-migrants, consistent with the exchange acting as a factor encouraging emigration. The average distance from governorate of birth to potential destination countries is also significantly lower for return migrants compared to migrants. This is line with the previous section suggesting that distance proxies costs to migrate – the closer the average distance to destination countries, the greater the likelihood to migrate.

Table 1: Descriptive statistics of estimation sample

	Full sample		By migration		By occupation		Retu.	
			Retu.	Stay.	Self.	Empl.	Self.	Empl.
	Mean	S.D.	Mean	Mean	Mean	Mean	Mean	Mean
Participation in								
Paid work	.142	.349	**.175**	.137	**.076**	.164	**.084**	.220
Unpaid work	.041	.198	**.074**	.036	**.111**	.018	**.164**	.030
Subsistence work	.181	.385	**.259**	.169	**.257**	.1556	**.326**	.227
Domestic work	.991	.097	.991	.991	.988	.991	.987	.993
Number of hours spent on								
Paid work	5.03	13.0	**5.99**	4.88	**2.72**	5.78	**2.80**	7.57
Unpaid work	1.23	6.69	**2.23**	1.08	**3.47**	.511	**5.01**	.866
Subsistence work	1.45	4.70	**11.3**	7.60	8.62	7.90	**2.80**	2.01
Domestic work	22.8	13.7	**23.7**	22.6	22.8	22.7	**22.6**	24.2
Indices of time specialisation								
Hirschman-Herfindahl*	.874	.201	**.827**	.881	**.855**	.880	.818	.831
Keeble-Hauser*	.927	.117	**.900**	.931	**.916**	.931	.893	.903
Wife characteristics								
Age	31.7	8.10	**35.6**	31.1	**32.9**	31.3	36.2	35.3
Illiterate	.259	.438	**.315**	.25	**.369**	.223	**.436**	.255
Literate with intermediate education or below	.543	.4982	.549	.543	**.498**	.558	**.473**	.586
Literate with more than intermediate education	.198	.399	**.136**	.208	.133	.2193	**.091**	.159
Literate mother	.212	.409	**.160**	.220	**.173**	.224	.138	.171
Husband characteristics								
Literate mother	.170	.375	**.116**	.178	**.134**	.181	**.087**	.131
Illiterate	.186	.389	**.211**	.182	**.298**	.150	**.339**	.1474
Literate (without diploma)	.050	.218	**.062**	.048	**.065**	.045	.067	.060
Elementary school	.109	.312	.100	.1105	**.141**	.100	**.131**	.084
Middle school	.056	.231	.046	.058	.051	.058	.047	.045
High school	.370	.483	**.435**	.361	**.3**	.393	**.322**	.490
Post-secondary, university and higher	.229	.420	**.148**	.241	**.146**	.255	**.094**	.174
Returnee	.131	.337	1.00	.000	**.176**	.116	1.00	1.00
Self-employed	.245	.430	**.330**	.232	1.00	.000	1.00	.000
Micro-enterprise	.494	.500	**.784**	.451	**.692**	.430	**.906**	.724
Vocational high-school	.349	.477	**.417**	.339	**.279**	.372	**.315**	.467
Father was self-employed	.381	.486	**.467**	.368	**.548**	.327	**.547**	.427
Past self-employment	.049	.216	**.100**	.042	**.089**	.036	**.188**	.056
First job was self-employed	.061	.239	**.029**	.066	**.198**	.016	**.050**	.018
Years of unemployment	.552	1.57	.563	.550	**.425**	.593	**.420**	.634
Agriculture	.159	.366	**.203**	.153	**.323**	.106	**.383**	.114
Mining	.003	.055	.002	.003	**.001**	.002	.000	.003
Manufacturing	.139	.346	**.091**	.147	**.087**	.156	**.074**	.099
Utilities	.024	.154	.019	.025	**.000**	.032	**.000**	.028
Construction	.129	.335	**.161**	.124	**.074**	.147	**.114**	.184
Trade	.172	.378	**.133**	.178	**.341**	.117	**.279**	.061
Transport	.105	.306	.100	.106	.096	.109	.111	.094
Business services	.032	.176	.026	.033	.033	.032	.020	.028
Government	.198	.399	**.237**	.193	**.004**	.261	**.000**	.354
Personal services	.037	.189	.028	.039	.041	.036	.020	.033
Extraterritorial	.0003	.017	.001	.0002	.000	.0004	.000	.002
Real exchange rate MA(5) (22)	6.39	1.51	**5.76**	6.49	**6.13**	6.48	**5.62**	5.83
Distance	1.684	.0378	**1.681**	1.686	**1.688**	1.684	1.682	1.680
Household characteristics								
Household size	4.60	1.77	**5.06**	4.53	**4.92**	4.50	**5.31**	4.94
Under 15 dependency ratio	.378	.205	**.359**	.381	**.390**	.375	.365	.356
Above 65 dependency ratio	.012	.048	**.017**	.011	.013	.012	.014	.018
Governorate characteristics								
2007 Unemployment	.090	.032	**.089**	.091	**.087**	.092	**.086**	.090
2007 Agriculture	.331	.182	**.370**	.325	**.356**	.323	.380	.365
2007 Secondary education/higher	.371	.080	**.359**	.373	**.362**	.374	.354	.362
2007 Public sector	.258	.067	**.243**	.260	**.248**	.261	**.238**	.245
Urban	.437	.496	**.336**	.453	**.399**	.450	**.272**	.368
Observations	6,902		902	6,000	1,690	5,212	298	604

Notes: Summary statistics for variables included in the analysis. The sample consists of 6,902 married couples – 6,902 working-age (16-64 year-old) men and their respective wives, aged 15-49. Means between treated (returnees, self-employed and returnee self-employed) and control groups (respectively stayers, employees and returnee employees) statistically significantly different at the 10 percent significance level are in bold. *Statistics computed for 6,850 non-missing observations.

6 Results

6.1 Benchmark specifications

Tables 2 and 3 present GSEM reduced-form coefficient estimates of a SUR linear probability model of husband's return migration and self-employment, and wives' time use. Table 2 reports coefficient estimates of the decision to engage in non mutually exclusive activities in the last seven days (extensive margin) – paid market work (column 1), unpaid market work (2), subsistence work (3) or domestic work (4). Table 3 reports coefficient estimates of the number of hours a woman has spent on such activities (intensive margin) in the last seven days.

F-statistics and associated p-values testing the strength of the real exchange rate interacted with the average distance to destination countries are reported. It is strong and relevant across all model specifications, except two. While the interaction of these two variables has a significant and negative association with temporary migation, estimates from equation (1) run with only one of these variables, presented in Table A1, confirm that the exchange rate and the average distance to destination countries decrease the probability to migrate, in line with the assumptions made in section 3. Similarly, husbands' work experience in a micro-firm appears to significantly increase their propensity to be self-employed at the time of the survey, in line with Stuetzer et al. (2013).

Tables 2 and 3 indicate that having a father who was self-employed, having been self-employed in their first job, and having worked in a micro-firm tend to increase the probability of working-age men being self-employed. Vocational training and past self-employment experiences decrease self-employment propensity, suggesting that varied, non self-employed jobs are required prior to starting a business. Family size and the need to support children tend to increase the likelihood of self-employment, maybe out of necessity. The likelihood to migrate decreases in education and wealth of the family men come from.

The marginal effects of being married to a return migrant on women's time use are displayed at the bottom of each table. Columns (1)-(4) of Table 2 suggest that husbands' migration significantly decreases women's likelihood to engage in paid market work, provided that men opt for self-employment upon return, by 8.92 percentage points. It increases their probability of contributing to (unpaid) family work by 10.5 percentage points, to participate in subsistence work (farming for own consumption) by 13.5, and in domestic work by 1.20. Intensive margin coefficient estimates are in line with extensive margins, as Table 3 shows. Irrespective of their decision to participate, being married to a return migrant significantly decreases wives' time spent on paid market work over the last seven days, upon establishment of a firm upon return to Egypt, by 3.52 hours. However, it increases the number of hours spent contributing to family work, as unpaid worker (3.15 hours), to farming for own consumption (.99), and to domestic chores (1.65).

Benchmark estimates indicate a significant causal relationship between women's time allocation and husbands' migration through occupational interdependence – either in deciding to engage in, or how much time to spend on, certain activities. The lower probability of engaging in paid market labour, as self- or wage-employed, and the greater probability to contribute to family work suggests that there are few, if any, transfers of (business-related) knowledge between spouses. It also indicates that their husbands' occupation does not act as a role model, since women do not show a greater probability of following in their husbands' footsteps as self-employed. These estimates do not support the existence of wealth transfers between spouses. Migration-induced wealth might not be big enough, husbands' activities might not be remunerative enough or gender norms too conservative for women to get into paid work outside their households. Traditional gender norms in Egypt – and the induced gender differentiation of its labour force – could explain the low statistical significance for domestic work. Given the increase in contributing to their family firms, it seems clear that having migrated and setting up a business upon return captures some of one's wife's time, potentially increasing the time burden placed on women. However, the existence of gender differentiated tasks combined with some degree of assortative mating in terms of education and family wealth could result

in income source diversification or risk-sharing strategies within households, between spouses, as suggested by the statistically significant positive marginal effects on subsistence work.

If women's likelihood to engage in market work, either paid or unpaid, and subsistence work increases with age, literacy increases their propensity to engage in paid work outside the household, and decreases their propensity to contribute to family, unpaid, and subsistence work. Coming from a relatively wealthy family increases their probability of participating in paid market work, and decreases their probability of engaging in subsistence farming. This is consistent with education as 'signaling' women's abilities on the labour market. Family size is associated with a lower likelihood to engage in paid market work, and with a higher likelihood to engage in unpaid market work and subsistence work. Moreover, a higher child dependency ratio is related to a greater likelihood to work outside their household, but a smaller likelihood to engage in subsistence farming. Only household level variables appear to significantly affect women's participation in domestic work: the more children to family size, the greater their likelihood to engage in domestic chores, accounting for household size. This may be explained by a greater labour burden placed on women given the existence of gender differentiation of tasks between family members. Regional – governorate – variables show a significant and negative relationship between lagged unemployment rate and paid and unpaid market work, and a positive one, between lagged share of population working in agriculture and paid, unpaid and subsistence work. The relationship between the lagged proportion of people having at least secondary education and unpaid market work and subsistence farming is positive as well, but the one between living in an urban area and unpaid market work or subsistence farming is negative.

Table 2: SUR reduced-form coefficient estimates, likelihood to participate (extensive margin)

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
Age (W)	0.0123***	0.0010***	0.0019***	0.0002		
	(0.0006)	(0.0003)	(0.0007)	(0.0002)		
At least literate (W)	0.1235***	-0.0437***	-0.0772***	0.0001		
	(0.0092)	(0.0070)	(0.0124)	(0.0030)		
Literate mother (W)	0.1170***	0.0020	-0.0216**	-0.0021		
	(0.0124)	(0.0040)	(0.0093)	(0.0027)		
Household size	-0.0198***	0.0086***	0.0185***	-0.0027**	0.0096***	0.0133***
	(0.0030)	(0.0023)	(0.0038)	(0.0011)	(0.0031)	(0.0029)
Under 15 dependency ratio	0.0754***	-0.0035	0.0093	0.0230***	0.0197	-0.1061***
	(0.0232)	(0.0131)	(0.0253)	(0.0075)	(0.0241)	(0.0220)
Above 65 dependency ratio	-0.0390	0.1000	0.3355***	-0.0305		
	(0.0829)	(0.0614)	(0.1144)	(0.0305)		
2007 Agriculture	0.1455***	0.0812***	0.5471***	0.0216		
	(0.0480)	(0.0200)	(0.0485)	(0.0156)		
2007 Secondary educacion	0.0914	0.1674***	1.2548***	0.0514		
	(0.1049)	(0.0509)	(0.1161)	(0.0367)		
2007 Public sector	-0.0338	0.0495	0.0548	0.0237	-0.2892***	
	(0.0845)	(0.0369)	(0.0783)	(0.0279)	(0.0840)	
2007 Unemployment	-0.5869***	-0.8217***	-0.1062	-0.0254	-0.1556	
	(0.1624)	(0.0968)	(0.1769)	(0.0535)	(0.1784)	
Urban	0.0111	-0.0200***	-0.1693***	-0.0008	0.0020	
	(0.0093)	(0.0047)	(0.0095)	(0.0023)	(0.0095)	
Micro-enterprise (H)	-0.0351***	0.0412***	0.0530***	0.0047**	0.2090***	
	(0.0080)	(0.0043)	(0.0089)	(0.0022)	(0.0097)	
Vocational (H)					-0.0544***	
					(0.0094)	
Father self-employed (H)					0.1127***	
					(0.0103)	
Past self-employment (H)					-0.1558***	
					(0.0326)	
First job self-employed (H)					0.6631***	
					(0.0204)	
Years unemployed (H)					0.0046	
					(0.0030)	
Exchange rate X Distance					-0.0102***	-0.0191***
					(0.0020)	(0.0017)
Literate mother (H)						-0.0201*
						(0.0104)
Literate (w/o diploma) (H)						0.0153
						(0.0217)
Elementary sch. (H)						-0.0050
						(0.0153)
Middle sch. (H)						-0.0257
						(0.0185)
High sch. (H)						0.0355***
						(0.0123)
Post-sec., uni. and higher (H)						-0.0320**
						(0.0131)
Constant	-0.3076***	-0.0365	-0.5150***	0.9580***	0.2280***	0.3142***
	(0.0581)	(0.0271)	(0.0598)	(0.0221)	(0.0385)	(0.0278)
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0892***	.1047***	.1349***	.0120*		
	(.0281)	(.0254)	(.0370)	(.0062)		
Observations	6,902	6,902	6,902	6,902	6,902	6,902
Variance of errors	0.1091***	0.0364***	0.1293***	0.0093***	0.1459***	0.1090***
	(0.0026)	(0.0019)	(0.0024)	(0.0011)	(0.0025)	(0.0028)
F-statistic (returnee)						127.79
P-value (returnee)						.0000

Notes: Outcome variables are binary variables taking value 1 if an individual has spent time on paid market work (1), unpaid market work (2), subsistence work (3) or domestic work (4) in the last seven days; 0, otherwise. Outcome categories are not mutually exclusive. In columns (1)-(4), observations are for married women in reproductive age; in columns (5)-(6), observations are for their respective husbands. Columns (1)-(4) present GSEM coefficient estimates of women's time use equations; column (5), of their husbands' self-employment propensity; and column (6), of their husbands' return migration propensity. Standard errors robust to heteroskedasticity are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: SUR reduced-form coefficient estimates, number of hours (intensive margin)

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
Age (W)	0.4296***	0.0339***	0.0132	0.0778***		
	(0.0234)	(0.0112)	(0.0084)	(0.0236)		
At least literate (W)	4.1625***	-1.4307***	-0.7599***	0.4753		
	(0.3506)	(0.2389)	(0.1544)	(0.4314)		
Literate mother (W)	4.2042***	-0.0102	-0.2257**	-0.4461		
	(0.4631)	(0.1237)	(0.0992)	(0.4079)		
Household size	-0.7461***	0.2246***	0.1799***	-0.2186*	0.0096***	0.0133***
	(0.1040)	(0.0774)	(0.0524)	(0.1212)	(0.0031)	(0.0029)
Under 15 dependency ratio	2.5444***	-0.0320	-0.0507	5.6343***	0.0197	-0.1061***
	(0.8392)	(0.4326)	(0.3174)	(0.9055)	(0.0241)	(0.0220)
Above 65 dependency ratio	-1.3134	3.7199*	2.4120*	3.9218		
	(2.9861)	(2.1846)	(1.3513)	(3.3155)		
2007 Agriculture	5.3432***	2.6901***	4.6094***	6.1844***		
	(1.8071)	(0.6743)	(0.6794)	(1.9911)		
2007 Secondary educacion	5.4811	6.3770***	11.0276***	32.1458***		
	(3.9443)	(1.7242)	(1.5955)	(4.4992)		
2007 Public sector	-4.0488	-0.0316	-2.2422***	-36.8279***	-0.2892***	
	(3.1245)	(1.0896)	(0.8251)	(3.3831)	(0.0840)	
2007 Unemployment	-16.9440***	-24.3983***	-2.0835	31.3729***	-0.1556	
	(6.0832)	(3.3700)	(2.0627)	(6.7211)	(0.1784)	
Urban	0.6737*	-0.4568***	-1.3124***	1.9829***	0.0020	
	(0.3477)	(0.1701)	(0.1135)	(0.3632)	(0.0095)	
Micro-enterprise (H)	-1.3829***	1.2361***	0.3883***	0.6494*	0.2090***	
	(0.2991)	(0.1409)	(0.1103)	(0.3326)	(0.0097)	
Vocational (H)					-0.0544***	
					(0.0094)	
Father self-employed (H)					0.1127***	
					(0.0103)	
Past self-employment (H)					-0.1558***	
					(0.0326)	
First job self-employed (H)					0.6631***	
					(0.0204)	
Years unemployed (H)					0.0046	
					(0.0030)	
Exchange rate X Distance					-0.0102***	-0.0191***
					(0.0020)	(0.0017)
Literate mother (H)						-0.0201*
						(0.0104)
Literate (w/o diploma) (H)						0.0153
						(0.0217)
Elementary sch. (H)						-0.0050
						(0.0153)
Middle sch. (H)						-0.0257
						(0.0185)
High sch. (H)						0.0355***
						(0.0123)
Post-sec., uni. and higher (H)						-0.0320**
						(0.0131)
Constant	-10.9067***	-1.3000	-3.6670***	10.3650***	0.2280***	0.3142***
	(2.1832)	(0.8939)	(0.7859)	(2.4934)	(0.0385)	(0.0278)
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-3.521***	3.147***	.9885***	1.653*		
	(1.077)	(.7781)	(.3538)	(.9159)		
Observations	6,902	6,902	6,902	6,902	6,902	6,902
Variance of errors	151.5985***	42.0660***	20.6857***	180.4451***	0.1459***	0.1090***
	(4.6151)	(3.3187)	(2.3926)	(6.5041)	(0.0025)	(0.0028)
F-statistic (returnee)						127.79
P-value (returnee)						.0000

Notes: Outcome variables are continuous variables measuring hours an individual has spent on paid market work (1), unpaid market work (2), subsistence work (3) or domestic work (4) in the last seven days; 0, otherwise. Outcome categories are not mutually exclusive. In columns (1)-(4), observations are for married women in reproductive age; in columns (5)-(6), observations are for their respective husbands. Columns (1)-(4) present GSEM coefficient estimates of women's time use equations; column (5), of their husbands' self-employment propensity; and column (6), of their husbands' return migration propensity. Standard errors robust to heteroskedasticity are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

6.2 Heterogeneity

The robustness of benchmark estimates is further investigated to changes in the estimation sample to understand which subgroups drive the migration effect found on wives' time use. In Table 4, regressions are run separately by location, by husbands' sector of occupation and by women's skill level. The effects seem to be particularly driven by women working in non-agricultural sectors, those living in urban areas, and literate women with intermediate education or less.

In spite of substantial differences between urban and rural environments,[37] households implement livelihood strategies in order to maximise their earnings with a limited amount of resources, in an attempt to manage risks, in both urban and rural areas. In rural areas, the focus is on natural assets and environmental sustainability, whereas they concentrate on housing and financial assets in urban ones, since urban economies have greater commercialisation, and most basic goods – food, accommodation – must be bought or rented through a market. Vulnerable urban households might need more cash revenue to survive compared to rural families who could rely more easily on subsistence farming or in-kind payments, and who might have a greater access to common property infrastructure (Wratten, 1995; Satterthwaite, 1997).

Although a strict distinction between rural and urban household systems might be oversimplifying,[38] gender norms affecting how women and men use their time might differ between urban and rural areas. Egyptian rural households are more likely to be conservative than urban households, which could affect the degree of gender stratification of local labour markets, and therefore time allocation, across locations. In addition to location-specific assets and opportunities, the nature of household diversification strategies across family members could thus differ between rural and urban areas. Urban women could engage in domestic services or urban agriculture; rural women could work in home gardening, vending, casual labour, etc.

The signs of the coefficient estimates are similar to those of the benchmark results, but their magnitudes differ by location. Both rural and urban women show a greater likelihood to engage in subsistence work due to their husbands' migration and self-employment upon return. But rural women display a much greater probability of contributing to family work, and a weaker probability of getting out of paid market labour than urban women. Marginal effects for hours spent on each activity point to a greater time burden placed on rural women, as they contribute more to their husbands' businesses. This is in line with a location-specific gender differentiation of labour, since in rural areas, that are more conservative than urban ones, women's time allocation might be significantly more affected by their husbands' migration through the transfer of more conservative gender norms and by their occupation. In other words, women represent a cheap, if not free, labour supply for their enterprise. Estimates might also reflect the fact that rural areas are relatively less commercialised than urban ones. In rural areas, basic goods are less likely to be bought through a market, like in urban areas, but tend to be produced by households themselves.

Running regressions separately by husband's sector of occupation could help to better understand these estimates. Effects could indeed differ by husband's sector of occupation, since the Egyptian agricultural sector has kept a rather traditional structure marked by a high degree of land fragmentation. As a result, a substantial part of individual farmers work on small, low-productivity plots, unable to benefit from economies of scale, that potentially capture the labour supply available in a household (Morsy et al., 2014). Regressions are run separately for women whose husbands work in agriculture and for those whose husbands work in non-agricultural sectors, following the International Standard Industrial Classification of all economic activities (ISIC4).

In contrast to working in non-agricultural sectors, Table 4 reveals that establishing agricultural ventures upon return appears to tie more of women's time to family work, with a greater likelihood of 53.7 percentage points (16.3 additional hours per week) to contribute to their husbands' farms, compared to 4.16 percentage

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[37] These include differences in vulnerable contexts, in capital assets, in access to assets and entitlements, in policies and in desired livelihood outcomes.

[38] Indeed, urban, rural and peri-urban areas are interlinked. Many underlying causes of poverty are the same in these different settings and the spatial relationship between urban and rural areas is dynamic by nature (Farrington et al., 2002).

points (1.18 additional hours) to an off-farm family business. This is consistent with a low-return type of agriculture, which is prevalent in Egypt. Women are simultaneously more likely to allocate time to farming for household consumption. Estimates might suggest that differences in results obtained by separately running the analysis for urban and rural households might be driven by the establishment of agricultural businesses. Women married to migrants who opted for farming upon return appear more time-deprived than those whose husbands set up non-agricultural businesses. The effects of (male) return migration on women's time use thus seem to be influenced not only by their migrant husbands' employment status, but also by their industry of occupation.

Estimates could also differ by women's skill level: the higher their level of education, the higher their bargaining power within their family, either through a greater control over resources or through their competencies acting as signal of their abilities. Regressions are run separately for illiterate women, literate women with intermediate education or less, and literate women with more than intermediate education.

Illiterate women see a significant increase in their probability of participating in paid market work outside their household (10.7 percentage points), as well as in contributing to family work (37.9) and farming for their own consumption (34.5), by marrying a migrant who start up a firm upon return to Egypt. In comparison, literate women with intermediate education or below are less likely to engage in outside activities – although the estimate of -2.42 percentage points is not statistically significant – but more likely to contribute to family (14.3) and subsistence work (17.8). Literate women with more than intermediate education do not appear significantly affected by their husbands' migration experience through their occupational choice.

These estimates could result from the extent of within-couple assortative mating if illiterate, poorer women, who are married to men of a similarly low education or poorer background, have to engage in labour outside their household out of survival, in order to better spread risks attached to their husbands' main occupations. Their greater likelihood to take on work outside their households, and to contribute to their husbands' enterprises and to subsistence work compared to literate women, suggests a stronger burden placed on low-educated women. Not only the degree of assortative mating, but also spouses' backgrounds in case of assortative mating could explain couple-specific and (socio-economic) background-specific income diversification strategies. This is consistent with the fact that the more educated women are, the less likely their time allocation seems influenced by their husbands' migration through their occupation. The higher spouses' family and educational background, the less households might need to diversify out of survival – at the cost of women's time. In addition, the higher women's education level is, the greater bargaining power they might have over the use of their time, as their education signals higher productivity in outside work and/or through greater control over household resources.

Table 4: Heterogenous effects

		Paid market work		Unpaid market work		Subsistence work		Domestic work	
		Ext. (1)	Int. (2)	Ext. (3)	Int. (4)	Ext. (5)	Int. (6)	Ext. (7)	Int. (8)
Benchmark	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0892***	-3.521***	.1047***	3.147***	.1349***	.9885***	.0120*	1.653*
		(.0281)	(1.077)	(.0254)	(.7781)	(.0370)	(.3538)	(.0062)	(.9159)
	F-statistic (returnee)	127.79	127.79	127.79	127.79	127.79	127.79	127.79	127.79
	P-value (returnee)	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	N	6,902	6,902	6,902	6,902	6,902	6,902	6,902	6,902
Agriculture	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0264	-1.414	.5367**	16.27**	.4573	3.367	-.0316	4.222
		(.0543)	(2.147)	(.2071)	(6.343)	(.1984)	(2.152)	(.0268)	(3.819)
	F-statistic (returnee)	12.66	12.66	12.66	12.66	12.66	12.66	12.66	12.66
	P-value (returnee)	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
	N	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Non agriculture	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0739**	-2.906**	.0416***	1.183**	.0773**	.5074*	.0135**	1.014
		(.0307)	(1.183)	(.0159)	(.4723)	(.0315)	(.2637)	(.0066)	(.7837)
	F-statistic (returnee)	116.15	116.15	116.15	116.15	116.15	116.15	116.15	116.15
	P-value (returnee)	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	N	5,802	5,802	5,802	5,802	5,802	5,802	5,802	5,802
Rural	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0332	-1.350*	.1088***	3.270***	.1101**	.6887*	.0025	1.547
		(.0204)	(.7656)	(.0391)	(1.185)	(.0443)	(.3880)	(.0053)	(.9408)
	F-statistic (returnee)	88.26	88.26	88.26	88.26	88.26	88.26	88.26	88.26
	P-value (returnee)	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	N	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883
Urban	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.2035***	-7.898***	.0457**	1.296*	.1199**	1.230**	.0303**	1.629
		(.0754)	(2.920)	(.0200)	(.6911)	(.0486)	(.4940)	(.0146)	(1.871)
	F-statistic (returnee)	49.34	49.34	49.34	49.34	49.34	49.34	49.34	49.34
	P-value (returnee)	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	N	3,019	3,019	3,019	3,019	3,019	3,019	3,019	3,019
Illiterate	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	.1067*	2.311	.3788***	12.12***	.3448**	1.816	.0022	2.876
		(.0583)	(2.062)	(.1252)	(4.065)	(.1392)	(1.442)	(.0217)	(3.372)
	F-statistic (returnee)	36.68	36.68	36.68	36.68	36.68	36.68	36.68	36.68
	P-value (returnee)	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	N	1,784	1,784	1,784	1,784	1,784	1,784	1,784	1,784
Intermediate education or below	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0242	-1.602*	.1534***	4.602***	.1784***	1.259**	.0103	1.550
		(.0242)	(.9456)	(.0351)	(1.083)	(.0490)	(.4927)	(.0081)	(1.229)
	F-statistic (returnee)	117.24	117.24	117.24	117.24	117.24	117.24	117.24	117.24
	P-value (returnee)	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	N	5,534	5,534	5,534	5,534	5,534	5,534	5,534	5,534
More than intermediate education	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	.0714	2.168	-.0062	-.1414	-.0219	-.1336	-.0163	-1.517
		(.0973)	(3.158)	(.0094)	(.2604)	(.0377)	(.2894)	(.0218)	(2.299)
	F-statistic (returnee)	5.86	5.86	5.86	5.86	5.86	5.86	5.86	5.86
	P-value (returnee)	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156
	N	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368

Notes: Please, refer to Tables 2 and 3.

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The link between husbands' return migration and the degree of specialisation and diversification of their wives' time allocation is eventually examined. Instead of a binary or continuous variable indicating the engagement in and time spent on an activity j by a woman w, the following Hirschman-Herfindahl index (Herfindahl, 1950; Hirschman, 1964), often used to measure market concentration or economic diversity, is computed:

$$HH_w = \sum_{j=1}^{4} (s_{wj})^2 \tag{10}$$

where s_{wj} represents the share of hours a woman w dedicated to activity j over the number of hours she spent on these four activities in total in the last seven days. An index of 1 indicates the highest level of specialisation (upper bound), meaning that a small number of activities captures a high proportion of a woman's time. Its lower bound is equal to $1/j$, i.e. specialisation is at its lowest when a woman equally allocates her time to each of the four possible activities. To lessen the effect of too much weight given to activities capturing most of women's time, Keeble and Hauser's (1971) variation of the Hirschman-Herfindahl index is alternatively used:

$$KH_w = \sqrt{\sum_{j=1}^{4} (s_{wj})^2} \tag{11}$$

By opting for an absolute measure of specialisation, the degree of differenciation is assumed to be obtained by substracting the computed index from 1. I do not use an index of diversification as such.[39] Specifications are run for a sample of women who have strictly done more than zero hours of work over the last week. Benchmark estimates are presented in Table 4. Table 5 repeats the above sensitivity analysis using the Hirshman-Herfindahl index and its variation as outcome variables.

Benchmark estimates of Table 5, suggest that men's migration significantly decreases their wives' time specialisation, if their husbands opted for self-employment upon return to Egypt, by 2.72 (Hirschman-Herfindahl index) to 1.67 percentage points (Keeble-Hauser variation).

This holds for rural households and for women whose husbands work in agriculture. Illiterate women diversify their time significantly more than literate women with intermediate education or less (-21.1 to -12.6 against -7.75 to -4.61 percentage points). Literate women with more than intermediate education are not affected. In the light of the previous set of results obtained by estimating specifications across main occupations independently, these results point to a greater diversification because of women's (greater) involvement in unpaid market work and subsistence work in particular, following the establishment of entrepreneurial activities upon their husbands' return to Egypt. Although the occupational choices of urban women or women whose husbands work in non-agricultural sectors are significantly affected, our measure of specialisation suggests that rural women, women whose husbands are self-employed in agriculture and women with low if any education experience a much stronger reallocation of their time. Their husbands' migration, and self-employment choice upon return, seems to push these groups of women to allocate their time to multiple activities.

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[39] The Hirschman-Herfindahl index has indeed been shown to perform best compared to other measures (Palan, 2010).

		Hirschman-Herfindahl (1)	Keeble-Hauser (2)
Benchmark	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0272**	-.0167**
		(.0133)	(.0078)
	F-statistic (returnee)	125.59	125.59
	P-value (returnee)	.0000	.0000
	N	6,850	6,850
Agriculture	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.2376**	-.1431**
		(.0992)	(.0596)
	F-statistic (returnee)	12.51	12.51
	P-value (returnee)	.0004	.0004
	N	1,093	1,093
Non agriculture	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0025	-.0017
		(.0099)	(.0057)
	F-statistic (returnee)	114.05	114.05
	P-value (returnee)	.0000	.0000
	N		
Rural	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0440**	-.0262**
		(.0188)	(.0111)
	F-statistic (returnee)	86.93	86.93
	P-value (returnee)	.0000	.0000
	N	3,857	3,857
Urban	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	.0383	.0210
		(.0267)	(.0153)
	F-statistic (returnee)	48.30	48.30
	P-value (returnee)	.0000	.0000
	N	2,993	2,993
Illiterate	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.2110***	-.1260***
		(.0772)	(.0459)
	F-statistic (returnee)	35.24	35.24
	P-value (returnee)	.0000	.0000
	N	1,768	1,768
Intermediate	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0775***	-.0461***
		(.0226)	(.0133)
	F-statistic (returnee)	114.02	114.02
	P-value (returnee)	.0000	.0000
	N	5,496	5,496
More than	$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.0172	-.0094
		(.0298)	(.0169)
	F-statistic (returnee)	6.46	6.46
	P-value (returnee)	.0112	.0112
	N	1,354	1,354

Notes: Outcome variables are continuous variables measuring the (absolute) degree of occupational specialisation of women, the Hirschman-Herfindahl index in column (1), and the Keeble-Hauser correction applied to the Hirschman-Herfindahl index in column (2). Outcome variables are binary variables taking unity if an individual is observed as self-employed in column (3), and is a return migrant in column (4). In columns (1) and (2), observations are for married women of reproductive age; in columns (3) and (4), observations are for their respective husbands, i.e. working-age (16-64 year-old) married men whose wives are of reproductive age (15-49). Columns (1) and (2) present GSEM coefficient estimates of women's specialisation equations; column (3) presents GSEM coefficient estimates of their husbands' self-employment propensity; and column (4) presents GSEM coefficient estimates of their husbands' return migration propensity. Standard errors robust to heteroskedasticity are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

7 Concluding remarks

This paper contributes to the literature on women's time use in a developing setting with prevalent international migration. A framework of within-couple occupational interdependence was used to investigate how, and how much, husbands' migration and occupational choice upon return can alter their wives' time allocation – which activities they engage in, and how much time they spent on a certain activity. Studying women's choices of occupation is of particular importance, not only to better understand household livelihood strategies, but also because they are a key determinant of their degree of control over household resources, and therefore of their autonomy within and outside their households.

Using the 2012 ELMPS, evidence was found of statistically significant relationships between return migration of men and their wives' time use. Reduced-form estimates of a SUR model show that being married to a migrant who opted for self-employment upon return decreases a woman's likelihood to engage in and time spent on paid work, and increases her likelihood to engage in and their contribution to family work and subsistence farming, especially in rural areas. Women whose husbands are self-employed in agriculture upon return contribute relatively more to unpaid family work and to subsistence work than women whose husbands are not, stressing the traditional structure of Egyptian agriculture. Results differ by skill level as illiterate women tend to engage in outside and inside household activities, whereas how literate women with more than intermediate education allocate their time is not significantly affected. Measures of time specialisation suggest that their husbands' migration and self-employment upon return somehow pushes women in rural areas, whose husbands work in agriculture, or women with little, if any, education, to allocate their time to multiple activities.

I explain these results by the existence of occupational interdependence between spouses, most likely in order to diversify income sources, and as a result of assortative mating along time-use gender differentiation lines. Results highlight the necessity to account for the existence of interdependencies between spouses' occupational choices, beyond the existence of traditional norms or gender differentiation of labour. In this framework, return migration might affect non-migrating wives, even once migration is complete, since spouses' occupations are interdependent in a need for intra-household income diversification and risk sharing. The transfer of conservative norms migrants immersed themselves in destination countries limits women's engagement in outside activities. However, it seems difficult to disentangle this effect from households' economic considerations.

When planning to create a favorable environment for efficient diversification and women's empowerment in Egypt, policy-makers should consider the effects of migration and gender differentiated time allocation within households. This is necessary in order to give poor, vulnerable households the means to make the most out of their migration experience. A more efficient allocation of household members' time could allow households to move away from low productivity, subsistence or unpaid activities to more remunerative ones. Because the higher propensity of migrants to set up businesses upon return might disproportionately capture their wives' time, attention should be paid to buffering potentially 'enslaving', depriving migration-induced effects on women's time use, given the existence of some degree of occupational interdependence between spouses and of gender differentiated labour options offered to women. An optimal allocation of both finanical and time resources might not be ensured by men migrating and bringing back resources accumulated abroad used to start up businesses upon return as those limit women's involvement in outside activities, despite contributing to the dynamic Egyptian MSE sector.

Measures should address women's specific needs by not only providing high(er) return work opportunities to women, but also accounting for context-specific time constraints. If not, return migration might increase the time burden placed on women, which is likely to contribute to women's time poverty (Serra, 2009). Strengthening local labour markets could decrease the level of occupational interdependence between spouses by encouraging households to substitute women's family work with hired external labour, whereby freeing up women's time. Women would be offered viable outside options, potentially enhancing their autonomy, for a more inclusive growth.

In this analysis, conclusions on women's empowerment were drawn from estimates based on the existing literature. The link between return migration, spouses' occupations and intra-household bargaining power has not been formally tested. The induced time diversification that women living in rural areas and illiterate women experience could lead to a decrease in their autonomy, since greater contribution to their husbands' businesses or to subsistence work might not be linked to a greater control over household resources, and could decrease in household efficiency. For instance, Sadania (2017) finds that working outside their households has a stronger empowering effect than working at home on Egyptian women, but that working at home increases their power in investment decisions jointly taken with their spouses. However, Sadania (2017) does not formally test household decision-making, bargaining power and efficiency implications of within-household task allocation and family enterprises. This might be an interesting direction for future research, moreover that returnees have been found to transfer (sometimes conservative) destination country norms (Bertoli and Marchetta, 2015; Tuccio and Wahba, 2015).

Finally, this paper highlights the importance of occupational interdependence between spouses over other existing channels to explain how migration can affect non-migrating wives in a static setting. Future research could investigate alternative explanations and study dynamics. It could indeed be that family enterprises capture women's time in their start-up phase, but release it in later stages – return migration of husbands would have only transitory effects on their wives' occupational choices in this case. Linking return migration, performance and family participation is also an interesting avenue for research, since the literature has found that dynamics of entry into an occupation differ from those of success. Return migrants' entrepreneurial success, survival or profitability could be related to their wives' occupations in a longer run.

Acknowledgements

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Appendices

<div align="center">

Table A1: Sensitivity to instrument definition

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Variables	Returnee (1)	Returnee (2)	Returnee (3)
Literate (without diploma)	0.0162	0.0182	0.0153
	(0.0217)	(0.0218)	(0.0217)
Elementary school	-0.0044	-0.0157	-0.0050
	(0.0153)	(0.0155)	(0.0153)
Middle school	-0.0251	-0.0314*	-0.0257
	(0.0185)	(0.0184)	(0.0185)
High school	0.0356***	0.0267**	0.0355***
	(0.0123)	(0.0123)	(0.0123)
Post-secondary, university and higher	-0.0315**	-0.0339***	-0.0320**
	(0.0131)	(0.0131)	(0.0131)
Literate mother	-0.0195*	-0.0232**	-0.0201*
	(0.0104)	(0.0105)	(0.0104)
Household size	0.0132***	0.0253***	0.0133***
	(0.0029)	(0.0028)	(0.0029)
Under 15 dependency ratio	-0.1063***	-0.1413***	-0.1061***
	(0.0221)	(0.0223)	(0.0220)
Exchange rate	-0.0313***		
	(0.0029)		
Distance		-0.5540***	
		(0.0985)	
Exchange rate X Distance			-0.0191***
			(0.0017)
Constant	0.3087***	1.0053***	0.3142***
	(0.0279)	(0.1669)	(0.0278)
Observations	6,902	6,902	6,902
R-squared	0.0397	0.0266	0.0408
F-statistic (instrument)	119.86	31.63	127.79
p-value (instrument)	.0000	.0000	.0000

Notes: Please, refer to Table 2.

| | | Destination countries | | | | | | | | | | | | Average distance from birth governorate |
		Iraq Baghdad	Saudi Arabia Riyadh	Libya Tripoli	Jordan Amman	Kuwait city Kuwait city	UAE Abu Dhabi	Lebanon Beirut	Qatar Doha	Algeria Algiers	Oman Muscat	Yemen Sana'a	Syria Damascus	
Alexandria	Alexandria	1370	1790	1590	570	1740	2510	600	2210	2540	2930	2280	650	1731.7
Aswan	Aswan	1510	1400	2160	920	1600	2170	1120	1890	3170	2590	1530	1100	1763.3
Asyut	Asyut	1430	1570	1850	700	1660	2340	860	2040	2840	2760	1880	860	1732.5
Beheira	Damanhur	1330	1740	1640	530	1690	2460	570	2160	2600	2870	2230	610	1702.5
Beni Suef	Beni Suef	1350	1620	1760	560	1640	2360	680	2060	2740	2780	2030	700	1690
Cairo	Cairo	1300	1630	1740	490	1620	2370	590	2060	2710	2780	2100	610	1666.7
Dakahlia	Mansoura	1240	1660	1730	440	1600	2370	500	2070	2680	2790	2170	530	1648.3
Damietta	Damietta	1200	1640	1760	390	1570	2340	440	2040	2700	2760	2180	480	1625
Faiyum	Faiyum	1360	1660	1720	570	1660	2390	670	2090	2710	2810	2070	700	1700.8
Gharbia	Tanta	1290	1680	1700	490	1640	2410	550	2100	2660	2820	2170	580	1674.2
Giza	Giza	1300	1640	1740	500	1620	2370	590	2070	2710	2790	2100	620	1670.8
Ismailia	Ismailia	1180	1560	1830	380	1520	2280	480	1980	2770	2690	2090	500	1605
Kafr El Sheikh	Kafr El Sheikh	1280	1710	1680	480	1650	2410	530	2110	2640	2840	2200	570	1675
Luxor	Luxor	1420	1410	2050	770	1570	2190	950	1900	3050	2610	1660	940	1710
Matruh	Marsa Matruh	1620	2050	1340	820	2000	2770	820	2470	2300	3180	2470	880	-
Minya	Minya	1420	1630	1770	660	1680	2380	790	2090	2760	2810	1970	800	1730
Monufia	Shibin El Kom	1290	1670	1700	490	1640	2400	560	2100	2664	2810	2160	590	1672.8
New Valley	Kharga	1600	1630	1880	890	1770	2400	1050	2100	2890	2820	1810	1050	1824.2
North Sinai	Arish	1020	1460	1950	220	1370	2150	350	1850	2890	2560	2040	350	1517.5
Port Said	Port Said	1160	1590	1810	350	1520	2290	420	1990	2750	2710	2150	450	1599.2
Qalyubia	Banha	1280	1650	1730	480	1620	2380	560	2080	2690	2790	2140	590	1665.8
Qena	Qena	1380	1410	2030	720	1540	2180	900	1890	3030	2600	1690	890	1688.3
Red Sea	Hurghada	1220	1320	2080	560	1410	2080	750	1780	3070	2510	1700	730	1600.8
Sharqia	Zagazig	1250	1630	1750	450	1590	2350	530	2050	2710	2770	2130	560	1647.5
Sohag	Sohag	1430	1510	1920	730	1630	2280	890	1990	2920	2710	1800	890	1725
South Sinai	El Tor	1170	1360	2020	470	1400	2110	650	1810	3000	2530	1790	640	-
Suez	Suez	1180	1510	1870	390	1490	2240	520	1940	2830	530	2010	2650	1596.7

Notes: A cell should be read as the distance in kilometres between the capital of a respondent's governorate of birth and the capital of one of the 12 estimation sample destination countries. The second and third columns list Egyptian governorates and their respective capitals. Columns (4)-(15) present distances from each birth governorate capital to each destination country capital. The last column presents average migration distances from each birth governorate capital to estimation sample destination country capitals. Distances were measured using Google Maps.

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