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Husbands' return migration and wives' occupational choices

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Husbands' return migration and wives' occupational choices

Clotilde Mahé*

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Abstract

Exploiting the documented effect of migration on occupational choice upon return to their origin country with data from Egypt, we 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, and increases her likelihood to engage in family work and subsistence farming, at both the extensive and intensive margins. This is pronounced for rural families, and when husbands work in agriculture. 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.

JEL classifications: F22, J16, J22, J24, L26, O12, O15

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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 transfer of remittances and within-household labour reallocation.¹ There is also evidence that migrants' decision making power is reinforced upon return relative to their spouse's.² Yet, whether men's return affects the time allocation of their wives has been left unanswered by the literature. In a developing economy where individuals' occupational and migration decisions are often made at the household level, and local labour markets segregate along gender lines, on one hand; where migration flows are dominated by men, and significantly alters returnees' choice of occupation, on the other hand; this paper exploits the documented effect of migration on occupational choice upon return to their origin country to establish a link between return migration of men and their wives' time allocation through within-couple occupational interdependence.

We 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, within and outside their household.³ Increased time-burden on household non remunerative activities, because of a new business set in place upon their husbands' return, could alter women's degree of control over resource allocation, among other household decisions. The wealth men gathered during migration could simultaneously be used to start up a business, freeing their wife's time, reallocated to relatively more income-generating activities outside their household, potentially empowering women.

This paper uses the 2012 Egyptian Labour 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 has been temporary in nature. Migration has been found to significantly increase men's propensity to set up a business upon return to Egypt, and to survive as entrepreneurs. 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.⁴ 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, 2016](#)).

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, and increases her likelihood to engage in family work and subsistence farming, at both the extensive and intensive margins. This is pronounced for rural families, and when husbands work in agriculture. Results differ by education level, 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, we 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 wife's time allocation through their occupational choice upon return. Section 3 introduces the context of this paper, followed by our estimation strategy in Section 4, and the data

¹ For a review of the empirical evidence on the effects of migration on left-behinds' occupations, see [Binzel and Assaad \(2011\)](#).

² On migration and intra-household decision making power, see for instance [Antman \(2014\)](#), [Bertoli and Marchetta \(2015\)](#) or [Tuccio and Wahba \(2015\)](#).

³ 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 relations between woman empowerment, earnings and control over income, or woman empowerment and development/economic growth, see [Sadania \(2016\)](#).

⁴ See [Wahba and Zenou \(2012\)](#), [Wahba \(2015\)](#) or [Marchetta \(2012\)](#) on migration and occupation upon return; [Bertoli and Marchetta \(2015\)](#) on migration and transfer of gender norms.

we use in Section 5. Section 6 presents estimation results. Section 7 concludes.

2 Conceptual background

We identify from the literature four non-mutually exclusive categories of women’s time use: household work,⁵ subsistence work,⁶ unpaid and paid market labour activities. 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 own household consumption; it does not generate income. Unpaid market labour is defined as 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 defined as 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), we acknowledge the possibility of bargaining between household members.⁷ Because getting divorced – suggested as outside option by cooperative models – might not be realistic in a country like Egypt, where women do not face equal rights regarding divorce,⁸ or where the labour market does not ensure the existence of viable outside options for women,⁹ this paper adopts a non-cooperative framework, more relevant to Egyptian realities, as in Sadania (2016).

However, because data only allow to observe the outcome of this bargaining process, we do not provide a theoretical framework of the channels at stake, nor test for the relevance of a model over another. We can 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,¹⁰ but also by some level of inflexibility attached to how women are allowed to allocate their time – a gender differentiated availability of labour that might constrain women’s time use to certain activities (Serra, 2009).¹¹

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

⁵ Household chores include time spent on shopping for food, clothing, household items, accompanying family members to their activities; on maintenance activities or helping in construction work for the household for the purpose of one’s own household consumption; on cooking, washing dishes, doing laundry and ironing, cleaning one’s house; and collecting water, firewood or other fuels.

⁶ Subsistence work includes time spent on agricultural activities, raising poultry/livestock, producing ghee/butter/cheese for the purpose of one’s own household consumption.

⁷ For a review on the evidence contradicting the unitary model of the household, see Sadania (2016). 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 so their behaviour. Cooperative and non-cooperative thus take into account intra-family income distribution.

⁸ 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, 2016).

⁹ There may not exist labour market options offered to women in case cooperation with their spouse breaks down, as suggests 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).

¹⁰ Such as educational, financial and technical assets that can help women accessing economic activities of higher return.

¹¹ 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.

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 productive, activities. In comparison, men tend to dedicate their time exclusively to income-generating activities. Backed by 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. 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 compared to non-migrants. Using a simultaneous probit equation system, Parker (2008) finds significant positive business ownership dynamics between spouses, attributed to knowledge transfers.¹² Alternative explanations, with little data support in Parker (2008), can be considered, such as assortative mating,¹³ role model,¹⁴ minimising risk,¹⁵ or intra-household wealth transfers.¹⁶ Within Parker's (2008) framework of occupational interdependence, we understand how households allocate labour and time between members in the context of a developing economy, where there might be a will 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 activity 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 idiosyncratic shocks or shocks common to all households, or escape from activities in stagnation or decline, i.e. 'push factors.' Whether and how households decide to diversify their activities depend on their incentives,¹⁷ but also on their capacity.¹⁸ In particular and of interest in this paper, the availability of household labour can allow for diversification across members of the same household¹⁹ (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 returns activities; more vulnerable families, in an attempt to survive by minimising risk and stabilising income, diversify into labour-intensive, low-returns activities. Income diversification can be seen either as signaling households' ability to seize opportunities, or as a survival strategy.

In sum, in a context of occupational interdependence between spouses, household income diversification and gender-differentiated time allocation, male-dominated migration could affect non-migrating women through husbands' choice of occupation upon return, in particular when that same migration significantly affects men's activity upon return. Specifically:

¹² Knowledge transfers are defined as business-related information readily shared within couples.

¹³ A high level of resemblance across personal features such education, age or earnings, revealing similar preferences would marry each other.

¹⁴ A spouse's occupational choice could be influenced by the performance of his/her spouse in a specific activity, and so follow in their footsteps.

¹⁵ Spouses would decide how each one allocates their time interdependently in order to diversify any risks attached to their income source activities they might face.

¹⁶ A spouse's occupation might be influenced by the ability of their wealthy co-spouse to overcome financial constraints for instance.

¹⁷ 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.

¹⁸ 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.

¹⁹ See examples from Burkina Faso or the Philippines as cited in Reardon et al. (2006).

- Women’s participation in *paid or unpaid market labour* would depend on the type and sector of occupation of their husband, their household’s livelihood strategy, the level of risk their household has to cope with, 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. Or, that husbands work in a rather risky and/or low-productivity sector might induce women to allocate their time out of their husband’s enterprise, towards less risky activities, albeit of low returns, in order to reduce risk and smooth household income. Allocating their time in one activity does not prevent women from engaging in another activity, household work being the best example. In this case, the increased probability of a man who has migrated to set 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.
- The greater probability of men to opt for self-employment upon return could be expected to increase their wife’s likelihood to engage in *subsistence work* because of gender differentiation of men and women’s time use. In developing societies, women tend to take care of food crops for household consumption; men, of 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 our case, the husband – we would expect women to engage, 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 could allocate time to other activities. It could however be that conservative gender norms place a higher time burden on women, with increased time spent on subsistence work.
- The impacts of husband’s migration on their wife’s 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. It could however be that, in a traditional society with conservative gender norms, the decision to engage in and/or the number of hours spent on household work is not altered.
- These dynamics are expected to differ (i) by *location* since household livelihood strategies, local labour market opportunities, as well as 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 part of individual farmers would work on small, low productivity plots, unable to benefit from economies of scale, likely to tie up available labour supply within a household (Morsy et al., 2014); or (iii) 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 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. 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 1970s economic reforms and opening of the country; it is the biggest labour exporter of the Middle East and North Africa (MENA) region (Wahba, 2014). Two main trends characterized Egyptian emigration: relatively temporary migration to Arab countries, involving male household heads, for one to five years; and more permanent migration to Western countries, involving the entire nuclear family. Egyptians’ first destination was labour-importing Arab countries, in particular 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 percent of Egyptian migrants were residing in Western countries in 2000 (Wahba, 2009).

On the other hand, micro and small enterprises (MSEs) constitute almost 99 percent of Egypt's total enterprises, and around 80 percent of total employment, providing work for about 75 percent of new entrants to the job market (Ghanem, 2013). Egyptian MSEs are mainly family businesses, with low capital-labour ratios and using simple, traditional technologies, with limited access to financing, to infrastructure and public services. It has been shown that return migration is significantly related to entrepreneurship, in the case of 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; 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 to become self-employed upon return than a non-migrant, as the accumulation of savings and skills abroad compensates 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 significantly 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 percent 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,²⁰ have triggered growing unemployment,²¹ which 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 has been limiting women's mobility, and restricting them to the domestic sphere, or to small home-based income-generating activities with few opportunities to expand (Sadania, 2016). 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 percent of Egyptian women engaged in public sector work in 2012), private sector (32 percent) and household work (24 percent). 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 husband's farm or non-agricultural business, often exercised from home, is more accepted for those who cannot join the public sector (Sadania, 2016).

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 worker and subsistence work. This labour supply response is found to be due to families' need to compensate the absence of migrants' labour rather than an easing of family budget constraints via remittance transfers. Binzel and Assaad's (2011) results are in line with Taylor's (1984) who finds that, in general, rural women are mostly limited to household work, and traditionally in charge of livestock and, 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'.

Empirical research on return migration suggests, in addition, that the return of male heads – husbands – from migration, alters intra-household resource allocation, benefitting relatively more boys than girls. This is evidence of greater authority for the household head, i.e. relative loss of a wife's degree of bargaining power upon the husband's return.²² Living in a household where a man has ever migrated, either before

²⁰ 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, 2016).

²¹ Egypt's unemployment rate among women was of 27.1 percent in 2012; that of men was of 7 percent.

²² See for instance Antman (2014) for the case of migration of Mexican men to the United States.

or after marriage, has also been found to affect gender norms. Bertoli and Marchetta (2015) for instance show that couples in 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 country display a higher internalisation of discriminatory gender norms, upon men’s return to Jordan. These empirical findings point to migration as a vehicle for transferring (potentially conservative) destination country gender norms. If this the case, return migrants might prefer stay-at-home wives, rather than wives working outside 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, in addition, 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’ business, subsistence farming or domestic chores – might be out of a thoughtful ‘cost-benefit’ analysis.

4 Estimation strategy

A major analytical issue is the endogeneity of temporary migration and occupational choice, on one hand; and husband and wife’s occupation and time use, on the other hand. 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 by lack of social capital and/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, and temporary migration, part of would-be entrepreneurs’ business strategies (Wahba and Zenou, 2012; ?).

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 to contribute to their business, to allocate to subsistence farming, or to paid labour outside their household, if the husbands’ main activity is seen as 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 wife’s 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.²³ Ignoring the interdependence in wife’s and husband’s occupational choices on one hand, and husband’s migration experience and occupational choice upon return on the other hand, when interdependence is actually present,²⁴ could lead to biased estimates. Exclusion restrictions play the role of instrumental variables.

For the decision of husbands to have temporarily migrated, *Returnee*, we use changes in the yearly average

²³ Correlated disturbances assume that corresponding endogenous variables share at least one common omitted explanatory variable.

²⁴ I.e. estimating this system of equations as single equations, in their structural rather than reduced form.

of the official exchange rate of the Egyptian Pound to US dollar, in local currency unit per US dollar,²⁵ at a potential age of emigration to obtain an exogenous source of variations in temporary migration. The lower Egypt’s official exchange rate – the weaker the Egyptian Pound – the greater the incentive to emigrate. Historical, matched exchange rates are assumed to act as 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 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 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 return migration. We proceed as in Bertoli and Marchetta (2015) to select the age at which individuals have to be matched to the exchange rate, and rely on an optimality criterion to choose out of 11 alternative ages, from 18 to 28 years old. The F-statistic is the highest for 19 years old; we opt for the official exchange rate at 19 years old to instrument for temporary migration to Arab countries.²⁶

As exclusion restriction for the decision of husbands to have started up a business, *SelfEmployed*, we use a binary variable taking unity if an individual 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. Small, micro-firms tend to lack complex hierarchical structures, and are less likely to be highly-specialised work places: 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 balanced skills via learning-by-doing (Stuetzer et al., 2013). For women’s time allocation, 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, and governorate-level lagged unemployment rate, share of agricultural work and public sector work, and proportion of the population with at least secondary education.

Our main model specification is the following:

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

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

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

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; and a corresponding set of continuous variables measuring the number of hours spent in each of these activities. The set of binary variables capture 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, whether an individual’s mother is literate,²⁷ household size and child dependency ratio. X_{SE} is a vector of variables thought to

²⁵ Data on official exchange rates in local currency unit per US dollar are available on the website of the World Bank.

²⁶ We also tried as instrumental variable 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.

²⁷ 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).

influence occupational choice such as vocational training, whether an individual’s father was self-employed,²⁸ whether his first job was self-employed,²⁹ years of unemployment,³⁰ lagged unemployment rate at the governorate level and household level characteristics such as household size and under 15 dependency ratio.³¹ 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, and governorate-level lagged unemployment rate, share of agricultural work and public sector work, and proportion of the population with at least secondary education. We include this set of governorate-level variables to take into account the fact that returns to local non-farm activities happen to occur in areas with growth motor (agriculture, mining, tourism,...), generating consumption and production dynamics with non-farm sectors, and increasing the demand for non-farm products (Reardon et al., 2006).

As explained above, Z_R , exclusion restriction for equation (1), is the official exchange rate at a matched age of potential emigration, 19 years old. Z_{SE} , exclusion restriction for equation (2), is a binary variable taking unity if an individual has worked in a micro-firm over his/her last four job spells, assumed to influence occupational choice through the accumulation of entrepreneurial skills or abilities. 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 the structural errors. The reduced form is estimated via a generalized simultaneous equations model (GSEM) estimator, with standard errors robust to heterogeneity.³²

$$Returnee = f(.; Z_R, \delta) \quad (4)$$

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

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

By estimating the relation between a husband to be self-employed and having migrated, we obtain the marginal effect of self-employment over return migration. By estimating the relation between women’s time allocation and the occupational choice of their husband, we obtain the marginal effect of their time use over their husband’s propensity to be self-employed:

$$\frac{\partial SelfEmployed}{\partial Returnee} = \frac{\beta}{\delta} \quad (7)$$

$$\frac{\partial Occupation}{\partial SelfEmployed} = \frac{\gamma}{\alpha} \quad (8)$$

²⁸ This variable is thought to capture the existence of knowledge transfers between self-employed parents and their children, as found in the literature, such as in Laband and Lentz (1983) or Dunn and Holtz-Eakin (2000) (Parker, 2008). It reflects a ‘family’ (cultural) entrepreneurial capital.

²⁹ Having been self-employed as first occupation has been shown to measure entrepreneurial motivation.

³⁰ Labour force related information are measured over the last four job spells available in the Module 6 of the ELMPS.

³¹ 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. Limited the estimation sample to working-age married men, we hope that potential omitted variable bias is reduced.

³² Standard errors could not be clustered at the kism level since, despite 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.

The marginal effect of women’s time allocation over their husband’s migration through setting up a business is computed by multiplying these two marginal effects:

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

5 Data

5.1 Data source

We 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 of four cross-sections – 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 empowerment (7) and return (international) 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 15 and 49 years old, whose husband is of working age (16-64) and born before 1990, as no return migrants are reported in the database for individuals born after 1990. This is to avoid potential bias in the use of the IV approach. The sample excludes individuals who changed job 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 better focusing 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 age 16-64, living in Egypt at the time of the survey. In equation (3), the unit of observation is married women aged 15-49 years old, that is of reproductive age, whose husband is 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) 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; and 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; the set of continuous variables, the intensive margin.

5.2 Descriptive statistics

Table 1 shows that 99.06 percent of Egyptian women of our full estimation sample engage in domestic work; 14.23, in paid labour outside their household; 4.10 contribute to their family business as unpaid

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

worker; and 18.05 participate in farming for 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 a bit less than 25 percent 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, contributing to their husband's enterprise; 1.45, on subsistence farming; and, 22.77, on domestic chores. These statistics should be interpreted with caution, since they do not account for the censored nature of these variables, as suggests relatively high standard deviations.

Women of our full estimation sample have on average 32 years old. 25.85 percent are illiterate; 54.33, literate with intermediate education or less; the rest, with more than intermediate education.³⁴ 21.12 percent had a mother who was literate at their fifteenth birthday, that is coming from a wealthier family. In contrast, 16.95 percent of men come from a wealthier family; 18.57 are illiterate, and 59.88 have at least high school education. Households are made of, on average, almost 5 members, the under 15 (child) dependency ratio (37.84 percent), being much greater than the above 65 (elderly) (1.22). 43.74 percent of interviewed households live in urban areas at the time of the survey.

13.07 percent 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 a poorer family 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, and farming for own consumption.

24.49 percent of sampled men have a self-employed (primary) occupation, either as own-account or employer, at the time of the survey. Women whose husband is self-employed are, on average, older, less educated, and come from less wealthy families than those whose husband is not self-employed, as are self-employed men compared to wage-employed. Women living in a household with a family business 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 husband is not self-employed.

Limiting the sample to couples in which husbands have temporarily migrated for work, women whose husband is 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 a household with a family business 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 husband is not self-employed. They tend to spend more time contributing to their family enterprise, as well as farming for own consumption, but less on paid, outside work, or domestic chores than women whose husband migrated but who is not self-employed.

³⁴ In the ELMPS, below intermediate education includes literacy without diploma, elementary and middle school; intermediate education, general and most of vocational high school; above intermediate education, post-secondary and university education.

Table 1: Descriptive statistics of estimation sample

	Full sample		By migration		By occupation		Returnees	
	Mean	S.D.	Returnees Mean	Stayers Mean	Self-employed Mean	Employees Mean	Self-employed Mean	Employees Mean
<i>Participation decision</i>								
Paid work	.1423	.3494	.1752	.1373	.0757	.1639	.0839	.2202
Unpaid work	.0410	.1983	.0743	.036	.1112	.0182	.1644	.0298
Subsistence work	.1805	.3847	.2594	.1687	.2574	.1556	.3255	.22682
Domestic work	.9906	.0966	.9911	.9905	.9882	.9914	.9866	.9934
<i>Number of hours</i>								
Paid work	5.0287	12.9659	5.9922	4.8838	2.7195	5.7774	2.802	7.5662
Unpaid work	1.2341	6.6882	2.2339	1.084	3.4657	.5106	5.0067	.8659
Subsistence work	1.4494	4.6991	11.26	7.5972	8.6164	7.9006	2.801	2.0135
Domestic work	22.7668	13.707	23.695	22.627	22.841	22.743	22.584	24.244
<i>Wife characteristics</i>								
Age	31.6703	8.1063	35.606	31.079	32.931	31.262	36.171	35.328
Illiterate	.2585	.4378	.3149	.25	.3686	.2228	.4362	.2550
Literate with intermediate education or below	.5433	.4982	.5489	.5425	.4982	.5579	.4732	.5861
Literate with more than intermediate education	.1982	.3987	.1364	.2075	.1331	.2193	.0906	.1589
Literate mother	.2117	.4085	.1597	.2195	.1728	.2243	.1376	.1705
<i>Husband characteristics</i>								
Literate mother	.1695	.3752	.1164	.1775	.1337	.1811	.0873	.1308
Illiterate	.1857	.3889	.2106	.182	.2976	.1495	.3389	.1474
Literate (without diploma)	.0500	.2179	.0621	.0482	.0645	.0453	.0671	.0596
Elementary school	.1091	.3118	.0998	.1105	.1408	.0988	.1309	.0844
Middle school	.0564	.2306	.0455	.058	.0509	.0581	.0470	.0447
High school	.3702	.4829	.4346	.3605	.3	.3929	.3222	.4901
Post-secondary, university and higher	.2286	.4200	.1475	.2409	.1462	.2554	.0940	.1738
Returnee	.1307	.3371	1	0	.1763	.1159	1	1
Self-employed	.2449	.4300	.3304	.232	1	0	1	0
Micro-enterprise	.4942	.5000	.7838	.4507	.6917	.4302	.9060	.7235
Vocational high-school	.3489	.4767	.4169	.3387	.2787	.3716	.3154	.4669
Father was self-employed	.3809	.4856	.4667	.368	.5479	.3268	.5470	.4272
Past self-employment	.0493	.2164	.0998	.0417	.0894	.0363	.1879	.0563
First job was self-employed	.0609	.2391	.0288	.0657	.1982	.0163	.0503	.0182
Years of unemployment	.5520	1.5709	.5632	.5503	.4254	.5931	.4195	.6341
Agriculture	.1594	.3661	.2029	.1528	.3231	.1063	.3826	.1142
Mining	.0030	.0551	.0022	.0032	.0006	.0038	0	.0033
Manufacturing	.1392	.3462	.0909	.1465	.0870	.1562	.0738	.0993
Utilities	.0242	.1537	.0189	.025	0	.0320	0	.0282
Construction	.1291	.3353	.1608	.1243	.0740	.1470	.1141	.1838
Trade	.1723	.3776	.1330	.1782	.3414	.1174	.2785	.0613
Transport	.1049	.3064	.0998	.1057	.0959	.1078	.1107	.0944
Business services	.0322	.1764	.0255	.0332	.0325	.0320	.0201	.0282
Government	.1983	.3988	.2373	.1925	.0041	.2613	0	.3543
Personal services	.0371	.1890	.0277	.0385	.0414	.0357	.0201	.0315
Extraterritorial	.0003	.0170	.0011	.0002	0	.0004	0	.0017
Exchange rate (19)	2.7493	1.8152	1.7453	2.9003	2.4326	2.8521	1.6344	1.7999
<i>Household characteristics</i>								
Household size	4.6017	1.7739	5.0621	4.5325	4.9154	4.5	5.3054	4.9421
Under 15 dependency ratio	.3784	.2050	.3588	.3813	.3897	.3747	.3645	.356
Above 65 dependency ratio	.0122	.0483	.0169	.0115	.0128	.0120	.0143	.0182
<i>Governorate characteristics</i>								
2007 Unemployment	.0904	.0321	.0885	.0907	.0868	.0916	.0860	.08972
2007 Agriculture	.3310	.1815	.3697	.3252	.3559	.3229	.3798	.3647
2007 Secondary education/higher	.3712	.0801	.3591	.373	.3616	.3743	.3541	.3616
2007 Public sector	.2579	.0672	.2431	.2601	.2475	.2612	.2384	.2454
Urban	.4374	.4961	.3359	.4527	.3994	.4497	.2718	.3676
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) men and their respective wife, 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.

Table 1 thus shows that women’s time allocation is significantly related to their husband’s migration experience and occupational choice. Women married with a returnee and/or self-employed having a greater likelihood to contribute to their family enterprise or to subsistence work suggests a distribution of task between household members, i.e. gender-differentiated labour options. The high percentage of women engaging in domestic work – almost 100 percent – whichever the status of their husband, follow the same line, and highlights 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 returnees who are wage-employed suggests that women’s time might be somewhat captured by their husband setting up a firm. It is worth noting the extent of similarities between husbands and wives in terms of education and (original) family background. Women married to return migrant, to self-employed or to migrant self-employed upon return, are relatively less educated and coming from poorer households than women who are not, as (male) returnees, self-employed and migrants self-employed at the time of the survey are compared to (male) stayers, wage-employed or returnees who are wage-employed. This indicates some degree of assortative mating between spouses, and, in addition to household livelihood strategies and time use gender-differentiation, could potentially explain the relation between a spouse’s migration experience, his occupational choice, and his wife’s.

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 wife’s time use. Table 2 reports coefficient estimates of the decision to engage in non mutually exclusive activities in the last seven days (extensive margin), that is 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. In Columns (5) and (6), observations are working-age (16-64) men who are married and whose wives are in reproductive age (15-49); in Columns (1)-(4), observations are married women in reproductive age, i.e. their respective wives.

Columns (1)-(4) present GSEM coefficient estimates of women’s time use equations; Column (5) presents GSEM coefficient estimates of their husband’s self-employment propensity, defined as a binary variable taking unity if an individual is observed as self-employed and residing in Egypt at the time of the survey; and Column (6) presents GSEM coefficient estimates of their husband’s return migration propensity, defined as a binary variable taking unity if an individual worked at least six months abroad and returned to Egypt by the time of the survey. Standard errors robust to heteroskedasticity are in parentheses. F-statistics and associated p-values testing the strength of the instrumental variable used to identify the model, historical official exchange rate when husbands were 19 years old, are reported. This instrument is strong and relevant across all model specifications.

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 to be self-employed. Vocational training and past self-employment experiences appear to 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 is decreasing in education and in the wealth of the family men comes from. Official exchange rate at 19 years old, with a negative sign, is a strong, statistically significant determinant of emigration, despite the relatively small magnitude of its coefficient estimates, which significantly increases the probability of a working-age man to be self-employed upon return.

Table 2: SUR reduced-form coefficient estimates, participation decision (extensive margin)

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Wife characteristics</i>						
Age (W)	0.0123*** (0.0006)	0.0010*** (0.0003)	0.0019*** (0.0007)	0.0002 (0.0002)		
At least literate (W)	0.1235*** (0.0092)	-0.0437*** (0.0070)	-0.0772*** (0.0124)	0.0001 (0.0030)		
Literate mother (W)	0.1170*** (0.0124)	0.0020 (0.0040)	-0.0216** (0.0093)	-0.0021 (0.0027)		
<i>Husband characteristics</i>						
Literate mother (H)						-0.0179* (0.0102)
Literate (without diploma) (H)						0.0169 (0.0215)
Elementary school (H)						0.0036 (0.0153)
Middle school (H)						-0.0274 (0.0184)
High school (H)						0.0441*** (0.0122)
Post-secondary, university and higher (H)						-0.0339*** (0.0130)
Micro-enterprise (H)	-0.0351*** (0.0080)	0.0412*** (0.0043)	0.0530*** (0.0089)	0.0047** (0.0022)	0.2090*** (0.0097)	
Vocational high school (H)					-0.0528*** (0.0094)	
Father was self-employed (H)					0.1127*** (0.0103)	
Past self-employment (H)					-0.1561*** (0.0327)	
First job was self-employed (H)					0.6629*** (0.0204)	
Years of unemployment (H)					0.0044 (0.0030)	
Exchange rate (19)					-0.0140*** (0.0028)	-0.0390*** (0.0024)
<i>Household characteristics</i>						
Household size	-0.0198*** (0.0030)	0.0086*** (0.0023)	0.0185*** (0.0038)	-0.0027** (0.0011)	0.0085*** (0.0032)	0.0051* (0.0029)
Under 15 dependency ratio	0.0754*** (0.0232)	-0.0035 (0.0131)	0.0093 (0.0253)	0.0230*** (0.0075)	0.0270 (0.0240)	-0.0706*** (0.0216)
Above 65 dependency ratio	-0.0390 (0.0829)	0.1000 (0.0614)	0.3355*** (0.1144)	-0.0305 (0.0305)		
<i>Governorate characteristics</i>						
2007 Unemployment	-0.5869*** (0.1624)	-0.8217*** (0.0968)	-0.1062 (0.1769)	-0.0254 (0.0535)	-0.1815 (0.1786)	
2007 Agriculture	0.1455*** (0.0480)	0.0812*** (0.0200)	0.5471*** (0.0485)	0.0216 (0.0156)		
2007 Secondary education/higher	0.0914 (0.1049)	0.1674*** (0.0509)	1.2548*** (0.1161)	0.0514 (0.0367)		
2007 Public sector	-0.0338 (0.0845)	0.0495 (0.0369)	0.0548 (0.0783)	0.0237 (0.0279)	-0.2726*** (0.0838)	
Urban	0.0111 (0.0093)	-0.0200*** (0.0047)	-0.1693*** (0.0095)	-0.0008 (0.0023)	0.0003 (0.0096)	
Constant	-0.3076*** (0.0581)	-0.0365 (0.0271)	-0.5150*** (0.0598)	0.9580*** (0.0221)	0.1579*** (0.0296)	0.2361*** (0.0196)
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-0.0602*** (.0190)	.0707*** (.01703)	.0910*** (.0249)	.0081* (.0042)		
Variance of errors	0.1091*** (0.0026)	0.0364*** (0.0019)	0.1293*** (0.0024)	0.0093*** (0.0011)	0.1460*** (0.0025)	0.1071*** (0.0027)
Observations	6,902	6,902	6,902	6,902	6,902	6,902
F-statistic (instrument)						254.73
P-value (instrument)						0.0000

Notes: Outcome variables are binary variables taking unity whether a woman has engaged in 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), (2), (3) and (4), observations are married women in reproductive age; in Columns (5) and (6), observations are their respective husbands, i.e. working-age (16-64) married men whose wives are in reproductive age (15-49). Columns (1), (2), (3) and (4) present GSEM coefficient estimates of women's time use equations; Column (5) presents GSEM coefficient estimates of their husband's self-employment propensity; and Column (6) presents GSEM coefficient estimates of their husband's return migration propensity. Standard errors robust to heteroskedasticity are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

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 work, unpaid, and subsistence work. Coming from a relatively wealthy family – as proxied by mother's education background – increases their probability to participate in paid market work, and decreases their probability to engage in subsistence farming. This is consistent with education acting as a signal of women's abilities on the labour market. Family size is significantly 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 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 correspond to a greater labour burden placed on women given the existence of gender-differentiation of task allocation between family members. Regional – governorate – variables show a significant and negative relation between lagged unemployment rate and paid and unpaid market work; positive, between lagged share of population working in agriculture and paid, unpaid and subsistence work; positive as well between the lagged proportion of people having at least secondary education and unpaid market work and subsistence farming; but negative, between living in an urban area and unpaid market work or subsistence farming.

The marginal effects of having a husband who has migrated on women's time use, through within-couple occupational interdependence, are displayed at the bottom of the 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 6.02 percentage points, but increases their probability to contribute to (unpaid) family work by 7.07, to participate in subsistence work, i.e. farming for own consumption, by 9.10, and in domestic work by 0.81 (note however that this estimate is economically insignificant). Intensive margin coefficient estimates are in line with extensive margins', as Table 3 shows. Irrespective of their decision to participate, that a husband migrated significantly decreases wives' time spent on paid market work over the last seven days, upon establishment of a firm upon return to Egypt, by 2.38 hours. However, it increases the number of hours spent contributing to family work, as unpaid worker (2.12), to farming for own consumption (.67), and to domestic chores (1.12).

Benchmark estimates indicate a significant causal relation between women's time allocation and husbands' migration through occupational interdependencies – either in deciding to engage in, or how much to spend on certain activities. The lower probability to engage in paid market labour, as self- or wage-employed, and the greater probability to contribute to family work of women married to a self-employed returnee suggests that there are few, if any, transfers of (business-related) knowledge between spouses, nor that their husband's occupation acts as a role model, since they do not show a greater probability to follow in their husband's 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' activity might not be remunerative enough; or gender norms too conservative for women to get into paid work outside their household. Traditional gender norms in Egypt – and the induced gender-differentiation of its labour force – could explain the economically insignificant effect on domestic work. Given the increase in contributing to their family firm, it seems clear that a man has migrated and set up a business upon return captures some of his 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 suggest the statistically significant positive marginal effects on subsistence work.

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)
<i>Wife characteristics</i>						
Age (W)	0.4296*** (0.0234)	0.0339*** (0.0112)	0.0132 (0.0084)	0.0778*** (0.0236)		
At least literate (W)	4.1625*** (0.3506)	-1.4307*** (0.2389)	-0.7599*** (0.1544)	0.4753 (0.4314)		
Literate mother (W)	4.2042*** (0.4631)	-0.0102 (0.1237)	-0.2257** (0.0992)	-0.4461 (0.4079)		
<i>Husband characteristics</i>						
Literate mother (H)						-0.0179* (0.0102)
Literate (without diploma) (H)						0.0169 (0.0215)
Elementary school (H)						0.0036 (0.0153)
Middle school (H)						-0.0274 (0.0184)
High school (H)						0.0441*** (0.0122)
Post-secondary, university and higher (H)						-0.0339*** (0.0130)
Micro-enterprise (H)	-1.3829*** (0.2991)	1.2361*** (0.1409)	0.3883*** (0.1103)	0.6494* (0.3326)	0.2090*** (0.0097)	
Vocational high school (H)					-0.0528*** (0.0094)	
Father was self-employed (H)					0.1127*** (0.0103)	
Past self-employment (H)					-0.1561*** (0.0327)	
First job was self-employed (H)					0.6629*** (0.0204)	
Years of unemployment (H)					0.0044 (0.0030)	
Exchange rate (19)					-0.0140*** (0.0028)	-0.0390*** (0.0024)
<i>Household characteristics</i>						
Household size	-0.7461*** (0.1040)	0.2246*** (0.0774)	0.1799*** (0.0524)	-0.2186* (0.1212)	0.0085*** (0.0032)	0.0051* (0.0029)
Under 15 dependency ratio	2.5444*** (0.8392)	-0.0320 (0.4326)	-0.0507 (0.3174)	5.6343*** (0.9055)	0.0270 (0.0240)	-0.0706*** (0.0216)
Above 65 dependency ratio	-1.3134 (2.9861)	3.7199* (2.1846)	2.4120* (1.3513)	3.9218 (3.3155)		
<i>Governorate characteristics</i>						
2007 Unemployment	-16.9440*** (6.0832)	-24.3983*** (3.3700)	-2.0835 (2.0627)	31.3729*** (6.7211)	-0.1815 (0.1786)	
2007 Agriculture	5.3432*** (1.8071)	2.6901*** (0.6743)	4.6094*** (0.6794)	6.1844*** (1.9911)		
2007 Secondary education/higher	5.4811 (3.9443)	6.3770*** (1.7242)	11.0276*** (1.5955)	32.1458*** (4.4992)		
2007 Public sector	-4.0488 (3.1245)	-0.0316 (1.0896)	-2.2422*** (0.8251)	-36.8279*** (3.3831)	-0.2726*** (0.0838)	
Urban	0.6737* (0.3477)	-0.4568*** (0.1701)	-1.3124*** (0.1135)	1.9829*** (0.3632)	0.0003 (0.0096)	
Constant	-10.9067*** (2.1832)	-1.3000 (0.8939)	-3.6670*** (0.7859)	10.3650*** (2.4934)	0.1579*** (0.0296)	0.2361*** (0.0196)
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-2.3751*** (.7297)	2.1230*** (.5227)	.6668*** (.2379)	1.1153* (.6192)		
Variance of errors	151.5985*** (4.6151)	42.0660*** (3.3187)	20.6857*** (2.3926)	180.4451*** (6.5041)	0.1460*** (0.0025)	0.1071*** (0.0027)
Observations	6,902	6,902	6,902	6,902	6,902	6,902
F-statistic (instrument)						254.73
P-value (instrument)						0.0000

Notes: Outcome variables are continuous variables measuring the number of hours an individual has spent in 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), (2), (3) and (4), observations are married women in reproductive age; in Columns (5) and (6), observations are their respective husbands, i.e. working-age (16-64) married men whose wives are in reproductive age (15-49). Columns (1), (2), (3) and (4) present GSEM coefficient estimates of women's time use equations; Column (5) presents GSEM coefficient estimates of their husband's self-employment propensity; and Column (6) presents GSEM coefficient estimates of their husband's return migration propensity. Standard errors robust to heteroskedasticity are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

6.2 Robustness checks

The robustness of benchmark estimates is further investigated to changes in the sample. Regressions are run separately for urban and rural households, by husbands' sector of occupation, by women's skill level. Tables A1 and A2 in the appendix report estimates for extensive and intensive margins for each of the four time use categories by location. In spite of substantial differences between urban and rural environments,³⁵ households implement livelihood strategies in order to maximise their earnings with a limited amount of resources, in an attempt to manage risk, in both urban and rural areas. In rural areas, the focus will be on natural assets and environmental sustainability; in urban, on housing and financial assets 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 simplifying,³⁶ 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 so time allocation, across locations. In addition to location-specific assets and opportunities, the nature of household diversification strategy across family members could thus differ between rural and urban areas. Urban women could engage in domestic services or urban agriculture; rural women, in home gardening, vending, casual labour, etc.

Signs of coefficient estimates are similar to 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 husband's migration and self-employment upon return. But rural women display a much greater probability to contribute to family work, and a weaker probability to get 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 husband's business and to domestic chores. This is in line with a location-specific gender-differentiation of labour, since in rural areas, more conservative than urban, women's time allocation might be significantly more affected by their husband's migration, through the transfer of more conservative gender norms, and their occupation, women representing cheap, if not free, labour supply for their enterprise. Estimates might also reflect the fact that rural areas are relatively less commercialised than urban: in rural areas, basic goods, such as food, are less likely to be bought through a market, like in urban areas, but tend to be produced by household 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 husband works in agriculture and for those whose husband works in a non-agricultural sector, following the International Standard Industrial Classification of all economic activities (ISIC4). Tables A3 and A4 report estimates for extensive and intensive margins for each of the four time use categories separately for women whose husband works in an agricultural or non-agricultural sector.

Husbands' migration influences women's time use similarly as in benchmark specifications, when men work in non-agricultural industries. However, when establishing an agricultural venture upon return appears to tie more of their time to family work, with a greater likelihood of 55.30 percentage points (16.76 additional hours) to contribute to their husband's farm, compared to 3.98 percentage points (1.06 additional hours) to an off-farm family business. This is consistent with low-return type agriculture prevalent in Egypt. Women simultaneously allocate significantly more time to farming for household consumption. Estimates

³⁵ These include differences in vulnerability context, in capital assets, in access to assets and entitlements, in policies, in desired livelihood outcomes.

³⁶ Indeed, urban, rural and peri-urban areas are interlinked; many underlying causes of poverty are the same in these different settings; and the spatial relation between urban and rural areas is dynamic by nature (Farrington et al., 2002).

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 business. Women married to a migrant who opted for farming upon return appear more time-deprived than those whose husband set up non-agricultural business. The effects of (male) return migration on women’s time use thus seem to be influenced not only through migrant husband’s employment status, but also by their choice of 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 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. Tables A5, A6 and A7 report estimates for extensive and intensive margins for each of the four time use categories by women’s level of education.

Illiterate women see a significant increase in their probability to participate in paid market work outside their household (7.40 percentage points), as well as in contributing to family work (26.26) and farming for own consumption (23.91), 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 -1.99 percentage points is not statistically significant – but more likely to contribute to family (3.98) and subsistence work (6.21). Literate women with more than intermediate education do not appear significantly affected by their husband’s migration experience through their occupational choice. In line with descriptive statistics, these estimates could result from the extent of within-couple assortative mating if illiterate, poorer women, who have for husbands 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 risk attached to their husband’s main occupation. Their greater likelihood to take work outside their household, and to contribute to their husband’s enterprise 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’ background in case of assortative mating could thus explain couple-specific, background-specific income diversification strategies. This is consistent with the fact that the more educated women are, the less likely how they allocate their time seems influenced by their husband’s 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. And, the higher women’s education level is, the greater bargaining power they might have over the use of their time – either their education signaling higher productivity in outside work, and/or through greater control over household resources.

We eventually examine the link between husbands’ return migration and the degree of specialisation and diversification of their wives’ time allocation. Instead of a binary or continuous variable indicating the engagement in and time spent on an activity j by a woman w , we compute the following Hirschman-Herfindahl index (??), often used to measure market concentration or economic diversity:

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

Where s_{wj} represents the share of hours a woman w dedicated to activity j over the number of hours she spent in 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 $1/4$: 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, we alternatively use ?’s (?) variation of the Hirschman-Herfindahl index:

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

By opting for an absolute measure of specialisation, the degree of differentiation is assumed to be obtained by subtracting the computed index from 1; we do not use an index of diversification as such.³⁷ Specifications are run for a sample of women who have strictly more than zero hour of work over the last week. Benchmark estimates are presented in Table 11; Tables 12-14 repeat the above sensitivity analysis using the Hirshman-Herfindahl index and its variation as outcome variables.

Benchmark estimates, as depicted in Table 4, suggest that men’s migration significantly decreases their wives’ time specialisation, had their husbands opted for self-employment upon return to Egypt, by 1.82 (Hirschman-Herfindahl index) to 1.11 percentage points (Keeble-Hauser variation). Tables B1, B2 and B3 in the appendix show that this is particularly clear in rural households (-3.35 to -1.99), and if husbands work in agriculture (-24.66 to -14.85). Illiterate women diversify their time significantly more than literate women with intermediate education or less (-14.43 to -8.62 against -2.98 to -1.22). 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 husbands’ return to Egypt. Although the occupational choices of urban women or women whose husbands work in a non-agricultural sector are significantly affected, our measure of specialisation suggests that rural women, women whose husbands are self-employed in agriculture, or 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 in multiple activities, potentially to the cost of their household efficiency.

³⁷ The Hirschman-Herfindahl index has indeed been shown to perform best compared to other measures (??).

Table 4: SUR reduced-form coefficient estimates of specialisation, full estimation sample

Variables	Hirschman-Herfindahl (1)	Keeble-Hauser (2)	Self-employed (3)	Returnee (4)
<i>Wife characteristics</i>				
Age (W)	-0.0057*** (0.0004)	-0.0033*** (0.0002)		
Literate mother (W)	-0.0432*** (0.0061)	-0.0249*** (0.0035)		
At least literate (W)	-0.0132** (0.0061)	-0.0072** (0.0036)		
<i>Husband characteristics</i>				
Literate mother (H)				-0.0173* (0.0103)
Literate without diploma (H)				0.0121 (0.0213)
Elementary school (H)				0.0044 (0.0153)
Middle school (H)				-0.0290 (0.0185)
High school (H)				0.0441*** (0.0123)
Post-secondary, university and higher (H)				-0.0339*** (0.0130)
Micro-enterprise	-0.0108** (0.0047)	-0.0066** (0.0027)	0.2093*** (0.0098)	
Vocational high school (H)			-0.0526*** (0.0095)	
Father was self-employed (H)			0.1126*** (0.0103)	
Past self-employment (1)			-0.1527*** (0.0327)	
First job was self-employed (H)			0.6616*** (0.0206)	
Years of unemployment (H)			0.0044 (0.0030)	
Exchange rate (19)			-0.0138*** (0.0029)	-0.0389*** (0.0025)
<i>Household characteristics</i>				
Household size	-0.0003 (0.0019)	-0.0003 (0.0011)	0.0086*** (0.0033)	0.0054* (0.0029)
Under 15 dependency ratio	-0.0309** (0.0134)	-0.0179** (0.0078)	0.0251 (0.0242)	-0.0736*** (0.0217)
Above 65 dependency ratio	-0.1378** (0.0553)	-0.0787** (0.0323)		
<i>Governorate characteristics</i>				
2007 Unemployment	0.5579*** (0.0944)	0.3363*** (0.0551)	-0.1984 (0.1793)	
2007 Agriculture	-0.2611*** (0.0268)	-0.1505*** (0.0155)		
2007 Secondary education/higher	-0.5349*** (0.0620)	-0.3096*** (0.0360)		
2007 Public sector	0.0461 (0.0449)	0.0288 (0.0260)	-0.2709*** (0.0844)	
Urban	0.0493*** (0.0051)	0.0281*** (0.0030)	0.0012 (0.0096)	
Constant	1.2954*** (0.0324)	1.1697*** (0.0188)	0.1576*** (0.0298)	0.2355*** (0.0198)
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-0.0182** (.0088)	-0.0111** (.0052)		
Variance of errors	0.0366*** (0.0006)	0.0125*** (0.0002)	0.1460*** (0.0025)	0.1072*** (0.0027)
Observations	6,850	6,850	6,850	6,850
F-statistic (instrument)				249.85
P-value (instrument)				0.0000

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 married women in reproductive age; in Columns (3) and (4), observations are their respective husbands, i.e. working-age (16-64) married men whose wives are in 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 husband's self-employment propensity; and Column (4) presents GSEM coefficient estimates of their husband's 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 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 so, of their autonomy within and outside their household.

Using the 2012 ELMPS, evidence was found of statistically significant relations 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 women’s likelihood to engage in and time spent on paid work, and increases their 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: illiterate wives tend to engage in outside and inside household activities; how literate wives with more than intermediate education allocate their time is not significantly affected. Measures of time specialisation suggest that husbands’ migration and self-employment upon return somehow pushes women in rural areas, whose husbands are working in agriculture, or women with low, if any, education level, to allocate their time in multiple activities, potentially to the cost of their household efficiency. We 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. If the transfer of conservative norms migrants immersed themselves in destination countries curbs women’s engagement in outside activities, it however seems difficult to disentangle this effect from households’ economic considerations.

These findings suggest that the creation of a favorable environment for efficient diversification and woman empowerment in Egypt 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. Moreover, the induced time diversification women living in rural areas, and illiterate women, experience points to a potential decrease in their autonomy, since greater contribution to their husband’s business or to subsistence work might not be linked to a greater control over household resources, and may induce decrease in household efficiency. Because the higher propensity of migrants to set up a business upon return might disproportionately capture their wives’ time, attention should be dedicated to buffer 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. That men migrated and brought back resources accumulated abroad used to start up a business upon return that limit women’s involvement in outside activities might not ensure an optimal allocation of financial, but also time resources, despite contributing to the dynamic MSE sector in Egypt. 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 time burden placed on women, likely to contribute to women’s time poverty (Serra, 2009) and loss in household efficiency. 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, freeing women’s time who would be offered viable outside options, potentially enhancing their autonomy, for a more inclusive growth.

We must eventually acknowledge the limitations of these results, which call for further research. Conclusions on women's empowerment are 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. Moreover, 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. We hope that future research will 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, in this case, only transitory effects on their wives' occupational choices. 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.

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Appendices

A Robustness of estimates at the extensive and intensive margins

Table A1: SUR reduced-form coefficient estimates, urban sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	-0.0546*** (0.0132)	0.0123*** (0.0041)	0.0322*** (0.0090)	0.0081*** (0.0031)	0.1931*** (0.0150)	
Exchange rate (19)					-0.0143*** (0.0043)	-0.0331*** (0.0035)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-.1222** (.0493)	.0275** (.0127)	.0720** (.0310)	.0182** (.0092)		
Variance of errors	0.1314*** (0.0039)	0.0142*** (0.0020)	0.0553*** (0.0035)	0.0095*** (0.0017)	0.1350*** (0.0039)	0.0859*** (0.0040)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	-2.1181*** (0.5113)	0.3476** (0.1579)	0.3299*** (0.0943)	0.4368 (0.4921)	0.1931*** (0.0150)	
Exchange rate (19)					-0.0143*** (0.0043)	-0.0331*** (0.0035)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\gamma}{\alpha} \cdot \frac{\beta}{\delta}$	-4.7418** (1.9127)	.7781* (.4288)	.7386** (.3159)	.9779 (1.1324)		
Variance of errors	194.4372*** (7.6971)	20.9069*** (3.8296)	6.2657*** (1.2202)	171.4920*** (7.3216)	0.1350*** (0.0039)	0.0859*** (0.0040)
Observations	3,019	3,019	3,019	3,019	3,019	3,019
F-statistic (instrument)						86.67
P-value (instrument)						0.0000

Notes: In the upper panel, outcome variables are binary variables taking unity if an individual has engaged in paid market work (1), unpaid market work (2), subsistence work (3) or domestic work (4) in the last seven days; 0, otherwise. In the lower panel, outcome variables are continuous variables measuring the number of hours an individual has spent in paid market work (1), unpaid market work (2), subsistence work (3) or domestic work (4) in the last seven days. Outcome categories are not mutually exclusive. In Columns (1)-(4), observations are married women in reproductive age; in Columns (5) and (6), observations are their respective husbands, i.e. working-age (16-64) men who are married and whose wives are in reproductive age (15-49). Columns (1)-(4) present GSEM coefficient estimates of women's time use equations; Column (5) presents GSEM coefficient estimates of their husband's self-employment propensity; and Column (6) presents GSEM coefficient estimates of their husband's return migration propensity. Standard errors robust to heteroskedasticity are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A2: SUR reduced-form coefficient estimates, rural sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	-0.0193* (0.0099)	0.0633*** (0.0069)	0.0641*** (0.0140)	0.0015 (0.0030)	0.2200*** (0.0128)	
Exchange rate (19)					-0.0136*** (0.0038)	-0.0467*** (0.0034)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\alpha} \cdot \frac{\beta}{\beta}$	-.0255* (.0151)	.0836*** (.0265)	.0846*** (.0310)	.0019 (.0040)		
Variance of errors	0.0906*** (0.0034)	0.0530*** (0.0029)	0.1838*** (0.0032)	0.0091*** (0.0015)	0.1531*** (0.0032)	0.1218*** (0.0036)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	-0.7857** (0.3564)	1.9029*** (0.2158)	0.4008** (0.1787)	0.8995** (0.4499)	0.2200*** (0.0128)	
Exchange rate (19)					-0.0136*** (0.0038)	-0.0467*** (0.0034)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\alpha} \cdot \frac{\beta}{\beta}$	-1.0368* (.5615)	2.5108*** (.8061)	.5288* (.2836)	1.1869* (.6967)		
Variance of errors	116.8787*** (5.5102)	57.9466*** (5.0161)	31.6969*** (4.1222)	185.1412*** (10.0720)	0.1531*** (0.0032)	0.1218*** (0.0036)
Observations	3,883	3,883	3,883	3,883	3,883	3,883
F-statistic (instrument)						191.40
P-value (instrument)						0.0000

Notes: See notes of Table 4.

Table A3: SUR reduced-form coefficient estimates, non-agricultural sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	-0.0369*** (0.0091)	0.0208*** (0.0034)	0.0387*** (0.0089)	0.0067*** (0.0024)	0.1674*** (0.0101)	
Exchange rate (19)					-0.0066** (0.0030)	-0.0400*** (0.0026)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\alpha} \cdot \frac{\beta}{\beta}$	-.0363* (.0190)	.0204** (.0101)	.0380* (.0195)	.0066* (.0039)		
Variance of errors	0.1193*** (0.0028)	0.0187*** (0.0016)	0.1073*** (0.0027)	0.0092*** (0.0012)	0.1316*** (0.0029)	0.1020*** (0.0029)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	-1.4534*** (0.3371)	0.5915*** (0.1196)	0.2537** (0.0997)	0.5071 (0.3548)	0.1674*** (0.0101)	
Exchange rate (19)					-0.0066** (0.0030)	-0.0400*** (0.0026)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\alpha} \cdot \frac{\beta}{\beta}$	-1.429* (.7387)	.5817** (.2959)	.2495* (.1511)	.4987 (.4171)		
Variance of errors	165.0272*** (5.0372)	22.6448*** (2.8787)	13.8441*** (1.9983)	172.7848*** (6.8108)	0.1316*** (0.0029)	0.1020*** (0.0029)
Observations	5,802	5,802	5,802	5,802	5,802	5,802
F-statistic (instrument)						232.29
P-value (instrument)						0.0000

Notes: See notes of Table 4.

Table A4: SUR reduced-form coefficient estimates, agricultural sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	-0.0073 (0.0148)	0.1482*** (0.0198)	0.1263*** (0.0308)	-0.0087 (0.0066)	0.3813*** (0.0292)	
Exchange rate (19)					-0.0491*** (0.0075)	-0.0345*** (0.0068)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} \cdot \frac{\beta}{\delta}$	-.0272 (.0554)	.5530*** (.1646)	.4712*** (.1675)	-.0326 (.0264)		
Variance of errors	0.0464*** (0.0056)	0.1091*** (0.0058)	0.2164*** (0.0045)	0.0098*** (0.0029)	0.1407*** (0.0056)	0.1330*** (0.0070)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	-0.3905 (0.5711)	4.4928*** (0.6085)	0.9299* (0.4862)	1.1658 (0.9685)	0.3813*** (0.0292)	
Exchange rate (19)					-0.0491*** (0.0075)	-0.0345*** (0.0068)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} \cdot \frac{\beta}{\delta}$	-1.4571 (2.1739)	16.7648*** (5.0634)	3.4698* (2.0275)	4.3501 (3.7872)		
Variance of errors	70.5059*** (10.8085)	124.7610*** (11.7725)	53.3240*** (10.1631)	218.2965*** (19.0118)	0.1407*** (0.0056)	0.1330*** (0.0070)
Observations	1,100	1,100	1,100	1,100	1,100	1,100
F-statistic (instrument)						25.72
P-value (instrument)						0.0000

Notes: See notes of Table 4.

Table A5: SUR reduced-form coefficient estimates, illiterate sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	0.0244** (0.0111)	0.0865*** (0.0119)	0.0787*** (0.0216)	0.0005 (0.0049)	0.2201*** (0.0210)	
Exchange rate (19)					-0.0271*** (0.0063)	-0.0405*** (0.0044)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} \cdot \frac{\beta}{\delta}$.0740* (.0393)	.2626*** (.0808)	.2391** (.0925)	.0015 (.0150)		
Variance of errors	0.0544*** (0.0048)	0.0811*** (0.0047)	0.1907*** (0.0043)	0.0104*** (0.0023)	0.1804*** (0.0044)	0.1266*** (0.0054)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	0.5276 (0.4459)	2.7674*** (0.3971)	0.4145 (0.3055)	0.6566 (0.7418)	0.2201*** (0.0210)	
Exchange rate (19)					-0.0271*** (0.0063)	-0.0405*** (0.0044)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} \cdot \frac{\beta}{\delta}$	1.6024 (1.4135)	8.4048*** (2.6292)	1.2589 (.9834)	1.9942 (2.3257)		
Variance of errors	81.4975*** (9.5236)	100.3680*** (9.9022)	37.9839*** (6.7909)	196.8510*** (13.8449)	0.1804*** (0.0044)	0.1266*** (0.0054)
Observations	1,784	1,784	1,784	1,784	1,784	1,784
F-statistic (instrument)						85.81
P-value (instrument)						0.0000

Notes: See notes of Table 4.

Table A6: SUR reduced-form coefficient estimates, literate with intermediate education or below sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	-0.0130 (0.0093)	0.0261*** (0.0053)	0.0407*** (0.0118)	0.0048* (0.0028)	0.1757*** (0.0125)	
Exchange rate (19)					-0.0110*** (0.0037)	-0.0410*** (0.0034)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\sigma} \cdot \frac{\beta}{\delta}$	-.0199 (.0156)	.0398** (.0160)	.0621** (.0281)	.0073 (.0050)		
Variance of errors	0.0792*** (0.0033)	0.0256*** (0.0024)	0.1260*** (0.0035)	0.0079*** (0.0014)	0.1380*** (0.0036)	0.1081*** (0.0037)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	-0.6506* (0.3417)	0.6921*** (0.1698)	0.3070** (0.1403)	0.4515 (0.4342)	0.1757*** (0.0125)	
Exchange rate (19)					-0.0110*** (0.0037)	-0.0410*** (0.0034)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\sigma} \cdot \frac{\beta}{\delta}$	-.9935 (.6191)	1.0568** (.4506)	.4687* (.2696)	.6895 (.7009)		
Variance of errors	108.7206*** (5.5369)	26.4225*** (3.4045)	18.0719*** (2.8529)	176.9527*** (9.3459)	0.1380*** (0.0036)	0.1081*** (0.0037)
Observations	3,750	3,750	3,750	3,750	3,750	3,750
F-statistic (instrument)						141.61
P-value (instrument)						0.0000

Notes: See notes of Table 4.

Table A7: SUR reduced-form coefficient estimates, literate with education above intermediate sub-sample

Variables	Paid market work (1)	Unpaid market work (2)	Subsistence work (3)	Domestic work (4)	Self-employed (5)	Returnee (6)
<i>Participation decision (extensive margin)</i>						
Micro-enterprise	-0.0380 (0.0261)	0.0033 (0.0032)	0.0117 (0.0145)	0.0087* (0.0047)	0.2221*** (0.0258)	
Exchange rate (19)					-0.0009 (0.0064)	-0.0273*** (0.0054)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\sigma} \cdot \frac{\beta}{\delta}$	-.0058 (.0403)	.0005 (.0035)	.0018 (.0123)	.0013 (.0091)		
Variance of errors	0.1997*** (0.0049)	0.0022* (0.0012)	0.0506*** (0.0047)	0.0115*** (0.0028)	0.1075*** (0.0058)	0.0767*** (0.0057)
<i>Number of hours (intensive margin)</i>						
Micro-enterprise	-1.1542 (0.9910)	0.0753 (0.1043)	0.0711 (0.1311)	0.8075 (0.7506)	0.2221*** (0.0258)	
Exchange rate (19)					-0.0009 (0.0064)	-0.0273*** (0.0054)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
$\frac{\alpha}{\sigma} \cdot \frac{\beta}{\delta}$	-.1765 (1.2266)	.0115 (.0809)	.0109 (.0767)	.1235 (.8531)		
Variance of errors	283.6693*** (9.3799)	3.1415 (2.1071)	4.4258*** (1.6529)	165.3957*** (9.3800)	0.1075*** (0.0058)	0.0767*** (0.0057)
Observations	1,368	1,368	1,368	1,368	1,368	1,368
F-statistic (instrument)						24.98
P-value (instrument)						0.0000

Notes: See notes of Table 4.

B Robustness of specialisation estimates

Table B1: SUR reduced-form coefficient estimates of specialisation by location

Variables	Hirschman-Herfindahl (1)	Keeble-Hauser (2)	Self-employed (3)	Returnee (4)
<i>Urban</i>				
Micro-enterprise	0.0103 (0.0066)	0.0056 (0.0038)	0.1941*** (0.0151)	
Exchange rate (19)			-0.0142*** (0.0043)	-0.0330*** (0.0036)
Control variables	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} - \frac{\beta}{\delta}$.0228 (.0164)	.0125 (.0094)		
Variance of errors	0.0319*** (0.0009)	0.0107*** (0.0003)	0.1354*** (0.0039)	0.0864*** (0.0040)
Observations	2,993	2,993	2,993	2,993
F-statistic (instrument)				85.41
P-value (instrument)				0.0000
<i>Rural</i>				
Micro-enterprise	-0.0261*** (0.0065)	-0.0155*** (0.0038)	0.2198*** (0.0128)	
Exchange rate (19)			-0.0132*** (0.0038)	-0.0466*** (0.0034)
Control variables	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} - \frac{\beta}{\delta}$	-.0335** (.0132)	-.0199** (.0078)		
Variance of errors	0.0397*** (0.0007)	0.0136*** (0.0003)	0.1529*** (0.0033)	0.1217*** (0.0036)
Observations	3,857	3,857	3,857	3,857
F-statistic (instrument)				187.35
P-value (instrument)				0.0000

Notes: See notes of Table 11. Upper panel presents estimates for urban households; lower panel, for rural households.

Table B2: SUR reduced-form coefficient estimates of specialisation by husbands' sector of occupation

Variables	Hirschman-Herfindahl (1)	Keeble-Hauser (2)	Self-employed (3)	Returnee (4)
<i>Non-agricultural sectors</i>				
Micro-enterprise	-0.0012 (0.0049)	-0.0009 (0.0028)	0.1675*** (0.0101)	
Exchange rate (19)			-0.0064** (0.0030)	-0.0399*** (0.0026)
Control variables	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} - \frac{\beta}{\delta}$	-.0012 (.0047)	-.0008 (.0028)		
Variance of errors	0.0337*** (0.0006)	0.0113*** (0.0002)	0.1317*** (0.0030)	0.1019*** (0.0029)
Observations	5,757	5,757	5,757	5,757
F-statistic (instrument)				228.05
P-value (instrument)				0.0000
<i>Agricultural sectors</i>				
Micro-enterprise	-0.0688*** (0.0140)	-0.0414*** (0.0083)	0.3839*** (0.0291)	
Exchange rate (19)			-0.0472*** (0.0072)	-0.0343*** (0.0068)
Control variables	Yes	Yes	Yes	Yes
$\frac{\lambda}{\alpha} - \frac{\beta}{\delta}$	-.2466*** (.0819)	-.1485*** (.0491)		
Variance of errors	0.0465*** (0.0014)	0.0164*** (0.0005)	0.1394*** (0.0056)	0.1336*** (0.0070)
Observations	1,093	1,093	1,093	1,093
F-statistic (instrument)				25.00
P-value (instrument)				0.0000

Notes: See notes of Table 11. Upper panel presents estimates for households with (male) heads working in an off-farm sector; lower panel, for households with (male) heads working in agriculture.

Table B3: SUR reduced-form coefficient estimates of specialisation by wives' skill level

Variables	Hirschman-Herfindahl (1)	Keeble-Hauser (2)	Self-employed (3)	Returnee (4)
<i>Illiterate</i>				
Micro-enterprise	-0.0499*** (0.0099)	-0.0298*** (0.0058)	0.2222*** (0.0211)	
Exchange rate (19)			-0.0259*** (0.0063)	-0.0403*** (0.0044)
Control variables	Yes	Yes	Yes	Yes
$\frac{\gamma}{\alpha} - \frac{\beta}{\delta}$	-0.1443*** (.0496)	-0.0862*** (.0295)		
Variance of errors	0.0414*** (0.0011)	0.0144*** (0.0004)	0.1800*** (0.0044)	0.1268*** (0.0054)
Observations	1,768	1,768	1,768	1,768
F-statistic (instrument)				82.99
P-value (instrument)				0.0000
<i>Literate with intermediate education or less</i>				
Micro-enterprise	-0.0137** (0.0057)	-0.0080** (0.0033)	0.1752*** (0.0126)	
Exchange rate (19)			-0.0109*** (0.0037)	-0.0409*** (0.0035)
Control variables	Yes	Yes	Yes	Yes
$\frac{\gamma}{\alpha} - \frac{\beta}{\delta}$	-0.0209* (.0115)	-0.0122* (.0067)		
Variance of errors	0.0298*** (0.0008)	0.0101*** (0.0003)	0.1382*** (0.0036)	0.1081*** (0.0037)
Observations	3,728	3,728	3,728	3,728
F-statistic (instrument)				138.84
P-value (instrument)				0.0000
<i>Literate with more than intermediate education</i>				
Micro-enterprise	0.0092 (0.0121)	0.0050 (0.0070)	0.2209*** (0.0259)	
Exchange rate (19)			-0.0012 (0.0064)	-0.0274*** (0.0055)
Control variables	Yes	Yes	Yes	Yes
$\frac{\gamma}{\alpha} - \frac{\beta}{\delta}$.0018 (.0101)	.0010 (.0056)		
Variance of errors	0.0414*** (0.0010)	0.0139*** (0.0004)	0.1074*** (0.0058)	0.0769*** (0.0057)
Observations	1,354	1,354	1,354	1,354
F-statistic (instrument)				25.01
P-value (instrument)				0.0000

Notes: See notes of Table 11. Upper panel presents estimates for illiterate women; middle panel, for literate women with intermediate education or less; lower panel, for literate women with more than intermediate education.

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