**Labor force participation of women left behind in Tajikistan**

**Sophia Kan[1] and R. Emre Aytimur[2]**

**Abstract**

This paper examines the impact of male migration on the labor force participation of the women left behind in Tajikistan. Studies from many countries show that when men migrate, female labor force participation decreases and this is largely explained by the income effect from remittances. Our study challenges this finding. Using panel data from 2007, 2009, and 2011, we find that, in Tajikistan, migration has no significant effect on the number of hours that women work. Because we use panel data, rather than the cross-sectional data used by others, our results are more robust. We propose several countervailing factors that may have neutralized the income effect, such as the need to substitute for the missing labor in the household. We also find that women work more when the household has a farm, regardless of the presence of a migrant in the household.

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[1] (corresponding author) Department of Economics, University of Göttingen, Göttingen, Germany. Email: skan@uni-goettingen.de.

[2] Department of Economics, University of Manchester, Manchester, UK. Email: refikemre.aytimur@manchester.ac.uk

## 1. Introduction

When a family's main breadwinner migrates, how their departure affects the left-behind spouse in terms of employment can vary. On the one hand, the migrant may send remittances, and left-behind household members may work less due to the income effect. On the other hand, the absence of a migrant could increase work for left-behind members due to the need to substitute for the missing labor. To study these opposing effects, we analyze data from Tajikistan. The question of the effect of international migration[3] on female labor force participation (FLFP) is particularly salient to Tajikistan given the scale of labor migration. An estimated 460,000 Tajiks work abroad, affecting around 25% of households (UNDESA, 2013).

For Tajik households, migration is often driven by economic necessity. Migrants are largely from poor rural households. Tajikistan is the poorest former Soviet Republic in Central Asia. In 2015, 31.3% of the population lived under the national poverty line (World Bank, 2016). Around 73% of the population lives in rural areas with few employment prospects; most households are involved in agricultural work and unemployment rates are estimated to be as high as 30% (Olimova & Bosc, 2003; World Bank, 2016). Most migrants are peak working-age labor men; around 90% are male and around 90% migrate to Russia.[4] . In Russia, migrants often work as low-skilled laborers. Some form new families, severing ties with their Tajik families. A study by the OSCE (2012) found that nearly a quarter of left-behind women do not know where their husbands are, nor do they receive remittances from them. Abandonment can create extreme hardship for the women left behind, who have less money for food and clothes, reduced social status, high levels of stigma (also for their children), and difficult relationships with in-laws (OSCE, 2012).

An examination of FLFP in Tajikistan is also timely given the country's current demographic structure, which provides a window of opportunity for economic growth. Among the population of 8.5 million people, there is a large working population with 60% being between the ages of 15 to 64, and a small old-age dependency population of about 3.2%. As a share of the total population, the percentage of children under 14 has been shrinking over the last two decades from 44% in 1994 to 35% in 2014 (World Bank, 2014). Increasing FLFP is one way to leverage potential gains from the current demographic structure, where the ratio of female to male labor force participation is still only 76% (World Bank, 2016).

In this paper, we analyze whether women with household farms work more hours to compensate for the labor lost to migration. Because farm work generally involves low-skilled labor, nonmigrant household members are likely substitutes for migrants and the share of work for the nonmigrant is likely to increase (Rodriguez & Tiongson, 2001). Furthermore, because normative culture in Tajikistan fosters traditional economic roles for women, jobs are gendered and women have fewer employment options outside the household.[5] These factors would result that among households with farms, women work mainly at home and are substitutes for migrants, increasing their participation in the labor force. On the other hand, remittances may enable women to work less. Remittances provide a critical source of income for households, where personal remittances account for 47.5% of GDP (World Bank, 2014). In the literature, the income effect typically outweighs the substitution effect, resulting in reduced

[3] The focus of this paper is on outward international migration rather than the very limited domestic (rural-urban) labor migration. According to the 2007 TLSMS, only around 9% of internal migration (defined as living in a different place from where one was born) was due to employment or looking for employment.

[4] According to the 2007 Tajikistan Living Standards Survey, others migrate to Kyrgyzstan, Kazakhstan, Ukraine, other former Soviet states, and less than 1% migrate to countries outside of the region.

[5] A report by the OSCE (2012) argues that the end of subsidies from Moscow in 1991, combined with the outbreak of civil war from 1992-1997 led to a severe economic depression. It also led to the deterioration of social services and education, and slowly drew women back to the home. Independence also revitalized Islam, and with it, greater gender inequality (Falkingham, 2000). Women are also considered primary domestic caretakers, and working outside of the home is often discouraged and even stigmatized. Even in 1991, only 29% of the economically active female population were in the workforce (Falkingham, 2000). Haarr (2007) adds that, of the women who work outside of the home, 81% work on collective farms and earn little or nothing.

employment among left behind women. We hypothesize, however, that in the case of Tajikistan, the substitution effect countervails downward pressure from the income effect because of the country-specific characteristics. As we explain in detail in the following section, the findings in the literature vary depending on the size of the agricultural sector and on local gender norms.

Our main independent variable of interest is the presence of a migrant in the household. We consider the relationship with the number of hours worked in the last 14 days. While there are two similar studies set in Tajikistan (Justino & Shemyakina, 2012; Piracha, Randazzo, & Vadean, 2013)—discussed in detail in Section 2—these studies estimate participation rates based only on cross-sectional data. In contrast to these studies, we use panel data to control for unobservable heterogeneity. Using a three-wave panel of household data (2007, 2009, 2011), we employ an instrumental variable fixed effects approach, combined with year fixed effects, and find a negative but insignificant relationship between migration and female labor hours.

We also conduct split-sample analyses based on employment type, household business type, remittance status, and consumption level. The results support our main finding that migration does not affect female labor hours. We then investigate the differential impact of unpaid and paid family work, and then address the intensive margins of labor supply, but find no evidence of a relationship between migrant status and labor force participation.

This paper is structured as follows. Section 2 provides a summary of the relevant literature and outlines the contribution of this study to the existing literature. Section 3 describes the data and section 4 presents the methodology. Section 5 presents the key findings, and section 6 concludes.

**2. Literature review**

The literature on the effect of migration on FLFP, utilizing household-level data to determine the impact of either migration or remittances (e.g. Amuedo-Dorantes & Pozo, 2006; Justino & Shemyakina, 2012; Lokshin & Glinskaya, 2009), largely finds that across continents, left-behind women work less. For example, in the Philippines, Rodriguez & Tiongsosn (2001) find that additional income from remittances corresponds to an increase in household consumption of leisure, but with a much larger income effect for men than for women. For women, both living in a migrant household and receiving remittances had negative effects on FLFP at the extensive margins. An additional 40 USD from remittances decreased FLFP by 0.2 percentage points and living in a migrant household decreased participation by 18.1 percentage points. In Morocco, de Haas and van Rooij (2010) find that international remittances even decreases the housework of left-behind women, as they can hire additional domestic help and agricultural workers. Acosta (2006) finds similar results for El Salvador, in that remittances reduced female labor supply, using propensity score matching and instrumental variable estimation methods. In Nepal, Lokshin & Glinskaya (2009) find that the effect of male migration on FLFP was also negative. They calculate the average effect of the treatment on the treated and find that women living in migrant households were 5.3 percentage points less likely to participate in the labor force. More recent results from Albania (Mendola & Carletto, 2012) and Tajikistan (Justino & Shemyakina, 2012) support the earlier studies.

There are two broad theoretical underpinnings for these findings. The first is straightforward: the income effect. When migration increases income via remittances, households increase their consumption of normal goods, including leisure. The second explanation stems from the U-shaped hypothesis for FLFP which can be applied to countries along a development projection (Goldin, 1994) as well as within a country across income quintiles (Klasen & Pieters, 2015). The U-shaped hypothesis for FLFP is a labor supply curve, with labor hours on the y-axis, and income on the x-axis. The curve is U-shaped because participation initially decreases as income rises, but starts to increase again when income levels are higher.

In the U-shaped model for FLFP, women in poor households work as (paid and unpaid) low-skilled laborers in order to make ends meet. As income increases, FLFP decreases because women can afford to stay home, which may be preferred if local norms stigmatize female laborers (Goldin, 1994). In Morocco, for example, social stigma restrict

women from certain types of agricultural work (de Haas & van Rooij, 2010). As income increases, education increases, and women take on white-collar jobs which increases their participation.

There are also several studies that find that migration increases FLFP in other ways. The first study (Chang, Dong, & MacPhail, 2011), posits that migration increases FLFP for women engaged in farm and domestic work. They argue that when someone migrates, shadow wages, or the opportunity cost of labor for the household increases, while wages earned outside the household remain constant. The study is set in China, where gender roles relegate women to domestic work, making shadow wages even higher for females. Tajikistan shares similar gendered labor roles (Falkingham, 2000; Haarr, 2007; OSCE, 2012), and migration may increase FLFP for women engaged in household-based work. Chang et al. (2011) tested their hypotheses using seven rotating waves of the China Health and Nutrition Survey (CHNS) and found that migration increased work hours for the elderly and had a much larger impact for women than men. The authors attribute this to the fact that men have greater non-farm employment possibilities than women. They then conclude that their results support the finding that downward pressure on FLFP from the income effect is compensated by the positive price effect from higher shadow wages.

The second study on FLFP in China is by Mu and van de Walle (2011), who analyze four waves of the CHNS survey. They focus on two measures of labor (agricultural and non-agricultural) and find that migration increases FLFP in agriculture (at both the extensive and intensive margins), but decreases work in other sectors. Among migrant households with farms, women worked on average three hours more per week. The authors posit several potential neutralizing and overcompensating effects of an income effect, such as compensation for the loss of income and labor, the cost of sending someone abroad, and the fact that women take on a greater burden of child-rearing, which is more compatible with farm work.

The third study (Binzel & Assaad, 2011) is set in Egypt, and is similar to the Tajik context in that migrants are largely men (96%) of peak working age, and the focus is on international labor migration (rather than rural-urban migration as in the two studies on China). The study finds that migration increases unpaid family work of left-behind women in rural areas. This is explained as being driven by a substitution effect in which women maintain the upkeep of household assets (maintaining land and livestock), thus increasing their unpaid work. For these women, living in a migrant household increases the likelihood of unpaid work by 400%. For paid workers, there is no significant relationship between migration status and FLFP.

The present paper examines whether migration increases farm-based work for women in Tajikistan and thereby expands the findings of two prior Tajik studies. The first study (Justino & Shemyakina, 2012) analyzed the 2003 Tajikistan Living Standards Survey (TLSS) and found that remittances reduced participation (at both the intensive and extensive margins). As a robustness check, the authors controlled for migrant status and found no significant effect on FLFP. This finding, however, may be due to their construction of the migrant status variable. In the TLSS survey, only information on past migration was available, thus, current migrant status was proxied by past migrant status. However, the nature of migration from Tajikistan to Russia is often highly dependent on volatile external influences, e.g. the Russian economy, availability and ease of securing work permits, and safety of transferring money back home. Because these factors may change rapidly, past migrant density may be a weak indicator for current migrant networks. We, instead, use current migrant status and current migrant density as an instrument. Our paper also aims to provide a more nuanced view of FLFP by differentiating participation by economic sectors.

The second study on Tajikistan (Piracha et al., 2013) finds that remittances have no significant effect on FLFP because participation is argued to be strongly dictated by traditional values and gender norms, which are not affected by migration. The authors focus on the extensive margins, and whether the work is on a household farm, non-farm, or the individual earns a wage outside of the household. In this paper, we focus on migration rather than remittances, and add to their analysis by controlling for unobserved heterogeneity.

The previous studies on Tajikistan use cross-sections (2003 and 2007), which places several econometric limitations on the ability to minimize bias from unobserved heterogeneity. We therefore anticipate that results may change when the bias is controlled for by applying panel data techniques. Our analysis supports the findings on the effect of migrant status on FLFP by Justino and Shemyakina (2012), and also supports the narrative on gender roles by Piracha et al. (2013).

**3. Data**

We use data from the 2007 and 2009 TLSS and the 2011 Tajikistan Household Panel Survey (THPS). The TLSS was designed by the World Bank and UNICEF as a representative probability sample at the national, urban and rural, and *oblast*[6] levels. *Oblasts* were divided into 270 clusters, which were further divided into primary sampling units composed of 18 observations each, for a total of 4,860 households. The 2007 survey was carried out by Goskomstat, the Tajikistan National Committee for Statistics, from September to November 2007. Two years later, in November of 2009, 1,503 of the 2007 households were re-interviewed, following the same sampling methodology. In 2011, IOS designed a shorter survey and re-interviewed the 2009 households, adding a third wave to the panel data set (IOS, 2013). The IOS survey was also conducted between September and November of 2011, remaining consistent with the timing of previous survey waves, taking into account the seasonality of farm work and migration.

For our analysis, we used data from the TLSS household and community questionnaires. The household questionnaires were answered by all individuals in the household over ten years old and over 14 years old for the employment section. A descriptive plot of the reported labor hours shows a normal distribution pattern. To complete the community questionnaire, enumerators worked with the local administration officials. Questions and definitions relevant to our variables of interest are consistent across all three waves of data.

After combining the data sets, there are 4,858 households for 2007, 1,500 for 2009, and 1,498 for 2011. We then narrowed our sample to females, aged 25-54, which is considered prime-aged workers by the OECD.[7] We keep all individuals and construct an unbalanced panel of women who lived in a migrant household at least one year (so that we can observe changes within the household and can use fixed effects) for a total of 5,882 individuals (from 4,454 households), where 79.6% of women lived in a migrant household in just one year, 9.4% in two years, and 11% across all three years. In 2011, 171 households from 2009 were not re-interviewed and were replaced by randomly sampling from the 2007 pool of surveyed households. When comparing the means of the 2009 households that were re-interviewed with those that were not, we find some significant differences among several household characteristics (see Appendix 1-1). Many of the differences, however, pertain to whether the household is based in a rural or urban area, which is considered in the selection of replacement households from 2007. Of the households from 2009 that did not participate in the 2011 study, many were urban (34% of the pool that participated are urban households, versus 52% of those that did not participate). At the same time, the number of migrant households is similar in both groups, 33% among participant groups and 29% among migrant groups. While attrition bias is difficult to estimate, Alderman et al. (2001) analyze the effect of attrition on the outcome variables of household-level longitudinal data sets from Bolivia, Kenya, and South Africa, and find that even when the means for key variables may differ among waves due to attrition, attrition does not affect obtaining consistent coefficient estimates from multivariate regressions.

[6] An *oblast* is an administrative geographic region in Tajikistan. There are five *oblasts*, Dushanbe, Regions of Republican Subordination, Sughd, Khatlon, and Gorno-Badakhshan..

[7] We use the active working-age population instead of the 15-64 years of adult age, because using the latter may introduce selection bias at both ends of the spectrum: the younger population may still be in school, and the older population may be retired.

Our final sample is a balanced panel of 818 women represented across all three waves, for a total of 2,454 observations.[8] Table 1 shows basic summary statistics for migrant versus non-migrant households (pooled). Migrant households tend to be larger than non-migrant households in terms of working-age adults,[9] have more children, and fewer elderly (65+) members. In Tajikistan, the elderly live with their youngest sons, who instead of migrating, traditionally stay at home even after marriage to take care of their parents (Hegland, 2008).

In general, migrant households appear to be poorer than non-migrant households. This is reflected by differences in community characteristics between the two groups. For example, migrant households tend to have fewer landlines and less access to central plumbing as a source of drinking water, both indicative of the households being located in communities with less infrastructure and economic development. While there is a cost to migration (e.g. visa fees, transportation, housing abroad), some studies (e.g. World Bank, 2009) argue that migration is a way to mitigate poverty in Tajikistan.

Labor force participation, defined as hours worked in the previous 14 days, is low for women relative to men in Tajikistan. In 2011, 31% of women and 79% of men reported having worked. Gender roles likely contribute to differences in employment rates. This disparity is also found in the education system where women have fewer years of education, e.g. in 2012 the ratio of female to male students in secondary school was 82.1% and 52.4% for tertiary enrollment (World Bank, 2014).

The TLSS includes three definitions of work, working as an employee (for a non-household member), family agricultural worker (working on the household's own farm), and being self-employed (and not in farm work). The calculation of labor hours therefore includes a range of jobs including unpaid work but excluding domestic work. For the main analysis, we focus on changes in work hours (regardless of payment), yet in our robustness checks, we also control for unpaid and paid work, recognizing the differential impact of earnings on FLFP. Women also take on unpaid family work at a higher rate than men do: In 2011, 22.7% of females were unpaid family workers, in contrast to 15.2% of males.[10]

The official ILO estimates for unemployment rates of the total labor force of Tajikistan have hovered around 11-12% over the past ten years (World Bank, 2014). Among migrants, however, the unemployment rates is much higher and 66.5% of the sample reported that they had been unemployed before migrating, although this number is likely upward biased from those who are actively preparing to migrate.

## 4. Methodology

In constructing our estimation model, we account for the potential of omitted time-invariant variables that can influence work hours. For example, in the case of Tajikistan, tradition and religious values may directly influence women's participation in the labor force at both the intensive and extensive margins. To minimize the bias from these unobserved variables, we employ a fixed effects instrumental variable model using household and time fixed effects. The unit of analysis is the individual. Our regression model is

$$FLH_{it} = \beta_0 + \beta_1 Migrant_{it} + \beta_2 Migrant_{it}*Farm_{it} + \beta_3 Farm_{it} + \mathbf{x'}_{it}\boldsymbol{\beta} + \alpha_i + \delta_t + \varepsilon_{it},$$

where *FLH* represents the average number of hours worked over the past 14 days[11] among working-age females. Intensive and extensive margins are considered jointly, since we include women who are not working (those who

[8] We also ran our main analysis on an unbalanced panel sample, which yielded consistent results with the balanced panel.
[9] Household size is the number of members physically living and sleeping in the household at the time of the survey. Therefore, while migrants are associated with the household, they are not included as part of the total household size.
[10] In total, 15.5% of all working people reported working in unpaid family positions.
[11] The hours worked over the past 14 days refers to the time immediately preceding the survey and most likely provides a strongly representative trend of the hours worked by women. The surveys were also conducted in the fall between September and November, ensuring that seasonality is consistent and that the results are not driven by seasonal variation, such as the extra work needed during harvest season.

work zero hours). Work includes work as an employee, self-employed work, and being an unpaid worker in a family business. Our main variable of interest is the household's migrant status, *Migrant*, which takes the value of one when the household has at least one migrant, and zero otherwise. *Farm* is a binary variable for whether the household has a farm as a household business. If the household has a farm, we expect women to work more hours since women have fewer employment opportunities outside the household and domestic work tends to be more compatible with farm work. *Migrant*Farm* is an interaction term of having both a migrant and farm in the household. When a household has both, we expect that workload remains constant but is then managed by fewer people, thereby increasing the share of workload per person.

$\mathbf{x}'_{it}$ represents a vector of independent variables: relationship to the head of household, age, age$^2$, number of children, household size, living in a rural area, owning land, having a landline phone, whether the household head is employed, and whether the household head earns a wage.[12] The relationship to household head is included as the following dummy variables: being the head (8.5%), spouse (51%), daughter (11.2%), and daughter-in-law (26.6%). The reference group is that of mother or other relative of the household head. We control for the number of children under the age of 14 because it can influence labor hours through two opposing channels: by women staying home to care for the child, or working more hours to support the cost of raising children. We also control for whether the household has a landline as an indicator of advanced infrastructure and therefore a wealthier community. Lastly, we control for the influence of the household head by controlling for employment status – whether they work, and whether they earn a wage. $\alpha_i$ represents the fixed effect used to control for unobserved household heterogeneity that is constant across years. $\delta_t$ represents dummy variables for 2007, 2009, and 2011. Subscript i denotes the individual and t denotes the time variable, year.

In contrast to studies that identify the effect of remittance levels on FLFP, we use *Migrant* instead of remittance levels as our variable of interest because we want to estimate the impact of the absence of a working-age household member, rather than the impact of an additional dollar of income. An analysis of remittance levels would shift the analysis to how women respond to changes in income of the entire household, which may or may not directly affect the left-behind woman. As Tajik women left behind typically live with their husband's parents, they have limited intra-household bargaining power and control over how remittances are spent.[13] As such, the additional dollar of income from remittances may tell us little about women's decisions to work. Moreover, not every household with a migrant receives remittances while some non-migrant households also receive remittances. In 2007, of the 4,858 households surveyed, 845 households (17.4%) received a remittance. Of the households that receive remittances, 77.2% (652) had a migrant, while the remaining 22.8% of households had no migrants. Lastly, remittance levels are also endogenous with labor hours, and are often under-reported, which can introduce measurement error.

In our main analysis, assigning *Migrant* as the variable of interest introduces endogeneity issues: omitted variable bias and simultaneity. An omitted variable could be a factor that influences both the decision to send a migrant abroad and for the women to work. For example, a risk-loving household may send a migrant abroad and simultaneously send females to work even when it is stigmatized. The second endogeneity issue stems from simultaneity bias where a household may simultaneously decide to send a household member abroad as well as decide how much left-behind family members should work. For example, women may work more to cover the cost

[12] Employment includes all forms of economic activity, including self-employment and unpaid work in a family business. Wage earner status asks the respondent whether they received any compensation (wages, salary, cash payments) from the employer, business, or for their work. Because of the large informal economy, many people are employed but not wage earners.

[13] Several descriptive studies (Falkingham, 2000; Haarr, 2007; Harris, 2005) explain that Tajikistan is a highly patriarchal society where brides move to their husband's homes, and her in-laws control each instance she leaves the home, and whether she works. Women are expected to be submissive, and often verbally, psychologically, and physically abused by members of the in-laws if she challenges family structures.

of a migrating household member, or a husband might migrate in response to a woman who exits the workforce to raise children.

To minimize endogeneity, we use a two-stage least squares (2SLS) approach where in the first stage, we predict *Migrant* using migrant density. The variable *Migrant* in our interaction term (*Migrant*Farm*) is also instrumented with migrant density. Migrant density has been applied in several papers as an instrument used to predict migrant status, e.g. see Binzel and Assaad (2011), Chang et al. (2011), Démurger and Xu (2011), and Piracha et al. (2013). Migrant density is a proxy for migrant networks, which is calculated as the percentage of migrants in the respective village, excluding the household itself. The reason that a migrant network affects the likelihood of migrating is because of the effect of information sharing. The greater the network, the more likely it is to receive information that affects the propensity of migrating: transportation methods, legal requirements, and assistance in securing a job and accommodation. While the density and community of migrants may influence the likelihood of migrating, it should not affect FLFP hours.

The instrument is calculated for each survey wave instead of using historical or lagged migration rates. This is because the nature of Tajik-Russia migration is dependent on the Russian economic climate, as well as policies that can radically hinder (e.g. requiring work visas) or promote migration (e.g. relaxing taxes on remittances). Because the changes are frequent, we also expect the size of the current information network, migrant density, to have a strong effect on migration decisions.

For the instruments to hold, we must consider several possible violations to the exclusion restriction. If migrant-dense communities are wealthier because of the influx of remittances, this may strengthen the local economy and thereby create jobs. Or, migrant communities may have greater human capital because of information gained in the host country, such as mothers in migrant households in Mexico who have greater knowledge of health care relative to mothers in non-migrant households (McKenzie, 2006). Another channel is productive and long-term investments in education, although the effects are debated. An absent parent, for example, can negatively affect children's learning (Giannelli & Mangiavacchi, 2010). On the other hand, remittances can increase school enrollment rates, as in the cases of El Salvador (Acosta, 2006) and Tajikistan (Bennett, Clifford, & Falkingham, 2013). Alternatively, from another perspective, migrant density could be symptomatic of local economic depression. In this scenario, left-behind women also face a job shortage, which would have a negative effect on *FLH*. To address these threats, we control for community-level economic status, using infrastructure (landline telephones) and employment status of the household head as a proxy for wealth.

Another consideration for the exclusion restriction to hold is the effect of a decrease in the supply of working-age men. Fewer working-age men decrease the overall labor supply, which may increase wages as well as *FLH*. However, two factors may counteract this influence. First, unemployment rates are high in Tajikistan, and many migrants were unemployed prior to leaving the country. This indicates a labor surplus, so any outflow of migration may not be sufficient to create new jobs or to raise wages. Second, Tajikistan is a highly traditional society, where many families have returned to more traditional and Islamic cultural practices since the dissolution of the Soviet Union (see Commercio (2015) on 'retraditionalization' and the phenomenon of women exiting the labor force in Tajikistan). As such, women's responses to wage increases may not be as elastic as men's. Nonetheless, to account for these potential macro-level changes in labor supply, we control for the five *oblasts*. To include these time-invariant geographic *oblasts* into our fixed effects model, we interact *oblast* with the three years, creating 15 dummies.

## 5. Results

### 5.1. Main Results

Our analysis utilizes an instrumental variables approach, and the first-stage results (see Appendix 1-2) show that our instrument, migrant density, has a positive effect on *Migrant*, significant at the one percent level. Our second

instrument, migrant density interacted with *Farm*, also has a positive effect on *Migrant*Farm*, significant at the one percent level. The overall Cragg-Donald Wald Statistic is 40.73, meaning that we can reject the null hypothesis of weak instruments since it exceeds the rule of thumb threshold of being greater than ten (Staiger & Stock, 1997). This is supported by the Stock-Yogo weak identification test, which is 7.03 when supposing a tolerable bias level of 10%.

The main results are presented in Table 2. Specifications 1 and 2 show the results of a simple pooled ordinary least squares (OLS) regression. Specification 3 is a two-stage least squares (2SLS) model with pooled data using migrant density as an instrument for migrant status both for *Migrant* alone as well as *Migrant* interacted with *Farm*. Specifications 4 and 5 present results from a fixed effects estimation (with and without instruments).[14] We also tested the robustness of our results, using random effects, which yielded similar results.[15]

Our main variable of interest, *Migrant*, when instrumented, has an insignificant effect on FLFP. The specifications controlling for endogeneity in column 3, controlling for unobserved heterogeneity in column 4, and controlling for both in column 5 all show varying effects of *Migrant* on *FLH*, but no significant effect in our most robust specification (column 5). These results must be interpreted in conjunction with the *Migrant*Farm* coefficient, because if this interaction term is significant, it would mean that migrant status has a significant effect, but only when the household has a farm. However, we also find an insignificant effect of *Migrant*Farm* on labor hours, except in column 3, and only at the 10-percent significance level. In short, migrant status does not seem to effect FLFP and this result is independent of farm status.

In contrast to *Migrant*, the effect of simply having a household farm is significant and straightforward: *Farm* increases *FLH* by 10.8 hours per week in our strictest specification (column 5). The magnitude of the coefficient is large, and the sign and significance level are consistent across all our specifications. This finding supports the argument that women are bound to farm work, that is, *Farm* increases *FLH* regardless of migrant status. The 2011 TLSS data also shows that women are more likely to work on farms than are men: 55% of women work in the agriculture sector as opposed to 30% of men. After agriculture, other frequent occupations include unskilled work, stall and market sales, and secondary education teachers.

Before delving into robustness checks, there are several unexpected and expected results to note regarding the main specification in column 5, Table 2. For example, there is a stark contrast between women who are daughters compared to being a spouse or daughter-in-law. Daughters work, on average, seven hours less per week than other women. This is a rather unexpected result, as qualitative studies indicate that daughter-in-laws are given significant household work, for which we would expect to see daughter-in-laws in rural areas increase their workload, rather than see daughters work less. Child dependants also surprisingly have no significant effect on FLFP. Age has the expected effect of increasing labor hours every year until the age of 43, after which there is a downward effect. It also appears that year-trends had no significant effect on FLFP. While the analysis of male labor lies beyond the scope of this paper, there were similarly no significant year-trend effects for men (Appendix 1-3, specification 5). In addition, since *Migrant* has no effect on *FLH*, we looked at whether men, in lieu of women, were supplementing the work of the absent migrant. We found, however, that the coefficient for men was also insignificant (Appendix 1-3, specifications 5). The effect of outward migration, as previously mentioned, raises some macroeconomic concerns with regard to both the supply and demand of labor. To mitigate this influence, we include

[14] Here, it is important to note that our dependent variable is censored, as some women work zero hours. In such cases, the Tobit model is considered a more consistent estimator than OLS (Amemiya, 1973), however it cannot be used for fixed effects models. While Honore (1992) provides an alternative semi-parametric estimator for censored regression models with fixed effects, it cannot accommodate instrumental variables. As such, although recognizing these shortcomings, we are limited by the available econometric tools.

[15] The purpose for testing a random effects model was to account for women living in households with long-term migrants. For these households, migrant status remains constant, warranting the use of a random effects approach to capture differences between households. At the same time, there are likely many omitted variables that correlate with the predicted variables that we only control in the fixed effects model.

geographic controls, using dummies for *oblasts* interacted with year dummies to maintain variation in our fixed effects model. Table 3 presents the results with these interaction terms. After including the interaction terms in specification 5, *Migrant* shows a larger coefficient while the standard error remained relatively constant, though still insignificant. The coefficient of our interaction term *Migrant*Farm* is also much larger, but also still insignificant. *Farm*, remains positive and significant. Table 3 gives the same results as Table 2, hence increasing our confidence in the results.

As a robustness check, we also ran regressions for cross-sections of the data for 2007, 2009, and 2011. The results are shown in Appendix 1-10 for women and Appendix 1-11 for men. The coefficients for *Migrant*, *Farm*Migrant*, and *Farm* differ from the panel data analysis. For example, in 2009, *Migrant* decreased FLFP by 15.7 hours per week, and having a migrant and farm increased work hours by more than 40 hours per week. For men, *Migrant* has a negative effect on work hours in 2009, but a positive effect in 2011. We give little credence to these results since cross-sectional analysis is not able to control for unobserved heterogeneity. However, it is interesting to see the different results confirm that without applying the fixed effects method using panel data, we could not have identified certain significant relationships and would have either under- or over-identified others.

A likely intuitive explanation for the lack of a significant relationship between *Migrant* and *FLH* is that countervailing effects neutralize the income effect. However, we should note that we cannot validate the presence of an income effect given our empirical set up. Controlling for remittance levels or whether a household receives a remittance introduces endogeneity to the model. We therefore attempt to tease out the association by using a split-sample analysis among non-remittance-receiving- and remittance-receiving households. Although only a very crude estimate, we detect no visible differences between the two samples, and our main variable of interest remains insignificant (Appendix 1-5). Again, in an attempt to identify associations, we run our main analysis and include a dummy for remittances, but find no significant effect (Appendix 1-6).

Factors that may mute an income effect include an increase in shadow wages of farm work, gender norms that limit work opportunities for women, compensation for the cost of sending a migrant abroad (e.g. initial costs needed to pay for the move, or the loss of income due to the migrant being absent), as well as a lack of remittances. However, there may also be reasons for which these effects are small in magnitude. For instance, with respect to the shadow wage effect, many migrants are unemployed before leaving and therefore do not create a gap in work to be compensated. It is also possible that remittance-receiving households are still too poor to decrease their labor hours or that the additional income does not trickle down from the head of household to the woman. It may also be the case that there is a surplus of labor, as household sizes tend be large (6.3 members on average).

### 5.2. Split-Sample Analyses

To better understand the nature of these countervailing effects, we disaggregate our analysis by employment sector, based on findings by Mu and van de Walle (2011), Chang et al. (2011), and Binzel and Assaad (2011) that the effect of migration on *FLH* is often differentiated by sector. To test for differences by sector in Tajikistan, we ran two split-sample analyses: the first, among households with and without a business (Table 4, column a) and the second, comparing the types of businesses among households with farms and non-farm businesses (Table 4, column b). Contrary to our hypothesis, we find that migrant status, after controlling for fixed effects, has no effect on hours worked for women in households regardless of whether they have a household business or not. Additionally, in the split-sample analysis, among households with farms, migrant status has no effect on labor hours. This hints at the possibility that even with an absent worker, there may be no substitution effect, most likely because of strict gender norms in labor roles. Results from this limited, reduced-sample analysis should be interpreted with caution. The same analysis for left-behind men (Appendix 1-7) shows no significant relationship between household migrant status and labor hours.

We also explore the relationship between migration and FLFP among the poor. To do this, we estimate *FLH* in a split-sample analysis of households that lie below or above the 2007 monthly per capita consumption median of 149.8 Tajik Somoni (TJS),[16] which in 2007 was equal to approximately $43.50.[17] Table 5 indicates that for households with a consumption level below the median, having a migrant has a negative but insignificant effect on *FLH* (column 2). At the same time, having a migrant and farm (*Migrant*Farm*) increases *FLH* by 14.1 hours per week (column 2), and is significant at the 10 percent level. Interestingly, this is the case only for households with below-mean consumption. This may indicate a possible difference in the structure of farms among income groups, where wealthier households may be able to transfer the labor to a non-household worker. Results presented in Table 5 are also consistent with our previous results, which finds that *Migrant*Farm* increases *FLH* although it is not statistically significant. The same split-sample analysis for men (Table 6, column 4) shows that migrant status has a negative but insignificant effect on households with an above mean per capita consumption. This does not support the income effect, nor does it have a differential impact for men, which deviates from the findings of Piracha et al. (2013).

### 5.3. Further Analysis: Intensive Margins and Unpaid Family Work

In this section, we summarize the results from two additional robustness checks and analyses in an attempt to gain further insight on the effect of migration on FLFP. We first study the effect of migration at the intensive margins. In order to measure how labor hours changes in response to migration, we reduced our sample to only the women who work, excluding women who are not available on the job market. In creating this new sample, we want to be careful not to lose women who should be included as members of the labor force, but have simply not worked in the past 14 days. While not a perfect measure, we attempt to estimate this as best as possible by including women who—even if they did not work the past 14 days—have actively sought work over the past month. This reduces our sample size to 502 women, and running our analysis on this sample size still closely mirrors the results of our main estimate in sign and magnitude as displayed in Appendix 1-4.

Second, an area that we have yet to address is unpaid family work, that is, non-domestic and income-generating work such as farming, managing livestock, and market stall sales. Among women who work for household businesses, around 40% reported that they are unpaid family workers. We do not include a binary variable for unpaid family work in our main analysis because it is difficult to define this status, e.g. some respondents consider themselves for a particular job as being both employed outside the household and simultaneously as being unpaid family workers, leading to a degree of measurement error. More importantly, unpaid family work is a complicated classification because it does not exclude the worker from benefiting from the fruits of their labor. Essentially, profits made by the head of the household (from the unpaid worker's labor) could be redistributed to the worker in the form of food and housing, so that the worker is paid 'in kind' so to speak. Nonetheless, this type of role constrains the worker with a level of vulnerability and dependence and it is valuable to see how *FLH* responds to this as a control. When controlling for unpaid family work, our results do not change, but we see that unpaid family workers work 13.59 hours more over two weeks, and 29.7 hours more when there is a migrant in the household (see Appendix 1-8). This hints at the potential presence of a substitution effect. To investigate this effect in a different way, we employ a linear probability estimation and a probit regression to estimate the effect of *Migrant* on the likelihood of being an unpaid family worker. Results in Appendix 1-9 columns 2 (probit with random effects) and 3 (pooled OLS) show no significant relationship. Columns 4 and 5 add remittance status as a control, which itself has no effect, but in the linear probability model in column 5 migrant status slightly decreases the likelihood of becoming an unpaid

[16] The official exchange rate of local currency to US dollars is based on a monthly average of the 2007 period, and $1 = 3.44 TJS (World Bank, 2014).

[17] We use consumption rather than income since we seek to understand the effect of poverty, and consumption may be more reliable in separating poor from non-poor households. Also, the 2011 survey omits questions about consumption, and we therefore keep 2009 consumption levels constant for 2011, assuming limited variation in consumption across years. We anticipate that consumption does not change as rapidly as income, and believe that it is a reasonable basis for which to impute the missing data for 2011.

family worker. Due to multicollinearity, we again cannot interpret this estimation as causal, but gain some hint at the possible relationship between the two variables.

## 6. Conclusion

In contrast to the existing literature, we find that migrant status does not have an effect on FLFP in Tajikistan. The potential income effects from remittances that would normally decrease FLFP are possibly muted or neutralized by several countervailing factors. These factors include a household labor shortage (which increases the shadow wage of working at home); constrained employment opportunities outside the household; lack of remittances from the migrant; and the high cost of migrating (which may initially put the left-behind family in debt). Our analysis also does not reveal clear substitution effects, which may be neutralized by gender for both farming and non-farming activities. In Tajikistan, the determinants of FLFP are confounded by the economic situation, family structure, and cultural norms.

While migrant status does not have an effect on FLFP, the presence of a household farm has a positive and significant effect, increasing labor hours by 10.8 hours per week. This is a salient finding given that 66% of households own land, of which 86% are in rural areas. When a household is engaged in farm work, we find that women work more hours irrespective of migrant status. This may be partially explained by gender roles, because women are disproportionately relegated to farm-based work. In Tajikistan, there is discrimination in the labor market; constrained mobility for women; the emergence of pre-Soviet traditional and religious values, which emphasize women's roles as caretakers, and which are reinforced by the necessity and compatibility of farm work with child-rearing (Short, Chen, Entwisle, & Fengying, 2002).

For left-behind men, data allude to the presence of an income effect among wealthier households. In this group, having a migrant has a significant and negative effect on male work hours. While the analysis of male labor force participation lies beyond the scope of this paper, initial evidence indicates a vastly different effect of migration on the labor outcomes of left-behind men. Additionally, despite the absence of a household member (migrant), having a farm does not change the amount of labor hours for left-behind men.

Our research suggests that migration in Tajikistan, similar to the case of China, is shaped by labor decisions along gender lines. Additionally, a high level of job scarcity can push women and minority groups further out of the job market. Subsequently, even if migration increases FLFP, it may have negative implications for socio-economic development. For example, an increase in FLFP may simply lead to greater unpaid family work and the absence of spouses may exacerbate the situation of the left-behind women, as we find some evidence that women increase hours in unpaid family work in response to the household having a migrant.

In Tajikistan, around a quarter of the left-behind women are not in contact with their husbands. These women often rely on the generosity of their in-laws in order to provide for themselves and their children. Just as economic independence may increase the bargaining position of women and spark positive externalities, economic dependence could potentially have the opposite effect. Further research is needed to better understand the nuances of the effects of migration on the left-behind, such as on housework, and how women balance housework with paid and unpaid work.

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**Tables**

Table 1. Descriptive statistics of non-migrant and migrant households (year=2011)

| | Non-migrant HH | Migrant HH | Difference in means | Sig. level |
|---|---|---|---|---|
| Avg. hours worked by women | 9.64 | 7.55 | 2.10 | ** |
| Household size | 7.40 | 6.60 | 0.80 | *** |
| Location (rural=1, urban=0) | 0.67 | 0.76 | -0.09 | *** |
| HH head, wage | 0.04 | 0.05 | -0.02 | |
| No. of migrants in the HH | 0.00 | 1.60 | -1.60 | *** |
| No. of children < 14 years old | 2.19 | 1.91 | 0.29 | *** |
| No. of elderly > 65 years old | 0.27 | 0.19 | 0.08 | *** |
| Oblast= Dushanbe | 0.15 | 0.10 | 0.05 | ** |
| Oblast= Sogd | 0.28 | 0.20 | 0.08 | *** |
| Oblast= Khatlon | 0.26 | 0.23 | 0.03 | |
| Oblast= RRP | 0.23 | 0.30 | -0.07 | *** |
| Oblast= GBAO | 0.08 | 0.16 | -0.09 | *** |
| Mobile phone | 0.88 | 0.92 | -0.04 | ** |
| Job: family owned or rented farm | 0.10 | 0.09 | 0.01 | |
| Job: own account or HH business | 0.07 | 0.04 | 0.03 | ** |
| Job: working outside the HH | 0.14 | 0.11 | 0.03 | |
| Observations | 987 | 401 | | |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2. Impact of migrant status on average hours worked in 14 days per ***woman***

| | (1) OLS | (2) OLS | (3) IV | (4) FE | (5) IVFE |
|---|---|---|---|---|---|
| Migrant status | -1.799* | -1.825* | 0.372 | 2.401* | -2.728 |
| | (0.975) | (0.992) | (3.707) | (1.339) | (5.731) |
| Migrant*Farm | | 1.214 | 15.12* | -5.742 | -0.719 |
| | | (3.120) | (8.733) | (4.414) | (8.937) |
| RTH=head | | 0.458 | 0.488 | -6.122 | -4.360 |
| | | (5.151) | (3.559) | (6.524) | (5.485) |
| RTH=spouse/partner | | -6.371 | -5.391 | -5.157 | -5.845 |
| | | (5.335) | (3.353) | (6.449) | (5.143) |
| RTH=daughter | | 2.699 | 3.355 | -12.29* | -12.95* |
| | | (6.190) | (3.691) | (6.710) | (7.039) |
| RTH=daughter-in-law | | -2.512 | -1.860 | -7.665 | -7.539 |
| | | (5.637) | (3.439) | (6.395) | (5.113) |
| Age | | 2.163*** | 2.175*** | 4.489*** | 4.127*** |
| | | (0.656) | (0.575) | (1.281) | (1.365) |
| $Age^2$ | | -0.0237*** | -0.0240*** | -0.0592*** | -0.0542*** |
| | | (0.00782) | (0.00722) | (0.0137) | (0.0146) |
| Farm | | 23.91*** | 21.46*** | 22.78*** | 21.77*** |
| | | (1.708) | (2.159) | (1.657) | (2.279) |
| No. of children < 14 years old | | -0.300 | -0.312 | -0.202 | 0.0388 |
| | | (0.424) | (0.379) | (0.600) | (0.649) |
| 2007 | | 4.935*** | 5.264*** | 3.045 | 2.693 |
| | | (1.826) | (1.303) | (3.162) | (3.377) |
| 2009 | | 0.996 | 1.459 | -0.106 | -0.512 |

| | | | | | |
|---|---|---|---|---|---|
| | | (1.204) | (1.180) | (1.819) | (1.950) |
| Household size | | -0.429 | -0.418* | 0.565 | 0.284 |
| | | (0.259) | (0.242) | (0.443) | (0.520) |
| Rural=1, Urban=0 | | -3.823** | -4.079*** | 5.690* | 5.583 |
| | | (1.559) | (1.081) | (3.330) | (5.601) |
| HH head - wage | | 1.105 | 0.913 | -0.0447 | -0.0206 |
| earner | | (0.836) | (1.043) | (1.039) | (1.134) |
| HH head - employed | | 4.550*** | 4.579*** | 4.164*** | 4.018*** |
| | | (1.120) | (1.050) | (1.212) | (1.142) |
| HH has landline | | 0.691 | 0.571 | -0.485 | -0.468 |
| phone | | (1.684) | (1.108) | (1.595) | (1.521) |
| Land ownership | | 3.139** | 2.939*** | | |
| | | (1.283) | (0.975) | | |
| Constant | 13.37*** | -31.81** | -33.03*** | -74.61** | -65.40* |
| | (1.018) | (14.83) | (12.05) | (36.35) | (39.67) |
| Observations | 2454 | 2454 | 2454 | 2454 | 2454 |
| $R^2$ | 0.001 | 0.174 | 0.165 | 0.167 | |
| Adjusted $R^2$ | 0.001 | 0.168 | 0.158 | 0.162 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives, and non-relatives).

Table 3. Impact of migrant status on average hours worked in 14 days per woman, with additional interaction terms,

| | (1) OLS | (2) OLS | (3) IV | (4) FE | (5) IVFE |
|---|---|---|---|---|---|
| Migrant status | -1.799* | -1.665* | 1.972 | 2.130* | -5.723 |
| | (0.975) | (0.964) | (4.070) | (1.281) | (5.914) |
| Migrant*Farm | | 1.954 | 17.86* | -3.464 | 9.458 |
| | | (3.043) | (9.184) | (4.320) | (9.366) |
| RTH=head | | 1.416 | 1.248 | -4.451 | -1.412 |
| | | (5.445) | (3.605) | (6.694) | (5.557) |
| RTH=spouse/partner | | -5.326 | -4.102 | -4.069 | -4.654 |
| | | (5.598) | (3.354) | (6.400) | (5.116) |
| RTH=daughter | | 3.618 | 4.427 | -11.04 | -11.68* |
| | | (6.409) | (3.690) | (7.514) | (7.025) |
| RTH=daughter-in-law | | -1.187 | -0.414 | -6.596 | -6.185 |
| | | (5.927) | (3.445) | (6.400) | (5.108) |
| Age | | 2.150*** | 2.201*** | 4.066*** | 3.473** |
| | | (0.656) | (0.580) | (1.326) | (1.366) |
| $Age^2$ | | -0.0237*** | -0.0245*** | -0.0540*** | -0.0454*** |
| | | (0.00794) | (0.00729) | (0.0146) | (0.0146) |
| Farm | | 24.06*** | 21.30*** | 22.98*** | 20.52*** |
| | | (1.672) | (2.194) | (1.565) | (2.299) |
| No. of children < 14 years old | | -0.407 | -0.427 | -0.313 | 0.0169 |
| | | (0.431) | (0.379) | (0.632) | (0.650) |
| Dushanbe*2007 | | | | -2.773 | -2.905 |
| | | | | (4.379) | (3.923) |
| Dushanbe*2009 | | -1.936*** | -1.739 | -3.453 | -3.997 |
| | | (0.315) | (2.580) | (3.837) | (2.825) |
| Dushanbe*2011 | | 0.591 | 0.431 | | |
| | | (0.880) | (2.720) | | |
| Sogd*2007 | | 0.625 | 0.673 | | 4.716 |
| | | (2.594) | (2.368) | | (3.645) |
| Sogd*2009 | | -3.794 | -3.632 | -3.796 | 0.429 |

| | | | | | |
|---|---|---|---|---|---|
| | | (2.517) | (2.389) | (2.365) | (2.358) |
| Sogd*2011 | | -6.088*** | -6.306** | -4.771 | |
| | | (2.144) | (2.547) | (3.619) | |
| Khatlon*2007 | | 5.345 | 5.464** | 8.961** | 9.243** |
| | | (3.319) | (2.469) | (3.926) | (3.678) |
| Khatlon*2009 | | 0.972 | 1.435 | 5.409** | 5.672** |
| | | (2.443) | (2.545) | (2.337) | (2.473) |
| Khatlon*2011 | | -6.094*** | -7.090*** | | |
| | | (2.142) | (2.742) | | |
| RRP*2007 | | -2.081 | -2.200 | | 0.0186 |
| | | (2.636) | (2.494) | | (3.678) |
| RRP*2009 | | -6.442*** | -6.499** | -3.616 | -3.520 |
| | | (1.899) | (2.563) | (2.260) | (2.422) |
| RRP*2011 | | -3.855 | -4.523* | -0.666 | |
| | | (2.777) | (2.739) | (3.902) | |
| GBAP*2007 | | 0.248 | -0.204 | | -0.261 |
| | | (4.566) | (2.936) | | (4.084) |
| GBAP*2009 | | -2.601 | -3.119 | -3.254 | -3.211 |
| | | (2.386) | (2.966) | (3.530) | (2.993) |
| GBAP*2011 | | -1.982 | -2.732 | -1.202 | |
| | | (3.169) | (3.219) | (4.376) | |
| Household size | | -0.373 | -0.352 | 0.638 | 0.244 |
| | | (0.286) | (0.245) | (0.461) | (0.527) |
| Rural=1, Urban=0 | | -3.379** | -3.659*** | 7.120 | 7.175 |
| | | (1.546) | (1.129) | (4.556) | (5.614) |
| HH head - wage earner | | 1.032 | 0.895 | 0.182 | 0.144 |
| | | (0.762) | (1.056) | (1.030) | (1.142) |
| HH head - employed | | 4.070*** | 4.114*** | 3.778*** | 3.455*** |
| | | (1.085) | (1.056) | (1.250) | (1.147) |
| HH has landline phone | | 0.0389 | -0.0828 | -0.353 | -0.440 |
| | | (1.784) | (1.157) | (1.730) | (1.530) |
| Land ownership | | 2.928** | 2.707*** | | |
| | | (1.211) | (1.026) | | |
| Constant | 13.37*** | -28.36* | -30.31** | -67.24* | |
| | (1.018) | (14.36) | (12.10) | (34.45) | |
| Observations | 2454 | 2454 | 2454 | 2454 | 2454 |
| $R^2$ | 0.001 | 0.189 | 0.174 | 0.182 | 0.161 |
| Adjusted $R^2$ | 0.001 | 0.179 | 0.164 | 0.174 | -0.278 |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives, and non-relatives). Omitted variables in specifications 2-5 are *oblasts* interacted with years that do not change over time.

Table 4. Split-sample analysis, impact of migrant status on average hours worked in 14 days per woman.

| | a. Presence of a business | | | | b. Type of household business | | | |
|---|---|---|---|---|---|---|---|---|
| | HH business | | No HH business | | Farm | | Service | |
| | (1) FE | (2) IVFE | (3) FE | (4) IVFE | (5) FE | (6) IVFE | (7) FE | (8) IVFE |
| Migrant status | 0.0927 | 22.63 | 2.345* | -0.937 | -1.894 | -7.754 | -11.20 | -34.58 |
| | (5.665) | (25.03) | (1.210) | (5.120) | (7.778) | (14.25) | (16.70) | (86.81) |
| Age | -4.253 | -6.416 | 4.244*** | 3.998*** | -5.839 | -5.829 | -12.87 | -16.29 |
| | (4.621) | (5.640) | (1.286) | (1.342) | (4.941) | (5.041) | (9.678) | (16.06) |
| $Age^2$ | - | 0.0217 | -0.0613*** | - | 0.0483 | 0.0485 | 0.0986 | 0.143 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.00273 (0.0525) | (0.0640) | (0.0132) | 0.0580*** (0.0142) | (0.0684) | (0.0698) | (0.104) | (0.195) |
| # children < 14 years old | 2.061 (2.235) | 3.431 (2.889) | 0.0877 (0.400) | 0.0544 (0.404) | 1.327 (2.590) | 0.844 (2.816) | -3.977 (4.621) | -2.785 (6.508) |
| RTH=head | 11.38 (20.10) | 12.09 (22.36) | -10.64** (4.891) | -8.930 (5.550) | 11.95 (17.27) | | | |
| RTH=spouse/partner | 0.739 (22.78) | 9.915 (27.18) | -6.488 (4.730) | -6.751 (4.761) | 12.14 (12.93) | 1.624 (10.35) | -12.02 (22.11) | -11.71 (23.25) |
| RTH=daughter | | | -8.133 (6.384) | -8.793 (6.481) | | | | |
| RTH=daughter-in-law | -7.457 (25.66) | 1.237 (30.02) | -8.510* (4.709) | -8.421* (4.725) | | -8.824 (18.71) | | |
| 2007 | -9.157 (10.20) | -7.892 (11.43) | 1.541 (3.219) | 1.272 (3.254) | 9.670 (14.85) | 8.610 (15.30) | -22.46 (19.41) | -23.93 (21.08) |
| 2009 | -2.711 (5.414) | -1.392 (6.185) | 0.256 (1.748) | -0.0999 (1.834) | 6.628 (8.683) | 5.483 (9.154) | -15.87 (10.34) | -16.02 (10.87) |
| Constant | 211.2 (126.8) | 242.0* (144.8) | -53.72 (37.65) | -48.35 (38.63) | 172.7 (139.9) | 184.4 (139.0) | 422.8 (266.7) | 487.7 (366.3) |
| Observations | 416 | 416 | 2038 | 2038 | 207 | 207 | 209 | 209 |
| $R^2$ | 0.145 | | 0.042 | | 0.684 | | 0.207 | |
| Adjusted $R^2$ | -4.294 | | -0.601 | | -3.646 | | -7.683 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives, and non-relatives).

Table 5. Split-sample analysis, impact of migrant status on average hours worked in 14 days per woman, by HH per capita consumption (pcc)

| | (pcc < median) | | (pcc > median) | |
|---|---|---|---|---|
| | (1) FE | (2) IVFE | (3) FE | (4) IVFE |
| Migrant status | 0.802 | -13.30 | 2.881 | 2.347 |
| | (2.093) | (8.152) | (1.923) | (9.115) |
| Migrant*Farm | 5.999 | 23.20 | -11.12* | -8.377 |
| | (5.496) | (16.75) | (6.032) | (13.39) |
| RTH=head | -8.020 | -1.330 | 2.885 | 3.295 |
| | (7.149) | (8.403) | (9.927) | (11.27) |
| RTH=spouse/partner | -9.777 | -10.54 | 5.826 | 5.945 |
| | (6.919) | (7.459) | (9.633) | (9.656) |
| RTH=daughter | -17.14** | -18.83** | 6.888 | 6.750 |
| | (8.271) | (9.108) | (15.45) | (15.47) |
| RTH=daughter-in-law | -12.67* | -12.61* | -0.803 | -0.879 |
| | (6.872) | (7.304) | (9.665) | (9.756) |
| Age | 9.437*** | 8.772*** | 6.126*** | 6.072*** |
| | (2.247) | (2.408) | (2.073) | (2.243) |
| $Age^2$ | -0.118*** | -0.109*** | -0.0785*** | -0.0777*** |
| | (0.0239) | (0.0256) | (0.0219) | (0.0242) |
| Farm | 23.41*** | 19.48*** | 23.79*** | 23.29*** |
| | (2.524) | (4.211) | (2.543) | (3.291) |
| No. of children < 14 years old | 0.200 | 0.222 | -0.0933 | -0.0903 |
| | (0.709) | (0.743) | (0.638) | (0.646) |
| 2007 | 8.755 | 7.421 | 3.796 | 3.855 |
| | (5.533) | (5.834) | (4.475) | (4.616) |

| | | | | |
|---|---|---|---|---|
| 2009 | 3.181 | 1.067 | 1.927 | 1.964 |
| | (2.902) | (3.213) | (2.404) | (2.559) |
| Constant | -167.2*** | -151.7** | -109.1* | -108.4* |
| | (63.23) | (67.10) | (58.27) | (61.26) |
| Observations | 1064 | 1064 | 1390 | 1390 |
| $R^2$ | 0.264 | | 0.140 | |
| Adjusted $R^2$ | -0.531 | | -0.546 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives and non-relatives).

Table 6. Split-sample analysis, impact migrant status on average hours worked in 14 days per man, by HH per capita consumption (pcc)

| | (pcc < median) | | (pcc > median) | |
|---|---|---|---|---|
| | (1) FE | (2) IVFE | (3) FE | (4) IVFE |
| Migrant status | -3.354 | 1.388 | -4.510 | -2.808 |
| | (3.879) | (17.45) | (3.205) | (15.28) |
| Migrant*Farm | -6.079 | -227.3 | 11.13 | 6.486 |
| | (11.56) | (172.5) | (8.721) | (24.93) |
| Age | -0.217 | 0.442 | 1.221 | 1.242 |
| | (4.068) | (6.037) | (3.075) | (3.231) |
| Age^2 | -0.00468 | 0.0271 | -0.0336 | -0.0347 |
| | (0.0420) | (0.0684) | (0.0292) | (0.0330) |
| Farm | 7.678** | 23.02* | -1.721 | -0.954 |
| | (3.547) | (12.95) | (3.268) | (5.079) |
| No. of children < | 1.512 | 4.031 | 0.0697 | 0.0361 |
| 14 years old | (1.059) | (2.468) | (0.915) | (0.934) |
| Year2007 | 5.641 | 21.02 | -6.325 | -6.405 |
| | (9.350) | (17.88) | (7.162) | (7.210) |
| 2009 | 6.409 | 12.27 | -2.483 | -2.503 |
| | (4.795) | (8.316) | (3.804) | (3.839) |
| Constant | 39.14 | -52.90 | 46.52 | 47.37 |
| | (115.2) | (181.5) | (90.68) | (92.51) |
| Observations | 795 | 795 | 1065 | 1065 |
| $R^2$ | 0.072 | | 0.010 | |
| Adjusted $R^2$ | -0.894 | | -0.770 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

**Appendix**

1-1: Mean comparison of households from 2009 with households re-interviewed in 2011, and those that were not

| | Re-interviewed in 2011 | Not re-interviewed | Difference | P-value |
|---|---|---|---|---|
| Average hours worked in 14 hours | 10.2429 | 10.4565 | -0.2136 | 0.8603 |
| Number of working age women | 2.2793 | 1.8655 | 0.4138 | 0.0000 |
| Number of working age men | 2.0931 | 1.7076 | 0.3855 | 0.0002 |
| Household size | 6.8011 | 5.9064 | 0.8946 | 0.0003 |
| Gender of household head | 0.8311 | 0.7661 | 0.0650 | 0.0358 |
| Education of household head | 0.5863 | 0.5906 | -0.0043 | 0.9143 |
| No. of children <14 years old | 2.1944 | 2.0292 | 0.1652 | 0.2396 |

| | | | | |
|---|---|---|---|---|
| No. of elderly >64 | 0.2883 | 0.3099 | -0.0217 | 0.6367 |
| Mobile phone = 1 | 0.7965 | 0.8070 | -0.0105 | 0.7485 |
| Land ownership = 1 | 0.6164 | 0.4854 | 0.1310 | 0.0010 |
| Drinking water: urban plumbing = 1 | 0.5248 | 0.6491 | -0.1243 | 0.0021 |
| Rural=1, Urban=0 | 0.6607 | 0.4854 | 0.1753 | 0.0000 |
| Observations | 1332 | 171 | | |

1-2: First-stage results, fixed effects linear regression

| Variables | (1) *Migrant* | (2) *Farm*Migrant* |
|---|---|---|
| RTH=head | 0.332*** | 0.010 |
| | (0.09905) | (0.03168) |
| RTH=spouse/partner | -0.139 | -0.026 |
| | (0.09721) | (0.03109) |
| RTH= daughter | -0.129 | -0.003 |
| | (0.13483) | (0.04313) |
| RTH=daughter-in-law | 0.046 | 0.020 |
| | (0.09852) | (0.03152) |
| Age | -0.062** | 0.006 |
| | (0.02525) | (0.008085) |
| Age^2 | 0.001*** | -0.000 |
| | (0.00026) | (0.000) |
| Farm | -0.033 | -0.004 |
| | (0.04411) | (0.01407) |
| No. of children < 14 years old | 0.043*** | 0.004 |
| | (0.01125) | (0.003602) |
| Dushanbe*2007 | 0.011 | -0.007 |
| | (0.07579) | (0.02424) |
| Dushanbe*2009 | -0.024 | -0.007 |
| | (0.05415) | (0.01731) |
| Sogd*2007 | -0.005 | -0.015 |
| | (0.07026) | (0.02248) |
| Sogd*2009 | -0.008 | 0.006 |
| | (0.04533) | (0.01449) |
| Khatlon*2007 | 0.003 | -0.019 |
| | (0.07065) | (0.02260) |
| Khatlon*2009 | -0.001 | -0.031** |
| | (0.04681) | (0.01497) |
| RRP*2007 | -0.016 | -0.012 |
| | (0.7073) | (0.02262) |
| RRP*2009 | 0.009 | -0.007 |
| | (0.04705) | (0.01504) |
| GBAO*2007 | -0.091 | 0.005 |
| | (0.07670) | (0.02452) |
| GBAO*2009 | -0.063 | -0.003 |
| | (0.05637) | (0.01802) |
| Household size | -0.056*** | -0.005** |

| | | |
|---|---|---|
| | (0.007701) | (0.002462) |
| Rural=1, Urban=0 | 0.015 | -0.004 |
| | (0.1084) | (0.03467) |
| HH head - wage earner | 0.035 | 0.012* |
| | (0.02183) | (0.006981) |
| HH head - employed | -0.021 | 0.012* |
| | (0.02182) | (0.006977) |
| HH has landline phone | 0.008 | 0.010 |
| | (0.02948) | (0.009425) |
| Migrant density | 0.712*** | 0.022 |
| | (0.08010) | (0.02561) |
| Land ownership*Migrant density | 0.062 | 0.975*** |
| | (0.1742) | (0.05568) |
| Constant | 1.529** | -0.047 |
| | (0.7398) | (0.2365) |
| Observations | 2,454 | 2,454 |
| R-squared | 0.245 | 0.353 |
| Individuals, per panel | 818 | 818 |
| F test of excluded instruments: | | |
| Angrist-Pischke Migrant density | 18.47 | |
| Angrist-Pischke Migrant density * Farm | | 30.34 |
| Cragg-Donald Wald F statistic | 40.73 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives and non-relatives).

1-3. Impact of migrant status on average hours worked in 14 days per ***man***

| | (1) OLS | (2) OLS | (3) IV | (4) FE | (5) IVFE |
|---|---|---|---|---|---|
| Migrant status | -7.488*** | -3.769** | 10.19* | -2.704 | 6.299 |
| | (1.400) | (1.552) | (5.748) | (2.230) | (8.641) |
| Migrant*Farm | | 2.107 | -7.292 | 2.091 | 1.799 |
| | | (4.464) | (14.80) | (5.054) | (19.21) |
| Age | | 1.763* | 2.754*** | 4.925** | 5.722*** |
| | | (0.924) | (0.873) | (2.091) | (2.142) |
| Age^2 | | -0.0249** | -0.0380*** | -0.0751*** | -0.0860*** |
| | | (0.0114) | (0.0112) | (0.0200) | (0.0217) |
| Farm | | 1.738 | 3.539 | -0.295 | 0.0902 |
| | | (2.023) | (2.283) | (2.024) | (2.946) |
| No. of children < 14 years old | | 0.549 | 0.667 | 0.708 | 0.200 |
| | | (0.524) | (0.464) | (0.766) | (0.915) |
| Year2007 | | 0.983 | 2.042 | -2.586 | -1.920 |
| | | (1.710) | (1.523) | (4.710) | (5.067) |
| 2009 | | 0.632 | 1.575 | -1.335 | -0.738 |
| | | (1.655) | (1.316) | (2.401) | (2.702) |
| Household size | | 0.722** | 0.738*** | 0.656 | 1.194 |
| | | (0.338) | (0.273) | (0.558) | (0.729) |
| Rural=1, Urban=0 | | -4.737** | -5.406*** | 2.408 | 2.599 |

| | | | | | |
|---|---|---|---|---|---|
| | | (1.889) | (1.445) | (8.664) | (8.859) |
| HH head - wage earner | | 2.415* | 2.805* | 2.665 | 2.666 |
| | | (1.378) | (1.467) | (1.694) | (1.719) |
| HH head - employed | | 18.33*** | 18.94*** | 20.99*** | 21.29*** |
| | | (1.736) | (1.282) | (1.892) | (1.696) |
| HH has landline phone | | -1.602 | -1.280 | -2.786 | -2.606 |
| | | (2.051) | (1.509) | (2.266) | (2.210) |
| Land ownership | | 1.157 | 0.587 | | |
| | | (1.377) | (1.306) | | |
| Constant | 35.08*** | -11.12 | -31.77* | -57.83 | -76.22 |
| | (1.089) | (18.95) | (17.33) | (60.27) | (62.78) |
| Observations | 1860 | 1860 | 1860 | 1860 | 1860 |
| $R^2$ | 0.012 | 0.172 | 0.137 | 0.156 | |
| Adjusted $R^2$ | 0.012 | 0.166 | 0.131 | 0.150 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

1-4. Impact of migrant status on average hours worked in 14 days per woman at the intensive margins, sample restricted to women who have worked or sought work in at least one year

| | (1) OLS | (2) OLS | (3) IV | (4) FE | (5) IVFE |
|---|---|---|---|---|---|
| Migrant status | -1.535 | -0.540 | 5.032 | 3.752 | -6.025 |
| | (1.342) | (1.378) | (5.507) | (2.355) | (9.730) |
| Migrant*Farm | | 0.933 | 16.76 | -6.068 | 4.824 |
| | | (3.128) | (10.41) | (4.619) | (11.89) |
| RTH=head | | -4.186 | -3.662 | -10.32 | -7.332 |
| | | (5.033) | (5.000) | (9.139) | (8.481) |
| RTH=spouse/partner | | -8.110 | -5.764 | -8.360 | -9.242 |
| | | (5.291) | (4.818) | (8.831) | (7.993) |
| RTH=daughter | | 2.630 | 4.230 | -22.67** | -21.02* |
| | | (6.263) | (5.254) | (10.73) | (11.86) |
| RTH=daughter-in-law | | -3.458 | -2.009 | -13.55 | -11.60 |
| | | (6.020) | (4.920) | (8.564) | (8.193) |
| Age | | 2.519*** | 2.404*** | 7.036*** | 6.624*** |
| | | (0.789) | (0.850) | (2.108) | (2.184) |
| Age^2 | | -0.0276*** | -0.0265** | -0.0885*** | -0.0833*** |
| | | (0.00938) | (0.0105) | (0.0233) | (0.0232) |
| Farm | | 17.75*** | 14.97*** | 22.69*** | 20.53*** |
| | | (1.453) | (2.552) | (1.722) | (2.982) |
| No. of children < 14 years old | | -0.579 | -0.594 | -0.523 | -0.0437 |
| | | (0.662) | (0.549) | (0.958) | (1.091) |
| 2007 | | 7.924*** | 8.626*** | 6.089 | 5.126 |
| | | (2.620) | (1.899) | (4.857) | (5.391) |
| 2009 | | 2.148 | 3.185* | 0.667 | -0.296 |
| | | (1.648) | (1.702) | (2.778) | (3.177) |
| Household size | | -0.241 | -0.228 | 0.906 | 0.383 |
| | | (0.318) | (0.349) | (0.713) | (0.874) |
| Rural=1, Urban=0 | | -5.762*** | -6.217*** | 8.321 | 7.290 |
| | | (1.833) | (1.692) | (5.713) | (9.704) |
| HH head - wage earner | | 0.880 | 0.494 | 0.00330 | 0.0442 |
| | | (1.270) | (1.503) | (1.700) | (1.855) |
| HH head - employed | | 5.725*** | 5.799*** | 6.654*** | 6.503*** |
| | | (1.554) | (1.511) | (1.856) | (1.796) |
| HH has landline phone | | 2.177 | 2.093 | -0.937 | -1.100 |
| | | (1.874) | (1.678) | (2.848) | (2.586) |

| | | | | | |
|---|---|---|---|---|---|
| Land ownership | | 0.759 | 0.213 | | |
| | | (1.356) | (1.582) | | |
| Constant | 21.49*** | -30.73* | -30.73* | -123.3** | -109.8* |
| | (0.938) | (17.98) | (17.48) | (56.45) | (62.71) |
| Observations | 1506 | 1506 | 1506 | 1506 | 1506 |
| $R^2$ | 0.001 | 0.148 | 0.123 | 0.196 | |
| Adjusted $R^2$ | 0.000 | 0.138 | 0.112 | 0.187 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives, and non-relatives).

1-5. Impact of migrant status on average hours worked in 14 days by remittance-receiving (RR) and non-remittance-receiving (NRR) households

| | (1) FE(RR) | (2) IVFE(RR) | (3) FE(NRR) | (4) IVFE(NRR) |
|---|---|---|---|---|
| Migrant status | 3.709 | 1.306 | -0.606 | -10.63 |
| | (2.873) | (12.79) | (2.114) | (7.631) |
| Migrant*Farm | 13.55 | 115.5 | -14.22*** | -7.846 |
| | (9.018) | (131.8) | (5.316) | (11.32) |
| RTH=head | -5.316 | 0.117 | -5.024 | -3.191 |
| | (20.17) | (29.71) | (6.021) | (6.240) |
| RTH=spouse/partner | -0.830 | 6.817 | -6.537 | -10.30 |
| | (19.78) | (30.43) | (6.104) | (6.795) |
| RTH=daughter | -27.78 | 3.631 | -14.55* | -18.38** |
| | (18.59) | (48.49) | (8.030) | (8.578) |
| RTH=daughter-in-law | -12.21 | -9.289 | -9.024 | -12.29* |
| | (17.46) | (25.48) | (6.230) | (6.728) |
| Age | 0.137 | -9.648 | 2.860* | 2.241 |
| | (3.577) | (13.49) | (1.661) | (1.737) |
| $Age^2$ | -0.0341 | -0.0133 | -0.0360** | -0.0267 |
| | (0.0313) | (0.0527) | (0.0172) | (0.0187) |
| Farm | 17.58** | -41.84 | 23.02*** | 22.23*** |
| | (6.812) | (77.29) | (1.891) | (2.305) |
| No. of children < 14 years old | 0.221 | -0.475 | 0.0740 | 0.239 |
| | (0.985) | (1.747) | (0.551) | (0.570) |
| 2007 | -8.963 | -43.89 | 5.172 | 3.647 |
| | (10.24) | (45.81) | (3.869) | (4.124) |
| 2009 | -6.256 | -26.58 | 1.575 | -0.265 |
| | (5.730) | (26.37) | (2.141) | (2.603) |
| Constant | 69.27 | 439.4 | -38.40 | -24.08 |
| | (117.5) | (501.8) | (47.20) | (48.95) |
| Observations | 532 | 532 | 1922 | 1922 |
| $R^2$ | 0.341 | | 0.146 | |
| Adjusted $R^2$ | -1.823 | | -0.483 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives and non-relatives).

1-6. Impact of migrant status on average hours worked in 14 days per woman, including remittance-receiving status as a control variable

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|

| | OLS | OLS | IV | FE | IVFE |
|---|---|---|---|---|---|
| Migrant status | -1.723* | -2.067** | 0.360 | 2.387* | -2.990 |
| | (0.960) | (0.965) | (3.905) | (1.415) | (5.660) |
| Migrant*Farm | | 1.196 | 15.09* | -5.471 | 0.341 |
| | | (3.115) | (8.793) | (4.376) | (8.968) |
| Remittance dummy | | 0.775 | -0.488 | 0.0857 | 1.540 |
| | | (0.987) | (1.736) | (1.268) | (1.917) |
| RTH=head | | 0.377 | 0.515 | -6.182 | -4.561 |
| | | (5.139) | (3.544) | (6.531) | (5.410) |
| RTH=spouse/partner | | -6.445 | -5.348 | -5.187 | -6.280 |
| | | (5.303) | (3.375) | (6.502) | (5.259) |
| RTH=daughter | | 2.471 | 3.246 | -12.21* | -12.99* |
| | | (6.156) | (3.703) | (6.723) | (7.073) |
| RTH=daughter-in-law | | -2.574 | -1.821 | -7.595 | -7.948 |
| | | (5.618) | (3.449) | (6.446) | (5.152) |
| Age | | 2.203*** | 2.195*** | 4.463*** | 4.055*** |
| | | (0.647) | (0.571) | (1.284) | (1.375) |
| Age$^2$ | | -0.0243*** | -0.0243*** | -0.0598*** | -0.0542*** |
| | | (0.00770) | (0.00716) | (0.0137) | (0.0147) |
| Farm | | 23.95*** | 21.46*** | 22.74*** | 21.62*** |
| | | (1.712) | (2.169) | (1.668) | (2.289) |
| No. of children < 14 years old | | -0.301 | -0.329 | -0.186 | 0.0320 |
| | | (0.424) | (0.380) | (0.599) | (0.635) |
| 2007 | | 4.970*** | 5.194*** | 2.731 | 2.572 |
| | | (1.825) | (1.282) | (3.170) | (3.364) |
| 2009 | | 1.031 | 1.370 | -0.292 | -0.467 |
| | | (1.214) | (1.149) | (1.834) | (1.906) |
| Household size | | -0.441* | -0.412* | 0.533 | 0.276 |
| | | (0.263) | (0.245) | (0.442) | (0.496) |
| Rural=1, Urban=0 | | -3.924** | -4.095*** | 5.706* | 5.696 |
| | | (1.548) | (1.062) | (3.314) | (5.614) |
| HH head - wage earner | | 1.104 | 0.882 | -0.00747 | -0.0139 |
| | | (0.837) | (1.039) | (1.039) | (1.135) |
| HH head - employed | | 4.652*** | 4.571*** | 4.275*** | 4.177*** |
| | | (1.129) | (1.037) | (1.217) | (1.140) |
| HH has landline phone | | 0.633 | 0.543 | -0.496 | -0.586 |
| | | (1.673) | (1.109) | (1.605) | (1.527) |
| Land ownership | | 3.125** | 2.957*** | | |
| | | (1.290) | (0.965) | | |
| Constant | 13.35*** | -32.46** | -33.22*** | -72.36** | -62.48 |
| | (1.017) | (14.69) | (11.92) | (36.46) | (39.80) |
| Observations | 2454 | 2454 | 2454 | 2454 | 2454 |
| $R^2$ | 0.001 | 0.174 | 0.165 | 0.167 | |
| Adjusted $R^2$ | 0.001 | 0.167 | 0.158 | 0.161 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives and non-relatives).

1-7. Split-sample analysis, impact of migrant status on average hours worked in 14 days per ***man***

| a. Presence of a business | | | | b. Type of household business | | | |
|---|---|---|---|---|---|---|---|
| HH business | | No HH business | | Farm | | Service | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |

| | FE | IVFE | FE | IVFE | FE | IVFE | FE | IVFE |
|---|---|---|---|---|---|---|---|---|
| Migrant status | 0.419 | 47.60 | -5.415* | -18.26 | 2.424 | -133.7 | -2.007 | 33.09 |
| | (4.862) | (31.60) | (2.945) | (11.85) | (10.03) | (283.0) | (6.872) | (45.62) |
| Age | -0.625 | 1.799 | -1.606 | -2.118 | 2.022 | 14.73 | -1.212 | 0.834 |
| | (4.359) | (5.357) | (2.853) | (2.932) | (7.061) | (31.09) | (6.593) | (7.649) |
| Age^2 | 0.00346 | -0.0423 | -0.0222 | -0.0136 | -0.0243 | -0.123 | 0.0225 | -0.0133 |
| | (0.0433) | (0.0591) | (0.0276) | (0.0290) | (0.0739) | (0.268) | (0.0630) | (0.0826) |
| No. of children < | 0.315 | -0.576 | 0.721 | 0.619 | -2.654 | 1.241 | 3.161* | 2.046 |
| 14 years old | (1.263) | (1.594) | (0.789) | (0.806) | (1.951) | (9.274) | (1.906) | (2.522) |
| 2007 | 4.926 | 0.885 | -9.504 | -10.31 | 16.54 | 50.30 | 3.070 | 0.914 |
| | (9.640) | (11.62) | (7.099) | (7.241) | (15.25) | (78.54) | (14.97) | (16.55) |
| 2009 | 5.248 | 2.454 | -4.605 | -5.606 | 15.05* | 35.54 | 3.427 | 0.688 |
| | (5.003) | (6.152) | (3.790) | (3.950) | (8.566) | (46.94) | (7.643) | (9.039) |
| Constant | 56.54 | 35.25 | 134.5 | 143.5* | -5.890 | -373.0 | 44.56 | 21.85 |
| | (124.0) | (146.1) | (85.31) | (86.96) | (198.9) | (892.0) | (190.9) | (210.1) |
| Observations | 669 | 669 | 1191 | 1191 | 230 | 230 | 439 | 439 |
| $R^2$ | 0.035 | | 0.027 | | 0.301 | | 0.028 | |
| Adjusted $R^2$ | -1.578 | | -0.844 | | -2.903 | | -2.062 | |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

1-8. Impact of migrant status on average hours worked in 14 days per woman

| | (1) OLS | (2) OLS | (3) IV | (4) FE | (5) IVFE |
|---|---|---|---|---|---|
| Migrant status | -1.609 | -2.153** | -3.435 | 1.878 | -1.122 |
| | (1.030) | (0.974) | (3.549) | (1.216) | (5.346) |
| Migrant*Farm | | 1.615 | 15.40* | -4.835 | 0.322 |
| | | (3.407) | (8.544) | (4.864) | (8.519) |
| Unpaid family worker | 16.88*** | 9.925*** | 10.59*** | 13.58*** | 13.59*** |
| | (2.285) | (2.528) | (1.779) | (1.875) | (1.842) |
| Unpaid family worker*Migrant | 8.854** | 10.64** | 8.323 | 15.25** | 16.11*** |
| | (4.328) | (4.712) | (5.414) | (5.967) | (5.871) |
| RTH=head | | -0.119 | 0.369 | -6.121 | -5.075 |
| | | (5.268) | (3.520) | (6.501) | (5.264) |
| RTH=spouse/partner | | -6.491 | -6.121* | -5.103 | -5.419 |
| | | (5.475) | (3.312) | (6.134) | (4.955) |
| RTH=daughter | | 2.165 | 2.489 | -12.54* | -12.87* |
| | | (6.302) | (3.651) | (7.505) | (6.796) |
| RTH=daughter-in-law | | -2.595 | -2.261 | -8.005 | -7.989 |

| | | | | | |
|---|---|---|---|---|---|
| | | (5.840) | (3.399) | (6.169) | (4.913) |
| Age | | 2.055*** | 1.973*** | 3.848*** | 3.631*** |
| | | (0.621) | (0.568) | (1.187) | (1.107) |
| Age$^2$ | | -0.0231*** | -0.0220*** | -0.0616*** | -0.0582*** |
| | | (0.00741) | (0.00715) | (0.0149) | (0.0142) |
| Farm | | 21.23*** | 18.53*** | 19.37*** | 18.33*** |
| | | (1.973) | (2.185) | (1.709) | (2.270) |
| No. of children < 14 years old | | -0.340 | -0.362 | -0.303 | -0.177 |
| | | (0.426) | (0.376) | (0.583) | (0.616) |
| Household size | | -0.435 | -0.443* | 0.514 | 0.362 |
| | | (0.263) | (0.240) | (0.447) | (0.493) |
| Rural=1, Urban=0 | | -3.753** | -3.690*** | 8.067*** | 8.053 |
| | | (1.585) | (1.064) | (2.243) | (5.401) |
| HH head - wage earner | | -0.705 | -0.999 | -0.205 | -0.245 |
| | | (0.914) | (0.905) | (0.953) | (1.065) |
| HH head - employed | | 5.814*** | 5.678*** | 2.763** | 2.584** |
| | | (1.005) | (0.888) | (1.064) | (1.037) |
| HH has landline phone | | 0.737 | 0.650 | -1.155 | -1.194 |
| | | (1.583) | (1.096) | (1.712) | (1.467) |
| Land ownership | | 2.751** | 2.781*** | | |
| | | (1.300) | (0.961) | | |
| Constant | 12.12*** | -26.73* | -25.13** | -45.03* | |
| | (1.058) | (14.01) | (11.85) | (25.96) | |
| Observations | 2454 | 2454 | 2454 | 2454 | 2454 |
| $R^2$ | 0.052 | 0.187 | 0.182 | 0.214 | 0.211 |
| Adjusted $R^2$ | 0.051 | 0.181 | 0.175 | 0.209 | -0.196 |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$. RTH stands for relationship to head, is a dummy variable, and the reference category is all other (mother, other relatives and non-relatives).

1-9. Impact of migrant status on unpaid family worker (binary), Linear Probability Model vs Probit

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | OLS | Probit | OLS | Probit | OLS |
| Migrant status | -0.0295** | -0.166 | -0.0144 | -0.195 | -0.0182 |
| | (0.0127) | (0.130) | (0.0115) | (0.143) | (0.0136) |
| Migrant*Farm | | -0.383 | -0.137* | -0.377 | -0.136* |
| | | (0.318) | (0.0738) | (0.319) | (0.0741) |
| Age | | 0.00442 | -0.000577 | 0.00556 | -0.000523 |
| | | (0.0631) | (0.00817) | (0.0631) | (0.00815) |
| Age^2 | | 0.000121 | 0.0000271 | 0.000104 | 0.0000264 |
| | | (0.000795) | (0.000105) | (0.000796) | (0.000105) |
| Farm | | 1.013*** | 0.225*** | 1.011*** | 0.225*** |
| | | (0.129) | (0.0408) | (0.129) | (0.0408) |
| No. of children < 14 years old | | 0.0555 | 0.00676 | 0.0556 | 0.00686 |
| | | (0.0403) | (0.00525) | (0.0403) | (0.00525) |
| Household size | | -0.0366 | -0.00404 | -0.0374 | -0.00417 |
| | | (0.0246) | (0.00267) | (0.0247) | (0.00265) |
| Rural=1, Urban=0 | | -0.128 | -0.0145 | -0.131 | -0.0148 |
| | | (0.119) | (0.0142) | (0.119) | (0.0142) |
| HH head - wage earner | | -0.185* | -0.0215** | -0.184* | -0.0215** |
| | | (0.104) | (0.0109) | (0.104) | (0.0109) |
| HH head - employed | | 0.366*** | 0.0423*** | 0.373*** | 0.0432*** |
| | | (0.0884) | (0.0116) | (0.0897) | (0.0118) |
| HH has landline phone | | -0.0653 | -0.00485 | -0.0677 | -0.00504 |

| | | | | | |
|---|---|---|---|---|---|
| | | (0.133) | (0.0131) | (0.133) | (0.0131) |
| Land ownership | | 0.357*** | 0.0375*** | 0.356*** | 0.0374*** |
| | | (0.116) | (0.0121) | (0.116) | (0.0121) |
| Remittance dummy | | | | 0.0607 | 0.00863 |
| | | | | (0.123) | (0.0121) |
| Constant | 0.0730*** | -2.195* | 0.0169 | -2.216* | 0.0155 |
| | (0.0116) | (1.252) | (0.159) | (1.253) | (0.159) |
| Observations | 2457 | 2457 | 2457 | 2457 | 2457 |
| $R^2$ | 0.0023 | | 0.0765 | | 0.0766 |
| Adjusted $R^2$ | 0.0018 | | 070430 | | 0.0702 |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

1-10. Cross-sectional analysis of ***women's*** hours worked in the past 14 days: 2007, 2009, and 2011

| | 2007 | | 2009 | | 2011 | |
|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV |
| Migrant status | -0.0786 | 7.819* | 0.699 | -31.39*** | -2.376** | 2.971 |
| | (0.765) | (4.021) | (1.510) | (10.40) | (0.936) | (2.480) |
| Migrant*Farm | 2.024 | -19.35* | 7.173 | 81.59*** | 0.944 | 14.80* |
| | (2.478) | (10.21) | (4.954) | (21.33) | (3.339) | (8.461) |
| Age | 2.365*** | 2.765*** | 0.254 | -0.656 | 1.149*** | 1.237** |
| | (0.372) | (0.421) | (0.460) | (0.753) | (0.348) | (0.491) |
| Age^2 | -0.0291*** | -0.0343*** | -0.00197 | 0.00951 | -0.0160*** | -0.0171*** |
| | (0.00458) | (0.00547) | (0.00603) | (0.00970) | (0.00440) | (0.00632) |
| Farm | 23.97*** | 27.96*** | 26.84*** | 16.00*** | 20.93*** | 18.09*** |
| | (1.375) | (2.264) | (2.248) | (3.659) | (1.943) | (2.518) |
| No. of children < 14 years old | -0.538 | -0.511** | -1.301*** | -2.113*** | -1.245*** | -1.465*** |
| | (0.446) | (0.260) | (0.401) | (0.556) | (0.400) | (0.368) |
| Household size | -0.0125 | 0.00396 | 0.0348 | 0.176 | 0.383 | 0.550** |
| | (0.169) | (0.156) | (0.243) | (0.292) | (0.283) | (0.217) |
| Rural=1, Urban=0 | -0.835 | -1.230 | -1.956 | -0.896 | -4.236*** | -4.783*** |
| | (1.543) | (0.929) | (1.644) | (1.622) | (0.992) | (1.074) |
| HH head - employed | 3.266*** | 3.669*** | 2.521* | 0.558 | 23.44*** | 21.39*** |
| | (0.999) | (0.665) | (1.324) | (1.590) | (2.732) | (2.246) |
| HH has landline phone | 3.074*** | 3.138*** | 0.286 | 0.852 | 1.498 | 1.416 |
| | (1.132) | (0.856) | (1.131) | (1.698) | (0.933) | (1.219) |
| Land ownership | 4.398*** | 4.240*** | 0.163 | 1.037 | 1.342 | 0.570 |
| | (1.567) | (0.786) | (1.347) | (1.270) | (1.110) | (0.934) |
| Constant | -34.69*** | -43.39*** | 5.812 | 28.65* | -8.935 | -12.22 |
| | (7.111) | (8.343) | (8.022) | (15.27) | (7.620) | (9.592) |
| Observations | 5316 | 5316 | 1595 | 1595 | 1435 | 1435 |
| $R^2$ | 0.108 | 0.089 | 0.176 | | 0.245 | 0.206 |
| Adjusted $R^2$ | 0.107 | 0.087 | 0.170 | | 0.239 | 0.199 |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

1-11. Cross-sectional analysis of ***men's*** hours worked in the past 14 days: 2007, 2009, and 2011

| | 2007 | | 2009 | | 2011 | |
|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV |
| Migrant status | -4.227*** | -4.539 | -7.675*** | -29.65** | -3.306* | 9.191* |
| | (1.091) | (5.609) | (1.913) | (12.33) | (1.913) | (4.868) |
| Migrant*Farm | 2.930 | 5.999 | 8.334* | 37.45 | 8.069** | 8.694 |
| | (3.098) | (13.89) | (4.242) | (23.96) | (3.847) | (14.88) |
| Age | 2.689*** | 2.688*** | 1.074 | 0.410 | 2.203*** | 2.971*** |
| | (0.506) | (0.483) | (0.848) | (0.896) | (0.736) | (0.807) |
| Age^2 | -0.0342*** | -0.0342*** | -0.0133 | -0.00454 | -0.0330*** | -0.0441*** |
| | (0.00628) | (0.00625) | (0.0103) | (0.0116) | (0.00945) | (0.0105) |
| Farm | 6.026*** | 5.602** | 8.450*** | 4.685 | 1.414 | 2.757 |
| | (1.602) | (2.196) | (2.381) | (3.851) | (2.173) | (2.635) |
| No. of children < 14 years old | 0.607 | 0.603** | 1.065* | 0.717 | -1.139 | -1.236** |
| | (0.392) | (0.295) | (0.557) | (0.606) | (0.721) | (0.565) |
| Household size | 0.285 | 0.284* | 0.0770 | 0.0430 | 1.029** | 1.168*** |
| | (0.234) | (0.172) | (0.341) | (0.332) | (0.447) | (0.341) |
| Rural=1, Urban=0 | -2.857* | -2.845*** | -0.0552 | 1.113 | -5.650*** | -6.750*** |
| | (1.505) | (0.990) | (1.962) | (1.890) | (2.070) | (1.611) |
| HH head - employed | 18.01*** | 18.01*** | 12.35*** | 11.52*** | 19.47*** | 21.63*** |
| | (1.550) | (0.711) | (2.611) | (1.881) | (1.936) | (2.053) |
| HH has landline phone | -1.547 | -1.569* | 4.665*** | 5.357*** | 0.0760 | -0.260 |
| | (1.174) | (0.945) | (1.587) | (1.959) | (1.249) | (1.844) |
| Land ownership | 1.591 | 1.572* | 1.778 | 1.961 | 1.170 | 0.862 |
| | (1.337) | (0.851) | (1.688) | (1.359) | (1.736) | (1.353) |
| Constant | -28.84*** | -28.74*** | -1.858 | 13.43 | -13.14 | -28.80* |
| | (10.16) | (9.430) | (17.93) | (17.85) | (15.25) | (15.58) |
| Observations | 4649 | 4649 | 1477 | 1477 | 1223 | 1223 |
| $R^2$ | 0.161 | 0.161 | 0.140 | 0.066 | 0.150 | 0.102 |
| Adjusted $R^2$ | 0.159 | 0.159 | 0.133 | 0.058 | 0.141 | 0.093 |

Standard errors are clustered at the primary sampling unit and displayed in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.