Migration impact on left-behind women's labour participation and time-use

Evidence from Kyrgyzstan

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Abstract: This paper aims to study the impact of migration on labour supply and time-use of women left behind in Kyrgyzstan. Using the household survey data for 2011, labour supply is measured by occupational choices and working hours. Apart from the labour supply data, this study uses detailed information on daily time-use, which is analysed within women's occupations. This approach makes it possible to indicate the impact of migration not only through the labour supply analysis, which may be limited by reflecting labour market behaviour only, but also through the measure of allocation of time among different activities at home. To address the issue of endogeneity, the instrumental variable approach is applied. Results show that the migration of a household member increases the choice of left-behind women to be unpaid family workers. Most of the left-behind women choose unpaid family work and work more hours in this occupation. Although in the labour supply analysis wage-employment is not affected by migration, time-use model estimations reveal that wage-employed women are mostly affected through increases in the time for housework.

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1   Introduction

Migration of the existing labour force may change the labour force participation of those left behind. Dominantly male-based migration may result in the increase of labour supplied by women, and contribute to women's empowerment (Amuedo-Dorantes and Pozo 2006). However, changes in labour supply by women may not directly lead to involvement in remunerative jobs, but to work within the household, which is unpaid (Binzel and Assaad 2011; Cabegin 2006; Lokshin and Glinskaya 2009; Mendola and Carletto 2008).

Along with changes in the labour supply, migration impacts on the left-behind women may be reflected in their time-use. Increased working hours or household duties of women due to migration of household members potentially increases the time devoted to working in paid and unpaid employment, while reducing the time for activities important for women and household welfare, such as leisure, personal care, childcare, and education. Despite the importance of the migration impact on the time-use of women and its implications for their welfare, there is little empirical evidence relating to this effect. To our knowledge there are only a few studies that focus on the migration impact on time-use of left-behind household members (Chang et al. 2011; Chen 2013; Powers and Wang 2013). In these studies time-use is mostly analysed from the perspectives of intra-household responsibility allocation among left-behind household members. Moreover, activities in time-use analysis in some of these studies remain aggregated and do not reflect details of time-use for paid work and housework.

The objective of this paper is to study the impact of migration on occupation choice, working hours, and time-use of women left behind in Kyrgyzstan, which receives one of the largest inflows of remittances as a percentage of GDP in the world.[1] According to different evaluations, from 10 to 20 per cent of the Kyrgyzstan population are migrants. Russia is the major destination country for labour migrants from Kyrgyzstan. Data from the National Statistical Committee of Kyrgyz Republic (NSCKR) (2015a) show that employment rate for the female population is 49 per cent, while for men it is almost 70 per cent. Women are mostly employed in the services sector, with comparatively low remuneration. According to the NSCKR (2015a), there is also a difference in daily time-use allocation: women men spend three times more hours than men engaged in housework and twice as much time for childcare. Moreover, men have one hour more of free time per day. In particular, the housework burden is evident in rural areas. A Kyrgyz Republic Government report (2015) notes that under the conditions of poverty in a household there is a risk of human capital degradation for women, because as a strategy for coping with poverty women decrease the time allocated to personal care (leisure, health, sleeping, etc.). It is also noted that the sharp decline in the number of preschool education institutions since independence is one of the factors that restricts employment opportunities for most women.

This study draws on the cross-sectional household survey dataset 'Life in Kyrgyzstan' for 2011. One of the main empirical challenges in migration-related empirical studies is endogeneity and selectivity bias (for instance, see: Bettin et al. 2012; Binzel and Assaad 2011). To address this issue, a conditional mixed process with the instrumental variable is applied, as suggested by Roodman (2011). Following the earlier literature, the migration network is used as the instrumental variable,

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[1]According to Ratha et al. (2016), in 2014 remittances received in Kyrgyzstan accounted for 30.3 per cent of GDP, which is the largest share after Tajikistan in the Europe and Central Asia region.

which indicates the share of households in the community that have at least one member who lived abroad for labour purposes in the past five years.

Apart from the labour supply data, this paper uses detailed information on daily time-use, which offers the option of analysing time allocation between several activities for women affected by migration. Moreover, time-use of women is analysed within the occupations of women, which allows us to study in detail the time-use impact of migration. It indicates the impact of migration not only through the labour supply analysis, which may be limited only by labour market behaviour, but also attempts to understand the potential burden that migration of household members places on left-behind women through the measure of allocation of time between different activities at home. Therefore, it contributes to the literature with an approach that uses both labour supply and time-use analysis to understand the possible burden of migration on left-behind women in a more comprehensive scope. To our knowledge this is the first empirical study of the impact of migration on women's labour force participation and time-use in the specific case of Kyrgyzstan.

The paper is organized as follows. Section 2 includes a review of the literature on the topic of migration impact on labour supply and time-use. Section 3 provides information about the empirical strategy, given the endogeneity and selectivity bias concerns. In Section 4, a description of the dataset and summary statistics is presented. Section 5 discusses estimation results of the impact of migration on occupational choices, working hours, and time-use. Section 6 concludes.

2   Literature review

One of the important research questions in analysis of migration impact is the gender differentials in left-behind labour force participation. In general, labour migration may have different effects on labour force participation of left-behind household members. Migration for remittances may serve as an extra income to invest in an existing household enterprise or to start a new business, and may increase productivity (Funkhouser 1992; Lucas 1987; Petreski and Mojsoska-Blazevski 2015; Piracha et al. 2013). However, remittances as a consequence of household member migration may increase the reservation wage of those household members who stay at home, and decrease their labour supply (for instance, see: Airóla 2008; Amuedo-Dorantes and Pozo 2006; Binzel and Assaad 2011; Justino and Shemyakina 2012; Khan and Valatheeswaran 2016; Killingsworth 1983; Mendola and Carletto 2008; Rodriguez and Tiongson 2001).

Moreover, migration may cause reallocation of labour within the household in order to replace the migrants' labour. Left-behind women may try to take over jobs that were previously done by the migrant household member. This potential effect in the long term may enhance women's empowerment. There exist few studies on the labour supply of left-behind women, and these indicate different results. Amuedo-Dorantes and Pozo (2006), for Mexico, show that in rural areas increases in remittances reduces women's labour supply in informal and unpaid activities. Lokshin and Glinskaya (2009), examining the impact of male migration on the labour force participation of women in Nepal, found that females in migrant-sending households reduce their market paid work. Studies by Cabegin (2006) show that in the Philippines migration reallocates labour supply of non-migrant women from paid jobs to work in the home, while higher remittances reduced participation of married men in the paid job market. Mendola and Carletto (2008), analysing the migration impact on the labour supply of left-behind family members, state that having a current migrant abroad decreases the labour supply of women in paid work and increases their unpaid work. However, women in households that have members with past migration experience have higher probabilities of engaging in self-employment and are less likely to supply unpaid work, which suggests that over time migration may increase women's empowerment. A study by Binzel and Assaad (2011) on

Egypt shows that remittances from migrant workers abroad decrease female labour participation in wage work in urban areas, while females in rural areas are more likely to be employed in unpaid family work. Abdulloev et al. (2014) examined the role of migration and education for the gender gap in labour force participation in Tajikistan. Their results indicate that international migration, which is mainly male-based, reduces domestic labour market participation by men, while education of women increases female participation. A study by Khan and Valatheeswaran (2016) on Kerala in India suggests that migration reallocates left-behind households' male members towards self-employment, while females are allocated towards household duties.

Empirical evidence suggests that migration may increase women's employment in the domestic economy. However, their employment might be related to unpaid domestic work in order to substitute for the loss of labour force caused by migration of a household member. It is also possible that upon receiving remittances women may start their own business in non-agricultural sectors, which is important for economic development. As the most negative effect, migration may increase women's inactivity and dependence on remittances from abroad. But most of the above-mentioned studies indicate that there is a higher probability that left-behind women decrease their participation in paid jobs, while increasing their unpaid workload within the family. Therefore, in analysis of the impact of migration on women's employment, it is crucial to focus on their occupational choices. Moreover, employment activities should be measured not only by indication of occupation and sector of employment, but also at the intensive margin – that is, working hours.

However, it is also possible that migration may have little influence over the occupation and working hours of women left behind, as women adopt strategies to compensate for the absence of migrated household members and to cope with poverty through decreasing the time devoted to personal care, childcare, or other activities, which are important for well-being and human capital development of both women and other members of the household (Blackden et al. 2006; Mark Pitt and Rosenzweig 1990). In this case, analysis of occupational choices and working hours only gives information about labour market behaviour; for full understanding of migration implications for welfare of left-behind women it is necessary to also focus on their activities at home. Analysis of time-use gives the option to indicate the burden of housework on women and the time allocation for human capital and family work activities, which may be neglected in labour supply analysis (Esquivel et al. 2008).

To our knowledge there are only a few studies analysing migration and time-use in left-behind households. Chang et al. (2011) examined migration impact on time-use of left-behind elders and children for market work, agricultural work, and housework in China. They indicated that migration increases the time devoted to farm work and domestic work. Another study in China by Chen (2013) analysed the impact of paternal migration on time allocation of mothers and children. Results show that the maternal time for housework and income-generating work decreases, while shifting the housework burden to children. Powers and Wang's (2013) empirical study on Mexico found that in households with male migrants, the housework burden tended to shift from mothers to girls, while market work and agricultural work shifted from boys to mothers.

Following these empirical studies, one may expect that migration increases the labour supply of women, which under the conditions of having less time available for personal care, leisure, and caregiving at home, may have negative consequences over the long term. Another expected outcome is decreasing labour supply associated with different allocations of time among activities at home.

3   Data and descriptive statistics

This study is based on 2011 data of the 'Life in Kyrgyz Republic' survey. This survey is representative at the national level, and the total sample includes 3,000 households and more than 8,000 individuals. The survey was conducted by the German Institute for Economic Research (DIW) in Berlin and consists of individual-, household-, and community-level questionnaires. The dataset for the estimation was constructed using all three levels of data. The survey includes a wide range of data, including information on household characteristics, income, and expenditure of households. Moreover, this survey contains a special section on migration and remittances.

As the objective of the paper is to analyse the impact of migration on women's labour force participation and time-use, our sample for estimation includes females older than 17 and those who are considered as part of the labour force.[2] Therefore, those women who are enrolled in full-time education, disabled, too old, or cannot work because of childcare are excluded from the dataset. Our dataset consists of 2,267 individuals.

Table 1 presents the individual-, household-, and community-level characteristics by migrant status of households. On average, women from households with a migrant member have a slightly higher share of tertiary education. Among the household-level characteristics, household size has the most evident difference. In mean terms, households with a migrant member have more than six household members, while households without a migrant member have fewer than five household members. All location- and community-level characteristics show statistically significant differences between households by migrant status. A large proportion of the left-behind women are located in rural areas and in the southern region of the country. Also, there is a difference in economic characteristics. Most of the migrant-sending households do not have kindergarten or a major factory in their communities.

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[2] In order to focus on employable women we might include women older than 14. However, in the survey the individual questionnaire regarding individuals' labour supply was used only for those who are older than 17.

Table 1: Basic characteristics of women by migration status of households

	Total		Households without migrants		Households with migrant	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Individual-level characteristics						
Age	37.900	12.116	37.669	12.010	39.33**	12.679
Marital status (1 = married)	0.831	0.374	0.826	0.379	0.87*	0.340
Tertiary education	0.236	0.425	0.249	0.433	0.16***	0.366
Household-level characteristics						
Household size	5.190	2.384	4.970	2.336	6.55***	2.229
Number of children (aged 0–5)	0.613	0.836	0.605	0.836	0.660	0.838
Number of children (aged 6–14)	0.738	0.925	0.741	0.934	0.721	0.870
Number of dependent (over age 65)	0.155	0.422	0.155	0.425	0.156	0.405
Log of non-wage-income	10.419	1.750	10.382	1.774	10.65**	1.577
Location and community-level characteristics						
Residence (1 = rural)	0.609	0.488	0.584	0.493	0.76***	0.427
North	0.139	0.346	0.154	0.361	0.05***	0.213
South	0.515	0.500	0.456	0.498	0.88***	0.326
Central	0.346	0.476	0.390	0.488	0.073***	0.261
Kindergarten (1 = exists)	0.674	0.469	0.698	0.459	0.53***	0.500
Major factory (1 = exists)	0.402	0.490	0.433	0.496	0.21***	0.408
N	2,267		1,952		315	

Statistical significance shows the result of the two-sample *t*-test of means of households without a migrant member versus households with a migrant member.

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively

Source: authors, based on the 2011 Life in Kyrgyzstan survey.

Summary statistics on labour supply and time-use of women are given in Table 2. Women in households with migrants compared to those in non-migrant households in average terms are less likely to be employed in wage-employment, but have higher share of working within the home. Analogous difference by these two occupations are reflected in working hours: women from migrants' households work fewer hours as employees, with more hours of work demonstrated within their family role. Data on the daily time allocation by the main six activities reveal that women from migrants' households devote more hours to housework and gardening, with less time for paid work.

One may note possible difficulties in making distinctions between own-account work and contributing family work of women. In a developing country where agriculture production dominates, women may still be contributing family worker, but the household may reap benefits from their contribution to agricultural work. At the same time, it is also possible that members of households that have agricultural land are considered to be own-account workers, though they may have low productivity. In the dataset, 92 per cent of family contributing worker women indicated

agriculture as their sector of employment, while for own-account worker women the share of agriculture accounts for 36.5 per cent. Therefore, some portion of own-account workers and most of the family contributing workers represent family agricultural workers. Such a concentration on agriculture should be taken into account in analysis of the labour supply.

Table 2: Summary statistics on occupation choice and time-use of women

	Total		Households without migrants		Households with migrants	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Occupational choices						
Unemployed	0.213	0.410	0.207	0.406	0.248	0.432
Own-account worker	0.146	0.353	0.143	0.350	0.165	0.372
Employee	0.443	0.497	0.463	0.499	0.324***	0.469
Contributing family worker	0.198	0.398	0.187	0.390	0.263***	0.441
Working hours						
Employee	17.530	21.352	18.445	21.590	11.885***	18.897
Own-account worker	5.637	14.856	5.569	14.819	6.061	15.103
Contributing family worker	5.962	13.460	5.731	13.314	7.395**	14.275
Daily time-use						
Personal care	11.226	1.744	11.237	1.787	11.157	1.445
Housework	4.500	2.757	4.453	2.741	4.797**	2.839
Caregiving	0.706	1.259	0.696	1.255	0.767	1.285
Leisure	2.773	1.935	2.751	1.931	2.914	1.957
Work time	4.078	4.117	4.184	4.165	3.421***	3.747
Gardening	0.716	1.398	0.679	1.375	0.944***	1.511

Statistical significance shows the result of the two-sample *t*-test of means of households without migrant members versus households with migrant members.

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively.

Source: authors, based on 2011 Life in Kyrgyzstan survey.

Descriptive statistics show that women from households with migrant members are more inclined to choose being a family contributing worker as their occupation, and to devote more of their daily time to activities such as housework and gardening, which are unpaid. These data provide evidence that migrant-sending households have more members and are mostly located in rural areas and southern regions of the country. Moreover, these households are located in communities where there are likely to be restricted employment opportunities and access to childcare services such as kindergarten.

4   Methodology

We measure the impact of migration on labour supply at extensive (occupation outcomes) and intensive margins (hours worked). Occupational choices of women are classified into four categories: unemployed, self-employed, wage-employed (employee), and unpaid household worker (family contributing worker). Empirical literature indicates that migration as a variable in estimations demonstrates an endogeneity issue (Bettin et al. 2012; Binzel and Assaad 2011; Mendola and Carletto 2008). Therefore, the probability of an individual choosing one of the occupation outcomes is estimated by a multinomial probit model with an endogenous regressor, which is formally presented as:

$$P(y_1 = j \mid x) = G(\beta_0 + \mathbf{Z}\beta) \tag{1}$$

$$y_2 = x\theta + \xi$$

where occupational choice alternative is $j = 1,2,3,4$ and $\mathbf{Z} = (y_2, x_1)$, $x = (x_1, x_2)$, and β is a vector of structural parameters. y_1 is the multinomial dependent variable indicating labour market status of women, y_2 is the endogenous regressor migration status of the household, x_1 is the vector of explanatory variables, and x_2 is the instrumental variable.

Following the earlier literature, we use the migration network as the instrumental variable (Atamanov and van den Berg 2012; Binzel and Assaad 2011; Karymshakov et al. 2016; Lokshin and Glinskaya 2009; Mansuri 2006; Piracha et al. 2013). The migration network indicates the share of households in the community that have at least one member who lived abroad for labour purposes in the past five years. The migration network, by providing information for potential migrants and decreasing migration costs, therefore is considered as facilitating the migration process and increasing the probability of having a migrant member in households.

A multinomial probit model with an endogenous regressor is estimated by 'conditional mixed process', or CMP, which efficiently deals with multinomial dependent models with binary endogenous regressors (Karymshakov et al. 2016; Petreski and Mojsoska-Blazevski 2015).

To analyse the impact of migration on labour supply decisions of women at the intensive margins, the Tobit model with endogenous regressors (IV-Tobit) is used. Formally, the model is (Wooldridge 2010):

$$w_1{}^* = z\delta + u \tag{2}$$

$$w_2 = x\Pi + v$$

where $z = (w_2, x_1)$; $x = (x_1, x_2)$. The dependent variable $w_1{}^*$ is the vector of total hours of work supplied by women during the last seven days. w_2 is a vector of endogenous variables, in our case a dummy for migration in the household; while x_1 is a vector of exogenous variables at individual, household, and community levels. Analogous to the occupational choice model x_2 is the instrumental variable or in our case migration network. The impact of remittances on working hours is analysed within each of the above-mentioned occupational choices.

Another aspect of our empirical estimation is to investigate how migration of a household member affects the one-day time allocation of women left behind. The time-use of women at home is investigated among six categories: personal care, leisure, household and family-related work, child and elderly care, work time, and time related to work outside the household in the garden. Due to the zero inflated nature of the dependent variables, it is appropriate to use analogous Tobit models with an endogenous regressor.

$$w_1 = \begin{cases} 0, & w_1^* < 0 \\ w_1^*, & 0 \le w_1^* \le 24 \end{cases} \tag{3}$$

where the upper bound is restricted to 24 hours in a day. The survey of the time-use has been conducted not only in working days but in weekend days too. Time allocation of women on working days and weekend days may represent different patterns. Therefore, in time-use models the set of explanatory variables contains the dummy variable if the survey were conducted during weekend days.

The vector of explanatory variables x_1 includes individual-, household-, and community-level variables. According to the labour supply literature, the set of individual characteristics are shaping decision of individual regarding participating in the labour market and reflecting its potential market wage (Mendola and Carletto 2008). Thus, it is expected that better-educated and older women more likely to participate in the labour market, while married women are less likely to participate.

Household composition is given by four variables: the household size, the number of children up to five years, children aged 6–14 years, and the number of dependents. Empirical studies on women's labour supply assumes that the number of children or the time for childcare is factored into the labour supply decision of women as a fixed cost, which in turn lowers the net wage of women and decreases their labour participation. Women with preschool and school-aged children exhibit different patterns in terms of their participation in the labour force; mothers of pre-schoolers appear to be less sensitive to wage changes than do mothers of school-aged children (Ribar 1995). Hence the mothers may shift a portion of their duties in terms of household work to their teenage children (Hedges and Barnett 1972), which may positively affect labour market participation. Given this reason and to see the possible varying impact of children according to their ages, the two categories of children variables are presented in the model (preschool children (0–5 years) and school-aged (6–14 years) children). The presence of dependents in the household may have both positive and negative impacts on the labour supply of women. First, co-residence with an elderly household member may increase caregiving demand, which in turn may reduce labour supply both at intensive and extensive margins (Ettner 1995). On the other hand, an elderly person in the household may share women's household duties and childcare, thus supporting the labour supply of women (Hedges and Barnett 1972). Along with these household characteristics, and following neoclassical theory, it may be assumed that non-labour income of the household is one of the important factors for supplying labour. Women in a household with higher non-labour income may have a higher reservation wage and more leisure time, thus reducing labour participation (Binzel and Assaad 2011; Cabegin 2006; Chang et al. 2011; Lokshin and Glinskaya 2009).

The regional characteristics of households are presented by rural/urban settlement of household and by the dummy variable on residence in three main regions of Kyrgyzstan. Employment opportunities and availability of financial resources in a community play important roles in women's labour supply. Therefore, among explanatory variables we include dummies for the existence of a major factory for employment, a commercial bank, and the proportion of male adults who have regular jobs in a community.

Labour supply and time-use may have different patterns depending on the sector of employment, area of residence, and age of women. As already mentioned, the greatest portion of women work as contributing family workers employed in the agricultural sector, which may have implications for labour supply. To account for these possible differential effects along with baseline estimation models, the labour supply models with interaction dummies of migration and agriculture sector of employment are used. Analogously, time-use analysis is extended with estimations for rural and urban samples and age groups of women.

5   Empirical results

This section presents estimation results for labour participation and daily time-use of women left behind. All occupational choice models are estimated within the CMP. Section 5.1 gives estimation results on labour supply of women at extensive and intensive margins. Section 5.2 presents the estimation results of migration impact on women's allocation of time.

5.1 Migration impact on occupational choice and work hours

The first-stage estimation results (see Table A4 in the Appendix) show that the instrumental variable—migration network—is highly significant in explaining the migration in the household. Significance of correlations between error terms of the occupational choice and work hours equations with the first-stage equation (atanhrho_25, atanhrho_45) demonstrate that using the instrumental variable technique for estimation is appropriate.

Table 3 presents marginal effects of estimation results of migration impact on occupational choices. Results are given in MNP and IV-MNP model specifications. Simple multinomial probit model estimations without instrumental variable do not indicate any impact of migration on occupational choices of women. But results of multinomial probit model with the instrumental variable approach show that migration of a household member has an impact on unpaid family worker women and, at a less statistically significant level, on self-employed women. This result also indicates that disregarding the endogeneity related to migration may lead to biased results. Thus, in Kyrgyzstan migration of a household member increases the probability of women being self-employed or a family worker to 24.32 per cent and 32.56 per cent, respectively. This finding is in accordance with the literature and supports the finding of increasing labour supply for unpaid family work (Binzel and Assaad 2011; Mendola and Carletto 2008).

Most of the other explanatory variables have the expected signs. Age of the individual positively affects the choice of women to be involved in remunerative works (self-employed and wage-employee). Married women are more likely to be self-employed or unpaid family workers. Higher educational background has a positive impact only on wage-employment, and is negatively associated with being a family worker, thus showing that more educated women are more likely to undertake remunerative works, and less likely to stay at home, though the statistical significance is low.

Table 3: Estimation results for migration impact on occupational choices (marginal effects)

	Self-employed		Employee		Family worker	
	MNP	IV-MNP	MNP	IV-MNP	MNP	IV-MNP
Migration (1 = household has migrant)	0.0391	0.2432*	−0.0609	0.1229	−0.0049	0.3156**
Individual characteristics						
Age	0.0085***	0.0077***	0.0160**	0.0212*	0.0008	0.0000
Marital status (1 = married)	0.3001***	0.2995***	−0.0306	−0.0882	0.1290***	0.1222***
Tertiary education	0.0595	0.0567	0.4800***	0.6168***	−0.0946**	−0.0877*
Household characteristics						
Household size	−0.0364***	−0.0469***	−0.0226	−0.0344	−0.0275***	−0.0414***
Children (0–5 years)	0.0034	0.0242	0.0698	0.1092	0.0227	0.0442*
Children (6–14 years)	0.0655***	0.0742***	0.0006	0.0006	0.0021	0.0178
Dependent (over 65 years)	−0.0343	−0.0411	0.2215*	0.3240*	0.0327	0.0280
Non-wage income	0.1125***	0.1149***	−0.1002	−0.1635	0.0993***	0.1045***
Residence (1 = rural)	0.0419	0.0463	0.1184*	0.1354	0.3073***	0.3085***
Regional dummies:						
North	0.0190	0.0225	−0.0966	−0.1474	0.1928***	0.1908**
South	−0.0348	−0.0628	−0.2158*	−0.3483*	0.1625***	0.1169**
Community characteristics						
Kindergarten	0.1454***	0.1569***	0.2021**	0.2652**	0.0959***	0.1090***
Major factory	−0.0699	−0.0630	0.2295	0.3631	−0.3169***	−0.3153***
	MNP	IV-MNP				
Observation	2,267	2,267				
Wald χ²	323.30***	684.52***				
Log likelihood	−2,319.08	−3,035.77				
atanhrho_25 (self-employed-migration eq.)	–	−0.3463*				
atanhrho_35 (employee-migration eq.)	–	−0.1188				
atanhrho_45 (family worker—migration eq.)	–	−0.6754**				

Reference group for dependent variable: unemployed women.

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. For coefficient estimates and first-stage results of the models, see Tables A2 and A4, respectively.

Source: authors.

Larger household size decreases the probability of women being self-employed or an unpaid family worker. This may suggest that a larger number of adults of working age in a household means availability of labour force that decreases women's labour force participation. However, larger household size does not imply only a higher number of working-age adults—the number of school-age children in a household may contribute to labour for housework and give the opportunity for older household members to use their time for other activities. This argument to some extent is supported by the positive sign of the variable indicating number of children aged 6–14 in a household. This result shows that a larger number of school-age children in a household increases the probability of women being self-employed.

The other way household composition impacts on women's labour supply is through the number of dependents over 65 years in the household; with every increase in the number of household members being from an older aged family member, the probability of women being wage-employed

increases. This probably could be explained by the fact that adults over 65 years take responsibility for looking after children in the household, thereby allowing a woman to engage herself in wage-employment.

Women residing in households with higher non-labour income are more likely to be self-employed or unpaid family workers. This effect can be interpreted differently for these two occupation choices. Women in households with higher non-labour income may have disincentives to work, or these households with higher non-labour income can sustain women staying at home as unpaid family workers. On the other hand, higher non-labour income may indicate the availability of capital in the household, which can increase women's self-employment activities.

Results of the location characteristics show that residing in rural areas raises the probability of women being unpaid family workers to 30.85 per cent. Analogously, women in northern and southern regions, which are mostly rural areas, are more inclined to be unpaid family workers compared to those in the central region. This effect reflects comparatively larger employment opportunities available in the central region, which includes the capital city.

Variables controlling for community characteristics show that the existence of any source of employment in the community, in our case a major factory, reduces the probability of women being unpaid family workers. The second community variable—existence of kindergarten in the community—shows that such a service increases the probability of women being involved in all three occupations. This result does not suggest a strong argument that the availability of childcare as a public service in a community increases certain remunerative occupation choices by women, since it positively affects unpaid family work too. But bearing in mind that the reference group for three occupational choices is unemployment, it can be argued that availability of childcare services increases labour force participation of women in general, including in unpaid family work.

Labour supply changes may appear not only in occupational choices, but also in working hours within occupational choices. Estimation results of migration impact on working hours by Tobit models are presented in Table 4. Results indicate that migration increases work hours of unpaid family workers only. It increases work hours supplied by women as family workers on average by 15.37 hours per week.

Most of the explanatory variables have the expected signs, and parallel the results on occupational choices. With increasing age women have more working hours as wage-employees, while unpaid family workers decrease their work hours. Higher educational background is positively associated with more work hours in wage-employment, and negatively in the remaining two occupations. The effects of household composition on work hours demonstrate that labour force participation by women is affected by the other members of the household differently according to age group. Children aged 6–14 increase working hours of women in self-employment activities. School-age children may provide support for women in a household to increase their working hours and self-employment activities. Dependents aged over 65 to some extent may provide childcare support that gives the option to women to work more hours as wage-employed, which is generally characterized as less intensive work compared to self-employment. The presence of a dependent in a household may prevent women work more in self-employment due to the conditions of intensity and necessity for physical strength. In particular, non-wage income demonstrates significant positive influence on higher working hours within unpaid family work and self-employment, while reducing wage-employment hours.

Table 4: Estimation results for migration impact on work hours (marginal effects)

	Self-employed		Employee		Family worker	
	Tobit	IV-Tobit	Tobit	IV-Tobit	Tobit	IV-Tobit
Migration (1 = household has migrant)	1.2686	4.1828	−0.6311	−1.6749	−0.4363	15.3726***
Individual characteristics						
Age	0.0658*	0.0604	0.1672***	0.1695***	−0.0872***	−0.1252***
Marital status (1 = married)	6.8760***	6.8624***	−1.7416*	−1.7310*	2.2329***	2.3029**
Tertiary education	−3.7486***	−3.7881***	7.0102***	7.0185***	−5.2509***	−5.7989***
Household characteristics						
Household size	−0.4343*	−0.5508*	−0.1259	−0.0840	−0.1717	−0.8609***
Children (0–5 years)	−0.4705	−0.2937	1.1762**	1.1115*	0.0256	1.0903**
Children (6–14 years)	1.3919***	1.5251***	−0.3762	−0.4229	−0.3305	0.3639
Dependent (over 65 years)	−2.9222***	−2.9099***	3.0034***	2.9960***	0.1302	0.3735
Non-wage income	2.5588***	2.6128***	−2.1620***	−2.1750***	1.7299***	2.1750***
Residence (1 = rural)	−2.6722***	−2.6814***	−1.1663	−1.1649	5.6934***	6.1513***
Regional dummies:						
North	0.1787	0.1699	−2.4816**	−2.4795**	3.2535***	3.3504***
South	−0.2629	−0.7390	−4.4531***	−4.2814***	3.5958***	1.1634
Community characteristics						
Kindergarten	1.4118	1.5753	1.8848**	1.8275*	0.65592	1.5233**
Major factory	−0.9452	−0.9738	4.3675***	4.834***	−7.8954***	−8.9219***
No. observations	2,265	2,265	2,252	2252	2,265	2,265
LR χ^2	193.39***	–	684.11***	–	640.03***	–
Wald χ^2	–	131.18***	–	615.48***	–	251.12***
Log likelihood	−2,335.99	−2,930.23	−5,605.67	−6,200.80	−2,703.71	−3,289.61
Pseudo R^2	0.0397	–	0.0575	–	0.1058	–
Wald test, (χ^2)	–	0.25	–	0.04	–	14.39***

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses.

For coefficient estimates and first-stage results of the models see Tables A3 and A4, respectively.

Source: authors.

Along with these results of the baseline model, it is important to consider the possible effect of migration labour supply by sectors of employment. In particular, under the conditions of migration of a household member, for most rural left-behind women the agricultural sector presents the most likely sector for employment. However, labour supply of women may differ by their involvement in agricultural works. Women working in agriculture may be self-employed or may work as unpaid family workers. In order to consider this possible effect we used an interaction dummy for migration and a variable indicating whether women were employed in agriculture (see Tables A5 and A6). Results show that migration of a household member increases the probability of women who are employed in agriculture being self-employed or unpaid family workers by 66.92 per cent

and 81.47 per cent, respectively. This effect is considerably higher if we consider the impact of migration alone without interaction in the baseline model (see Table 3). Further results on work-hour estimations indicate that among those women who are from migrant households and employed in agriculture, unpaid family workers work more hours—up to 36.73 hours per week, which is almost two times higher than baseline estimations for work hours.

In general, these findings suggest that the migration effect on labour force participation of left-behind women is concentrated on becoming family workers. However, this labour supply effect is mostly related to employment in agriculture. Dominance of the agriculture sector demonstrates the fact that for left-behind women off-farm employment strategies are not widespread. Moreover, involvement of women in self-employment in agriculture may not be considered as full entrepreneurship activity, because in general these activities are characterized by small-scale farming that does not require particular labour skills (for instance, see Piracha and Vadean 2010). Along with this, the necessity for physical strength for work in agriculture may have negative effects on the human capital of women.

5.2 Migration impact on daily time-use of women

Labour supply analysis may not reveal full effects of migration on women's welfare as it lacks information about their time distribution at home. Migration impact on left-behind female family members' labour participation may have indirect effects through changing women's time-use, as they may allocate time to other duties to compensate for the absence of the migrant household member. Thus women may have to reallocate their personal care and leisure time for work, caregiving, and household duties to carry out the migrant's duties in the household (Mendola and Carletto 2008).

Table 5 presents estimation results on time-use by women. Daily time is allocated in to six groups of activities. Results of the total sample suggest that migration decreases the time of left-behind women devoted to caregiving and leisure. However, women from households with a migrant abroad increase their work time by more than three hours per day compared to women from non-migrant households.

Estimations of time-use by women within occupation types show that women who are unpaid family workers are mostly affected by migration through increasing working time by almost 6.6 hours, while decreasing their time for caregiving, though this effect does not demonstrate strong statistical significance. Wage-employed women from migrant households increase their time used for household and family-related work, such as cooking, cleaning, laundry, etc. But they tend to decrease their time for leisure, though at low statistical significance. Unemployed women in migrant households work less in gardening than the women in non-migrant households, while increasing the hours devoted to other household and family works. The personal care time of women is not affected by migration of household members.

Table 5: IV-Tobit model estimation results for migration impact on daily time-use of women (marginal effects)

	Total sample	Daily time-use within occupational choices			
		Self-employed	Employee	Family worker	Unemployed women
Personal care	0.6107	−0.0433	1.3189	1.9024	1.1306
Housework	0.7881	−3.1844	2.1662**	−1.8480	1.8322*
Caregiving	−0.7660**	−0.4754	−06761	−2.0021*	−0.1325
Leisure	−1.3491***	−2.9702	−1.1587*	0.4731	−1.0831
Work time	2.9546***	7.0082	−1.0993	6.6117**	–
Gardening	−0.4691	−0.8508	−0.3899	−1.9589	−1.0309**

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively.

For detailed model estimations and the set of explanatory variables, coefficient estimates, and first-stage results of the models, see Table A7 (total sample), A8 (self-employed sample), A9 (employee sample), A10 (family worker sample), A11 (unemployed sample), and A12 (first-stage results).

Source: authors.

Overall results show that migration significantly influences work time of unpaid family workers by decreasing the time devoted to caregiving, while women having other types of occupation are affected differently. Wage-employed women are less likely to change their time for work, but more likely to be influenced by migration of a household member by reallocating her non-market time, decreasing her time for leisure (for activities such as going to the cinema, theatre, conversation with friends, sports, reading, social activities, etc.) and increasing her time for household and family-related works. Self-employed women are less likely to be influenced by migration, while unemployed women in migrant households are likely to devote more time to household work and reduce time for animal care, yard work, and gardening. These findings support the argument that migration results in reallocation of women's time primarily towards duties in the household.

Time-use patterns of individuals may differ significantly by residence and age group because urban and rural livelihoods focus on different activities or an individual may spend more time on particular activities depending on their age. To account for this potential heterogeneity in time-use, the set of subsample estimations for women by residence and age groups are provided.

Table 6 presents marginal effects of the IV-Tobit model for urban and rural samples. Estimation for rural and urban samples reveals a statistically significant impact of migration on personal care of the urban women in the sample, which is not indicated in the total sample. Thus, women in migrant households in urban areas are more likely to undertake personal care activities, such as sleeping, getting rest, visiting a doctor, going to school or university, and self-education, for 2.43 more hours than those in non-migrant households.

Table 6: IV-Tobit model estimation results for migration impact on daily time-use of women by residence (marginal effects)

	Total sample	Daily time-use by residence	
		Urban	Rural
Personal care	0.6107	2.4352***	−1.0197
Housework	0.7881	−0.7449	2.0875*
Caregiving	−0.7660**	−0.6534*	−0.9538*
Leisure	−1.3491***	−1.8052***	−1.1006*
Work time	2.9546***	1.1968	4.4210**
Gardening	−0.4691	0.0030	−0.9173

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively.

The coefficient estimates and first-stage results of the models can be provided upon request.

Source: authors.

Nevertheless, the opposite results are found for rural women in the sample, who tend to increase the time devoted to work. Interestingly, both urban and rural women in migrant households tend to reduce time for caregiving. Further estimation with respect to age categories shows that women aged 29–50 are most affected by migration through the reduction of caregiving and leisure and increasing work time (see Table 7)

Table 7: IV-Tobit model estimation results for migration impact on daily time-use of women by age groups (marginal effects)

	Total sample	Daily time-use by age groups		
		Younger than 28 years	29–50 years	Older than 50 years
Personal care	0.6107	−0.4259	0.8419	1.7259
Housework	0.7881	0.7675	1.0114	0.4739
Caregiving	−0.7660**	−0.1124	−1.4916***	0.2306
Leisure	−1.3491***	−1.5163*	−1.3485**	−1.0655
Work time	2.9546***	3.2222*	3.6148**	0.4878
Gardening	−0.4691	0.1754	−0.5647	−1.5052

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively.

The coefficient estimates and first-stage results of the models can be provided upon request.

Source: authors.

These results confirm that apart from the labour supply, migration has considerable effects on the time-use of left-behind women. In general, women in migrant-sending households appear to reduce their time for leisure and caregiving and increase work time and housework. In particular, unpaid family workers spend more time working. This time-use analysis demonstrates that wage-employed women are affected through increased time engaged in housework, although labour supply analysis indicated an impact on self-employed and family workers only. Taking into account the fact that urban women increase their time for personal care, some evidence on migration's positive impact can be asserted. However, for most of the left-behind women, migration of a household member shows negative effects: decreasing time for caregiving and leisure, while

increasing work time. Moreover, the most potentially negatively affected women are those in rural areas and those in the 29–50 age cohort.

Empirical literature on this topic points to the possible allocation of housework among household members, which can be reflected in time-use patterns of women, especially mothers. Therefore, one may argue that less caregiving by left-behind women might be compensated by other members of the left-behind household, especially by sons and daughters. More detailed analysis of this possible effect requires additional information on time-use by children, but individual data used in this study includes only those older than 18. But time-use model estimation variables on household size and children (aged 6–14) may provide some indirect evidence on this possible effect. Results on the total sample and employee sample indicate that household size has a positive impact on the leisure time of women, while there being children aged 6–14 has a statistically significant positive effect on the caregiving time only in the case of the unemployed women in the sample. These findings suggest that there is a possible impact of other household members on women's time allocation. But there is not sufficient evidence to argue that the shifting of duties from women to other household members alleviates possible negative effects of migration on time-use of women.

6   Conclusion

This paper aimed to study the impact of migration on occupation choice, working hours, and time-use of women left behind in Kyrgyzstan, drawing on the cross-sectional household survey dataset. Migration may have considerable effects on labour supply by left-behind household members. However, labour supply analysis may be limited by focusing on labour market behaviour only, while the burden caused by migration of household members may be reflected in the allocation of time between different activities at home. This study contributes to the literature through its focus on time-use along with the labour supply analysis of left-behind women.

Our main finding indicates that migration effects on labour force participation of left-behind women are concentrated on unpaid family workers. Most of the left-behind women choose unpaid family work and work more hours in this occupation. Further analysis reveals that these labour supply effects are mostly related to employment in agriculture, which suggests that increases in women's labour market participation in remunerative works in off-farm employment are limited. These findings are in line with previous empirical studies that indicate higher probabilities of left-behind women decreasing market work and increasing family work (Binzel and Assaad 2011; Lokshin and Glinskaya 2009; Mendola and Carletto 2008). However, one may argue that women working as family-contributing workers in agriculture indeed may benefit from the agricultural production and may also experience improvements in their level of empowerment. However, within the available data our analysis did not control for possible returns for women from their participation as contributing workers in agriculture. Further research on this possible effect with data from a longer period of time would contribute to exploring this effect.

Findings in time-use model estimations suggest that women in migrant-sending households reduce their time for leisure and caregiving, while increasing time for work and housework. Estimations of time-use by occupational subsamples provide interesting findings. In the labour supply analysis, wage-employment as an occupational choice is not influenced by migration, although wage-employed women are mostly affected through increases in time engaged in housework. Therefore, even though migration of a household member may not alter labour market behaviour for some left-behind women, its burden may be reflected in the allocation of time at home through increasing time for housework.

From the long-term point of view, more work in agriculture and more time devoted to work, and less time for leisure, may have a negative effect on the human capital of left-behind women. Moreover, less time devoted to childcare may decrease children's educational performance. These negative consequences for human capital development may be reflected more in those households where left-behind women are wage employed. However, further studies on allocation of duties among household members that are affected by migration may provide more detailed insights into possible shifting of housework from women to other household members.

These findings have several policy implications. First, under the conditions of decreasing caregiving time it is important to increase access to the preschool education institutions for children. According to the NSCKR (2015b: 44), in 2014 only 19.5 per cent of children were engaged in preschool education. Access to these education institutions in rural area is two times lower than in urban parts of the country. Increasing access to preschool education would provide children with education services, while giving opportunities for women to work in paid employment. Second, decreasing the amount of unpaid family work for women is important. For this, opportunities should be provided to access the labour market. Policy interventions in this regard might include enlarging educational opportunities for women working as family workers, such as short-term training programmes on business skills or other programmes oriented to provide skills that are required in local labour markets.

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Appendix

Table A1: Variables definition

Dependent variables	
Labour participation	1 = individual is unemployed
	2 = individual is self-employed
	3 = individual is wage-employed
	4 = individual is unpaid family worker
Working hours	The amount of hours worked during the last seven days
Diary-time allocation	Personal care time
	Household and family-related time
	Child and elderly care time
	Leisure time
	Work time
	Gardening time
Explanatory variables	
Migration	1 = household has at least one migrant; 0 = otherwise.
Migration*agricultural sector	1 = household has migrant and woman is employed in agricultural sector
Individual characteristics:	
Age	Age (years).
Marital status	1 = married; 0 = single
Education level	
Basic, secondary, technical	1 = woman has basic, secondary, or technical education; 0 = otherwise
Tertiary education	1 = woman has tertiary education; 0 = otherwise
Household characteristics:	
Household size	The total number of household members
Children (0–5 years)	The number of children in the household aged 0–5 years
Children (6–14 years)	The number of children in the household, aged 6–14 years
Dependent (over 65 years)	The number of dependents in household aged over 65 years
Non-wage income	The total of non-wage income the household receives (logarithm)
Residence	1 = the household resides in a rural area, 0 = otherwise
Regional dummies	

North	1 = the household resides in Issyk-Kul, Naryn, or Talas oblast; 0 = otherwise
South	1 = the household resides in Jalal-Abad, Batken, or Osh oblast, 0 = otherwise
Central	1 = the household resides in Chui oblast or Bishkek city, 0 = otherwise
Community characteristics:	
Kindergarten	1 = presence of kindergarten; 0 = otherwise
Major factory	1 = presence of a major factory/other source of employment; 0 = otherwise
Instrumental variable:	
Migration network	Share of households with migrants abroad in last five years, in total household number in the community.

Source: authors.

Table A2: Estimation results for migration impact on occupational choices (coefficient estimates)

	Self-employed		Employee		Family worker	
	MNP	IV-MNP	MNP	IV-MNP	MNP	IV-MNP
Migration	0.1044	0.6305*	−0.162	0.3332	−0.0174	0.9186***
(1= household has migrant)	(0.1614)	(0.3240)	(0.2171)	(0.7209)	(0.1566)	(0.3277)
Individual characteristics						
Age	0.0231***	0.0210***	0.0436***	0.0551**	0.0029	0.0002
	(0.0055)	(0.0057)	(0.0159)	(0.0272)	(0.0055)	(0.0056)
Marital status (1 = married)	0.9948***	1.0165***	−0.0842	−0.2351	0.5298***	0.5023***
	(0.2116)	(0.2169)	(0.2602)	(0.3921)	(0.1799)	(0.1815)
Tertiary education	0.1587	0.1526	1.8533**	2.5341*	−0.3598*	−0.3348
	(0.1645)	(0.1715)	(0.7646)	(1.3435)	(0.1987)	(0.2045)
Household characteristics						
Household size	−0.0985***	−0.1282***	−0.0614	−0.0893	−0.0964***	−0.1462***
	(0.0341)	(0.0364)	(0.0423)	(0.0625)	(0.0347)	(0.0370)
Children (0–5 years)	0.0091	0.0663	0.1898	0.2836	0.0796	0.1560*
	(0.0828)	(0.0861)	(0.1237)	(0.1870)	(0.0804)	(0.0838)
Children (6–14 years)	0.1772***	0.2029***	0.0015	0.0016	0.0075	0.063
	(0.0631)	(0.0656)	(0.0841)	(0.1172)	(0.0624)	(0.0651)
Dependent (over 65 years)	−0.0928	−0.1123	0.6019**	0.8411*	0.1143	0.0990
	(0.1414)	(0.1427)	(0.2855)	(0.4808)	(0.1284)	(0.1278)
Non-wage income	0.3045***	0.3142***	−0.2723	−0.4246	0.3477***	0.3691***
	(0.0413)	(0.0415)	(0.1719)	(0.3054)	(0.0463)	(0.0458)
Residence (1 = rural)	0.1139	0.1275	0.3185*	0.3498	1.2194***	1.2373***
	(0.1486)	(0.1517)	(0.1848)	(0.2470)	(0.1844)	(0.1836)
Regional dummies:						
North	0.0510	0.0610	−0.2546	−0.3748	0.5862***	0.5838***
	(0.1859)	(0.1900)	(0.2545)	(0.3694)	(0.2062)	(0.2084)
South	−0.0942	−0.1716	−0.5957*	−0.9385*	0.5755***	0.4158**
	(0.1553)	(0.1690)	(0.3128)	(0.5417)	(0.1711)	(0.1822)
Community characteristics						
Kindergarten	0.4076***	0.4474***	0.5368**	0.6847**	0.3543***	0.4101***
	(0.1410)	(0.1426)	(0.2291)	(0.3404)	(0.1305)	(0.1303)
Major factory	−0.1907	−0.1736	0.6499	1.0084	−1.2468***	−1.2518***
	(0.1549)	(0.1587)	(0.4135)	(0.7092)	(0.1912)	(0.1942)
Constant	−5.1550***	−5.1910***	0.8746	1.7654	−5.3315***	−5.3655***
	(0.5596)	(0.5606)	(1.0204)	(1.7449)	(0.6002)	(0.5887)

	MNP	IV-MNP
No. observations	2,267	2,267
Wald χ²	323.30***	684.52***
Log likelihood	−2,319.0859	−3,035.7772
atanhrho_25 (self-employed-migration eq.)	−	−0.3463*
atanhrho_35 (employee-migration eq.)	−	−0.1188
atanhrho_45 (family worker – migr. eq.)	−	−0.6754**

Reference group for dependent variable: unemployed women. *,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. For margin estimates see Table 3.

Source: authors.

Table A3: Estimation results for migration impact on work hours (coefficient estimates)

	Self-employed		Employee		Family worker	
	Tobit	IV-Tobit	Tobit	IV-Tobit	Tobit	IV-Tobit
Migration	6.6646	21.8811	−1.6784	−4.3907	−2.1333	67.9696***
(1 = household has migrant)	(5.9776)	(30.9900)	(2.7817)	(14.2638)	(3.5032)	(18.9065)
Individual characteristics						
Age	0.3459*	0.3164	0.4448***	0.4506***	−0.4266***	−0.5537***
	(0.2002)	(0.2087)	(0.0856)	(0.0907)	(0.1238)	(0.1375)
Marital status (1 = married)	36.1226***	35.8987***	−4.6193*	−4.5911*	10.9167**	10.1823**
	(8.2726)	(8.2867)	(2.7462)	(2.7508)	(4.2438)	(4.5360)
Tertiary education	−19.693***	−19.816***	18.644***	18.663***	−25.671***	−25.639***
	(5.5153)	(5.5282)	(1.9954)	(1.9986)	(4.4890)	(4.6380)
Household characteristics						
Household size	−2.2817*	−2.8815*	−0.3373	−0.2282	−0.8396	−3.8065***
	(1.2498)	(1.7347)	(0.5407)	(0.7804)	(0.7930)	(1.1563)
Children (0–5 years)	−2.4722	−1.5368	3.1282**	2.9598*	0.1255	4.8208**
	(3.0873)	(3.6119)	(1.3309)	(1.5893)	(1.8488)	(2.3447)
Children (6–14 years)	7.3122***	7.9783***	−1.0044	−1.1256	−1.6162	1.6094
	(2.2847)	(2.6520)	(1.0556)	(1.2271)	(1.3798)	(1.7166)
Dependent (over 65 years)	−15.351***	−15.223***	7.9876***	7.9675***	0.6368	1.6516
	(5.0100)	(5.0211)	(2.1224)	(2.1254)	(2.6143)	(2.8685)
Non-wage income	13.4427***	13.6684***	−5.7511***	−5.7843***	8.4576***	9.6167***
	(1.4805)	(1.5547)	(0.5446)	(0.5712)	(1.0774)	(1.1858)
Residence (1 = rural)	−14.038***	−14.027***	−3.1266	−3.1224	27.8344***	27.1980***
	(5.3806)	(5.3886)	(2.3209)	(2.3217)	(4.3404)	(4.5332)
Regional dummies:						
North	0.9388	0.8892	−6.6189**	−6.6125**	15.9061***	14.8140***
	(6.4889)	(6.5001)	(2.8071)	(2.8081)	(4.7149)	(4.9837)
South	−1.3813	−3.866	−11.871***	−11.423***	17.5794***	5.1443
	(5.5961)	(7.4986)	(2.3445)	(3.2901)	(4.0010)	(5.2846)
Community characteristics						
Kindergarten	7.4169	8.2409	5.0280**	4.8785*	3.2229	6.7352**
	(5.1177)	(5.3860)	(2.3994)	(2.5206)	(2.7343)	(3.1667)
Major factory	−4.966	−5.0944	11.581***	11.621***	−38.599***	−39.448***
	(5.6898)	(5.7049)	(2.4346)	(2.4439)	(4.7025)	(4.9343)
Constant	−232.95***	−233.29***	41.510***	41.466***	−135.21***	−136.83***
	(21.3225)	(21.3685)	(6.8614)	(6.8668)	(14.0261)	(14.7425)

No. observations	2,265	2,265	2,252	2,252	2,265	2,265
LR χ²	193.39***	–	684.11***	–	640.03***	–
Wald χ²	–	131.18***	–	615.48***	–	251.12***
Log likelihood	−2,335.99	−2,930.23	−5,605.67	−6,200.80	−2,703.71	−3,289.61
Pseudo R²	0.0397	–	0.0575	–	0.1058	–
Wald test (χ²)	–	0.25	–	0.04	–	14.39***

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For margin estimates see Table 4.

Source: authors.

Table A4: First-stage results for occupational choice and working hours models

	Occupational choice model	Working hours models		
	IV-MNP	Self-employed IV-Tobit	Employee IV-Tobit	Family worker IV-Tobit
Individual characteristics				
Age	0.0108***	0.0020***	0.0020***	0.0020***
	(0.0036)	(0.0007)	(0.0007)	(0.0007)
Marital status (1 = married)	0.0607	0.0123	0.0126	0.0126
	(0.1253)	(0.0213)	(0.0214)	(0.0213)
Tertiary education	0.0043	0.0126	0.0097	0.0126
	(0.1005)	(0.0166)	(0.0166)	(0.0166)
Household characteristics				
Household size	0.1726***	0.0345***	0.0350***	0.0348***
	(0.0228)	(0.0041)	(0.0041)	(0.0041)
Children (0–5 years)	−0.2427***	−0.0484***	−0.0489***	−0.0491***
	(0.0568)	(0.0102)	(0.0102)	(0.0102)
Children (6–14 years)	−0.2353***	−0.0412***	−0.0408***	−0.0411***
	(0.0453)	(0.0079)	(0.0079)	(0.0079)
Dependent (over 65 years)	−0.0091	−0.0111	−0.0100	−0.0110
	(0.0871)	(0.0162)	(0.0163)	(0.0162)
Non-wage income	−0.0631**	−0.0115***	−0.0119***	−0.0116***
	(0.0251)	(0.0043)	(0.0043)	(0.0043)
Residence (1 = rural)	−0.1815*	−0.0390**	−0.0400**	−0.0389**
	(0.1036)	(0.0188)	(0.0190)	(0.0188)
Regional dummies:				
North	0.1656	0.0088	0.0093	0.0086
	(0.1632)	(0.0222)	(0.0224)	(0.0222)
South	0.5146***	0.0485**	0.0487**	0.0491**
	(0.1347)	(0.0217)	(0.0219)	(0.0217)
Community characteristics				
Kindergarten	−0.2033**	−0.0535***	−0.0560***	−0.0539***
	(0.0906)	(0.0175)	(0.0175)	(0.0175)
Major factory	−0.1491	−0.0225	−0.0196	−0.0221
	(0.1109)	(0.0195)	(0.0197)	(0.0195)
Migration network	*2.4741****	*0.6215****	*0.6222****	*0.6164****
	(0.3048)	*(0.0636)*	*(0.0642)*	*(0.0638)*

Constant	−2.0379*** (0.3154)	0.0106 (0.0544)	0.0135 (0.0548)	0.0117 (0.0544)
Wald test of exogeneity, (χ^2)	–	0.25	0.04	14.39***
atanhrho_25	−0.3463* (0.1906)	–	–	–
atanhrho_35	−0.1188 (0.1529)	–	–	–
atanhrho_45	−0.6754** (0.2752)	–	–	–

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For second-stage coefficient estimates see Tables A2 and A3.

Source: authors.

Table A5: Estimation results for occupational choices with agricultural sector interaction (marginal effects)

	Self-employed		Employee		Family worker	
	MNP	IV-MNP	MNP	IV-MNP	MNP	IV-MNP
*Migration*agricultural sector* (1 = Household has migrant* 1 = Woman works in agriculture)	0.6660***	0.6692***	−0.1147	−0.5713	0.8047***	0.8147***
Individual characteristics						
Age	0.0087***	0.0082***	0.0171**	0.0228**	0.0003	−0.0001
Marital status (1 = married)	0.3107***	0.3263***	−0.0347	−0.0713	0.1258***	0.1314***
Tertiary education	0.0707	0.0718	0.5024**	0.6220***	−0.0847	−0.0607
Household characteristics						
Household size	−0.0414***	−0.0407***	−0.0246	−0.0228	−0.0401***	−0.0451***
Children (0–5 years)	0.0110	0.0088	0.0767	0.0943	0.0407	0.0458*
Children (6–14 years)	0.0786***	0.0741***	−0.0027	−0.0240	0.0223	0.0330
Dependent (over 65 years)	−0.0338	−0.0372	0.2444*	0.3482**	0.0362	0.0034
Non-wage income	0.1175***	0.1220***	−0.1105	−0.1714*	0.1076***	0.112***
Residence (1 = rural)	0.0232	0.0322	0.1281	0.1699	0.3141***	0.3215***
Regional dummies:						
North	0.0240	0.0278	−0.1114	−0.1695	0.2031***	0.2018**
South	−0.0517	−0.0427	−0.2346	−0.3032**	0.1383***	0.1221**
Community characteristics						
Kindergarten	0.1604***	0.1608***	0.2145**	0.2582***	0.1143***	0.1193***
Major factory	−0.0681	−0.0721	0.2476	0.3617*	−0.3325***	−0.3429***
	MNP	**IV-MNP**				
No. observations	2,267	2,267				
Wald chi2	328.61***	463.20***				
Log likelihood	−2,262.43	−2,560.03				
atanhrho_25 (self-employed-migr*agr eq.)	−	0.1601				
atanhrho_35 (employee-migr*agr eq.)	−	0.2278				
atanhrho_45 (family worker – migr*agr eq.)	−	−0.4155				

Reference group for dependent variable: unemployed women. *,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. The coefficient estimates and first-stage results are available upon request.

Source: authors.

Table A6: Estimation results for working hours with agricultural sector interaction (marginal effects)

	Self-employed		Employee		Family worker	
	Tobit	IV-Tobit	Tobit	IV-Tobit	Tobit	IV-Tobit
Migration*agricultural sector (1 = household has migrant* 1 = woman works in agriculture)	2.3062	10.1020	−20.1483***	−14.4536	5.3196***	36.7333***
Individual characteristics						
Age	0.0668*	0.0640*	0.1687***	0.1647***	−0.0955***	−0.1176***
Marital status (1 = married)	6.8581***	6.7498***	−1.5168	−1.6332	1.9482**	1.4561
Tertiary education	−3.7035***	−3.6174***	6.7868***	6.8428***	−4.8988***	−4.8167***
Household characteristics						
Household size	−0.4100*	−0.4867*	−0.0833	−0.1361	−0.3315**	−0.6974***
Children (0–5 years)	−0.4906	−0.3671	1.0743**	1.1678**	0.2760	0.9085*
Children (6–14 years)	1.3923***	1.5796***	−0.5422	−0.4142	−0.0436	0.6536
Dependent (over 65 years)	−2.9440***	−2.9905***	3.0273***	3.0041***	0.1342	0.1655
Non-wage income	2.5410****	2.5487***	−2.1090***	−2.1227***	1.6886***	1.8112***
Residence (1 = rural)	−2.7939***	−3.0725***	−0.8791	−1.0640	5.3385***	4.8285***
Regional dummies:						
North	0.2037	0.3442	−2.6258**	−2.5104**	3.2185***	3.9702***
South	−0.1775	−0.5000	−4.1142***	−4.3331***	3.0357***	1.9520*
Community characteristics						
Kindergarten	1.3858	1.5196	1.7267*	1.7986**	0.7583	1.2652*
Major factory	−0.8999	−0.8011	4.1839***	4.2356***	−7.6195***	−8.0329***
No. observations	2,265	2,265	2,252	2,252	2,265	2,265
LR χ²	194.07***	–	739.79***	–	676.29***	–
Wald χ²	–	130.96***	–	595.91***	–	241.44***
Log likelihood	−2,335.65	−1,895.89	−5,580.49	−5,158.54	−2,685.57	−2,241.7325
Pseudo R²	0.0399	–	0.0622	–	0.1118	–
Wald test (χ²)	–	0.29	–	0.19	–	8.10***

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. The coefficient estimates and first-stage results of the models are available upon request.

Source: authors.

Table A7: IV-Tobit model estimation results for migration impact on daily time-use (total sample) (coefficient estimates)

	Personal care time	Household and family-related time	Child and elderly care time	Leisure time	Work time	Gardening
Migration (1 = household has migrant)	0.6108 (0.5599)	0.9776 (0.8692)	−2.5074** (1.0219)	−1.9047*** (0.6782)	6.5793*** (2.3051)	−1.7283 (1.1395)
Weekend days (1 = if the survey has been conducted on weekend days)	0.2787*** (0.0847)	0.6559*** (0.1314)	−0.0003 (0.1541)	0.3974*** (0.1027)	−2.3231*** (0.3525)	0.2852 (0.1895)
Individual characteristics						
Age	0.0058 (0.0038)	−0.0513*** (0.0059)	−0.0534*** (0.0069)	0.0277*** (0.0046)	0.0596*** (0.0154)	0.0161* (0.0085)
Marital status (1 = married)	−0.6192*** (0.1172)	1.1028*** (0.1818)	2.8638*** (0.2502)	−1.0942*** (0.1422)	−0.2604 (0.4802)	−0.0332 (0.2821)
Tertiary education	−0.0409 (0.0912)	−0.5757*** (0.1414)	−0.2400 (0.1708)	−0.1083 (0.1108)	2.0074*** (0.3597)	−1.352*** (0.2460)
Household characteristics						
Household size	0.0127 (0.0316)	0.0030 (0.0490)	−0.0171 (0.0575)	0.1407*** (0.0383)	−0.3394*** (0.1299)	−0.0758 (0.0696)
Children (0–5 years)	−0.0369 (0.0656)	−0.2133** (0.1018)	0.6378*** (0.1172)	−0.1695** (0.0795)	0.4388 (0.2697)	−0.0318 (0.1429)
Children (6–14 years)	0.0609 (0.0498)	−0.0433 (0.0773)	0.3735*** (0.0872)	−0.2277*** (0.0605)	0.3978* (0.2043)	−0.0136 (0.1073)
Dependent (over 65 years)	0.0774 (0.0890)	0.0476 (0.1380)	0.3573** (0.1533)	−0.3296*** (0.1083)	−0.0537 (0.3673)	0.2312 (0.1843)
Non-wage income	0.0044 (0.0245)	0.0354 (0.0381)	0.0312 (0.0456)	−0.0585** (0.0298)	−0.0023 (0.0985)	0.2191*** (0.0609)
Residence (1 = rural)	−0.1865* (0.1005)	0.3547** (0.1562)	0.2847 (0.1863)	−0.3559*** (0.1222)	−0.4717 (0.4041)	2.3234*** (0.2492)
Regional dummies:						
North	0.1033 (0.1222)	1.3148*** (0.1894)	0.0651 (0.2221)	−0.3334** (0.1488)	−2.0830*** (0.4943)	1.7803*** (0.2841)
South	−0.1630 (0.1358)	0.3788* (0.2106)	0.3830 (0.2466)	0.7780*** (0.1647)	−2.9635*** (0.5561)	2.0301*** (0.3075)
Community characteristics						
Kindergarten	−0.1720* (0.1004)	0.6206*** (0.1559)	−0.3165* (0.1776)	−0.2183* (0.1216)	1.0700** (0.4178)	−1.030*** (0.2046)
Major factory	0.3051*** (0.1059)	−0.3960** (0.1643)	0.0573 (0.1948)	−0.3920*** (0.1286)	0.6285 (0.4265)	−0.1686 (0.2404)

Constant	11.4054*** (0.2994)	4.2494*** (0.4643)	−2.1314*** (0.5725)	3.0998*** (0.3638)	1.5664 (1.2151)	−5.919*** (0.7590)
No. observations	2,267	2,267	2,267	2,267	2,267	2,267
Wald χ^2	74.83***	277.59***	351.23***	204.51***	281.56***	388.76***
Log likelihood	−5,034.7234	−5,957.9207	−3,147.0185	−5,179.9912	−5,477.465	−2,901.39
Wald test (χ^2)	1.30	0.97	7.82***	6.54**	8.34***	2.56

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For marginal effects of migration impact see Table 3.

Source: authors.

Table A8: IV-Tobit model estimation results for migration impact on daily time-use (self-employed sample) (coefficient estimates)

	Personal care time	Household and family-related time	Child and elderly care time	Leisure time	Work time	Gardening
Migration (1 = household has migrant)	−0.0433 (1.7962)	−4.3325 (3.7616)	−1.6463 (3.8356)	−4.6736* (2.8409)	14.0653 (9.0541)	−2.8712 (4.4715)
Weekend days (1 = if the survey has been conducted on weekend days)	−0.2887 (0.2231)	0.6495 (0.4671)	0.4257 (0.4787)	−0.2532 (0.3539)	−0.4998 (1.1271)	−0.4309 (0.6036)
Individual characteristics						
Age	0.0279** (0.0128)	−0.0302 (0.0269)	−0.0096 (0.0275)	0.0431** (0.0203)	−0.0901 (0.0646)	0.0884*** (0.0338)
Marital status (1 = married)	−0.534 (0.4185)	1.4366 (0.8735)	0.5266 (0.9660)	−1.7967*** (0.6604)	1.8089 (2.1309)	−1.5244 (1.1820)
Tertiary education	0.4390* (0.2417)	−0.8085 (0.5066)	−2.0409*** (0.6554)	0.5991 (0.3830)	0.7669 (1.1957)	−0.6845 (0.7489)
Household characteristics						
Household size	0.0719 (0.0780)	0.0413 (0.1633)	0.1322 (0.1648)	0.1427 (0.1238)	−0.3868 (0.3921)	−0.0600 (0.2032)
Children (0–5 years)	−0.2435** (0.1234)	0.1924 (0.2578)	1.0559*** (0.2616)	0.0441 (0.1955)	−0.442 (0.6210)	0.1415 (0.3360)
Children (6–14 years)	0.0755 (0.1170)	−0.4624* (0.2445)	0.3523 (0.2441)	−0.3467* (0.1850)	0.8873 (0.5903)	0.1277 (0.2973)
Dependent (over 65 years)	−0.0452 (0.2063)	−0.1159 (0.4308)	0.1771 (0.4146)	−0.0944 (0.3278)	0.1390 (1.0367)	0.3085 (0.5179)
Non-wage income	−0.0205 (0.0941)	−0.5431*** (0.1969)	0.0318 (0.2064)	−0.1568 (0.1492)	1.1439** (0.4747)	−0.5734** (0.2546)
Residence (1 = rural)	−0.0412 (0.2060)	0.8834** (0.4320)	0.74 (0.4572)	0.8691*** (0.3284)	−3.604*** (1.0353)	3.0638*** (0.6424)
Regional dummies:						
North	0.2311 (0.2737)	1.7244*** (0.5716)	−0.6969 (0.5924)	−0.8487* (0.4349)	−2.6995* (1.3909)	2.0622*** (0.7565)
South	0.2077 (0.3865)	1.0599 (0.8088)	−1.0374 (0.8303)	1.0334* (0.6114)	−3.4567* (1.9427)	1.9484* (1.0289)
Community characteristics						
Kindergarten	−0.2609 (0.2081)	0.3587 (0.4352)	0.5099 (0.4434)	−0.1848 (0.3290)	0.7345 (1.0584)	−0.7782 (0.5131)
Major factory	0.4539** (0.2248)	−0.4856 (0.4698)	−0.0868 (0.4777)	0.2243 (0.3571)	−0.2074 (1.1340)	−0.5239 (0.6102)

Constant	10.4549***	9.4198***	−2.8855	3.2499**	−4.015	0.7532
	(0.8568)	(1.7911)	(1.9282)	(1.3616)	(4.3839)	(2.2607)
No. observations	331	331	331	331	331	331
Wald χ^2	26.96	63.25	51.78	28.18	40.19	61.07
Log likelihood	−682.90083	−860.96186	−440.36104	−706.3028	−864.334	−461.619
Wald test (χ^2)	0.00	1.34	0.30	2.34	2.21	0.32

*,**, *** show statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For marginal effects of migration impact see Table 3.

Source: authors.

Table A9: IV-Tobit model estimation results for migration impact on daily time-use (employee sample) (coefficient estimates)

	Personal care time	Household and family-related time	Child and elderly care time	Leisure time	Work time	Gardening
Migration (1 = household has migrant)	1.3189 (0.9267)	2.8335** (1.1648)	−2.4394 (1.5509)	−1.7193* (1.0151)	−1.4214 (2.2007)	−2.1956 (2.2458)
Weekend days (1 = if the survey has been conducted on weekend days)	0.5063*** (0.1293)	1.1814*** (0.1624)	0.2507 (0.2115)	0.6512*** (0.1415)	−3.074*** (0.3133)	0.6187* (0.3306)
Individual characteristics						
Age	0.0108* (0.0055)	−0.0154** (0.0069)	−0.0744*** (0.0094)	0.0294*** (0.0061)	0.0015 (0.0131)	0.0225 (0.0149)
Marital status (1 = married)	−0.1414 (0.1744)	0.9127*** (0.2191)	3.1014*** (0.3605)	−0.715*** (0.1912)	−1.159*** (0.4136)	0.8624 (0.5570)
Tertiary education	0.0696 (0.1150)	0.2373 (0.1443)	0.0336 (0.1920)	0.1980 (0.1260)	−0.4860* (0.2729)	0.1661 (0.3079)
Household characteristics						
Household size	0.0000 (0.0505)	−0.0899 (0.0634)	−0.0538 (0.0852)	0.1198** (0.0554)	−0.0162 (0.1199)	0.1166 (0.1289)
Children (0–5 years)	0.0262 (0.1140)	−0.0846 (0.1432)	0.1957 (0.1861)	−0.1073 (0.1248)	0.2341 (0.2705)	−0.5483* (0.2966)
Children (6–14 years)	0.0469 (0.0734)	0.1005 (0.0922)	0.4236*** (0.1156)	−0.0278 (0.0805)	−0.2769 (0.1743)	−0.1355 (0.1963)
Dependent (over 65 years)	0.0741 (0.1458)	0.3968** (0.1831)	0.2415 (0.2287)	−0.1728 (0.1596)	−0.3051 (0.3478)	0.0484 (0.3494)
Non-wage income	0.0036 (0.0346)	0.0431 (0.0434)	0.1338** (0.0574)	−0.0409 (0.0379)	−0.0735 (0.0820)	0.0533 (0.0952)
Residence (1 = rural)	−0.1398 (0.1486)	0.0743 (0.1869)	−0.3082 (0.2486)	−0.436*** (0.1627)	0.5844* (0.3521)	2.0855*** (0.4072)
Regional dummies:						
North	0.0953 (0.1804)	0.7821*** (0.2264)	0.2580 (0.2912)	−0.2378 (0.1984)	−0.9379** (0.4295)	1.2696*** (0.4515)
South	−0.2895 (0.2047)	−0.0066 (0.2572)	0.4579 (0.3329)	0.5919*** (0.2241)	−0.4801 (0.4858)	1.1085** (0.5186)
Community characteristics						
Kindergarten	−0.0376 (0.1795)	0.3381 (0.2259)	−0.4017 (0.2917)	−0.0037 (0.1966)	0.3179 (0.4264)	−0.7383* (0.4061)
Major factory	0.0736 (0.1542)	0.0790 (0.1939)	−0.0388 (0.2551)	−0.2808* (0.1688)	0.1066 (0.3656)	0.2867 (0.3763)

Constant	10.4912*** (0.4447)	1.9850*** (0.5584)	−1.9101** (0.7773)	1.6779*** (0.4874)	8.839*** (1.0555)	−7.014*** (1.3347)
No. observations	1,005	1,005	1,005	1,005	1,005	1,005
Wald χ^2	26.90	113.62	147.46	87.04	133.62	64.51
Log likelihood	−2,077.93	−2,253.58	−1,080.21	−2,026.45	−2,661.82	−611.55
Wald test (χ^2)	2.28	4.49**	2.76*	3.25*	0.14	0.97

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For margin estimates of migration impact see Table 3.

Source: authors.

Table A10: IV-Tobit model estimation results for migration impact on daily time-use (family worker sample) (coefficient estimates)

	Personal care time	Household and family-related time	Child and elderly care time	Leisure time	Work time	Gardening
Migration (1 = household has migrant)	1.9024 (1.4014)	−2.0853 (2.3329)	−5.1150* (2.7467)	0.5702 (1.4548)	17.317** (7.4257)	−4.1665 (2.7914)
Weekend days (1 = if the survey has been conducted on weekend days)	0.0061 (0.1705)	0.3623 (0.2829)	−0.2094 (0.3287)	0.0969 (0.1769)	−0.3040 (0.9075)	−0.0914 (0.3455)
Individual characteristics						
Age	0.0035 (0.0084)	−0.0484*** (0.0140)	−0.0472*** (0.0165)	0.0445*** (0.0087)	0.0009 (0.0444)	0.0271 (0.0169)
Marital status (1 = married)	−0.9093*** (0.2700)	1.5524*** (0.4493)	2.8475*** (0.5844)	−1.119*** (0.2799)	−0.6931 (1.4424)	−0.4385 (0.5516)
Tertiary education	0.5720 (0.3767)	−0.5543 (0.6256)	−0.7487 (0.7145)	0.0726 (0.3911)	2.7200 (2.0050)	−2.0712** (0.8471)
Household characteristics						
Household size	−0.0900 (0.1076)	0.0691 (0.1792)	0.2540 (0.2070)	−0.0068 (0.1118)	−0.7195 (0.5696)	−0.0132 (0.2175)
Children (0–5 years)	0.1059 (0.1834)	−0.1959 (0.3058)	0.5902* (0.3515)	−0.0168 (0.1904)	−0.0218 (0.9733)	−0.0317 (0.3707)
Children (6–14 years)	0.1484 (0.1438)	−0.2996 (0.2391)	0.0562 (0.2762)	−0.0686 (0.1492)	1.4081* (0.7620)	−0.0863 (0.2888)
Dependent (over 65 years)	0.1834 (0.1530)	−0.2232 (0.2541)	0.5059* (0.2892)	−0.3631** (0.1592)	−1.3751 (0.8468)	0.6773** (0.3052)
Non-wage income	−0.0423 (0.0856)	−0.1204 (0.1425)	−0.0948 (0.1663)	−0.0940 (0.0888)	0.4929 (0.4477)	0.2203 (0.1817)
Residence (1 = rural)	0.8287** (0.3931)	2.7135*** (0.6598)	1.0021 (0.8446)	0.0148 (0.4098)	−5.64*** (2.0039)	1.3323 (0.8891)
Regional dummies:						
North	0.2051 (0.3411)	1.0961* (0.5661)	−0.7931 (0.6478)	−0.5410 (0.3555)	−1.3449 (1.7697)	1.6245** (0.7450)
South	−0.3297 (0.3306)	−0.0111 (0.5491)	−0.0926 (0.6245)	0.2070 (0.3445)	−4.241** (1.7305)	3.0549*** (0.7272)
Community characteristics						
Kindergarten	−0.0471 (0.1854)	1.4964*** (0.3079)	−0.7407** (0.3549)	−0.1563 (0.1924)	0.6389 (1.0029)	−1.467*** (0.3784)
Major factory	0.7269* (0.4115)	−0.0644 (0.6835)	0.1586 (0.8071)	−0.5513 (0.4263)	−0.1471 (2.1749)	0.6616 (0.8572)

Constant	11.2493***	4.1698**	−1.3871	3.3642***	3.2447	−4.3612*
	(1.0661)	(1.7743)	(2.1199)	(1.1066)	(5.5336)	(2.2963)
No. observations	448	448	448	448	448	448
Wald χ^2	23.10	84.83	109.39	79.95	38.04	60.64
Log likelihood	−945.52	−1,205.43	−749.74	−999.03	−921.75	−959.68
Wald test (χ^2)	1.99	0.43	3.15*	0.20	4.70**	2.94*

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For margin estimates of migration impact see Table 3.

Source: authors.

Table A11: IV-Tobit model estimation results for migration impact on daily time-use (unemployed sample) (coefficient estimates)

	Personal care time	Household and family-related time	Child and elderly care time	Leisure time	Work time	Gardening
Migration (1 = household has migrant)	1.1306 (0.8121)	2.0107* (1.1816)	−0.4308 (1.5141)	−1.3242 (0.9641)	4.1842 (5.6495)	−3.4812** (1.5529)
Weekend days (1 = if the survey has been conducted on weekend days)	0.2453 (0.1938)	−0.4535 (0.2821)	−0.3758 (0.3720)	0.0959 (0.2299)	−1.9748 (1.5775)	0.6783* (0.3783)
Individual characteristics						
Age	−0.0001 (0.0089)	−0.0544*** (0.0130)	−0.0038 (0.0162)	0.0427*** (0.0105)	−0.0193 (0.0671)	0.0351** (0.0174)
Marital status (1 = married)	−0.9666*** (0.2443)	1.6202*** (0.3554)	2.5579*** (0.5232)	−1.2134*** (0.2898)	−0.0301 (1.7817)	−0.2878 (0.4914)
Tertiary education	−0.0325 (0.2874)	−0.3459 (0.4180)	−0.1056 (0.5516)	0.3723 (0.3417)	2.8774 (1.8805)	−1.4812** (0.6792)
Household characteristics						
Household size	−0.1160** (0.0557)	0.0024 (0.0810)	−0.1934* (0.1065)	0.1506** (0.0661)	0.0999 (0.4011)	0.0033 (0.1127)
Children (0–5 years)	0.2065 (0.1300)	−0.3934** (0.1892)	0.9441*** (0.2437)	−0.1449 (0.1542)	−0.2294 (0.9837)	0.0105 (0.2478)
Children (6–14 years)	0.2550** (0.1150)	0.1136 (0.1674)	0.5857*** (0.2075)	−0.4652*** (0.1372)	0.1822 (0.8091)	−0.2836 (0.2288)
Dependent (over 65 years)	0.4163* (0.2494)	0.1030 (0.3630)	0.5318 (0.4523)	−0.4073 (0.2977)	1.2322 (1.6681)	−0.1190 (0.4685)
Non-wage income	0.0074 (0.0574)	0.0681 (0.0835)	−0.0166 (0.1098)	−0.1430** (0.0681)	0.0554 (0.4163)	0.1938* (0.1168)
Residence (1 = rural)	−0.3639* (0.2202)	0.1161 (0.3206)	0.8564** (0.4157)	−0.7727*** (0.2617)	0.0107 (1.6569)	1.9739*** (0.4606)
Regional dummies:						
North	−0.3413 (0.3037)	0.6263 (0.4421)	0.2884 (0.5772)	−0.5444 (0.3605)	−1,012.73 (0.0000)	1.2399** (0.5868)
South	−0.6129** (0.2715)	−0.5519 (0.3950)	0.5217 (0.5193)	0.499 (0.3220)	−0.0803 (2.0008)	1.5538*** (0.5320)
Community characteristics						
Kindergarten	−0.3709 (0.2444)	1.0504*** (0.3558)	0.0074 (0.4485)	0.0296 (0.2902)	−0.4638 (1.7176)	−1.1617** (0.4697)
Major factory	0.7437*** (0.2381)	−0.484 (0.3463)	−0.1127 (0.4605)	−0.5934** (0.2824)	0.0969 (1.8060)	0.6158 (0.4788)

Constant	13.2299***	5.8152***	−3.2897**	5.0404***	−11.05**	−5.398***
	(0.6731)	(0.9789)	(1.3193)	(0.7995)	(5.3510)	(1.4254)
No. observations	483	483	483	483	483	483
Wald χ^2	63.76	49.44	73.20	73.04	6.47	66.74
Log likelihood	−1,122.6384	−1,294.75	−734.69	−1,188.29	−309.45	−677.38
Wald test (χ^2)	1.78	1.449	0.87	0.46	1.66	3.84**

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For margin estimates of migration impact see Table 3.

Source: authors.

Table A12: First-stage results for IV-Tobit model, migration impact on daily time-use

	Total sample	Self-employed	Employee	Family worker	Unemployed
Weekend days	−0.0142	−0.0492	−0.0165	−0.0094	0.0132
	(0.0153)	(0.0482)	(0.0200)	(0.0396)	(0.0329)
Individual characteristics					
Age	0.0020***	0.0053**	0.0003	0.0028	0.0034**
	(0.0007)	(0.0021)	(0.0009)	(0.0017)	(0.0014)
Marital status (1 = married)	0.0125	0.0343	−0.0029	0.0737	0.0000
	(0.0213)	(0.0952)	(0.0273)	(0.0599)	(0.0415)
Tertiary education	0.0130	0.0362	0.0038	−0.0928	0.0898*
	(0.0166)	(0.0544)	(0.0180)	(0.0802)	(0.0473)
Household characteristics					
Household size	0.0347***	0.0313***	0.0322***	0.0586***	0.0329***
	(0.0041)	(0.0115)	(0.0056)	(0.0119)	(0.0080)
Children (0–5 years)	−0.0490***	0.0151	−0.0643***	−0.0838***	−0.0478**
	(0.0102)	(0.0287)	(0.0140)	(0.0270)	(0.0204)
Children (6–14 years)	−0.0412***	−0.0416**	−0.0132	−0.0820***	−0.0514***
	(0.0079)	(0.0212)	(0.0112)	(0.0180)	(0.0180)
Dependent (over 65 years)	−0.0114	0.0024	−0.0359	0.0339	−0.0469
	(0.0162)	(0.0479)	(0.0224)	(0.0348)	(0.0424)
Non-wage income	−0.0115***	−0.0335**	−0.0030	0.0126	−0.0223**
	(0.0043)	(0.0140)	(0.0054)	(0.0203)	(0.0090)
Residence (1 = rural)	−0.0390**	−0.0189	−0.0587**	−0.1283	−0.0046
	(0.0188)	(0.0492)	(0.0240)	(0.0887)	(0.0375)
Regional dummies:					
North	0.0077	−0.0384	0.0374	−0.0598	0.0101
	(0.0223)	(0.0606)	(0.0280)	(0.0778)	(0.0516)
South	0.0481**	0.0843	0.0315	0.0014	0.0306
	(0.0217)	(0.0648)	(0.0290)	(0.0765)	(0.0440)
Community characteristics					
Kindergarten	−0.0542***	−0.0324	−0.0431	−0.0689*	−0.0639
	(0.0175)	(0.0463)	(0.0275)	(0.0369)	(0.0402)
Major factory	−0.0228	−0.0372	−0.0331	−0.0852	−0.0119
	(0.0195)	(0.0542)	(0.0248)	(0.0947)	(0.0406)
Migration network	*0.6234***	*0.4959**	*0.6862***	*0.4429***	*0.9176***
	(0.0636)	*(0.2072)*	*(0.0995)*	*(0.1439)*	*(0.1266)*
Constant	0.0147	0.0903	0.0209	−0.2751	0.0655

| | (0.0546) | (0.1909) | (0.0699) | (0.2429) | (0.1136) |

*,**, *** = statistical significance at the 10, 5, and 1 per cent level, respectively. Standard errors presented in parentheses. For coefficient estimates of second-stage results of the models, see Tables A5 (total sample), A6 (self-employed sample), A7 (employee sample), A8 (family worker sample), and A9 (unemployed sample).

Source: authors.