

working paper
2020-06

Remittances and Non-Farm Self-Employment among the Left-Behind: Evidence from Nepal

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January 2020



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Abstract

We estimated the impact of remittances from international migration on the labor supply of left-behind household members to non-farm self-employment and on the performance of the non-farm enterprises they operated. We used data from a nationally representative household survey from Nepal that included an enterprise module. We accounted for both the truncated nature of observed hours worked and the endogeneity of remittances when assessing the impact on labor supply, and, in estimating the effects on firm performance, we addressed selection into operating a non-farm enterprise as well as the endogeneity of remittances. Remittances were found to encourage women to reduce their labor supply in non-farm self-employment, whereas there was no significant effect on men. We found evidence that the disincentive effect was strong enough to exert a negative influence on the revenues of non-farm enterprises operated by the left-behind labor force.

JEL: J22; F22; L20; O20

Keywords: Remittances; Migration; Labour supply; Microenterprises; Entrepreneurship

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Acknowledgements

This research was carried out with financial and scientific support from the Partnership for Economic Policy (PEP) (www.pep-net.org) with funding from the Department for International Development (DFID) of the United Kingdom (or UK Aid) and the Government of Canada through the International Development Research Center (IDRC). The authors gratefully acknowledge the comments received during PEP annual conferences in Bangalore (2018) and Capetown (2019) and from an anonymous reviewer.

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I. Introduction

International migrant workers' remittances have become a major resource for many developing countries. Questions about the effects of out-migration and the associated resource inflows on macroeconomic as well as microeconomic outcomes in originating countries abound (see Yang, 2011). A question at the microeconomic level is whether and to what extent receipt of remittances affects left-behind family members' entrepreneurial activities or at least their engagement in non-farm self-employment.

We investigated this question using data from Nepal, a country with one of the largest personal remittances-to-GDP ratios (24% in 2018). In the last two decades, this landlocked, least-developed country has seen a surge in out-migration, with a third of households now having at least one member abroad.¹ International remittance flows are greater than foreign aid, foreign direct investment, and export earnings combined. Concurrently, the proportion of households with enterprises increased from 24.2% in 1995-1996 to 34.6% in 2010-2011.

Notwithstanding the importance of international remittances as a source of foreign exchange and as a contributor to poverty reduction (e.g., Lokshin, Bontch-Osmolovski & Glinskaya, 2010), it is well-recognized in Nepal's policy discourse that relying on labor exports cannot be a viable, sustainable development strategy.² Furthermore, as we discuss in Section 2, empirical evidence on the causal relationship between remittances and the rise of entrepreneurship among the left-behind is limited and mixed. Similarly, there is scant evidence—not only in Nepal but globally—regarding the productive use of remittances in household enterprises.

Involvement in non-farm self-employment by the left-behind labor force has implications for (i) the domestic employment prospects of foreign-employment returnees

¹ Emigrants are mostly men (80%) under the age of 35.

² Government policies such as National Employment Policy 2015, Foreign Employment Policy 2012, and National Youth Policy 2015 speak of utilizing the capital, skills, technology, and experience gained by migrant workers in the aid of the domestic productive sector. Industrial Policy 2010 describes the need to create industrial jobs, including in micro- and small industries, to arrest the outflow of workers. Even the Constitution of Nepal has recognized the potential role of migrant workers and returnee migrants. The budget of the government of Nepal for fiscal year 2018-2019 accorded priority to job creation and proposed measures for, among others, stimulating both self-employment activities and productive utilization of remittances from abroad in production-oriented micro- and small enterprises, tourism, agriculture, and employment-generating services; and productive utilization of returnee migrants (Ministry of Finance, 2018).

(the median migrant from Nepal spends, per migration episode, nine months abroad if the destination is India and 2.3 years abroad if the destination is West Asia and Malaysia; see Shrestha, 2017); (ii) the employment prospects of migrants' children (who, if faced with the same scarcity of decent off-farm jobs as their parents, are compelled to migrate); and (iii) in the long term, the employment opportunities for non-migrants in the neighborhood (if household-owned non-farm enterprises expand and hire labor or through possible spillovers arising from the "discovery"—à la Hausmann and Rodrik (2003)—of an entrepreneurial economic activity by the migrant-sending household).

In this setting, the objective of this study was twofold. First, we estimated the impact of international remittances on entrepreneurship among the left-behind, the latter proxied by hours worked in non-agricultural self-employment. For comparative purposes and to aid interpretation, we also estimated the impact of remittances on hours supplied to other types of employment as well as total hours supplied. Second, we addressed the question of the productive-use effects of remittances by measuring the impact of remittances on the gross revenues of non-farm enterprises operated by the left-behind labor force.

Our empirical analysis built on a nationally representative household survey in Nepal for the year 2010-2011. We assessed the impact of remittances on the labor supply to non-agricultural self-employment following an IV Tobit Type 1 specification to account both for the truncated nature of observed working hours and the endogeneity of remittances.³ To quantify the impact of remittances on enterprise performance, we utilized data from a hitherto largely unexploited module of the household survey that contains information on household-operated enterprises, and we matched this with data on individuals. We accounted for both the self-selection of individuals into operating non-farm enterprises and the endogeneity of remittances by employing an IV-Tobit Type 2 (IV-Heckman) estimation.

To the best of our knowledge, the existing literature did not account for both self-selection and endogeneity in studying the productive use of remittances. Our algorithm for IV-Heckman also allowed us to compute marginal effects at the observation level. We instrumented remittances by the migration network in the village/municipality where the household was located, proxied by the number of emigrants from that locality as a fraction

³ IV-Tobit Type 1 was also employed in Amuedo-Dorantes and Pozo (2006a), Binzel and Assaad (2011), and Dávalos et al. (2017).

of its resident population, a decade before the survey year. Reassuringly, two alternative instruments—based on migration networks at a broader geographical area measured with a two-decade lag—deliver qualitatively similar results.

We found that higher remittances led left-behind people to supply fewer hours to non-farm self-employment. A doubling of remittances led an individual to supply, on average, 2.7 fewer hours to non-farm self-employment per week. Higher remittances reduced labor hours supplied to self-agriculture and wage employment, too. A doubling of remittances led an individual to supply, per week, an average of nearly 1.6 fewer hours to agricultural self-employment and nearly 2.4 fewer hours to wage employment. Contrary to the reductions in hours supplied to wage work and in the two types of self-employment, we found a small positive effect on hours spent on household chores (collecting firewood, fetching water, etc.). The latter, however, was not powerful enough to counteract the negative effect seen in other types of work, with the result that there was a reduction in total hours worked.

From a theoretical framework inspired by the model of Gronau (1973), we argue that these results indicate a rise in the reservation wage, creating a disincentive to work in general. In particular, the observed negative impact of remittances on labor hours supplied to non-farm self-employment suggested that substitution and liquidity channels were weak or dominated by the reservation-wage channel. The results for the full sample of the labor force appeared to be driven by women, as it was only for women that we detected statistically significant reductions in hours supplied to non-farm self-employment as well as in agricultural self-employment and wage employment, and a (small) rise in hours spent on household chores. Higher remittances induced women to reduce the labor they supplied to non-farm self-employment (by 3.6 hours per week, on average) as well as to other core economic activities. An intuition for the biological sex-based heterogeneity in results is that, as a consequence of social mores (including the expectation that women spend more time at home or women's preferences shaped by these mores), women were likely to experience a greater increase in reservation wages than men on account of a given increase in remittance inflows.

The investigation of productive use of remittances revealed that, in line with the decline in the hours supplied to non-farm self-employment, higher remittances also led to

lower gross revenues of non-farm enterprises operated by the left-behind labor force. A 10% increase in remittances led to a 0.5% drop in gross revenue. The disincentive effect of higher remittances seemed to dominate channels such as credit relaxation through which remittances could have a positive impact on firm performance. This may have happened because those operating non-farm enterprises, mostly micro- or small-scale, were “reluctant entrepreneurs” who were engaged in the vocation out of desperation, as posited by Banerjee and Duflo (2011).

II. Relationship to the Literature

This paper is related to two broad lines of enquiry in the empirical literature on the impact of migration on non-migrating members of households (see Yang, 2011, and Antman, 2013, for surveys). The first was the effect on income, production, investment, consumption, health, education, poverty and other welfare metrics. Studies on countries other than Nepal include: for China, Rozelle, Taylor, and de Brauw (1999); for Mexico, Lopez-Feldman (2010); Alcaraz, Chiquiar, and Salcedo (2012), and Antman (2010a, 2010b); and, on the Philippines, Yang (2008). Nepal-specific studies have explored the effects of migration and remittances (internal, international, or both) on poverty (Lokshin, Bontch-Osmolovski & Glinskaya, 2010; Acharya & Leon-Gonzalez, 2013), on the educational attainment of children (Acharya & Leon-Gonzalez, 2014), and agricultural production and productivity (Maharjan, Bauer & Knerr, 2012; Tuladhar, Sapkota & Adhikari, 2014). Papers on Nepal have found that migration and/or associated remittances have contributed to poverty reduction, improved the educational attainment of children, and reduced agricultural output/yields.

The second line of investigation—to which our research question was more closely related—concerns the labor-market behavior and outcome of left-behind household members. There are a few papers on Nepal that investigate the impact of migration on the labor supply of the left-behind. Lokshin and Glinskaya (2009), using data from a 2003-2004 household survey, found that migration by men had a negative impact on the level of labor-market participation (wage employment) of women in migrant-sending households. They did not distinguish between internal and external migration. We explicitly considered

remittances from abroad. Adhikari (2017), using the same household-level survey (for 2010-2011) that we used, found a positive effect of migration on the probability of owning a non-farm enterprise. Although Adhikari used two endogenous variables in that study's regression—a dummy for migration status and the value of remittances—only migration was instrumented. Moreover, the proportion of emigrants in the primary sampling unit (PSU) in which the household was located, in the same survey year, was used as an instrument, raising concerns over the exogeneity of the instrument. We mitigated concerns about instrument validity by using lags ranging from one to two decades.

Bossavie and Denisova (2018) provided a descriptive analysis of youth labor migration in Nepal, using the same household data that we used. While they did not distinguish between migration to internal and external destinations, Bossavie and Denisova (2018) found that migration by young men negatively affected hours worked for young women who stayed behind. Young men who emigrated to countries other than India reduced the probability that young men who stayed behind would be employed by thirty-four percentage points and by twenty-one percentage points for young women who stayed behind. The migration of young men, together with remittances (whether internal or external), was found to reduce hours worked for left-behind men by 12% and for left-behind women by 13%. Bossavie and Denisova (2018) did not investigate non-farm self-employment separately and did not examine causal relationships. We investigated the causal impact of remittances on the labor supply to non-farm self-employment.

Phadera (2016)—the paper closest to ours in the context of Nepal and which used the same household survey data that we used⁴—estimated the causal impact of international migration on the extensive and intensive margins of the labor supplied by left-behind household members. Phadera found that women reallocated their time from market employment (wage jobs) to self-employment and home production while men decreased their overall labor supply. Phadera did not delve into non-farm self-employment in detail and did not investigate the impact of international remittances on the performance of enterprises run by the left-behind labor force. Methodologically, while Phadera used an IV to address endogeneity of international migration, the author did not address the truncated

⁴ Phadera (2016) pooled the cross-section and panel components of the Nepal Living Standards Survey (NLSS) III (2010/2011), whereas we used nationally representative cross-sectional data from NLSS III.

nature of observed hours worked as we have done. Moreover, while Phadera focused on whether a household has a migrant member as a key explanatory variable, we focused on remittances received. As a result, the results in the two papers are not directly comparable.

To our knowledge, there are no studies on Nepal that assess the impact of remittances on the performance of non-farm enterprises operated by the left-behind labor force. This was an additional contribution in the context of Nepal.

Turning to related studies in countries other than Nepal, the evidence was mixed, although our results are not directly comparable to many studies because of differences in methodology. Amuedo-Dorantes and Pozo (2006a) found that men in urban Mexico, not women, worked lower hours in self-employment in response to receipt of remittances, but they did not distinguish between farm and non-farm self-employment. Broadly, our finding of a reduction in hours supplied in general and an increase in hours supplied to extended economic activities (household chores) due to receipt of remittances was in line with findings of a negative impact of international migration on wage work and a positive impact on unpaid family work in Kyrgyzstan (Dávalos et al., 2017) and in Egypt (Binzel & Assaad, 2011); and a negative impact on labor-force participation in Cambodia (Roth & Tiberti, 2017). In contrast, Lenoel and David (2018) found a negative impact of remittances on labor-force participation in unpaid family work in Morocco.

Our finding for Nepal—that receipt of remittances led to a reduction in labor supply to non-farm self-employment—is similar to Amuedo-Dorantes and Pozo’s finding for the Dominican Republic (2006b) that receipt of remittances was associated with a reduced probability of owning a business.

Our results contrasted with those of Vasco (2013) for rural Ecuador (neither international migration nor remittances had any effect on the odds of a household owning a rural business); of Acosta (2007) for El Salvador (international remittances were significantly and positively associated with business ownership, with stronger effects in rural areas and among women); and of Massey and Parrado (1998) for Mexico (remittances from the United States by households and communities in Mexico significantly increased the odds of business formation and productive investment).

In investigating the impact of remittance receipt on the performance of non-farm enterprises operated by the left-behind labor force in Nepal, our work is also related to

Woodruff and Zenteno (2007), who used a survey of more than 6,000 microenterprises in urban areas of Mexico and found that the attachment of owners to migration networks (proxied by the migration rate in their state of birth) led to higher investments and profits but not higher sales. For firms in the high-capital sector, they found that investments, sales, and profits increased with attachment to migration networks, with the implication that such attachment alleviates capital constraints in these sectors.

This paper can also be related to the literature that has investigated the impact of shocks in the destination country or of remittances on entrepreneurship and investments in the home country. For example, Yang (2008), studying Filipino households, showed that a positive economic shock in the destination country increased investments in entrepreneurship in the migrant-sending households. Ang, Sugiyarto, and Jha (2009) did not detect a significant positive impact of remittances on productive investments in the Philippines.

Although we did not study return migration, our paper is also related to the few studies on the relationship between return migration and entrepreneurship (e.g., Wahba & Zenou, 2012 in Egypt; Giuliatti, Wahba & Zimmermann, 2013, and Demurger & Li, 2013, in China).

As Naude, Siegel, and Zimmermann concluded in their global survey of empirical studies on the effect of migration and remittances on entrepreneurship (2017), evidence regarding the effectiveness of remittances in encouraging entrepreneurship in migrant-sending countries has been mixed, and our results make an additional contribution in this area.

This paper also provides partial commentary on the literature that has analyzed the processes and determinants of structural change in developing countries (i.e., the decline in the importance of agriculture in total output and employment and the corresponding rise of non-farm sectors/occupations⁵). The potential role of non-farm entrepreneurship in fostering large-scale industrialization in the long run, even if it is in the form of operating informal

⁵ For example, Foster and Rosenzweig (2004) and Shilpi and Emran (2016) looked at the role of agricultural productivity in effecting structural change in India and Bangladesh, respectively. Emran and Shilpi (2011) presented evidence on intergenerational occupational mobility from agriculture to the non-farm sector in Nepal and Vietnam. In related literature, Scharf and Rahut (2014) assessed the effect of participation in non-farm employment on rural welfare, finding an overall positive effect.

household-level microenterprises, also makes analyses of its determinants relevant.⁶ In domestic employment in Nepal in the 1995-1996 to 2010-2011 period, the share of non-farm self-employment increased while the share of agricultural employment decreased. This happened against a backdrop of increasing out-migration and inward remittances.

III. Data

Our main source of data was a nationally representative cross-sectional household survey in Nepal for the year 2010/2011 (Nepal Living Standards Survey—NLSS III), conducted by the national statistical organization, the Central Bureau of Statistics (2011a). The survey enumerated 5,988 households from 499 primary sampling units spread over 381 villages in 71 districts.

NLSS III has information on a range of topics, including hours worked by individuals in core economic activities (agriculture wage work, non-agriculture wage work, agricultural self-employment, non-farm self-employment) and “extended economic activity” (e.g., household-level work such as collecting firewood and fetching water); remittances received by households from absentees; and other standard individual-, household- and community-level characteristics. We used reported hours worked in the previous seven days in different economic activities. Remittances were at the household level: households reported the amount of remittances received from absentees abroad in the last twelve months.⁷

A note on the definition of remittances is in order here. Some households received remittances from “other” sources abroad—that is, from people abroad who were not absentee household members. While 24.7% of households received remittances from absentees abroad, 2.8% also received remittances from other sources abroad. Further, another 5.4% of households received remittances from other sources abroad but not from

⁶ The rural non-farm sector has been credited with providing the foundation for the rise of a modern industrial state in Japan (Smith, 1988). The manufacturing sector is a component of the non-farm sector, and theoretical models feature learning-by-doing in the manufacturing sector as the engine of growth (e.g., Matsuyama, 1992).

⁷ The survey defined a member of a household as an absentee living abroad if s/he was away in a foreign country, at the time of the survey, for a period of at least six months and was expected to return to the household in future. A question may arise: about absentees who returned to Nepal to get married and form a new household but then went back to work abroad? The survey captures such households, too.

absentees. We focused on remittances received from absentee household members living abroad for two main reasons. First, we wanted to assess the impact of remittances received regularly. In the data, we observe the amount received by a household, from the two different sources, over a short window only: the twelve months preceding the survey date. It was reasonable to assume that remittances received from an absentee member (defined as someone living abroad who was formerly a member of the household and who was expected to return to the household in the future) were more likely to be a regular source of income than remittances received from someone who was not a household member.⁸ Second, remittances received from absentees abroad accounted for 89.5% of total remittances received from abroad. We performed several robustness checks with regard to these and related data issues (see the section on robustness checks).

We also utilized a separate module in the household survey on the characteristics of non-farm enterprises operated by household members. The main variables drawn from this module were gross revenue, measured in Nepali Rupees (NPR) in current prices, and a few firm characteristics. Ninety percent of household members who operated these enterprises worked in a single enterprise, just over 8% worked in two, just under 1% worked in three, and the remainder worked in four.

The microsample data from the National Population Census 2001, also conducted by the Central Bureau of Statistics (2011b), was used to construct the main instrument for remittances. This was the lagged village-level emigration rate: The ratio of absentees abroad to the resident population in a village in 2001, a decade before the survey year in which the outcome variable was measured. An alternative instrument, the district-level emigration rate observed two decades before the survey year, was constructed from published tables of the National Population Census 1991. The instruments, and the intuition behind them, are further discussed in Section 4.

Table 1 presents summary statistics for key variables grouped as follows: remittances and migration networks; individual characteristics, including positive hours worked; household characteristics other than remittances; community-level characteristics; and enterprise characteristics. We used a sample of 14,191 economically active household

⁸ Information on the number of times transfers were made in the twelve months preceding the survey date was collected for remittances from absentees but not for remittances from other sources.

members aged 15-64 (i.e., the labor force) from 5,667 households located in 381 villages across all 499 primary sampling units. The average household had 4.89 members, 63% of whom were of working age. Sixty percent of households were headed by a literate person. Some 23% of these households received remittances. Yearly remittances averaged NPR 32,644 (or, about USD \$290 at current exchange rates⁹), with substantial variation across households. There was variation across households in these variables as well as in the distance to a paved road, distance to a market center, and the size of agricultural land owned. There was also a decent variation in the year 2001 village-level migration rate, the main instrument, which ranges from a minimum of 0% to 0.7% in the 25th percentile to 24% at the maximum.

The sample was young, with a mean age of 35 years. It had a low level of education, with an average of five years in formal educational institutions. Slightly over 55% were woman, partly a reflection of the fact that most emigrants are men. Married individuals were 78% of the sample. About 70% had worked in the previous seven days in core economic activities. This did not mean the unemployment rate was 30% because there were individuals who were not engaged in core economic activities but rather in “extended economic activity,” which was counted as employment in the official definition (see Central Bureau of Statistics, 2011a). Including extended economic activity, the unemployment rate was around 4% in the sample.

Employed individuals worked, on average, forty hours per week, including in extended economic activity. The average hours worked were the highest in wage employment (forty-two), followed by non-farm self-employment (thirty-nine), farm self-employment (twenty-three) and extended economic activity (eighteen).

Household enterprises were, on average, quite young (9.2 years). They were fairly evenly distributed across manufacturing, service, and trade sectors. Just a fifth of them reported having borrowed successfully to expand their business. Their annual gross revenue averaged NPR 632,380 (or USD \$5,748 at the current exchange rate).

⁹ These are averaged over remittance recipients as well as non-recipients.

Table 1: Summary Statistics

	Mean	sd	Min	p25	p50	p75	Max	N
Remittances and Migration Networks								
Household received remittances from absentee abroad	0.231	0.422	0.000				1.000	5667
Remittance received by household (Nepali Rupees)	32643.716	138035.855	0.000	0.000	0.000	0.00	3600000.000	5667
Migration network (external migration rate in village in 2001)	0.038	0.044	0.000	0.007	0.021	0.051	0.241	381
Individual Characteristics, Labor Force (N = 14,191)								
Biological sex (1 if man)	0.454	0.498	0.000				1.000	
Married (1 if married)	0.785	0.410	0.000	1.000	1.000	1.000	1.000	
Age (years)	34.985	13.714	15.000	23.000	34.000	46.000	64.000	
Years of education	5.092	5.046	0.000	0.000	4.000	10.000	17.000	
Positive hours worked								
All sectors	40.160	24.146	1.000	20.000	42.000	56.000	150.000	13617
Extended eco. activity	17.809	13.737	1.000	7.000	14.000	26.000	94.000	10128
Wage employment	42.165	19.277	1.000	30.000	42.000	56.000	112.000	3237
Farm self-employment	23.294	15.836	1.000	10.000	20.000	34.000	126.000	5135
Non-farm self-employment	39.049	25.286	1.000	16.000	36.000	56.000	112.000	2827
Household Characteristics (N = 5,667)								
Household size, excluding absentees	4.888	2.283	1.000	3.000	5.000	6.000	20.000	
Share of working-age members in household	0.630	0.235	0.125	0.444	0.600	0.800	1.000	
Distance to paved road (km)	14.758	36.977	0.000	0.000	2.000	12.000	288.000	
Distance to market center (km)	9.394	35.873	0.000	1.000	4.000	10.000	800.001	
Head of household was literate	0.604	0.489	0.000				1.000	
Agriculture land owned (ha)	0.483	0.960	0.000	0.000	0.237	0.620	24.409	
Community (Primary Sampling Unit) Characteristics (N = 499)								
Share of population aged 15 or above who are literate	0.603	0.194	0.086	0.475	0.618	0.744	1.000	
Share of population aged 15 or above who were in or had completed grade 8-10	0.220	0.104	0.000	0.146	0.222	0.294	0.514	
Share of population aged 15 or above who were in	0.142	0.148	0.000	0.029	0.094	0.214	0.694	

or had completed grade 11 or above							
Share of population aged 15 and above engaged in non-agriculture wage work	0.248	0.144	0.000	0.146	0.226	0.333	0.824
Share of population aged 15 and above engaged in non-agricultural self-employment	0.217	0.163	0.000	0.088	0.188	0.313	0.946
Log of average household (per capita) consumption	10.575	0.542	9.061	10.180	10.465	11.010	12.195

Enterprise Characteristics (2350)

Gross revenue NPR '0000	63.238	257.289	0.000	2.400	10.000	40.000	8140.000
Age	9.212	9.418	0.000	2.500	6.167	12.542	100.000
Borrowed successfully	0.218	0.413	0.000				1.000
% where main operator was a man: 29.5%							
% in manufacturing: 29.4							
% in services: 28.5							
% in trade: 30.7							

IV. Theoretical Framework and Empirical Strategy

4.1 Labor Supply

Our empirical analysis may be interpreted in light of theoretical models that have focused on labor supply at the intensive and extensive margins. Under the model proposed by Gronau (1973), workers maximized a utility function depending on consumption and time allocated to home activities (leisure and work at home). Individuals engaged in employment if the offered wage (W_o) was higher than a shadow (or reservation) wage (W_r).¹⁰ Because the reservation wage was defined as the monetary value of not accepting the job offer, monetary transfers such as international remittances (R) unambiguously increased W_r , other things being equal.¹¹ This effect alone was expected to reduce the likelihood of accepting any job offer. Nevertheless, a parallel effect of remittances on W_o may have been anticipated. Because the wages offered to workers depended upon human capital and

¹⁰ Gronau's model (1973) was erected in the context of labor supplied by housewives. Thus, the reservation wage represented housewives' value of time. It was formally defined as the marginal rate of substitution between consumption and time allocated to home activities (including leisure and work at home).

¹¹ $\frac{\partial W_r}{\partial R} \geq 0$

other determinants, remittances from international migration could have affected W_o positively through a liquidity channel.¹² This led to a potentially ambiguous effect of remittances on labor supply.

Extending Gronau's dichotomous framework (to-work or not-to-work) to an analysis of the labor supply in a specific j-th occupation, such as non-agricultural self-employment, requires further clarification. The shadow wage now needs to be interpreted as the monetary value of not engaging in the j-th specific occupation. Hence, the likelihood of labor supply (p_j) to j-th occupation was defined as:

$$p_j = P[W_o - W_{rj} > 0] \equiv P[h_j^* > 0] \quad (1)$$

where the individual-specific subscript was suppressed.

With regard to labor supply to non-farm self-employment, the focus of this study, there were three forces or channels at work when there was a change in remittances received. The first was the reservation-wage channel (negative effect). The second was the liquidity channel (positive effect): if receiving remittances eased liquidity/credit constraints sufficiently for the left-behind family members to invest in and expand their businesses (see Lucas & Stark, 1985), an increase labor supply might result. The third was a (positive) substitution effect that could operate if left-behind family members supplied their labor to fill, fully or partially, the gap created by a member's departure¹³.

From Heckman (1974), it can be shown that labor-supply intensity h_j^* depends upon the offered-wage and shadow-wage differential ($W_o - W_{rj}$). Similarly, the labor supply at the extensive margin (for j-th occupation) was determined by the probability of observing positive working hours $P[h_j^* > 0]$. As a result, the labor-supplied model can be written as a Tobit type 1 model (Equations 2 and 3).

$$h_j = \begin{cases} h_j^*, & h_j^* > 0 \\ 0, & h_j^* \leq 0 \end{cases} \quad (2)$$

Heckman (1974) showed that Expression 1 implied that the working-hours estimating equation was conditioned on human capital (W_o) and individual characteristics (W_{rj}), both

¹² $\frac{\partial W_o}{\partial R} \geq 0$

¹³ This was analogous to the substitution effect posited for agriculture self-employment in, for example, Rozelle, Taylor, and de Brauw (1999).

represented by x , a vector of exogenous variables:

$$h_j^* = x' \beta + \delta R + u \quad (3)$$

where δ represents the net-effect of remittances on offered and reservation wages. The unit of observation is the individual. Remittances (R) are expected to be endogenous, which implies the need for extending the Tobit type 1 setup. In the literature, such a model has been specified as an IV-Tobit (see Amuedo-Dorantes & Pozo, 2006a; Binzel & Assaad, 2011; Dávalos et al., 2017). Before we discuss instrumentation, we note that R is expressed in logarithms, which let us account for (possible) non-linear effects of remittances as well as to deliver a strong first stage. Because some households did not receive remittances, we added unity to remittances before taking their logarithm.¹⁴

The explanatory variable of interest, remittances, was measured on a continuous scale. The coefficient measures the impact of a *change* in remittances received on the outcome variable. Because of the continuous scale, the results did not permit a binary treatment-effect analysis where the comparison group would be households that did not receive remittances. Instead, we measured the average impact on outcomes (e.g., hours worked) of an increase or decrease in the remittances that flowed into a given household. We compared households with lower (higher) level of remittances with a higher (lower) level of remittances, where low remittances included, but were not limited to, zero values.

Households with zero remittances were mostly those with no absentee members abroad (about 90%). Because about 10% of them had absentees abroad, zero remittances, strictly speaking, captured having no absentee members abroad and/or receiving no remittances. In the section on robustness checks, we assessed the results by dropping such households, so that zero remittances were only associated with households that did not have any absentee member abroad.

4.2 Endogeneity and identification

The endogeneity of migration and associated remittances to decision regarding

¹⁴ Results are very similar to taking the inverse hyperbolic sine transformation of remittances (see the section on robustness checks), as described in Bellemare and Wichman (2019).

labor supply (or household-level decisions such as spending) has been well-recognized (see, for example, Antman, 2013, and Naude, Siegel & Zimmermann, 2017, for surveys; and Lokshin & Glinskaya, 2009, for a discussion on Nepal). The preferred, standard method in the literature to address this endogeneity has been to use an instrumental variable (IV). The most popular IV draws on migrants' networks, meaning the share of emigrants in the population/labor force of the geographical unit with which the household/left-behind individual was associated. It is germane to note here that, in the literature, migrants' networks have served as an instrument for migration (e.g., Rozelle, Taylor & de Brauw, 1999; McKenzie & Rapoport, 2007) as well as remittances (e.g., Lokshin & Glinskaya, 2009; Lokshin, Bontch-Osmolovski, and Glinskaya, 2010; Binzel & Assaad, 2011; Dávalos et al., 2017).

The intuition for the relevance of the instrument was that it was a proxy for the social networks that emigrants maintained and which linked their home villages with their destinations.¹⁵ This could lower the cost of out-migration as well as enable prospective migrants to make more informed decisions when choosing destinations, occupations, or agents to help them get a job abroad. Better information was expected to lead to receiving higher remittances. The justification for the exclusion restriction was that migrants' networks affected the outcome variable (whether that was household consumption or labor allocation) only through the variable of interest. Most relevant to our study, Lokshin and Glinskaya (2009) and Lokshin, Bontch-Osmolovski, and Glinskaya (2010) used the proportion of the labor force that had emigrated at the level of the ward (the smallest administrative unit), with a lag of about three years, as an instrument for household-level international migration/remittance status. Following these studies, Phadera (2016) used the ratio of international emigrants from a village to the local population as an instrument.

We instrumented remittances by the ratio of absentees abroad to the resident population in a village in 2001, a decade before the outcome variables were measured. As has been standard in the literature, we also conditioned on covariates at the individual, household, and community (i.e., primary sampling unit) levels. Following our conceptual framework and related previous studies (e.g., Massey & Parrado, 1998; Lokshin & Glinskaya,

¹⁵ Munshi (2003) showed the importance of networks in Mexico-U.S. migration. McKenzie and Rapoport (2010) showed the role of migration networks in determining self-selection patterns of Mexico-US migration.

2009; Rozelle, Taylor & de Brauw, 1999; Amuedo-Dorantes & Pozo, 2006a, 2006b; Wahba, 2015; and Wahba & Zenou, 2012) and given the data available, we controlled for: (i) individual-level variables: biological sex, marital status, age, age squared, years of education, and broad ethnic group fixed effects; (ii) household variables: household size and its square, share of working-age members, distance to paved road and market, whether household head was literate, and size of agricultural land; and (iii) community-level variables: percentage of population aged 15 and above who were literate; percentage that was enrolled in or had completed grades 8-10; the percentage that was enrolled in or had completed grade 11 and above; the percentage engaged in non-agricultural wage work; the percentage in self-employed non-agricultural work; the log of average per capita household consumption in the community; and geographical region fixed effects.

The identifying assumption was that the village-level migration rate of a decade ago, at least conditioned on these covariates, affected labor supply only through the amount of remittances received by the household. Insofar as migration rate at the village level a decade ago affected current economic conditions in the village, in turn affecting an individual's engagement in non-farm employment activities, we attempted to control for this channel by including village-level socioeconomic conditions.¹⁶ As a robustness check, we also used two alternative IVs: (i) the ratio of absentees abroad to resident population in a district in 1991; and (ii) the ratio of absentees abroad to resident population in a district in 1991 multiplied by the average remittances received by remittance-receiving households in a district in 1995.

4.3 Productive Use Specification

Let y_i^* be our latent outcome of interest (i.e., potential gross revenues of the non-farm enterprise that individual i operated), y_i our observed outcome, and h_i^* the labor supply (or desired hours of work) in non-farm self-employment. Our econometric specification was thus written as a Tobit Type-II model (Amemiya, 1984):

¹⁶ A concern could be that if the dependent variable was correlated over time, the instrument might not be exogenous. As pointed out in Mishra (2007), who used lagged migration rate as an instrument for migration when studying the impact of migration on wages, this was less of a concern when using data over long periods. Mishra (2007) also used an instrument with a lag of a decade, as we did.

$$y_i = \begin{cases} y_i^*, & h_i^* > 0 \\ -, & h_i^* \leq 0 \end{cases}$$

Three equations are estimated:

$$R = \mathbf{x}'_3 \boldsymbol{\phi} + \epsilon_2,$$

$$h_i = \begin{cases} 1 & \text{if } h^* > 0 \\ 0 & \text{if } h^* \leq 0 \end{cases}$$

with

$$h_i^* = \mathbf{x}'_2 \boldsymbol{\beta}_2 + \epsilon_2, \text{ and}$$

$$y_i^* = \mathbf{x}'_1 \boldsymbol{\beta}_1 + \epsilon_1 \text{ for } h_i = 1.$$

The first is an IV first stage linear regression of remittances (R) on the instrument and other exogenous variables in the system. The instrument for R was the same as before. The second was a probit model of selection of an individual into being self-employed as the main operator of a non-farm enterprise, where the regressors included the predicted value of R . An inverse Mills ratio (IMR) was computed from this step. The third was a linear regression of the outcome of interest (gross revenues) on enterprise-level variables, other exogenous variables, the predicted value of R from the first step, and the IMR from the second step.

The outcome equation contained controls for enterprise-level characteristics (firm age, firm age squared, whether the firm borrowed successfully,¹⁷ and sector: manufacturing, service, trade) and individual-, household-, and community-level characteristics. The latter three were also included in the selection equation and the IV first stage equation. To avoid identification in the outcome equation resulting solely from non-linearity in the estimation of the selection equation, we introduced a different type of educational variable in the selection equation. While years of education was used in the outcome equation, categorical educational variables (dummies denoting the grades an individual had completed or in which she or he was enrolled) were used in the selection equation. A bootstrap procedure with 10,000 replications was used to compute standard errors.

Under this particular setup, the effect of remittances on the latent outcome was

¹⁷ The variable took the value 1 if the enterprise owner borrowed money to operate or expand his business in the previous twelve months, and 0 if he either did not try to borrow money or tried but was not successful in getting a loan.

represented by $\frac{\partial E y_i^*}{\partial R}$, whereas the effect on the observed outcome—the marginal effect at the truncated mean— was given as $\frac{\partial E y_i | h_i^* > 0}{\partial R}$. While the first derivative accounted for the direct effect of international remittances on potential gains, the second integrated the effect of remittances into the likelihood of engaging in self-employment in a non-farm enterprise. It can be shown that both effects are related by

$$\frac{\partial E y_j | h_j^* > 0}{\partial R} = \frac{\partial E y_j^*}{\partial R} - \sigma_{12} \lambda(x' \gamma_1) (x' \gamma_1 + \lambda(x' \gamma_1)) \gamma_1 ,$$

where $\lambda(\cdot)$ was the inverse Mills ratio function and $x' \gamma_1$ the underlying linear predictor.¹⁸

V. Results

5.1 Labor Supply

Table 2 presents the results for the IV-Tobit (Type 1) estimation of labor supply. Each column refers to a particular economic activity. The first row reports the coefficient on remittances. Appendix Table A1 reports the first-stage results for the corresponding columns of Table 2, with the third row from the bottom reporting the F-statistic of the coefficient on the instrument, which shows the first-stage to be quite strong.¹⁹

¹⁸ \mathbf{x} was the vector formed by the union of \mathbf{x}_1 and \mathbf{x}_2 . Then $\mathbf{x}_1' \boldsymbol{\beta}_1$ was rewritten as $\mathbf{x}' \boldsymbol{\gamma}_1$, and $\mathbf{x}_2' \boldsymbol{\beta}_2$ was rewritten as $\mathbf{x}' \boldsymbol{\gamma}_2$ (see Cameron & Trivedi 2005, 552).

¹⁹ The F-statistics were also greater than the critical values under the size method of Stock and Yogo (2005).

Table 2: IV-Tobit Results for Hours Worked

	(1)	(2)	(3)	(4)	(5)	(6)
	Total hours	Hours in core economic activities (4+5+6)	Hours in extended economic activity	Hours in wage work	Hours in agriculture self-employment	Hours in non-agriculture self-employment
(Log) remittances	-1.227** (0.517)	-3.447*** (0.887)	0.658* (0.339)	-3.430** (1.668)	-2.375** (1.195)	-3.864*** (1.495)
<i>Individual characteristics</i>						
Gender (Man =1)	7.848*** (1.066)	10.018*** (1.094)	-6.935*** (0.486)	25.889*** (3.600)	-5.649*** (1.316)	10.830*** (2.042)
Married	3.795*** (0.884)	4.500*** (1.188)	0.041 (0.524)	-1.491 (2.464)	1.846 (1.361)	12.312*** (2.656)
Age	2.035*** (0.164)	1.182*** (0.226)	0.241*** (0.091)	2.735*** (0.551)	-0.144 (0.258)	1.399*** (0.511)
Age squared	-0.025*** (0.002)	-0.015*** (0.003)	-0.002* (0.001)	-0.038*** (0.007)	0.003 (0.003)	-0.016** (0.007)
Education in years	-0.276*** (0.063)	0.086 (0.127)	-0.566*** (0.057)	1.328*** (0.261)	-0.547*** (0.105)	0.331 (0.355)
<i>Household characteristics</i>						
Household size	-1.072** (0.424)	-1.336** (0.657)	-0.244 (0.291)	-1.944 (1.227)	0.526 (0.743)	-3.226*** (1.233)
Household size squared	0.070*** (0.026)	0.109** (0.043)	-0.008 (0.018)	0.048 (0.078)	0.007 (0.044)	0.248*** (0.079)
Share of working age members in HH	-4.874** (1.985)	-4.673* (2.390)	-2.630** (1.060)	-8.013 (5.115)	-1.082 (3.230)	-4.125 (5.488)
Distance to paved road in km	-0.000 (0.011)	-0.013 (0.016)	0.015* (0.009)	-0.043 (0.032)	0.014 (0.018)	-0.076** (0.037)
Distance to market centre in km	0.012 (0.009)	0.021* (0.012)	-0.005 (0.003)	0.014 (0.018)	0.018 (0.014)	-0.004 (0.023)
HH head is literate	-0.262 (0.684)	-0.011 (1.056)	0.393 (0.428)	-9.478*** (2.086)	0.408 (1.297)	9.265*** (2.223)
Agriculture land owned in ha	0.292 (0.320)	0.131 (0.542)	0.850*** (0.266)	-6.554*** (2.012)	4.827*** (0.780)	-2.357* (1.352)
<i>Community characteristics</i>						
Share of population aged 15 or above who are literate	-3.950 (4.845)	-5.788 (7.116)	-2.794 (3.419)	-7.396 (11.718)	-0.436 (10.026)	4.146 (10.772)

Share of population aged 15 or above who are in or have completed grade 8-10	-4.492 (6.101)	-0.416 (8.621)	-2.432 (4.431)	10.581 (11.996)	-15.868 (12.908)	18.431 (11.768)
Share of population aged 15 or above who are in or have completed grade 11 or above	-12.992*** (4.851)	-3.615 (8.430)	-17.921*** (4.788)	-2.492 (14.464)	-47.153*** (13.858)	29.776** (12.417)
Share of population aged 15 and above engaged in non-agriculture wage work	2.091 (2.925)	3.134 (4.681)	-4.050* (2.415)	76.027*** (8.042)	-15.405** (7.674)	-36.660*** (6.740)
Share of population aged 15 and above engaged in non-agriculture self-employment	8.087*** (3.110)	11.169*** (3.776)	-5.444*** (1.819)	-33.843*** (7.527)	-19.321*** (5.783)	122.383*** (7.557)
Log of average consumption	3.261** (1.620)	15.383*** (2.283)	-7.120*** (1.125)	22.863*** (3.859)	2.442 (3.112)	9.288*** (2.953)
Observations	14191	12608	14191	12608	12608	12608

Notes: Robust standard errors, clustered at the village level, are in parentheses. All regressions have six ethnicity fixed effects and six region fixed effects. The instrument was village-level migration network. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We found that receiving a higher amount of remittances led individuals to reduce their (desired) labor supply to non-farm self-employment. A doubling of remittances led an individual to supply, on average, 2.7 fewer hours per week to non-farm self-employment (Column 6, Table 2). Higher remittances also induced individuals to work less in other sectors. A doubling of remittances led an individual to supply, on average, 1.6 fewer hours per week to agricultural self-employment (Column 5), and 2.4 fewer hours per week to wage employment (Column 4). Not surprisingly, when we pooled the three core economic activities, we noted an overall reduction in the supply of labor (Column 2)—by, on average, 2.4 hours per week.²⁰ There was a weak statistically significant positive effect of higher

²⁰ The sum of the coefficients in the work-category-specific regressions (Columns 4-6, Table 2) are not equal to the coefficient in the total hours worked regression (Column 2). This is because of the (IV) Tobit estimation we pursued, given the nature of the dependent variable. Moreover, zeros in the total-hours-worked-specification imply unemployment, whereas zeros in the specifications for categories of work can imply either unemployment

remittances on extended economic activity (i.e., household work such as fetching water and collecting firewood), as shown in Column 3. When hours worked in extended economic activity and core economic activities were pooled (Column 1), however, the result was not strong enough to overturn the negative effects on the labor supply in the three core economic activities. When we used alternative instruments, these results were qualitatively the same. The finding that higher remittances led individuals to reduce the labor they supplied to non-agricultural self-employment continued to hold, a result of particular importance (see Appendix Table A2).

Table 2 also reports the coefficients on other controls in the model. Here, we focus on the results for non-farm self-employment and demonstrate the statistically significant coefficients (Column 6). Men, on average, supplied 10.83 more hours than women to non-farm self-employment. Note that this was not the effect of remittances for men versus women—which will be explored later. Married people supplied, on average, 12.31 more hours than those not married. Older people supplied more hours in the sector, although the effect of age decayed. Years of education did not have a significant effect on hours supplied to non-farm self-employment but did have a negative effect on agricultural self-employment and a positive effect on wage employment. Hours supplied to non-farm self-employment decrease with household size, but the negative effect of household size decayed. Hours supplied to non-farm self-employment fell with distance to a paved road and the size of the household’s agricultural landholding. Hours supplied were higher if the household head was literate, increased with the share of population aged 15 or above that had completed or was enrolled in grade 11 or above, decreased with the share of population aged 15 or above that was engaged in non-agriculture wage work, and increased with the share of population aged 15 or above that was engaged in non-farm self-employment and with the average living standard in the community, proxied by average per capita consumption.

To test whether heterogeneity existed in the results across groups according to biological sex, we also ran IV-Tobit regressions separately on samples of men and women. For men, we found no statistically significant effect of remittances on hours worked in any of

or not employed in a particular category (although the individual may be employed in some other category). Had we run OLS regressions, the coefficients would have summed to the “total” coefficient.

the core economic activities (although all the coefficients had a negative sign), but there was a negative and statistically significant effect on total hours worked in these activities combined (Table 3, upper panel). For women, however, the results mirrored the full-sample results. Higher remittances induced them to reduce their labor supply to non-farm self-employment (by 3.6 hours per week on average) as well as to other core economic activities (Table 3, lower panel). Women also slightly increased the labor they supplied to extended economic activities.

Table 3: IV-Tobit Results for Hours Worked For Men and Women

	(1) Total hours	(2) Hours in core economic activities (4+5+6)	(3) Hours in extended economic activity	(4) Hours in wage work	(5) Hours in agricultural self- employment	(6) Hours in non- agricultural self- employment
Men						
(Log) remittances	-1.821** (0.749)	-3.347*** (1.115)	0.443 (0.547)	-1.491 (2.270)	-2.534 (1.628)	-2.297 (2.116)
F-stat for first stage	60.68	57.46	60.68	57.46	57.46	57.46
Observations	6448	6066	6448	6066	6066	6066
Women						
(Log) remittances	-1.060** (0.535)	-3.402*** (0.976)	0.737** (0.354)	-4.970** (2.124)	-2.311** (1.111)	-5.124*** (1.834)
F-stat for first stage	87.42	75.69	87.42	75.69	75.69	75.69
Observations	7743	6542	7743	6542	6542	6542

Notes: Robust standard errors, clustered at the village level, in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics as shown in Table 2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 Robustness checks

Recall that remittances were expressed in logarithms after adding one to them, in order to deal with zero values. As a robustness check, we employed the inverse hyperbolic sine transformation that has emerged as an alternative way to deal with zero values of variables that need to be expressed in logarithms (see Bellemare & Wichman, 2019). The implied elasticities were similar between the two approaches (Appendix Table A3).

As discussed in the section on data, 8.2% of households received remittances from sources abroad other than absentee members. To allay concerns that ignoring remittances from other sources had affected our results, we included remittances from all sources (that is, from absentees plus from other sources) in our regressions; the results held (Appendix

Table A4).

Some households (5.5 %) received more remittances from other sources abroad than from absentees abroad. To see whether such households drove the result, we dropped them from the main sample while retaining the definition of remittances as transfers coming solely from absentees abroad. The results were robust to this adjustment (Appendix Table A5). Similarly, we dropped households (8% of total) that receive any remittances from other sources abroad and found that the results held (Appendix Table A6).

A quarter of households with absentee(s) abroad received no remittances from absentee(s). These were 8% of households. To see whether the presence of these households drove results, we dropped them from the main sample as a robustness check while retaining the definition of remittances as transfers coming from absentees abroad. In this sample, households with zero remittances were only those with no absentee member(s) abroad. The results held (Appendix Table A7).

5.3 Productive Use of Remittances

We found that higher remittances led to a reduction in labor supply to non-farm self-employment. Did remittances also affect the performance of non-farm enterprises, as measured by gross revenue?

The effect of remittances on the potential revenue (the latent variable) was negative and seemed statistically insignificant at the 10% level (Column 1 of Table 3 presents the results for the outcome equation). Because the effect on potential revenues did not account for the self-selection effects of remittances that arose from effective (and not potential) engagement in non-farm employment, we estimated the marginal effect of remittances on enterprise revenue conditional upon operating an enterprise.²¹ The marginal-effects distribution, shown in Figure 1, retained the negative sign observed in the effects on potential revenue and exhibited limited dispersion with a mean of -0.05. All were statistically significant at conventional levels, as can be seen from the distribution of their t-statistics in Figure 2. For those who operated a non-farm enterprise, a 10% increase in remittances led to a 0.5% decline in the gross revenue of their enterprise, on average.

²¹ See the section on methodology for the formula.

Table 3: IV-Tobit Type 2 Results for Impact on Enterprise Revenue

	Outcome equation (gross revenue)	t-stat	Selection equation	t-stat
Man	0.755 (0.305)	2.48	0.687 (0.045)	15.44
Married	0.916 (0.383)	2.39	0.812 (0.061)	13.4
Age of individual	-0.000 (0.005)	-0.05	0.012 (0.001)	8.06
Education in years	0.051 (0.009)	5.50		
Education dummy (grades 1-4)			0.162 (0.057)	2.86
Education dummy (grades 5-7)			0.247 (0.055)	4.45
Education dummy (grades 8-10)			0.200 (0.056)	3.56
Education dummy (grades 11 and above)			0.167 (0.063)	2.62
Firm age	0.035 (0.010)	3.37		
Firm age squared	-0.001 (~0.000)	-2.03		
Borrowed successfully	0.523 (0.074)	7.1		
Is in manufacturing	-0.107 (0.090)	-1.20		
Is in service	0.279 (0.099)	2.81		
Is in trade	0.612 (0.092)	6.63		
Share of adult literate population in community	0.372 (0.438)	0.85	0.303 (0.171)	1.77
Share of adult population with 8-10 years of education	0.557 (0.502)	1.11	-0.268 (0.213)	-1.26
Share of adult population with 11 or more years of education	0.926 (0.624)	1.48	0.263 (0.192)	1.37
Share of adult population in wage work	-0.116 (0.257)	-0.45	-0.173 (0.120)	-1.44
Share of adult population in non-farm self-employment	1.065 (0.869)	1.220	2.300 (0.133)	17.28
Log of average consumption in community	0.756 (0.129)	5.860	-0.024 (0.048)	-0.51
Household size	0.038 (0.061)	0.630	-0.117 (0.020)	-5.93
Household size squared	0.000 (0.003)	0.100	0.005 (0.001)	4.10
Share of working-age individuals among household members	-0.063 (0.222)	-0.280	-0.488 (0.086)	-5.67
Distance to paved road	-0.002 (0.001)	-1.190	0.000 (0.001)	-0.23

	Outcome equation (gross revenue)	t-stat	Selection equation	t-stat
Distance to market	-0.001 (0.003)	-0.350	0.000 (0.001)	-0.34
Distance to bank	-0.004 (0.003)	-1.250	0.001 (0.001)	1.05
Head of household was literate	0.120 (0.102)	1.170	0.116 (0.040)	2.88
Agriculture land size	0.090 (0.033)	2.740	-0.032 (0.026)	-1.23
Remittances	-0.055 (0.047)	-1.170	-0.002 (0.022)	-0.09
Inverse Mills ratio	0.471 (0.505)	0.930		
Observations	2350		14413	

Notes: Standard errors, clustered at the village level, are in parenthesis. They were obtained by bootstrapping with 10,000 replications. Values are rounded off to three decimal places for coefficients and standard errors and two decimal places for t-statistics.

Figure 1: Distribution of Marginal Effects of Remittances on Gross Revenue

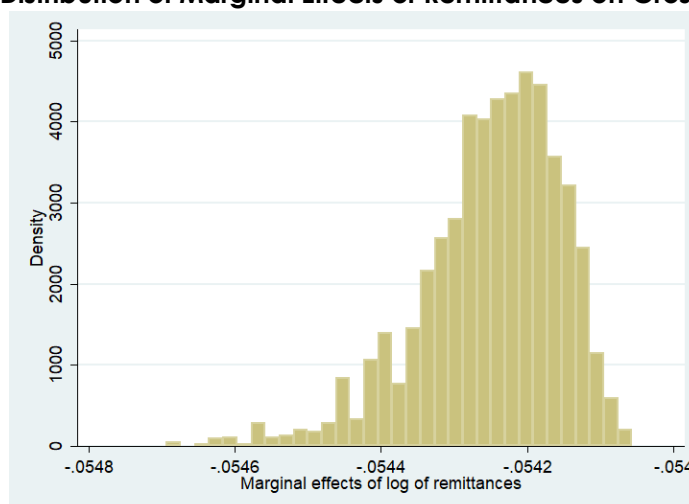
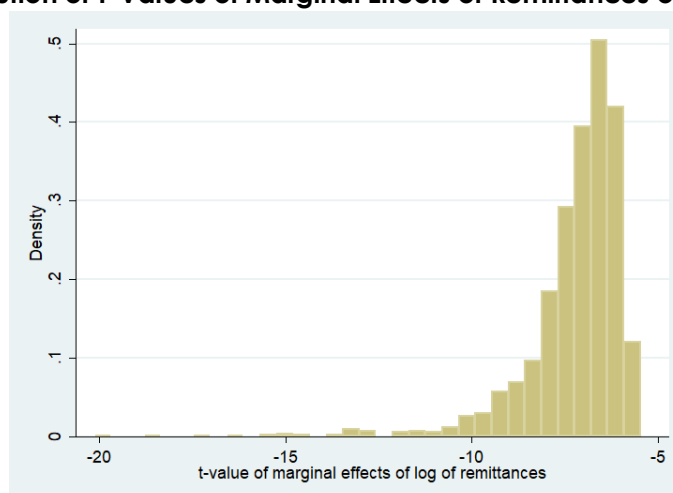


Figure 2: Distribution of T-Values of Marginal Effects of Remittances on Gross Revenue



VI. Interpretation and Discussion

In terms of our theoretical framework, the finding that higher remittances led to a reduction in labor supply to core economic activities, including non-farm self-employment, was suggestive of a rise in the reservation wage that was strong enough to dominate the effects of remittances via the substitution and liquidity channels. Both men and women reduced the total labor they supplied to core economic activities. But it was women, not men, who reduced the labor they supplied to *all* core economic activities, including non-farm self-employment, and it was again women who slightly increased their labor supply to extended economic activities. This can partly be explained by the social milieu in Nepal: Women are expected to spend more time at home and, as a result, remittances increase their reservation wage relative to the offered wage by a greater degree than for men.

We also uncovered evidence that higher remittances led to lower revenues of non-farm enterprises operated by the self-employed. Even though the productive-use channel, in theory, included a positive effect, the negative effect may be linked to our previous finding (i.e., the negative effect of remittances on working hours supplied to non-farm employment). The latter reduced an input to a firm's production function (labor) which, in turn, led to a lower output (i.e., revenues). To the extent that higher remittances may have eased credit constraints, the associated positive effect on firm revenues must have been counteracted by the disincentive effect. A rise in the reservation wage thus appeared to be the predominant channel at play. This could have reflected the reality that the bulk of those engaged in non-farm self-employment in poor countries are, as characterized by Banerjee and Duflo (2011), "reluctant entrepreneurs" who are pursuing their vocation out of desperation.

VII. Conclusions and Policy Implications

Remittances from international migration have become an important resource for many poor countries. Whether these transfers aid entrepreneurship among the left-behind labor force is an open question, and empirical evidence is mixed. Using data from Nepal, a poor, remittance-dependent country, we estimated the impact of remittances on (i) the labor supply of the left-behind, with a focus on non-farm self-employment, and (ii) the

revenues of enterprises operated by these individuals. Our estimation of the impact on labor supply followed an IV-Tobit Type 1 and took into account the truncated nature of observed hours worked as well as the endogeneity of remittances.

The estimation of the impact on enterprise revenues employed an IV-Tobit Type 2 (IV Heckman), which addressed the self-selection of individuals into operating an enterprise as well as the endogeneity of remittances. Because our estimation was in a partial equilibrium framework—similar to other papers that have estimated the impact of international migration and/or remittances on individual- or household-level outcome variables (Lokshin, Bontch-Osmolovski & Glinskaya, 2010; Acharya & Leon-Gonzalez, 2013; and Lokshin & Glinskaya, 2009, for example)—it should be noted that we did not take into account the spillover or general equilibrium effects of remittances (for example, through increasing effective demand and thereby affecting economy-wide economic activities). This is an interesting area for a future study.

We found that higher remittances induced women who were left behind to reduce their labor supply to non-farm self-employment as well as to other economic activities outside of the home (wage employment and agricultural self-employment). The effect on left-behind men was insignificant for core economic activities individually, although there was a negative and significant effect on the total hours they supplied to core economic activities. We also found that higher remittances lead to lower revenues of enterprises operated by the left-behind labor force. This suggests that the increase in the reservation wage, which reduces labor supply and possibly efforts expended on enterprises, dominates any possible positive effect on enterprise performance that may be at play through the liquidity channel.

Most household-operated enterprises are informal and micro-sized with low returns, and it can be plausibly argued that, were wage jobs in adequate supply, many people would opt for wage jobs over self-employment (see Banerjee & Duflo, 2011). But it is because wage jobs are scarce that policy attention towards promoting non-farm micro and small enterprises for practical reasons could have merit. This is independent of whether non-farm self-employment activities should be termed entrepreneurship. The predominance of the reservation-wage channel that prompted women to pare down the supply of their labor to non-farm self-employment points to the need for policymakers to

create conditions that make non-farm self-employment a vocation of entrepreneurs who are enthusiastic rather than reluctant.

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Appendix

Table A1: First-Stage Regressions (for Regressions in Table 2): Dependent Variable Is (Log) Remittances

	(1)	(2)	(3)	(4)	(5)	(6)
Biological sex (Man =1)	-0.882*** (0.073)	-0.967*** (0.075)	-0.882*** (0.073)	-0.967*** (0.075)	-0.967*** (0.075)	-0.967*** (0.075)
Married	-0.051 (0.135)	0.037 (0.148)	-0.051 (0.135)	0.037 (0.148)	0.037 (0.148)	0.037 (0.148)
Age	-0.134*** (0.021)	-0.154*** (0.023)	-0.134*** (0.021)	-0.154*** (0.023)	-0.154*** (0.023)	-0.154*** (0.023)
Age squared	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Education in years	0.009 (0.011)	0.012 (0.011)	0.009 (0.011)	0.012 (0.011)	0.012 (0.011)	0.012 (0.011)
Household size	-0.417*** (0.114)	-0.360*** (0.117)	-0.417*** (0.114)	-0.360*** (0.117)	-0.360*** (0.117)	-0.360*** (0.117)
Household size squared	0.027*** (0.008)	0.023*** (0.008)	0.027*** (0.008)	0.023*** (0.008)	0.023*** (0.008)	0.023*** (0.008)
Share of working-age members in household	-1.608*** (0.309)	-1.418*** (0.306)	-1.608*** (0.309)	-1.418*** (0.306)	-1.418*** (0.306)	-1.418*** (0.306)
Distance to paved road in km	-0.005*** (0.002)	-0.005*** (0.001)	-0.005*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Distance to market center in km	0.003* (0.001)	0.003** (0.001)	0.003* (0.001)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)
Head of household was literate	-0.617*** (0.154)	-0.592*** (0.159)	-0.617*** (0.154)	-0.592*** (0.159)	-0.592*** (0.159)	-0.592*** (0.159)
Agriculture land owned in hectares	0.240*** (0.093)	0.257*** (0.089)	0.240*** (0.093)	0.257*** (0.089)	0.257*** (0.089)	0.257*** (0.089)
% of population aged 15 or above who were literate	0.431 (0.898)	0.442 (0.903)	0.431 (0.898)	0.442 (0.903)	0.442 (0.903)	0.442 (0.903)
% of population aged 15 or above who were in or had completed grades 8-10	-0.278 (1.014)	-0.365 (1.068)	-0.278 (1.014)	-0.365 (1.068)	-0.365 (1.068)	-0.365 (1.068)
% of population aged 15 or above who were in or had completed grade 11 or above	-1.503* (0.889)	-1.282 (0.947)	-1.503* (0.889)	-1.282 (0.947)	-1.282 (0.947)	-1.282 (0.947)
Share of population aged 15 and above engaged in non-agriculture wage work	-1.608*** (0.503)	-1.694*** (0.501)	-1.608*** (0.503)	-1.694*** (0.501)	-1.694*** (0.501)	-1.694*** (0.501)
Share of population aged 15 and above engaged in non-agri self-employment	-0.947** (0.483)	-0.674 (0.478)	-0.947** (0.483)	-0.674 (0.478)	-0.674 (0.478)	-0.674 (0.478)
Log of average consumption	0.534** (0.253)	0.474* (0.254)	0.534** (0.253)	0.474* (0.254)	0.474* (0.254)	0.474* (0.254)
Instrument (village-level migration networked)	20.244*** (2.123)	19.391*** (2.150)	20.244*** (2.123)	19.391*** (2.150)	19.391*** (2.150)	19.391*** (2.150)

F-statistic	90.82	81.36	90.82	81.36	81.36	81.36
alpha						
Constant	1.070**	3.210***	-0.520	2.754	2.654**	3.171**
(Wald test of exogeneity)	(0.529)	(0.896)	(0.343)	(1.701)	(1.203)	(1.501)

Observations 14191 12608 14191 12608 12608 12608

Notes: Robust standard errors, clustered at the village level, in parenthesis. All regressions have six ethnicity fixed effects and six region fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: IV-Tobit Results for Hours Worked with Alternative Instruments

	(1)	(2)	(3)	(4)	(5)	(6)
	Total hours	Hours in core economic activities (4+5+6)	Hours in extended economic activity	Hours in wage work	Hours in agricultural self-employment	Hours in non-agricultural self-employment
District-level migration rate in 1991						
(Log) remittances	-1.225	-4.398***	1.505***	-5.434***	-2.174	-4.845***
	(0.755)	(1.339)	(0.559)	(2.095)	(1.664)	(1.870)
F-stat for first stage	49.70	43.16	49.70	43.16	43.16	43.16
Observations	14191	12608	14191	12608	12608	12608
District-level migration rate in 1991 x Log average district-level remittances in 1995						
(Log) remittances	-1.202	-4.049***	1.358**	-4.819**	-1.988	-5.051**
	(0.782)	(1.351)	(0.575)	(2.194)	(1.720)	(1.965)
F-stat for first stage	45.70	39.06	45.70	39.06	39.06	39.06
Observations	13943	12376	13943	12376	12376	12376

Notes: Robust standard errors, clustered at the village level, in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics as shown in Table 2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: IV-Tobit Results for Hours Worked, with Inverse Hyperbolic Sine (IHS) Transformation of Remittances

	(1) Total hours	(2) Hours in core economic activities (4+5+6)	(3) Hours in extended economic activity	(4) Hours in wage work	(5) Hours in agricultural self- employment	(6) Hours in non- agricultural self- employment
Full sample						
Remittances (IHS)	-1.151** (0.485)	-3.233*** (0.832)	0.617* (0.318)	-3.217** (1.564)	-2.228** (1.120)	-3.626*** (1.403)
Implied elasticity	-0.0299** (0.018)	-0.111*** (0.029)	0.049* (0.025)	-0.297** (0.145)	-0.235** (0.118)	-0.414** (0.160)
F-stat for first stage	91.58	81.90	91.58	81.90	81.90	81.90
Observations	14191	12608	14191	12608	12608	12608
Men						
Remittances (IHS)	-1.709** (0.703)	-3.140*** (1.045)	0.416 (0.513)	-1.399 (2.129)	-2.378 (1.527)	-2.157 (1.986)
Implied elasticity	-0.040** (0.016)	-0.087*** (0.029)	0.046 (0.057)	-0.088 (0.133)	-0.285 (0.183)	-0.186 (0.171)
F-stat for first stage	60.84	57.76	60.84	57.76	57.76	57.76
Observations	6448	6066	6448	6066	6066	6066
Women						
Remittances (IHS)	-0.994** (0.502)	-3.190*** (0.915)	0.691** (0.332)	-4.661** (1.991)	-2.167** (1.042)	-4.805*** (1.719)
Implied elasticity	-0.028** (0.014)	-0.140*** (0.040)	0.044** (0.021)	-0.771** (0.329)	-0.206** (0.099)	-0.785*** (0.281)
F-stat for first stage	88.17	76.21	88.17	76.21	76.21	76.21
Observations	7743	6542	7743	6542	6542	6542

Notes: Robust standard errors, clustered at the village level, in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics as shown in Table 2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: IV-Tobit Results for Hours Worked, with Remittances that Include All Transfers from Abroad

	(1) Total hours	(2) Hours in core economic activities (4+5+6)	(3) Hours in extended economic activity	(4) Hours in wage work	(5) Hours in agricultural self- employment	(6) Hours in non- agricultural self- employment
Full sample						
(Log) Remittances	-1.066** (0.451)	-3.002*** (0.787)	0.573* (0.297)	-2.982** (1.460)	-2.063** (1.043)	-3.324** (1.307)
Men						
(Log) Remittances	-1.569** (0.650)	-2.871*** (0.956)	0.385 (0.471)	-1.266 (1.952)	-2.163 (1.387)	-1.917 (1.815)
Women						
(Log) Remittances	-0.921** (0.463)	-2.980*** (0.863)	0.641** (0.308)	-4.369** (1.855)	-2.019** (0.978)	-4.447*** (1.613)

Notes: Robust standard errors, clustered at the village level, in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics as shown in Table 2. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table A5: IV-Tobit Results for Hours Worked, Excluding Households That Received More Remittances from Other External Sources Than from Absentees Abroad

	(1) Total hours	(2) Hours in core economic activities (4+5+6)	(3) Hours in extended economic activity	(4) Hours in wage work	(5) Hours in agricultural self- employment	(6) Hours in non- agricultural self- employment
Full sample						
(Log) Remittances	-1.142** (0.467)	-3.134*** (0.819)	0.555* (0.315)	-3.293** (1.513)	-2.107* (1.090)	-3.429** (1.455)
Men						
(Log) Remittances	-1.722** (0.710)	-3.247*** (1.028)	0.452 (0.521)	-2.177 (2.108)	-2.346 (1.499)	-1.767 (2.105)
Women						
(Log) Remittances	-0.960** (0.480)	-2.975*** (0.905)	0.571* (0.321)	-3.912** (1.899)	-2.018** (1.009)	-4.697*** (1.754)

Notes: Robust standard errors, clustered at the village level, in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics as shown in Table 2. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table A6: IV-Tobit Results for Hours Worked, Excluding Households That Received Positive Remittances from Other External Sources

	(1) Total hours	(2) Hours in core economic activities (4+5+6)	(3) Hours in extended economic activity	(4) Hours in wage work	(5) Hours in agricultural self- employment	(6) Hours in non- agricultural self- employment
Full sample						
(Log)	-	-3.403***	0.618*	-3.544**	-2.290*	-3.988**
Remittances	1.152** (0.534)					
		(0.946)	(0.372)	(1.716)	(1.241)	(1.745)
Men						
(Log)	-	-3.783***	0.535	-2.578	-2.714	-2.009
Remittances	2.049** (0.854)					
		(1.193)	(0.628)	(2.396)	(1.771)	(2.414)
Women						
(Log)	-0.878*	-3.118***	0.633*	-3.942*	-2.125*	-5.514**
Remittances						
	(0.523)	(1.020)	(0.369)	(2.118)	(1.136)	(2.160)

Notes: Robust standard errors, clustered at the village level, are in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics as shown in Table 2. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table A7: IV-Tobit Results for Hours Worked, Excluding Households That Had Absentee Members Abroad But Did Not Receive Remittances from Them

	(1) Total hours	(2) Hours in core economic activities (4+5+6)	(3) Hours in extended economic activity	(4) Hours in wage work	(5) Hours in agricultural self- employment	(6) Hours in non- agricultural self- employment
Full sample						
(Log)	-0.960**	-2.987***	0.637**	-3.094**	-1.986*	-3.743***
Remittances						
	(0.453)	(0.767)	(0.300)	(1.458)	(1.048)	(1.316)
Men						
(Log)	-1.506**	-2.938***	0.443	-1.629	-1.985	-2.797
Remittances						
	(0.657)	(0.973)	(0.500)	(2.005)	(1.433)	(1.819)
Women						
(Log)	-0.768*	-2.895***	0.707**	-4.188**	-1.968**	-4.468***
Remittances						
	(0.453)	(0.844)	(0.313)	(1.929)	(0.968)	(1.586)

Notes: Robust standard errors, clustered at the village level, are in parenthesis. All regressions included six ethnicity fixed effects and six region fixed effects and controlled for individual and community characteristics, as shown in Table 2. * p < 0.10, ** p < 0.05, *** p < 0.01.