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Remittances and Labor Supply in Peru: Do the Poor Respond Differently?

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Abstract

This study examines the role of migrant's remittances on labor supply for a panel of Peruvian households over the period 2002-2006. Remittances can undermine the incentives to work. On the other hand, the inflows may alleviate credit constraints for poor households which may foster productive investment and hence self-employment. Applying fixed effects estimations, we show that remittances have no average effect on employment. However, (male) wage-employment decreases, and self-employment increases. The latter is driven by poor individuals of both genders who are much more likely to be self-employed. Moreover, capital stock and profits of poor entrepreneurs increase, and consequently their implicit self-employment wage rises, suggesting that remittances alleviate credit constraints for the poor.

Keywords: Remittances, Labor supply, Peru
JEL classification: O15, J22, F24, R23, C35

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1 Introduction

Emigration from Peru is a relatively recent phenomenon, and it hardly existed prior to 1970. After several crises beginning in the 1980s and therefore high poverty and few economic prospects, the emigration rate increased strongly (see for a comprehensive review Takenaka and Pren (2010)). Peruvians emigrated to whatever countries they could enter, which resulted in a dispersed migration pattern. In general, they come from urban areas and in particular Lima as it has the only international airport. Rural migrants typically migrate first to Lima where they work for several years to save money. Peruvian migrants are of both genders, diverse ages and varying motivations. They have a very high education level (52 percent in the United States have some college education), that stands in sharp contrast to migrants from Mexico. Though the educational level in Peru is very high, this is not matched with adequate employment opportunities hence resulting in low returns to schooling and a high incentive for the educated to migrate. As a consequence of the rising emigration flows, remittances have more than tripled in Peru since 2000. In 2010 they sum up to US\$ 2.5 bn. This accounts for 2 percent of GDP thus resulting in a relevant impact on the local economy.

Although remittances have generally a positive impact on the recipient households, they can undermine the incentives to work according to the neoclassical model of labor-choice. In a context of financial markets imperfections, however, remittances may alleviate credit constraints for poor households which may foster productive investment and hence self-employment. Remittance flows are - in contrast to other sources of non-labor income - explained as part of familial contracts between the migrant and the remittance receiver. In face of poorly developed credit markets in developing countries, sending a family member abroad and receiving remittances may be a possibility to alleviate credit constraints for poor households. The financial transfers hence allow the start-up or expansion of firm up to a level which is optimal under complete markets. Several empirical studies indeed find migration and remittance receipts to be positively correlated with the likelihood of self-employment (e.g. Yang (2008); Binzel and Assaad (2011)), and a different strand of literature finds a positive impact on productive asset accumulation (e.g. Chiodi et al. (2012); Woodruff and Zenteno (2007)). Investment in productive assets is particularly relevant in the case of Peru. The informal sector constituting of mainly self-employment and micro enterprises (MEs) account for about 75 percent of employment in this country, and a major part operates under severe credit constraints (Göbel et al. (2011)). Remittance receipt may hence not only influence the decisions of whether to work and how much to work (the extensive and intensive margin of labor supply, respectively), but also the type of work performed. These considerations lead to the following hypotheses to be tested subsequently: (1) Remittances decrease labor supply in each occupation except self-employment. (2) Self-employment increases, if the remittance income is used to overcome credit constraints. (3) In this case, remittances increase the capital stock, profits, and the self-employment wage. (4) Credit constraints, and consequently the impact of alleviation via remittances is stronger for poor individuals.

The study explicitly explores the linkage between the impact of remittances on

labor supply and credit constraints. This is done by splitting the sample into poor and non-poor individuals to analyze whether both groups respond differently. We take an additional step further and examine, if the capital stock, and consequently profits and the (implicit) self-employment wage increases as hypothesized.

The remainder of the paper is organized as follows. The subsequent section provides an overview of the corresponding literature. Econometric difficulties are highlighted. Section three illustrates the data. In the fourth section the econometric framework for is developed, and the results are presented. The final section concludes.

2 Previous evidence and empirical issues

There is a growing literature on the impact of migration and remittances on employment outcomes. Funkhouser (1992) finds in his early empirical study in Nicaragua that labor supply responds negatively to remittances, although self-employment increases. The main difficulty in measuring impacts of migration or remittances on a certain outcome is endogeneity. Migration of one household member is a precondition for the inflows. The occurrence of one member migrating depends heavily on household characteristics, and consequently variables that may “explain” migration may also be correlated with the dependent variable. These variables may include observable characteristics such as the educational level, as well as unobservable characteristics like the degree of risk aversion or ambition. In the absence of random assignment, an estimation strategy that allows for identification of the treatment effect has to be employed.

Gibson et al. (2009), for instance, use a quasi natural experiment - a migration lottery program - to estimate the impacts of international migration and remittances on several outcomes of remaining household members. The authors find labor supply to be unaffected. In his Philippines case study, Yang (2008) exploits information from favorable exchange rate shocks that increase income in remittance receiving households. While the number of total hours worked seems to remain unaffected, the author provides evidence of increasing hours in self-employment. In addition, households become more likely to start relatively capital-intensive enterprises after a positive shock which is consistent with alleviation of credit constraints.¹ Studies that analyze the behavior of men and women separately, find gender-specific effects. After using propensity score matching as well as networks as instruments to correct for selection, Acosta (2006) observes a significant decline in women’s labor supply, whereas men’s labor force participation remains unaffected. Amuedo-Dorantes and Pozo (2006) address the endogeneity concern by instrumenting remittances with information on Western Union offices in the state. They find no effect on the overall labor supply of males, but the type of work is altered by remittance receipt. While

¹Further evidence is provided by Cox-Edwards and Rodríguez-Oreggia (2009). Applying propensity score matching, no significant effect of remittance receipt on labor force participation in Mexico is detected. The authors explain their findings with remittances being the income contribution of the migrant abroad thus leaving total household income unchanged.

formal sector work and urban self-employment decrease, informal sector employment increases. Female labor supply decreases slightly, but only in rural areas. The study of Binzel and Assaad (2011) uses both an instrumental variable approach as well as a matching procedure to identify the effects of migration and remittances on the labor supply of women. Their findings suggest that women in migration households decrease their wage work, whereas female self-employment increases.

Once endogeneity is appropriately addressed, (gender-specific) labor supply seems to respond (negatively) marginally to remittance receipt on average. The type of work, however, appears to be affected, and self-employment tends to increase. The latter may follow from the fact that remittances foster productive investments which hence has a positive effect on self-employment. The second literature which relates to the issues addressed in this study examines the impact of migration/ remittances on asset accumulation.² Using a survey of more than 6000 self-employed workers and small firm owners in Mexico, Woodruff and Zenteno (2007) analyze the impacts of attachment to migration networks. They identify the causal effect by exploiting variation in the degree of connection to historical migration networks (distance from rail lines). Migration networks are hypothesized to be associated with lower capital costs and/ or the alleviation of capital constraints. Results suggest that investment, and profits increase with attachment to the migration networks. Sales increase only in firms in high-capital sectors. The authors argue that the first results hint at lower capital costs while the latter provides evidence of an alleviation of credit constraints in those sectors.³ Chiodi et al. (2012), evaluate the link between migration and asset dynamics for a panel of poor rural households in Mexico. Their identification strategy exploits variation in aggregate migration across time and space. Results suggest that migration may be used to foster accumulation of productive asset. In the same vein, a study by Adams (1998) shows that remittances tend to increase investment in rural Pakistan by raising the marginal propensity to invest for migrant households.⁴

3 Data

We use data from the nationally representative Peruvian household survey (ENAHO) collected by the National Institute of Statistics and Informatics (INEI for its Spanish initials) between 2002 and 2006. The ENAHO comprises around 20,000 households each year, and it entails a panel sub-sample of about 5,000 to 6,000 households (again nationally representative) of which 55-80 percent are re-visited in the following year

²Further indirect evidence is derived from the behavior of returning migrants. Dustmann and Kirchkamp (2002), and Mesnard (2004) and Mesnard and Ravallion (2006), for example, find immigrants after returning Turkey and Tunisia, respectively, relatively likely to start self-employment activities due to an alleviation of credit constraints.

³In a first step, Woodruff and Zenteno (2007) estimate the relationship between migration networks and labor force participation or entry into self-employment, but they do not find a robust relationship.

⁴In contrast, Miluka et al. (2010) provide evidence that migrant households appear to invest less in farm technologies in crop production in Albania.

(see Table 9 in the appendix).⁵

The survey provides detailed information on socio-demographic and employment characteristics at the individual level, including whether an individual is working, unemployed or out of the labor force (i.e. neither working nor searching for a job). For individuals that are working, we have information on the number of hours worked and the type of employment. Individuals are either working in dependent paid employment, named "wage-employment" in the following, they are independent workers or as employers, named "self-employment" in the following, or they are helping in a household firm without getting paid, named "unpaid family aid" in the following. We restrict our analysis to individuals aged 18 to 70 that are not currently studying. In addition, we exclude those that are never in the labor force. In rural registration area ("Área de Empadronamiento Rural, AER"), defined as villages with less than 500 inhabitants, only 0.5 percent of the households receive remittances. Therefore, and because of probably different employment behavior, we exclude them as well. The final dataset is an unbalanced panel with 27,333 observations of 3,304, 2,898, 619, and 1,911 working-age individuals which we observe in two, three, four and five years, respectively.

Self-employed individuals which are not working in agriculture are interviewed in an Informal Sector Module.⁶ This module captures the characteristics of the entrepreneurs and their production unit in micro enterprises (MEs) with up to ten employees. It contains detailed information on investment, input use, and sales. We exclude observations from villages with less than 400 dwellings as these are only observed since 2004 due to a change in the survey design. Moreover, we restrict the analysis to MEs which seem to be operated with the main aim to earn income. This excludes firms without profits, in which less than 20 hours monthly are worked (from the owner and staff members), and those in which the owner is not working at all.⁷ The final ME dataset is an unbalanced panel with 6,889 observations of 1,395, 1,003, 549, 219, and 193 MEs, which we observe in one, two, three, four and five years, respectively.

Unfortunately, the ENAHO is not a specialized survey of remittances or migration. Therefore, it does not contain any information on household members that migrated which would allow for an estimation of the effect of migration on labor sup-

⁵In 2002, the survey took place during the 4th quarter (Oct-Dec). Starting from May 2003, the survey is permanent (the whole sample is distributed monthly along the year). The survey captures an impressive growth period that started in 2002 with average annual growth rates of 5.7 percent. Around 18 percent of the visited households are not interviewed as the household refuses, is absent, the house is unoccupied or other reasons (miscellaneous category). This leads to an unbalanced panel with 719, 1435, 1153, 1870 and 2096 households being observed in one, two, three, four and five years, respectively. The fact that this number is increasing reflects increased effort by INEI to create a larger panel dataset. Quite a number of panel households were not interviewed in consecutive years. We exclude them in the analyses as measurement errors and mistaken identities are likely to occur. This reduces our sample by 15 percent.

⁶In villages with at least 400 dwellings, 19 percent of self-employed individuals work in agriculture, livestock production, or forestry, and are consequently not included in the Informal Sector Module.

⁷Excluding observations from villages with less than 400 dwellings, and without the main aim to earn income reduces the sample by 3 and 5 percent, respectively.

Table 1: Household and individual characteristics

Remittance receipt	Never	Always	Some periods
<i>Household characteristics</i>			
No. hh. mem.	4.55	4.66	4.83*
No. hh mem. aged 0-5	0.46	0.46	0.40*
No. hh mem. aged +65	0.20	0.34*	0.41*
Total labor income (wage-employed)	2036	2091	2574*
Total labor income (self-employed)	1621	1404	1834
Total non-labor income (excl. Rem.)	832	1337*	1892*
Total remittances (if > 0)	.	2156	1267
Poor (%)	0.41	0.11*	0.23*
Observations	11,932	110	907
<i>Individual characteristics</i>			
Male	0.51	0.50	0.49
Years of education	10.00	11.45*	11.35*
Employed	0.80	0.70*	0.71*
Employed if in labor force	0.92	0.86*	0.90*
Hours worked (if > 0)	182	168	186
Observations	25,104	206	2,023

Notes: Income and remittances are measured annually. All monetary values are in constant Dec. 2001 US-\$ (Nuevo Sols values were deflated using the INEI Consumer Price Index, and converted into US-\$ using the Dec. 2001 nominal exchange rate). The difference between the households or individuals that never received remittances and other types of households are significant * at 5%.

ply. However, the impact of remittances can be evaluated, since the data set contains comprehensive information on remittances, including the amount remitted, and the frequency in which remittances are received. Roughly 8 percent of the households included in the sample receive remittances at least in some years. Table 1 summarizes some household and individual characteristics separately according to the remittance receipt status. The INEI classifies households as poor, if the total expenditure level is below the poverty line i.e. too low to buy the basic food basket plus basic clothing, transportation, utilities, and other home goods and services.⁸ Households that receive remittances at least in some periods are significantly less likely to be poor than those that never receive remittances.

The survey provides valuable information on household incomes, including labor income from each type of employment as well as non-labor income. Whereas households that always receive remittances have a similar wage-employment income as non-remittance receiving households, those that either gain or lose remittance receipt earn significantly more. In contrast, there is no significant difference in self-employment income. Yet, the non-labor income of households which receive remittances at least once is about twice as high as that of non-receivers. Individuals who live in remittance receiving households have a significantly higher educational level. They are less likely to be employed, although the impact is more nuanced when only individuals in the

⁸The expenditure level includes self-produced goods as well as public and private donations. The measure is not equivalent to the World Bank's definition of poverty (1.25 US\$ per day). The INEI poverty line is constructed for each region separately, according to local prices and available goods. On average, households are classified as poor if the daily expenditure level is below 2 US\$.

labor force are considered. For individuals that are working, there is no difference in the number of hours worked.

Table 2: Employment pattern in Peru

	Women	Men
Wage employment	0.333	0.496
<i>of which: Informal sector</i>	0.139	0.221
Self-employment	0.442	0.400
Unpaid family aid	0.117	0.040
Unemployed	0.104	0.062
Observations	10577	12819

Table 2 illustrates the employment structure of those that are in the labor force.⁹ The importance of the informal sector - constituting of mainly self-employment and MEs - is remarkable, even compared to Latin American averages. More than 40 percent of the Peruvian labor force is self-employed. Another fourth work as paid worker in informal firms, defined as firms without registration or written accounts, or as unpaid family workers. Compared to men, women are less likely to be wage-employed and more often engaged as unpaid family aid.

Table 3: Descriptive statistics of firms by industry

Industries	All	Prim.	M.&F.	C.	W./R.	P.T.	H.&R.	T.	Serv.
Capital stock	55	163	115	27	158	28	60	1206	15
Labor (owner)	205	205	167	205	240	227	180	274	116
Labor (owner& staff)	248	210	205	231	325	270	235	282	128
Profits	94	157	87	139	197	75	77	140	85
Zero capital (%)	0.15	0.06	0.03	0.03	0.04	0.20	0.05	0.12	0.34
Gender: Male (%)	0.47	0.97	0.54	1.00	0.80	0.30	0.11	0.99	0.50
Observations	6,889	93	850	333	209	2,916	932	893	663

Notes: All monetary values are in constant Dec. 2001 US-\$. Industries are: primary sector, other manufacturing & food, construction, wholesale/retail shops, petty trading, hotels and restaurants, transport, and other services. The median is shown, except for the variables presented in percentage. Labor and profits are measured in monthly hours and US\$, respectively.

Some basic characteristics of Peruvian MEs from the Informal Sector Module are highlighted in Table 3. Monthly incomes from self-employment are with a median of 94 US \$ fairly low, especially in respect to the high labor input of more than 200 hours monthly. A median capital stock of 55 US \$ suggests that most activities operate with a very low capital stock, but the level of capital stock is very different across industries.¹⁰ About half of the entrepreneurs are female, and gender-specific preferences in the sector choice become obvious. While firms in the industries "hotels and restaurants" and "petty trading" are mostly owned by women (89 and 70 percent, respectively), firms operating in the "construction" or "transport" sector are almost

⁹In our sample, 14 percent of the individuals are out of the labor force. They are included in the empirical analysis, but not in this table.

¹⁰Capital stock is the replacement value of the sum of investment in machinery, furniture, vehicles, utilities, and other investment, excluding property investment.

always headed by a man (100 and 99 percent, respectively). Comparing the male and female dominated sectors, incomes appear to be higher in male dominated sectors.

4 Empirics

4.1 Remittances and labor supply

Labor supply depends on the real wage and real non-labor income including remittances given the attributes of the individual which involves the following empirical specification:

$$y_{iwt}^{o*} = X_{it}\gamma + R_{it}\beta + \epsilon_{iwt}, \quad (1)$$

where the dependent variable measures participation (y_{iwt}^{p*}) or hours of work (y_{iwt}^{h*}) of individual i in period t in employment type w . We focus on the impact on overall employment (i.e. any type of employment), wage-employment, and self-employment, as the employment types unpaid family aid or unemployment have a rather low incidence. The wage rate is typically highly endogenous, moreover we do not observe it directly in our data. The vector X_{it} contains variables that serve as proxies for the wage rate as well as for the employment behavior. The variable R_{it} is a dichotomous indicator of remittance receipt. It is equal to one if the household receives remittances.

Table 4: Labor supply: first OLS regressions

Sample		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
All	R	-0.049 ^a	-13.226 ^a	0.011	-3.234	-0.061 ^a	-8.523 ^b
	SE	(0.015)	(3.906)	(0.015)	(3.387)	(0.015)	(3.432)
Non poor	R	-0.066 ^a	-13.877 ^a	-0.006	-5.196	-0.054 ^a	-6.149
	SE	(0.017)	(4.372)	(0.016)	(3.704)	(0.017)	(3.915)
Poor	R	0.017	-6.207	0.079 ^b	8.696	-0.080 ^b	-16.756 ^b
	SE	(0.031)	(8.771)	(0.035)	(8.174)	(0.033)	(7.099)

Notes: Regressions include: a constant, age and its squared, years of education and its squared, family size, number household members < 5 and 65+, log non-labor income, per-capita income and unemployment rate within the province, a dummy indicating Lima, urban areas, and whether the household is poor, and whether the individual is the head of the household, respectively, and year dummies. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

We estimate equation 1 for the full sample, as well as for poor and non poor individuals separately. To get a first idea about the potential impacts of remittances, Table 4 summarizes the naive OLS results. On average, labor supply at the intensive and extensive margin seems to respond negatively to remittances. This effect is driven by a drop in wage-employment. The self-employment sector seems to react more heterogeneously. While poor individuals appear to be more likely to work self-employed, non poor individuals do not adjust their labor supply in self-employment.

So far, we have left endogeneity issues aside although remittance receipt is very likely to be endogenous. In the analysis of the impacts of migration and remittances,

an instrumental variable (IV) approach is generally expected to perform best among the non-experimental methods (McKenzie et al. (2010)). This method relies heavily on the exogeneity assumption. Thus, variables that explain remittance receipt but are uncorrelated with labor supply have to be employed. Unfortunately, we lack of such an exogenous instrument and an IV approach is not feasible.¹¹

The longitudinal nature of the data, however, allows us to address the endogeneity concern in a direct way. The error term ϵ_{iwt} from equation (1) may be decomposed into

$$\epsilon_{iwt} = \alpha_i + u_{iwt}, \quad (2)$$

where α_i is a time-invariant effect unique to individual i which includes both observable and unobservable characteristics that do not change over time, such as human capital and taste factors, and u_{iwt} is an i.i.d. error term. Treating α_i as a parameter is known as the fixed effects (FE), or least square dummy variable (LSDV) model.¹² In this study, we use the within variation which overcomes the incidental parameter problem, and is equivalent to the inclusion of individual fixed effects. All individual-specific determinants of labor supply are absorbed, and the estimates are unbiased under the assumption of the individual-specific effects being time-invariant. The impact of variables that are (quasi-) constant over time, such as gender or education, cannot be estimated, so they are not included in X_{it} . With fixed effect estimation, only individuals who receive remittances in some but not all periods contribute information for the estimate of R_{it} . The effects for individuals who always or never receive remittances are absorbed in those individual fixed effects. The estimator treats remittance receipt gain and loss symmetrically. Thus, the employment effect upon remittance receipt is assumed to be equal and opposite to that of losing the remittances. Yet, the gain of remittances may have an effect on employment which persists in subsequent periods due to a potentially positive effect on investments. In the panel analysis, we therefore measure the impact of remittances by two dummies R_{it} and $R_{\text{before}_{it}}$. The latter is equal to one from the period onwards the household does not receive remittances anymore.¹³ This yields:

$$y_{iwt}^{o*} = X_{it}\gamma + R_{it}\beta + R_{\text{before}_{it}}\beta_1 + \alpha_i + u_{iwt}, \quad (3)$$

¹¹In the absence of short-term shocks, identification of the casual effect relies often on historical migration. Historical migration developed networks which can promote future migration. As it has been in the past, it is not affecting current outcomes. Unlike in the prominent Mexican case, however, migration is a rather recent phenomenon in Peru which cast some doubt on the validity of this instrument. Nevertheless, we have tried to use the percentage of remittance receiving households at the community level in the year 1998 as well as internal migration experience of the head of the household. The latter is defined as the head of the household living in a community other than the community of birth, and serves as a proxy for migration will. The potential instruments were additionally interacted with the number of household members with secondary and with tertiary education, respectively, to allow for the variability of the instruments at the household level (Amuedo-Dorantes and Pozo (2006); Hanson and Woodruff (2003)). Unfortunately, in any specification and with or without community dummies to control for effects at the community level, the instrument(s) never passed the exogeneity test.

¹²A hausman test rejects the validity of a random effects model.

¹³Consequently, the baseline category is the period before remittances.

Table 5: Labor supply: FE regressions

Sample		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
All	R	0.000	0.610	0.036 ^c	1.772	-0.037 ^c	-0.504
	SE	(0.022)	(6.006)	(0.022)	(4.952)	(0.022)	(4.894)
	R _{before}	-0.036	-6.912	0.002	-2.909	-0.041	-2.465
	SE	(0.032)	(8.356)	(0.030)	(6.518)	(0.030)	(6.934)
Non Poor	R	-0.032	-2.304	-0.010	-5.379	-0.023	2.919
	SE	(0.025)	(6.174)	(0.024)	(5.282)	(0.025)	(5.387)
	R _{before}	-0.065 ^c	-12.456	-0.044	-10.599	-0.012	0.171
	SE	(0.036)	(8.978)	(0.034)	(7.157)	(0.035)	(7.717)
Poor	R	0.099 ^b	8.935	0.163 ^a	21.770 ^c	-0.058	-9.012
	SE	(0.047)	(15.041)	(0.045)	(11.532)	(0.045)	(10.865)
	R _{before}	0.056	10.689	0.124 ^b	18.034	-0.101 ^c	-6.774
	SE	(0.067)	(19.483)	(0.058)	(14.364)	(0.061)	(15.113)

Notes: Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 5 summarizes the main results of interest, pertaining to the effects of remittance receipt. Overall, the standard errors are quite large and the impact is rather modest. For the full sample, remittances appear not to alter the average labor supply, but the type of work changes. Whereas the likelihood of wage-employment decreases by 4 percentage points, it increases in self-employment by 4 percentage points (weakly significant). Although the effects on self- and wage-employment seem to persist in subsequent periods without the transfers, this is not statistically significant (which might be attributed to the lower incidence). The rise in self-employment is driven by poor individuals who are 16 percentage points more likely to be self-employed upon remittance receipt. The effect appears to be permanent: even in subsequent periods without remittances, poor individuals are 12 percentage points more likely to be self-employed. An insignificant drop in the likelihood of wage-employment - which is even stronger after remittance receipt - suggests that some of these new entrepreneurs move out of wage-employment. Overall, the employment likelihood of poor individuals increases by 10 percentage points. In contrast, non poor individuals seem less likely to be either self- or wage-employed, but this effect is small and insignificant. The amount of hours worked appears to be rather unaffected for the full sample and subsamples. The only, weakly significant effect is an increase in the total number of hours worked in self-employment by the poor by 22 hours a month.

In addition, we estimate separate regressions for males and females (see Table 6). Both genders appear to react similarly. If they are poor, remittance receipt is associated with a higher likelihood of self-employment by 15-17 percentage points. This effect appears to be permanent for men. Yet, although the sign suggests a similar behavior for women, this is not significant. The likelihood of wage-employment decreases for poor men (by weakly significant 12 percentage points), but not for poor women. While some of the male poor new entrepreneurs seem to come from wage-

employment, their female counterpart appears to come from unemployment, out of the labor force or unpaid family work (the miscellaneous categories), and consequently their total employment probability rises by 15 percentage points. The non poor seem to reduce their labor supply in self-employment. However, this is only significant for poor women in the periods after remittances.

Table 6: Labor supply: gender-specific effects

Sample		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
<i>Women</i>							
All	R	0.013	5.003	0.046	7.532	-0.024	2.238
	SE	(0.034)	(7.895)	(0.029)	(6.548)	(0.029)	(5.504)
	R _{before}	-0.072	-13.783	-0.063	-9.900	-0.012	-0.351
	SE	(0.048)	(11.024)	(0.040)	(7.978)	(0.038)	(8.808)
Non Poor	R	-0.022	2.630	0.016	2.281	-0.027	5.703
	SE	(0.038)	(8.141)	(0.034)	(7.054)	(0.034)	(6.235)
	R _{before}	-0.115 ^b	-18.669	-0.106 ^b	-17.950 ^b	0.007	3.508
	SE	(0.055)	(12.404)	(0.048)	(9.148)	(0.047)	(10.755)
Poor	R	0.146 ^b	18.315	0.145 ^a	26.067 ^c	0.009	-4.859
	SE	(0.071)	(20.407)	(0.051)	(15.459)	(0.053)	(12.052)
	R _{before}	0.107	13.219	0.081	20.860	-0.040	-6.268
	SE	(0.096)	(23.384)	(0.067)	(15.829)	(0.054)	(12.698)
<i>Men</i>							
All	R	-0.016	-4.779	0.024	-4.430	-0.052	-3.971
	SE	(0.030)	(9.019)	(0.032)	(7.367)	(0.034)	(8.138)
	R _{before}	0.004	0.629	0.070	4.400	-0.070	-4.369
	SE	(0.042)	(12.529)	(0.043)	(10.316)	(0.047)	(10.722)
Non Poor	R	-0.043	-7.915	-0.036	-13.520 ^c	-0.022	-0.647
	SE	(0.033)	(9.348)	(0.033)	(7.819)	(0.038)	(8.969)
	R _{before}	-0.006	-4.676	0.022	-2.745	-0.028	-2.791
	SE	(0.046)	(12.882)	(0.048)	(11.006)	(0.051)	(11.031)
Poor	R	0.057	-0.284	0.173 ^b	17.533	-0.115 ^c	-13.216
	SE	(0.061)	(21.238)	(0.070)	(16.546)	(0.068)	(17.186)
	R _{before}	0.014	9.774	0.163 ^c	16.637	-0.153	-7.086
	SE	(0.094)	(30.001)	(0.091)	(23.035)	(0.103)	(25.894)

Notes: Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

4.2 Remittances and firms

Our results suggest that self-employment activities respond positively to remittance receipt. A logical next step is then to determine if the capital stock, profits, sales, and the self-employment wage is altered as hypothesized. Our empirical analysis departs

from the following functional form:

$$y_{it} = X_{it}\gamma + R_{it}\beta + R_{\text{before}_{it}}\beta_1 + \alpha_i + \xi_{iwt}, \quad (4)$$

where all variables are defined as before, and ξ_{iwt} is an error term. The dependent variable y_{it} measured the key input and performance variables: capital, labor, profits, sales, and wage, all measured in logs. Capital stock is the replacement value of the sum of investment in machinery, furniture, vehicles, utilities, and other investment, excluding property investment. Labor includes the labor inputs of the firm owner and her staff members. Profits is defined as the monthly owner's income. Sales are the value of monthly sales of goods and services. Wage is defined as owner's income divided by owner's labor input. All monetary values are in constant Dec. 2001 US-\$.

Table 7: Firm performance

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Capital	Labor	Profits	Profits	Sales	Sales	Wage
All	R	0.354	-0.110	0.155	0.143	0.058	0.042	0.266 ^b
	SE	(0.288)	(0.075)	(0.131)	(0.130)	(0.095)	(0.093)	(0.130)
	R _{bef.}	0.629	-0.059	0.314	0.293	0.091	0.062	0.374 ^c
	SE	(0.390)	(0.085)	(0.210)	(0.210)	(0.119)	(0.117)	(0.213)
Non P.	R	0.333	-0.169 ^c	-0.048	-0.058	-0.010	-0.022	0.068
	SE	(0.384)	(0.090)	(0.130)	(0.129)	(0.113)	(0.112)	(0.133)
	R _{bef.}	0.504	-0.122	0.130	0.115	0.013	-0.005	0.234
	SE	(0.510)	(0.106)	(0.171)	(0.171)	(0.140)	(0.136)	(0.179)
Poor	R	0.457	0.025	0.680 ^b	0.662 ^b	0.260	0.231	0.803 ^a
	SE	(0.319)	(0.133)	(0.301)	(0.301)	(0.175)	(0.172)	(0.283)
	R _{bef.}	1.093 ^b	0.061	0.754	0.712	0.335 ^c	0.267	0.725
	SE	(0.546)	(0.144)	(0.500)	(0.503)	(0.202)	(0.206)	(0.510)
Capital control	No	No	No	Yes	No	Yes	No	

Notes: All dependent variables are measured in logs. Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 7 presents the key results of FE regressions of equation (4). The evidence for the full sample is rather weak. Only the self-employment wage increases significantly by more than 30 percent, and the effect seems to be permanent. Again, poor and non-poor individuals appear to react differently. The non poor seem not to respond much to remittances, only labor input is reduced (weakly significant). In contrast, poor entrepreneurs tend to increase their capital stock upon remittance receipt (insignificant), and in subsequent periods it is 200 percent higher than before remittances (significant). Labor input is not adjusted, and consequently profits grow significantly by 100 percent. The effect on profits is rather insensitive to the inclusion of log(capital) in the regression (Column 4). This suggest that remittances affect profits not only through the higher capital stock, but have an additional positive effect. Due to the higher profits, the implicit wage is 120 percent higher (significant). The effects on profits and wage seems to persist in subsequent periods, but the coefficients are not significant. Sales seem to respond positively, but this is weakly significant.

These relative numbers would correspond to an increase in capital stock from 28 to 43 US\$ (80 US\$), in profits from 65 to 129 US\$ (139 US\$) monthly, and a rise in wage from 0.38 to 0.83 US\$ (0.77 US\$) hourly for poor entrepreneurs with mean X_{it} upon remittances (in subsequent periods).

4.3 Robustness

Several biases may have contaminated our estimations. The main concern might be the use of linear models. In the first specification, participation y_{ijt}^{p*} is an unobservable latent continuous variable which has an observable realization of one, if y_{ijt}^p takes on a positive value, and zero otherwise. When the dependent variable y_{ijt}^{h*} reflects the hours worked in one employment category, these are all either positive or zero, if the individual is not working in the specified employment category. Logit and tobit models, respectively, account for the censored nature of the dependent variables. However, Angrist and Pischke (2009) pointed out that although a nonlinear model may provide a better fit than a linear model, the issue may matter little when the interest lies in marginal effects. On the other hand, no standard procedures for nonlinear fixed effects estimations exists which allows to construct marginal effects.

The difficulty in nonlinear panel models is that estimators can be severely biased due to the incidental parameters problem and the individual effect α_i which, in contrast to linear models, cannot be overcome by differencing. The most widely used solution to address this problem was proposed by Mundlak (1978):

$$\alpha_i = \omega_i + \bar{Z}_i \lambda. \quad (5)$$

The idea is to parameterize the individual effect using the individual mean of all regressors Z_{it} . The term ω_i is an error term. Rewriting (3) by incorporating the individual fixed effects and with $e_{iwt} = \omega_i + u_{iwt}$ yields:

$$y_{iwt}^{o*} = X_{it} \gamma + R_{it} \beta + R_{\text{before}_{it}} \beta_1 + \bar{Z}_i \lambda + e_{iwt}. \quad (6)$$

We examine the probability of participation employing logit models conditional on the Mundlak-terms. Although the models are estimated using a random effects procedure, the results display fixed effects coefficients, as we utilize a Mundlak-type specification.¹⁴ To account for the censored nature of the number of hours worked, a fixed effects tobit conditional on Mundlak-terms is applied.¹⁵

¹⁴In linear models this is equivalent to using the within variation or the inclusion of individual fixed effects. This does not hold for non-linear models, but coefficients are very similar. For comparison, we have additionally estimated the by means of a fixed effects logit model (Chamberlain (1980)). Yet, this procedure comes at the cost of the singularity in the consideration of only individuals with a change in participation status, and no marginal effect can be estimated. Both regression results appear to be almost equal (see 10 and Table 11 in the appendix).

¹⁵A fixed effects conditional tobit estimation is not feasible as no sufficient statistic exists which would allow the fixed effects to be conditioned out of the likelihood. The estimation of an unconditional tobit fixed effects model by including dummy variables suffers from the incidental parameter problem and is not consistent. Using Monte-Carlo methods Greene (2004) finds that the slope estimators for the fixed effects tobit models seem not to be biased beyond five time periods. However, the dispersion is underestimated which results in an upward bias in the marginal effects.

Table 8: Labor supply: non-linear specification

Sample		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
All	R	0.000	1.623	0.063	3.119	-0.052 ^c	-0.673
	SE	(0.017)	(4.780)	(0.042)	(4.345)	(0.030)	(3.689)
	R _{before}	-0.030	-5.818	0.005	-1.779	-0.057	-2.777
	SE	(0.029)	(6.549)	(0.047)	(5.768)	(0.040)	(5.507)
Non Poor	R	-0.024	-1.444	-0.015	-4.344	-0.036	2.052
	SE	(0.021)	(4.969)	(0.035)	(4.457)	(0.044)	(4.295)
	R _{before}	-0.054	-11.104	-0.060	-9.662 ^c	-0.015	-0.410
	SE	(0.035)	(7.028)	(0.041)	(5.764)	(0.063)	(6.499)
Poor	R	0.058 ^a	10.536	0.312 ^a	22.643 ^b	-0.068	-7.805
	SE	(0.021)	12.442	(0.090)	(9.575)	(0.042)	(8.317)
	R _{before}	0.034	11.443	0.236 ^b	17.773	-0.103 ^b	-8.055
	SE	(0.041)	16.191	(0.120)	(11.244)	(0.041)	(11.704)

Notes: Regressions include: a constant, age and its squared, log non-labor income, a dummy indicating whether the individual is the head of the household, and mundlak-terms. Coefficients display marginal effects. For the tobit model, the marginal effects for the expected value of y conditional on being uncensored ($y = E(hours_w | hours_w > 0)$) are shown. Standard errors in parenthesis: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 8 highlights the estimation results from this specification (for full results, see Table 10 and Table 11 in the appendix). All findings from the linear models are confirmed, and the effects are even stronger and more significant. The largest impact of remittances is a permanent increase in the likelihood of self-employment for poor individuals by at least 24 percentage points. In addition, their monthly number of hours in self-employment increases permanently by at least 18 hours (significant only after remittance lost), while their likelihood of wage-employment decreases by at least 7 percentage points.

In the analysis above, we distinguish poor and non poor individuals according to the definition of the INEI (see section 3 for a detailed description). However, remittances are likely to allow households to move out of poverty which may bias our results. To reduce possible reverse causality problems, we classify the households in the first observed period.¹⁶ To check the sensitivity of the results to the poverty measure, we split the sample into two groups according to a household wealth index.¹⁷

¹⁶Given that we include dummies indicating periods with remittances and afterwards, the baseline category is the period before remittances. Accordingly, the remittance coefficient for poor individuals is estimated for those residing in households that have been poor in the first observed period (and before remittances), which does not give rise to concerns. Similarly, the remittance coefficient for non poor individuals is estimated for those residing in households that have been non poor in a period before remittances. One may argue that some of these households may have received remittances in an earlier period which made them move out of poverty. Indeed, it is possible that some households observed and classified as non poor have been poor at some point in the past. Nevertheless, this does not give rise to major concerns as we estimate the impact for non poor individuals without questioning the reason for being non poor.

¹⁷Moreover, it would be interesting to see how the results change with the World Bank's poverty definition (1.25 US\$). According to this definition, however, only 10 percent of all households are classified as poor which results in a too low sample size.

The household wealth index is derived from the first principal component of a set of indicators of ownership of household assets. The latter include only non-business assets, such as color televisions and the condition of the house, for example the state of the walls and the quality of sanitary facilities. Possible problems of reverse causality are addressed by using the wealth index from the first observed period. We choose a threshold such that the ratio of poor and non poor individuals remains constant. Estimation results provided in Table 12 and Table 13 support our previous findings: remittances increase self-employment at the intensive and extensive margin, and decrease the likelihood of wage-employment of poor individuals, while the non poor do not change their labor supply. Yet, the decrease in the likelihood of wage-employment becomes stronger, and the increase in the likelihood of self-employment becomes smaller. Regarding firm performance, remittances are associated with a higher capital stock, profits level, and wage for poor entrepreneurs, although the estimates are only significant at the 10 percent level.

One source of potential concern is that we measure remittance receipt by a dummy. As a robustness check we substitute the dichotomous variable by the log of total amount of household' remittance. Our results appear to be very robust regarding the measurement of remittance receipt (see Table 14 and Table 15 in the appendix). A rise in the amount of remittance has a rather moderate effect. If yearly remittances increase from 160 US\$ (the first quartile for poor individuals) to 1600 US\$ (the last quartile) the likelihood of self-employment for poor individuals increases from 9 to 13 additional percentage points. In that situation, capital stock, profits, and the wage increase by 45 instead of 31 percent, by 53 instead of 37 percent, and by 61 instead of 43 percent, respectively.

Remittances appear to provide access to capital, and consequently capital stock, profits and the self-employment wage of poor entrepreneurs increase. Nevertheless, the finding that sales remain constant casts some doubt on whether remittances truly alleviate credit constraints as already pointed out by Woodruff and Zenteno (2007). The increase in profits and wage may also be associated with lower capital costs. However, our finding that remittances are associated with higher capital stock, profits and wage only for poor entrepreneurs hints at an alleviation of credit constraints. Furthermore, sales respond positively to remittances in our study, although this is only significant in subsequent periods and only at the 10 percent level.¹⁸

The new poor entrepreneurs may run firm which are irrelevant in economic terms. The total number of hours worked in self-employment increases, however, by 22 hours, from 68 to 90 hours monthly per individual implying an increase by 32 percent which

¹⁸Somehow related, there is an ongoing debate whether a greater cash flow sensitivity of investment is a reliable indicator for credit constraints. Given that most firms may be classified as constrained and therefore respond to internal cash flows, Kaplan and Zingales (1997) argue that the sensitivities has to increase monotonically with the degree of credit constraints. The empirical evidence indeed is mixed. Cash flow, however, is also a good indicator for investment opportunities. In contrast, remittance income is additional liquidity, and constrained firms should be sensitive to additional liquidity while unconstrained firms should not. Indeed, we only observe some firms investing which hints at credit constraints.

suggests that the new firms are relevant.¹⁹ Nevertheless, we have addressed this concern further by estimating the impact of remittances on households' total self-employed income and the self-employed income share. Whereas households' total self-employed income increases significantly by 1400 US\$ (380 US\$) annually for the poor (for the full sample), the self-employed income share rises significantly by 8 percentage points (no effect is present for the full sample).²⁰

Finally, we have checked the robustness of our results to minor changes in the specification. We additionally include time dummies to estimate a two-way FE model. The time dummies appear to be significant only in some regressions, and do not change the results, but increase the standard errors due to less degrees of freedom (see Table 16 and Table 17 in the appendix). Moreover, we have included individuals aged at least 15 years, as well as excluded individuals younger than 25 years or older than 60 years. The estimates are very robust to these changes, only the significant level is in some regressions slightly lower when we use a smaller sample (not shown). In addition, empirical evidence suggests that employment decisions exhibit serial persistence (Hyslop (1999)). To investigate whether the results are robust, it would be desirable to perform system GMM estimations. Unfortunately, only individuals which are observed at least three periods can be considered which reduces our sample by 30 percent, and no significant impact can be determined (not reported).

5 Conclusion

This study explores the linkage between the impact of remittances on labor supply and credit constraints. Remittances can undermine the incentives to work by increasing the recipients' income. On the other hand, the inflows may alleviate credit constraints for poor households which may foster productive investment and hence self-employment. These hypotheses are tested using a five-year panel data set that stems from the Peruvian household survey. Individual fixed effects estimations are applied to estimate the effect of remittances on both the decision whether to work and how much to work. All results are very robust, as shown by the estimation of a number of alternative specifications. The findings are another piece of evidence that once endogeneity is appropriately addressed, remittances have only a minor and insignificant impact on labor supply on average. However, the type of work is altered. Remittances are associated with a lower likelihood of wage-employment and a higher likelihood of self-employment. The impacts differ among poor and non poor individuals. Whereas the non poor appear to react little, the poor are 16 percentage points more likely to be self-employed. Overall, the employment likelihood of poor individuals increases by 10 percentage points.

Some of these poor new entrepreneurs seem to come from wage-employment if they are male. In contrast, female poor new entrepreneurs appear to come from unem-

¹⁹The total number of hours worked is constructed for all individuals including, for example, those in wage-employment and the unemployed. Self-employed individuals have an average work load of 180 hours monthly.

²⁰Results are available from the authors upon request.

ployment, out of the labor force, or unpaid family work, and consequently their total employment probability rises. It is difficult to judge, however, whether these results are driven by gender-specific preferences. Men are much more likely to be wage-employed. This may be due to social norms that impede female wage-employment or that put pressure on men to take any available wage-employment, even if it's poorly paid. Therefore, while both genders react to profitable earning opportunities, men are much more likely to come from wage-employment than women.

In a second step, we examine the impacts of remittances on firm performance. The effects are large: capital stock, profits, and the self-employment wage of poor entrepreneurs increase by 58 to 123 percent upon remittances. In contrast, non poor entrepreneurs seem to reduce labor input. The evidence suggests that remittances indeed provide access to capital, and allow poor individuals to start and expand firms. Self-employment activities become more profitable, and the poor are thus more likely to be self-employed. Whether this implies an additional positive effect on total employment (as some of the entrepreneurs may wish to hire employees) is beyond the scope of this paper, but could be a promising approach for future research. Moreover, this study has little to say about how sustainable the effects are.

From a policy perspective, our results suggest that remittances alleviate credit constraints that leave the entrepreneurial potential of poor individuals unexploited. This finding provides a rationale for microcredit which would benefit especially the poor. However, the purpose of this document is not to go into detail about a potentially successful program design. Furthermore, remittances appear to be pro poor at least with respect to labor supply. Policy makers might hence be encouraged to think about policies to promote remittance flows. A reduction in transfer costs, for example, could increase remittances sent through formal channels. Improved and low-cost access to banking services, such as savings accounts, might be a possible solution. Savings accounts may also mitigate the credit constraints that we have identified.

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Appendix

Table 9: Panel survey

Year	Hh. visited	Hh. not interviewed	Hh. observed in prev. period	Hh. interviewed
2002	6257	847	.	5410
2003	4217	688	3068	3529
2004	6490	1141	2787	5349
2005	6778	1469	4146	5309
2006	6593	1182	4496	5411

Table 10: Non-linear specification: Full results I

	Employed			Self-employed			Wage-employed		
	Logit	FE-Logit	Tobit	Logit	FE-Logit	Tobit	Logit	FE-Logit	Tobit
R	-0.001 (0.182)	-0.011 (0.179)	2.735 (8.018)	0.331 (0.206)	0.323 ^c (0.192)	10.849 (14.930)	-0.318 (0.201)	-0.327 ^c (0.178)	-2.388 (13.119)
R _{before}	-0.290 (0.251)	-0.294 (0.277)	-10.012 (11.465)	0.026 (0.266)	0.017 (0.276)	-6.313 (20.625)	-0.359 (0.278)	-0.348 (0.263)	-9.937 (19.946)
Log(non-labor income)	0.004 (0.009)	0.003 (0.007)	1.179 ^a (0.305)	-0.022 ^a (0.008)	-0.021 ^a (0.007)	-0.608 (0.477)	0.031 ^a (0.009)	0.028 ^a (0.007)	3.553 ^a (0.613)
Age	0.280 ^a (0.057)	0.275 ^a (0.058)	8.129 ^a (2.415)	0.241 ^a (0.064)	0.232 ^a (0.059)	13.720 ^a (4.588)	0.157 ^a (0.057)	0.154 ^a (0.056)	9.093 ^b (4.204)
Age ²	-0.003 ^a (0.001)	-0.003 ^a (0.001)	-0.096 ^a (0.026)	-0.002 ^a (0.001)	-0.002 ^a (0.001)	-0.137 ^a (0.047)	-0.002 ^a (0.001)	-0.002 ^a (0.001)	-0.127 ^a (0.049)
Household head = 1	0.585 ^a (0.176)	0.630 ^a (0.199)	17.610 ^b (7.041)	0.463 ^b (0.197)	0.448 ^b (0.186)	30.825 ^b (12.326)	0.404 ^b (0.188)	0.420 ^b (0.204)	28.605 ^b (13.264)
Mundlak-terms	Yes 27333	No 9530	Yes 27333	Yes 27333	No 9912	Yes 27333	Yes 27333	No 9157	Yes 27333
N. obs.	8732	2861	8732	8732	2840	8732	8732	2751	8732
N. indiv.	-12119.01	-3482.723	-136302.7	-14039.42	-3654.349	-71438.88	-13747.98	-3377.944	-69753.66
Log likelihood									

Notes: Regressions include: a constant, and mundlak-terms where applicable. Bootstrapped standard errors (with 500 reps.) in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 11: Non-linear specification: Full results II

	Employed		Self-employed		Wage-employed	
	Logit	Tobit	Logit	FE-Logit	Logit	FE-Logit
<i>Non Poor</i>						
R	-0.247 (0.198)	-2.443 (8.439)	-0.099 (0.243)	-0.081 (0.230)	-0.190 (0.244)	-0.197 (0.196)
R _{before}	-0.507 ^c (0.300)	-19.321 (12.643)	-0.445 (0.358)	-0.438 (0.337)	-0.079 (0.329)	-0.054 (0.281)
Log(non-labor income)	0.023 ^c (0.012)	2.095 ^a (0.449)	-0.031 ^a (0.011)	-0.029 ^a (0.011)	0.056 ^a (0.012)	0.048 ^a (0.010)
Age	0.229 ^a (0.073)	7.946 ^a (2.916)	0.216 ^b (0.089)	0.209 ^b (0.087)	0.126 (0.087)	0.139 ^c (0.080)
Age ²	-0.002 ^a (0.001)	-0.100 ^a (0.032)	-0.002 ^b (0.001)	-0.002 ^c (0.001)	-0.002 ^b (0.001)	-0.002 ^b (0.001)
Household head = 1	0.792 ^a (0.239)	33.346 ^a (9.092)	0.901 ^a (0.253)	0.860 ^a (0.240)	0.116 (0.235)	0.136 (0.275)
Mundlak-terms	Yes	Yes	Yes	No	Yes	No
N. obs.	15756	15756	15756	5135	15756	4846
N. indiv.	5246	5246	5246	1559	5246	1523
Log likelihood	-6856.296	-78528.42	-7849.195	-1878.724	-7859.894	-1761.702
<i>Poor</i>						
R	0.773 ^b (0.391)	17.361 (19.917)	1.324 ^a (0.371)	1.350 ^a (0.423)	-0.537 (0.396)	-0.517 (0.401)
R _{before}	0.395 (0.557)	18.802 (25.776)	1.014 ^b (0.480)	1.026 ^b (0.471)	-0.930 ^c (0.533)	-0.981 (0.617)
Log(non-labor income)	-0.013 (0.011)	0.209 (0.446)	-0.016 (0.011)	-0.015 (0.010)	0.008 (0.011)	0.008 (0.010)
Age	0.318 ^a (0.077)	8.301 ^b (3.264)	0.274 ^a (0.088)	0.268 ^a (0.083)	0.173 ^b (0.083)	0.166 ^c (0.087)
Age ²	-0.003 ^a (0.001)	-0.091 ^b (0.036)	-0.003 ^a (0.001)	-0.003 ^a (0.001)	-0.001 (0.001)	-0.001 (0.001)
Household head = 1	0.285 (0.294)	-6.485 (9.744)	-0.090 (0.323)	-0.096 (0.302)	0.756 ^b (0.327)	0.708 ^b (0.299)
Mundlak-terms	Yes	Yes	Yes	No	Yes	No
N. obs.	11577	11577	11577	4777	11577	4311
N. indiv.	3486	3486	3486	1281	3486	1228
Log likelihood	-5222.322	-57709.73	-6131.922	-1765.064	-5826.148	-1604.153

Notes: Regressions include: a constant, and mundlak-terms where applicable. Bootstrapped standard errors (with 500 reps.) in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 12: Labor supply: poverty measure= wealth index

		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
Non Poor	R	0.002	-4.450	0.017	-6.326	-0.013	2.118
	SE	(0.024)	(6.485)	(0.025)	(5.445)	(0.024)	(5.417)
	R _{before}	-0.033	-14.648	-0.007	-8.292	-0.009	-3.369
	SE	(0.035)	(9.520)	(0.035)	(7.612)	(0.034)	(8.051)
Poor	R	-0.001	22.647	0.113 ^b	34.667 ^a	-0.115 ^b	-9.555
	SE	(0.058)	(14.520)	(0.046)	(11.169)	(0.052)	(11.472)
	R _{before}	-0.042	23.412	0.034	16.661	-0.139 ^b	2.935
	SE	(0.072)	(16.624)	(0.056)	(11.966)	(0.061)	(13.512)

Notes: Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 13: Firm performance: poverty measure= wealth index

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Capital	Labor	Profits	Profits	Sales	Sales	Wage
Non Poor	R	0.241	-0.155 ^c	0.058	0.052	0.035	0.025	0.192
	SE	(0.335)	(0.081)	(0.113)	(0.112)	(0.103)	(0.101)	(0.118)
	R _{before}	0.364	-0.101	0.275	0.266	0.196	0.181	0.357 ^c
	SE	(0.466)	(0.096)	(0.182)	(0.181)	(0.137)	(0.131)	(0.195)
Poor	R	0.983 ^c	0.071	0.773 ^c	0.729	0.295	0.240	0.809 ^c
	SE	(0.505)	(0.186)	(0.460)	(0.469)	(0.232)	(0.236)	(0.445)
	R _{before}	1.723 ^a	0.081	0.665	0.587	-0.116	-0.212	0.664
	SE	(0.646)	(0.188)	(0.654)	(0.666)	(0.225)	(0.236)	(0.629)
Capital control		No	No	No	Yes	No	Yes	No

Notes: All dependent variables are measured in logs. Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 14: Labor supply: remittances = log(total amount)

Sample		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
All	R	-0.000	0.130	0.004	0.156	-0.004	0.046
	SE	(0.003)	(0.675)	(0.002)	(0.567)	(0.003)	(0.560)
	R _{before}	-0.039	-6.502	-0.001	-3.211	-0.040	-1.770
	SE	(0.032)	(8.323)	(0.030)	(6.550)	(0.031)	(6.975)
Non Poor	R	-0.004	-0.241	-0.001	-0.629	-0.002	0.410
	SE	(0.003)	(0.692)	(0.003)	(0.608)	(0.003)	(0.609)
	R _{before}	-0.065 ^c	-12.337	-0.043	-10.786	-0.011	0.758
	SE	(0.036)	(8.890)	(0.034)	(7.196)	(0.035)	(7.745)
Poor	R	0.011 ^c	1.319	0.018 ^a	2.654 ^c	-0.007	-0.975
	SE	(0.006)	(1.776)	(0.005)	(1.358)	(0.006)	(1.315)
	R _{before}	0.051	12.252	0.117 ^c	18.589	-0.102	-6.285
	SE	(0.068)	(19.820)	(0.060)	(14.563)	(0.063)	(15.433)

Notes: Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 15: Firm performance: remittances = log(total amount)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Capital	Labor	Profits	Profits	Sales	Sales	Wage
All	R	0.044	-0.012	0.015	0.014	0.004	0.002	0.026 ^c
	SE	(0.033)	(0.009)	(0.015)	(0.015)	(0.011)	(0.011)	(0.015)
	R _{before}	0.644 ^c	-0.050	0.294	0.273	0.071	0.041	0.341
	SE	(0.391)	(0.085)	(0.213)	(0.212)	(0.119)	(0.117)	(0.216)
Non Poor	R	0.041	-0.018	-0.003	-0.004	0.001	-0.001	0.009
	SE	(0.043)	(0.011)	(0.015)	(0.015)	(0.013)	(0.013)	(0.015)
	R _{before}	0.518	-0.106	0.149	0.134	0.028	0.009	0.245
	SE	(0.507)	(0.107)	(0.169)	(0.169)	(0.139)	(0.136)	(0.176)
Poor	R	0.059	0.003	0.070 ^c	0.067 ^c	0.017	0.013	0.081 ^b
	SE	(0.036)	(0.016)	(0.036)	(0.036)	(0.022)	(0.021)	(0.034)
	R _{before}	1.108 ^b	0.061	0.678	0.635	0.254	0.184	0.627
	SE	(0.554)	(0.140)	(0.524)	(0.527)	(0.216)	(0.221)	(0.535)
Capital control		No	No	No	Yes	No	Yes	No

Notes: All dependent variables are measured in logs. Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 16: Labor supply: inclusion of year dummies

Sample		Employment		Self-employment		Wage-employment	
		Likelihood	Hours	Likelihood	Hours	Likelihood	Hours
All	R	-0.004	0.646	0.033	1.554	-0.037 ^c	-0.176
	SE	(0.022)	(5.991)	(0.022)	(4.953)	(0.022)	(4.898)
	R _{before}	-0.041	-6.097	-0.002	-3.136	-0.040	-1.363
	SE	(0.032)	(8.358)	(0.030)	(6.534)	(0.030)	(6.975)
	F-test(4,N)	20.29	23.11	1.83	3.05	13.52	16.71
Non P.	R	-0.030	-2.015	-0.012	-6.302	-0.019	4.105
	SE	(0.025)	(6.194)	(0.024)	(5.297)	(0.025)	(5.415)
	R _{before}	-0.060 ^c	-11.091	-0.047	-11.779	-0.004	2.620
	SE	(0.036)	(8.999)	(0.034)	(7.213)	(0.035)	(7.791)
	F-test(4,N)	13.27	13.76	0.93	3.11	10.61	11.17
Poor	R	0.090 ^c	9.179	0.160 ^a	22.479 ^c	-0.064	-9.520
	SE	(0.047)	(14.932)	(0.045)	(11.523)	(0.045)	(10.825)
	R _{before}	0.038	11.004	0.118 ^b	19.029	-0.111 ^c	-7.298
	SE	(0.068)	(19.545)	(0.058)	(14.349)	(0.062)	(15.224)
	F-test(4,N)	10.78	10.03	1.11	0.87	4.86	6.73

Notes: Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household, and year dummies. The F-test tests for the joint significance of the year dummies. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.

Table 17: Firm performance: inclusion of year dummies

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Capital	Labor	Profits	Profits	Sales	Sales	Wage
All	R	0.281	-0.113	0.126	0.117	0.032	0.019	0.231 ^c
	SE	(0.288)	(0.075)	(0.133)	(0.132)	(0.095)	(0.094)	(0.131)
	R _{before}	0.552	-0.061	0.259	0.241	0.051	0.025	0.307
	SE	(0.391)	(0.087)	(0.214)	(0.213)	(0.119)	(0.117)	(0.218)
	F-t.(4,N)	12.10	2.34	5.36	5.38	2.69	3.13	7.46
Non P.	R	0.313	-0.181 ^b	-0.071	-0.080	-0.016	-0.028	0.046
	SE	(0.386)	(0.091)	(0.133)	(0.133)	(0.114)	(0.113)	(0.137)
	R _{before}	0.464	-0.128	0.060	0.046	-0.005	-0.023	0.154
	SE	(0.510)	(0.109)	(0.176)	(0.176)	(0.140)	(0.137)	(0.187)
	F-t.(4,N)	5.59	3.20	4.20	4.27	1.47	1.94	6.07
Poor	R	0.259	0.026	0.644 ^b	0.634 ^b	0.197	0.181	0.758 ^a
	SE	(0.312)	(0.134)	(0.304)	(0.303)	(0.171)	(0.169)	(0.284)
	R _{before}	0.962 ^c	0.057	0.723	0.687	0.257	0.198	0.679
	SE	(0.554)	(0.145)	(0.507)	(0.509)	(0.199)	(0.202)	(0.517)
	F-t.(4,N)	8.14	0.48	1.46	1.38	3.54	3.34	2.19

Notes: All dependent variables are measured in logs. Regressions include: a constant, age and its squared, log non-labor income, and a dummy indicating whether the individual is the head of the household, and year dummies. The F-test tests for the joint significance of the year dummies. Robust standard errors in parentheses: ^c significant at 10%; ^b at 5%; ^a at 1%.