

## Migration, Remittances and Male and Female Employment Patterns

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Little is known about the microeconomic impacts of workers' remittances despite their magnitude in countries with considerable out-migration. Reports that families receiving international remittances severely curtail their work efforts are fairly common in the popular press (e.g. Frank 2001). Yet, we lack rigorous analyses of how male and female labor supplies respond to increases in remittance income to either support or refute these anecdotal observations. According to the neoclassical model of labor-leisure choice (Killingsworth 1983), remittances –a source of non-labor income– may lift budget constraints, raise reservation wages and, through an income effect, reduce the employment likelihood and hours worked by remittance-receiving individuals. However, the receipt of remittances is usually preceded by the out-migration of working-aged household members, which may induce changes in the labor supply of non-migrating household members in order to compensate for forgone income or to defray migration-related expenses. Distinguishing the disruptive effect from the income effect of remittance inflows is problematic as most surveys do not contain detailed information on household out-migration and remittance receipt. However, to the extent that these two effects are expected to have opposite impacts on labor supply, we can assess which effect dominates.

The impact of remittances on the decision to work has been previously examined by Rodriguez and Tiongson (2001) in Manila and by Funkhouser (1992) in Managua. Without accounting for endogeneity of remittances with respect to labor supply, they conclude that remittances reduce employment. Funkhouser also finds that remittances slightly increase self-employment. While informative, these studies focus on the decision to work and do not consider that, without altering the employment status of their recipients, remittances may induce changes in the *hours* worked and/or the *type of work* performed. Furthermore, male and female labor supplies may be impacted differently and their responsiveness to remittance income may vary from rural to urban areas. Using data from Mexico –a country with a large and growing remittance inflow<sup>1</sup>– we address the following questions: How do the employment status and hours worked by men and women vary owing to international remittances? Do male and female labor supplies differ across various types of employment in rural versus urban areas on account of higher remittance income?

## **I. Data**

We use the *Encuesta Nacional de Ingresos y Gastos de los Hogares* (ENIGH), a nationally representative income and expenditure survey carried out biennially by the Mexican statistical institute since the late 1980s. We rely on data from individuals 16 to 64 years old from the 2002 ENIGH—the most complete wave yet. We work with a total of 42,341 individuals, 5.5 percent of which reside in remittance-receiving households. Monthly per capita remittance income amounts to 620 pesos (approximately \$57) in remittance-receiving households—about half of their monthly per capita non-labor income. Remittance-receiving households display higher non-labor incomes (excluding remittance income) and have fewer employed working-age members than non-remittance receiving households; hence, the importance of accounting for non-labor income when assessing the labor supply impacts of international remittances.

According to Table 1, nine percent of men and 12 percent of women residing in rural areas live in a remittance-receiving household relative to four and three percent of male and female urban dwellers, respectively. Likewise, male and female work patterns differ between rural and urban areas. For the purposes of this study, formal sector employment refers to wage and salary work performed under the auspices of a written work contract, whereas informal sector employment refers to wage and salary work without a work contract. Table 1 reveals that there is a higher incidence of formal employment in urban areas, with about 40 percent of working men and women employed in this sector versus 11 percent of men and 12 percent of women in rural areas. In contrast, self-employment and non-paid work have a higher incidence in rural areas. More than 30 percent of working men and about one quarter of working women are employed in the informal sector.

Of specific interest to us is how male and female labor supplies in urban and rural areas change on account of remittance income. Table 2 reports the average hours worked by men and women in various types of employment according to their remittance receipt. Men in remittance-receiving households work fewer hours in practically all types of employment regardless of urban/rural residency—the sole exception being non-paid employment. No clear pattern is observed for women over the four types of work. Nonetheless, overall, remittance receipt seems to be associated with a reduction in the total number of hours worked by men and women.

## **II. Methodology**

We could estimate the following benchmark model to examine the effect of remittances on the hours worked by male and female working-age recipients in the home community:

$$(1) \quad Y_i^* = \alpha_0 + \alpha_1 R_i + \alpha_2 Z_i + \varepsilon_i, \quad \varepsilon_i \sim \text{Normal}(0, \sigma^2) \text{ and } Y_i = \max(0, Y_i^*),$$

for  $i=1, \dots, n$  individuals. The vector  $Y$  measures hours worked,  $R$  captures average monthly per capita remittance income, and  $Z$  is a vector of exogenous explanatory household and individual level variables. However, a few econometric issues arise in the estimation of equation (1). First,  $Y$  is a zero-inflated continuous variable. The estimation of equation (1) by OLS would yield biased and inconsistent estimates of the impact of remittances on hours worked. Second, remittances and the error term in equation (1) may be correlated. Remittances may be endogenous and their coefficient estimate biased. There are two potential sources for this endogeneity. Unobserved heterogeneity and omitted variable bias may exist if remittances are related to wealth which, in turn, may be correlated to the choice of work hours by the respondent. Additionally, there is the potential of reverse causality as hours worked may influence emigrants' decision to send remittances home.

To account for both the zero inflated nature of our dependent variable and for the endogeneity of remittance income, we use Amemiya Generalized Least Squares (AGLS) estimator for the Tobit with endogenous regressors described in Newey (1987, eq. 5.6); henceforth IV-Tobit.<sup>2</sup> We instrument remittances with information on the per capita count of Western Union offices in the state during the previous year to guarantee the predetermined character of this variable. Following Hanson and Woodruff (2003), we interact this instrument with the percentage of household members with secondary education and with the percentage of household members with post-secondary education, respectively, to allow for the variability of the instrument at the household level. These three variables are inspected to ascertain their correlation with remittances by testing for their joint significance in explaining monthly per capita remittance income.<sup>3</sup> Given the expected link between household educational attainment and individuals' employment patterns, we test the joint exogeneity of these three variables with respect to labor supply following Wooldridge (2003, p. 505). The exogeneity of our instruments is confirmed owing to the complete lack of correlation between the per capita count of Western Union offices in the state during the previous year and male and female labor supplies.<sup>4</sup> Equation (1) is estimated for all work hours and for hours worked in various types of work – self-employment, wage and salary work in the formal sector, wage and salary work in the informal sector, and non-paid employment – to understand the employment dynamics responsible for the observed impact of remittances on overall work hours.

### **III. Results**

Table 3 displays the coefficients and marginal effects for monthly per capita remittance income from the IV-Tobit. While overall male labor supply does not vary on account of changes in remittance income, its composition by type of employment does. A 100 peso increase in remittances (about 16 percent of the average monthly per capita remittance amount) is associated with a 32 hours/month or 15 percent reduction in formal sector work by men in urban and rural areas, and with an 11 hours/month (5 percent) reduction in male self-employment in urban areas. Yet, the same remittance increment is tied to a 30 hours/month (14 percent) and to a 28 hours/month (13 percent) increase in informal sector work in urbanized and rural areas, respectively. What may be causing the differing allocation of labor associated with increases in remittance income? Various explanations are possible. In particular, the higher incidence of informal sector employment among men experiencing an increase in remittance income may be linked to the disruptive impact of household migration, which induces these non-migrating men to work. If these men experience barriers to formal sector work or urban self-employment, they may turn to “just-in-time” or informal jobs to compensate for lost household income and/or to defray household migration-related expenditures (e.g. coyote payments). Alternatively, men may prefer informal jobs for flexibility reasons and decide to forego the benefits and longer-term security of formal sector work in response to greater remittance inflows.

Unlike men, the overall female labor supply appears to decrease on account of changes in remittance income, although only in rural areas. A 100 peso increase in remittance income is associated with a 6 hours/month (4 percent) reduction in female non-paid employment and with a fall in female informal sector work of 12 hours/month (7 percent). Therefore, an income effect by which women purchase time away from these two poorly or non-remunerated types of employment seems to be dominating. Using 2002 minimum wages,<sup>5</sup> this reduction in female employment would imply an income drop of 63 pesos/month, an amount well-offset by the 100 peso increase in remittance income.

### **IV. Discussion**

We trace the impact of international remittances on the labor supply of working-age men and women in Mexico. Unlike earlier studies, we account for the endogeneity of remittance income and examine differences in the hours worked in various types of employment by men and women in urban and rural areas owing to their remittance income. Remittances may reduce or increase work hours depending on the gender of the recipient, the location of the household, and the type of work. What might explain these differential impacts? One plausible explanation is

that, when measuring the labor supply impact of remittances, the income effect from these monetary inflows is confounded with the disruptive effect caused by the preceding out-migration of family members. While the remittance literature has begun to recognize the existence of these two opposing impacts (e.g. Hanson and Woodruff 2003, Amuedo-Dorantes and Pozo 2004), it is difficult to disentangle them as most surveys fail to collect data on both household out-migration and remittance receipt. Consequently, sometimes we observe that remittances loosen the budget constraints of receiving individuals, who then reduce their labor supply. This income effect appears to dominate in the case of women in rural areas, who seem to be using remittances to purchase time away from informal and non-paid work. Likewise, higher remittance incomes appear to be associated with a reduced male labor supply in formal sector work and urban self-employment. However, among men, the latter income effect seems offset by a higher incidence of informal sector employment, possibly signaling the disruptive effect of household out-migration.

Overall, we find no support for the anecdotal observations of reduced labor effort on account of greater remittance incomes reported in the popular press among Mexican men. Remittances only seem to alter the allocation of male labor supply across various types of employment. In contrast, women appear to work less in response to greater remittance receipts, although exclusively in informal sector and non-paid work in rural areas.

## **Bibliography**

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**Table 1**  
**Remittance Receipt and Work Patterns by Gender and Area of Residence**

<b>Remittance Receipt and Work Patterns</b>	<b>Men</b>		<b>Women</b>	
	<b>Urban</b>	<b>Rural</b>	<b>Urban</b>	<b>Rural</b>
Household Receives Remittances	0.03	0.09	0.04	0.12
Formal Sector Work	0.41	0.11	0.40	0.12
Informal Sector Work	0.31	0.39	0.26	0.24
Self-Employment	0.24	0.38	0.25	0.45
Non-Paid Work	0.04	0.12	0.09	0.19

**Table 2**  
**Average Monthly Work Hours by Remittance Receipt**

Type of Employment	Urban		Rural	
	Without Remittances	With Remittances	Without Remittances	With Remittances
<b>Men</b>				
All Work	208	146	202	148
Formal Sector Work	211	208	215	200
Informal Sector Work	215	204	216	211
Self-Employment	218	208	218	206
Non-Paid Work	176	189	181	187
<b>Women</b>				
All Work	166	163	138	134
Formal Sector Work	180	186	170	186
Informal Sector Work	171	164	169	162
Self-Employment	157	149	124	136
Non-Paid Work	156	155	130	112

**Table 3**  
**Instrumental Variable Tobit Results**

<b>Average Monthly Per Capita Remittance Income</b>	<b>All Work</b>	<b>Formal Sector Work</b>	<b>Informal Sector Work</b>	<b>Self Employment</b>	<b>Non-paid Work</b>
<b>Urban</b>					
<b>Men</b>					
Coefficient	-0.03	-0.95***	0.98***	-0.63**	0.36
S. E.	0.09	0.30	0.34	0.35	0.83
$\partial E(Y   R, Z, Y > 0) / \partial Z$	-0.03	-0.32	0.30	-0.11	0.01
$\partial P(Y > 0   R, Z) / \partial Z$	-3.34e-5	-1.47e-3	1.24e-3	-5.51e-4	5.88e-5
Observations			14,665		
<b>Women</b>					
Coefficient	0.97	1.45	-2.65	-0.66	3.13
S. E.	0.58	1.29	2.52	1.45	3.11
$\partial E(Y   R, Z, Y > 0) / \partial Z$	0.05	0.25	-0.27	-0.07	0.16
$\partial P(Y > 0   R, Z) / \partial Z$	4.20e-4	1.50e-3	-1.60e-3	-4.29e-4	9.52e-4
Observations			16,494		
<b>Rural</b>					
<b>Men</b>					
Coefficient	-0.07	-1.79***	1.09**	-0.32	-0.77
S. E.	0.09	0.55	0.46	0.22	0.48
$\partial E(Y   R, Z, Y > 0) / \partial Z$	-0.07	-0.32	0.28	-0.12	-0.06
$\partial P(Y > 0   R, Z) / \partial Z$	-6.86e-5	-1.32e-3	1.52e-3	-5.83e-4	-4.27e-4
Observations			5,440		
<b>Women</b>					
Coefficient	-0.53***	-0.16	-1.00**	-0.42	-0.75*
S. E.	0.20	0.41	0.46	0.27	0.38
$\partial E(Y   R, Z, Y > 0) / \partial Z$	-0.26	-0.01	-0.12	-0.07	-0.06
$\partial P(Y > 0   R, Z) / \partial Z$	-3.40e-4	-6.45e-5	-6.39e-4	-5.01e-4	-4.38e-4
Observations			5,742		

**Notes:** \*\*\*: significant at the 1% level, \*\*: 5% level, and \*: 10% level. Regressions include: a constant; respondents' age, relationship to the household head, and education; the percentage of household members younger than 6, the percentage of household members older than 64, monthly per capita non-labor income excluding remittances, and a dummy indicative of residing in a state with poor living conditions, high unemployment rates and low economic growth possibly affecting employment patterns (<http://jweb.inegi.gob.mx/niveles/jsp/index.jsp>).

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<sup>1</sup> In 2002, Mexico received \$9.8 billion in remittances—the third largest source of foreign exchange after maquiladoras and oil (<http://www.dallasfed.org/research/busfront/bus0401.html>).

<sup>2</sup> Prior to estimating the IV-Tobits, we estimate Tobit models for comparability purposes. Remittances affect male and female labor supply at the one percent significance level. Results are available from the authors.

<sup>3</sup> The F-statistics from regressing monthly per capita remittance income on our three instruments are 22.16 (Prob>F=0.00) for women and 17.50 (Prob>F=0.00) for men.

<sup>4</sup> The F-statistics for the error term derived from an equation predicting remittance income and included in the overall work hours regressions are 1.61 (Prob>F=0.21) for women and 0.01 (Prob>F=0.92) for men.

<sup>5</sup> Information available at:

[http://www.inegi.gob.mx/prod\\_serv/contenidos/espanol/bvinegi/productos/integracion/economico/mbsi/excel/tp238.xls](http://www.inegi.gob.mx/prod_serv/contenidos/espanol/bvinegi/productos/integracion/economico/mbsi/excel/tp238.xls)