Migration, Remittances, and Male and Female Employment Patterns

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Little is known about the labor market impacts of workers' remittances, despite their magnitude in countries with considerable outmigration. Reports that families receiving international remittances severely curtail their work efforts are fairly common in the popular press (e.g., Robert 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 (Mark R. Killingsworth, 1983), remittances—a source of nonlabor income—may lift budget constraints, raise reservation wages, and, through an income effect, reduce the employment likelihood and hours worked by remittance-receiving individuals. The receipt of remittances is usually preceded by the out-migration of working-aged household members, however, which may induce changes in the labor supply of nonmigrating 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 outmigration and remittance receipt. To the extent that these two effects are expected to have opposite impacts on labor supply, however, we can assess which effect dominates.

The impact of remittances on the decision to work has been previously examined by Edgard Rodriguez and Erwin R. Tiongson (2001) in Manila and by Edward Funkhouser (1992) in Managua. Without accounting for the 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 employment rates, remittances may change the *hours* worked and/or the *type of work* performed in the receiving economy. Furthermore, the impact may be different on male and female labor supplies and responsiveness to remittance income may vary from rural to urban areas. Using data from Mexico—a country with a large and growing remittance inflow[1]—we address the following questions: How does 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 due to higher remittance inflows?

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 aged 16 to 64 from the 2002

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

TABLE 1—REMITTANCE RECEIPT AND WORK PATTERNS BY GENDER AND AREA OF RESIDENCE

Remittance receipt and work patterns	Men		Women	
	Urban	Rural	Urban	Rural
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
Nonpaid work	0.04	0.12	0.09	0.19

ENIGH—the most complete survey yet. We work with a total of 42,341 individuals, 5.5 percent of whom 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 nonlabor income. Remittance-receiving households display higher nonlabor incomes (excluding remittance income) and have fewer employed working-age members than non-remittance-receiving households; hence, the importance of accounting for nonlabor income when assessing the labor supply impacts of international remittances.

According to Table 1, 9 percent of men and 12 percent of women residing in rural areas live in a remittance-receiving household relative to 3 percent and 4 percent of male and female urban dwellers, respectively. Likewise, male and female work patterns differ across 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 nonpaid work are more common in rural areas. About 40 percent of working men and one-quarter of working women are employed in the informal sector.

Of specific interest is how male and female labor supplies in urban and rural areas vary on account of remittance income. Table 2 reports the average hours worked by men and women in various types of employment according to remittance recipiency. Men in remittance-receiving households work fewer hours in practically all types of employment—the sole exception being nonpaid employment. Likewise, women residing in remittance-receiving households work generally fewer hours, although no clear pattern is observed for women over the four types of work.

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:

$$(1)\quad Y_i = \alpha_0 + \alpha_1 R_i + \alpha_2 Z_i + \varepsilon_i$$

$$\varepsilon_i \sim Normal(0, \sigma^2) \qquad \text{and}$$

$$Y_i = \max(0, Y_i^*),$$

for $i = 1, \ldots, n$ 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. A few econometric issues arise in the estimation of equation (1), however. 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' decisions 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 Whitney K. Newey (1987, equation (5.6)), henceforth, IV-Tobit.[2] We instrument

[2] Prior to estimating the IV-Tobits, we estimate Tobit models for comparability purposes. Remittances affect male

TABLE 2—AVERAGE MONTHLY WORK HOURS BY REMITTANCE RECEIPT

Type of employment	Urban		Rural	
	Without remittances	With remittances	Without remittances	With remittances
Men				
All work	208	198	202	194
Formal sector work	211	208	215	200
Informal sector work	215	204	216	211
Self-employment	218	208	218	206
Nonpaid work	176	189	181	187
Women				
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
Nonpaid work	156	155	130	112

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 Gordon H. Hanson and Christopher 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.[3] Given the expected link between household educational attainment and individuals' employment patterns, we also test the joint exogeneity of these three variables with respect to labor supply following Jeffrey M. 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.[4] To understand the employment dynamics responsible for the observed impact of remittances on overall work hours, we estimate Equation (1) for all work hours and for hours worked in various types of work such as self-employment, wage and salary work in the formal sector, wage and salary work in the informal sector, and nonpaid employment.

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 because 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 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

and female labor supply at the 1-percent significance level. Results are available from the authors.

[3] The F-statistics from regressing monthly per capita remittance income on the three instruments are 22.16 (Prob $> F = 0.00$) for women and 17.50 (Prob $> F = 0.00$) for men.

[4] 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.

TABLE 3—INSTRUMENTAL VARIABLE TOBIT RESULTS

Average monthly per capita remittance income	All work	Formal sector work	Informal sector work	Self-employment	Nonpaid work
			Urban		
Men					
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		
Women					
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		
			Rural		
Men					
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		
Women					
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: Regressions include: a constant, respondents' age, relationship to the household head, and education, the percentage of household members younger than 6 years old, the percentage of household members older than 64 years old, monthly per capita nonlabor 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).

* Significant at the 10-percent level.

** Significant at the 5-percent level.

*** Significant at the 1-percent level.

among men experiencing an increase in remittance income may be linked to the disruptive impact of household migration, which induces these nonmigrating 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 forgo 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 due to changes in remittance income, although only in rural areas. A 100-peso increase in remittances is associated with a six-hours/month (4-percent) reduction in female nonpaid 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 nonremunerated types of employment, seems to be dominating. Using 2002 minimum wages,[5] this reduction in female employment would imply an income drop of 63

[5] Information available at: http://www.inegi.gob.mx/prod_serv/contenidos/espanol/bvinegi/productos/integracion/economico/mbsi/excel/tp238.xls.

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 nonpaid work. Likewise, higher remittance incomes appear to be associated with a reduced male labor supply in formal sector work and urban self-employment. Among men, however, 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 due to greater remittance incomes among Mexican men reported in the popular press. Remittances seem only to be associated with a variation in the allocation of male labor supply across various types of employment. In contrast, remittances are accompanied by an overall drop in female labor supply resulting from reductions in informal sector and nonpaid work in rural areas.

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