CONTEMPORARY ECONOMIC POLICY

CAN INTERNATIONAL TRANSFERS BE PROBLEMATIC? HONDURAN REMITTANCES AND LABOR SUPPLY DECISIONS

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Declining work force participation rates are a potentially important public policy issue for governments in countries with large capital inflows. Here we consider remittances as both a household and individual characteristic to estimate the impact of this nonwage transfer on labor supply decisions in Honduras. Although an initial view suggests moderate reductions across the working-age population, we find evidence of increased participation through a reallocation of labor time across work categories. Our inclusion of the individual nature of remittance reception suggests less emphasis on the unified household perspective is warranted. (*JEL* O15, O12, J29)

I. INTRODUCTION

The financial flows associated with international migration ("remittances") have reached record levels. Honduras offers an important case study of remittance effects, since the flows represented 20% of GDP in 2007 and have remained around 16% in recent years (Endo et al. 2010; Pew Research Center 2013). Remittance flows to Honduras declined during the Great Recession but recovered to over $2.8 billion by 2011 and past post-recession levels in 2013 (MIN 2012; Pew Research Center 2013). Well over 10% of the workforce has left the country; most sources suggest between 200,000 and 700,000 Hondurans living in the United States (Endo et al. 2010). But the country is also highly dependent on exports, which represent almost 50% of GDP (World Bank 2013). The main products include coffee, apparel (assembled mainly in northern Honduras), shrimps (from the south), and bananas. The effects of financial flows on tradable sectors have become an important economic development topic (Lartey et al. 2009), and globalized countries such as Honduras are vulnerable to such interactions.

In general (sending) developing countries have avoided activist policies around taxation and international labor mobility. Donor programs have focused on reducing the transaction costs of remittance transfers, under the assumption that such transfers are necessarily beneficial and reduce absolute poverty. Taylor and Adelman (1996) mention spending multipliers as a reason to expect economic growth from remittances. But brain drain, Dutch disease effects, and family dislocation are a few of the concerns about migration raised in the social science literatures. Labor reductions are another potential macroeconomic cost.

ABBREVIATIONS

2SLS: Two-Stage Least Squares
CIAT: International Center for Tropical Agriculture
CSUF: California State University-Fullerton
CSULB: California State University-Long Beach
ENCOVI: Encuesta Nacional de Condiciones de Vida
EPHM: Permanent Household Survey
GDP: Gross Domestic Product
GIS: Geographic Information System
INE: National Statistics Institute of Honduras
MIN: Multilateral Investment Fund
NELM: New Economics of Labor Migration
OLS: Ordinary Least Squares
PLATS-UNAH: Latin American Postgraduate Program in Social Work
TPS: Temporary Protected Status

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In this article, we examine this labor question in Honduras using traditional and intra-household variations of the explanatory remittance variable. Other studies have linked remittances and national labor market outcomes using computable general equilibrium or elasticity approaches (Bussolo and Medvedev 2008; Gagnon 2012; Mishra 2007; Posso 2012). We aim to use the microeconomic story to complement the macroeconomics literature on remittances by considering if remittances create negative labor supply effects and, if so, which subgroups of the population are affected. We focus on working-age adults, given the established literature around remittances and reduced child labor.

Although we cannot determine the person sending each transfer, we can identify the recipient within the household. Our methodological change of focusing on the individual reception of remittances contrasts the previous literature relying upon a household perspective. This semantic difference is important since it includes variation by scale and gender of the people impacted by remittances.[1] We suggest that a smaller subset of individuals (those actually receiving the money) could demonstrate different, and potentially stronger, labor supply changes than that of every member of the whole household. Other studies outside of Latin America (i.e., Binzel and Assaad 2011; Mendola and Carletto 2012) have focused on wives as recipients; here we consider all genders. We also take care to differentiate participation done by individuals across types of wage and nonwage work (i.e., self-employment and unpaid family labor).

At first cut, the survey summary statistics and results assuming exogeneity suggest remittances lower labor force participation rates by 7 percentage points. But when controlling for the endogenous nature of remittance flows, reversals occur. Our main results suggest that each person within a remittance-receiving household is not significantly affected by the transfer; however, individual recipients are 23 percentage points more likely to work. If our identification strategy is valid, this outcome contrasts some previous findings. A focus on nonwage work (especially self-employment), rather than increased private sector employment, is likely behind our overall participation trends.

We first review the labor supply patterns of remittance and nonremittance households and highlight the economic concerns involved. The article proceeds to compare the unified and individualistic frameworks which could guide labor supply decisions. We next outline our estimation strategy to incorporate these frameworks and controls for endogeneity. Section V describes the Honduran dataset used and trends across type of reception and types of employment; the subsequent section breaks out findings across the subgroups affected. Section VII concludes.

II. INDIVIDUAL CHOICES AND REGIONAL PROBLEMS

Cox-Edwards and Rodriguez-Oreggia (2009) provide an overview of the utility maximization problem facing individuals left behind who receive nonlabor income from a migrant. As one person leaves, the household's dependency ratio may be higher, and the migrant's labor/income is gone. But in most cases the remaining household members often get more money (remittances), so those members could consume more leisure as reservation wages are higher. This income decreases the probability that an individual enters or stays in the labor market. On the other hand, substitution toward work could occur as there are tighter local labor supplies and higher local wages. Separately, remittances could give families more capital to start a business outside of the paid labor market (Funkhouser 2006). Thus distinctions between work categories (i.e., wage and nonwage work) remain important.

The Latin American literature has relied upon different methodologies and variations of the labor supply dependent variable and the remittance independent variable.[2] Yet many studies pinpoint a negative effect of remittances on the (receiving) family labor, which indicates the dominance of income effects from the transfer. Most rely upon instrumental variable methods to control for endogeneity. Acosta (2006), Alcaraz et al. (2012), Cox-Edwards and Rodriguez-Oreggia (2009), Funkhouser

1. The MECOVI dataset covers 8,175 household including 39,125 individuals (18,774 men and 20,351 women). Using the factor expansion, this represents 7,070,500 people (close to the national population at that time, with 52% women). Of this, there were 317,049 working-age women and 213,551 working-age men in "remittance-receiving" households in 2004. But there were only 163,585 women and only 64,979 men who were remittance-recipients themselves.

2. Notable recent remittance participation studies for other regions include Binzel and Assaad (2011), Mendola and Carletto (2012), and Mu and van de Walle (2011).

(2006), and Kim (2007) incorporate panel difference-in-difference or propensity score matching techniques.

Fajnzylber and López (2008) summarize results for ten Latin American countries showing reduced hours worked associated with a remittance transfer status dummy, with no gender differences.[3] A negative link between hours worked and remittance transfer status is found in Amuedo-Dorantes and Pozo (2006) for men and Acosta (2006) for women. Both females and males in Mexico and Haiti have demonstrated the negative transfer-work phenomenon (Airola 2008; Jadotte 2009). Only Kim (2007) finds no reduction in the weekly working hours of Jamaican remittance households.

Regarding participation, the Fajnzylber and López (2008) summary finds lower work activity in remittance-receiving households across the region, although this trend is most significant for the rural subsamples.[4,5] In several countries (El Salvador, Paraguay, Haiti, and Peru) urban females in remittance households work more. Acosta (2006), Hanson (2007), Kim (2007), and Jadotte (2009) emphasize the negative remittances-labor participation links. Cox-Edwards and Rodriguez-Oreggia (2009) conclude that urban women in Mexico increased participation, which may have come from more opportunities due to new family ventures. The Funkhouser (2006) and Fajnzylber and López (2008) projects also raise this point.

While desirable reductions in child labor (and an increase in schooling) are common (Acosta 2011; Alcaraz et al. 2012; Calero et al. 2009; Mueller and Shariff 2011), decreases in the wage work effort of adults represent a development quandary. Increases in regional wage rates help nonmigrant families move out of absolute poverty. But greater inequality is likely occurring as wage changes could center on the more-educated segment of the population (Mishra 2007). And individuals taking leisure are not saving the remittance transfer. This reduces the potential of remittances to reduce inter-generational poverty.

If labor shortages develop, output could fall. Taylor et al. (2003) find the labor decrease reduces cropping income given imperfect markets; and a switch away from cash crops has been observed in El Salvador (Damon 2010). In semi-urban zones there is a potentially problematic interplay between female labor force participation decisions, income and wage changes, and other tradable sectors (i.e., maquiladoras). The exchange rate appreciation of remittances capital inflows may reduce export competitiveness (Lartey et al. 2009); rising real wage rates, labor withdrawals, and production supply chain delays could also occur.

III. HOUSEHOLD OR INDIVIDUAL REMITTANCES?

Most of these studies treat the effect of remittances as a household characteristic. Under the New Economics of Labor Migration (NELM) framework (Stark and Bloom 1985), a unified household approach assumes members invest in sending a migrant abroad in order to receive a future return. When a member sends back a remittance, the complete household would be affected by this general transfer status as a dummy variable.

NELM builds on Becker (1974) in that any income flow into the household impacts each member's utility function and corresponding work decisions. For instance, Fortin and Lacroix (1997) suggest that nonwage income earned by either of two household members would affect each other's work hours in equal marginal fashion. Responses do not vary according to which person receives the income. In this view, unified household coefficients from a regression on hours (or participation) could be used to aggregate the magnitude of the remittance effect on national (or regional) labor supplies if all family members behave the same, regardless of who receives a transfer.

But moral hazard presents one problem when using unified coefficients for migrant families; a person's decisions on leisure may not maximize total household utility, particularly if one member abroad cannot view the action. Chen (2006) demonstrates that noncooperative behavior in migrant households leads mothers to decrease their labor time when fathers migrate, even though the absent male may have expressed other goals. Mendola and Carletto

3. The Honduras analysis relied upon an earlier dataset than that used here.

4. "Participation" has been addressed in many ways by whether that person has earned positive labor income (Hanson, 2007), whether the person had economic activity in the last week (Alcaraz et al. 2012), or whether the person is working or actively looking (Fajnzylber and López 2007).

5. Recent studies in Albania (Mendola and Carletto 2012), China (Mu and van de Walle 2011), and Eygpt (Binzel and Assaad 2011) have focused on the labor force participation of women left behind following male external migration; generally women have increased their participation rates in unpaid work.

(2012) conclude that remittances could lead to female bargaining empowerment and labor withdrawals. Remittance senders may provide use instructions, but the labor effects of this flow are likely quite different than those implied by strict public conditional cash transfers (Davis et al. 2009). Additionally, although recipient status would be known, household members have imperfect information about the precise amount of remittance income if only one person picks up the money.

During the 1990s a literature on intra-household resource allocation questioned the hypotheses of pooled income and joint utility maximization (see for instance, Folbre 1986; Katz 1991). Who earns the income affects use patterns. Different types of monies could lead to different actions, with the classic pin money of married women usually being spent in different fashion than the husband's salary (Zelizer 2005). We use these concerns to focus on the individual reception of remittances, with some attention to gender differentials. Specifically, individual nonwage income may not affect the labor supply of all members equally (Doss 1996). This means the coefficients on individual flows could be appropriate to analyze aggregate labor supply changes, rather than the traditional reliance upon coefficients associated with household flows.

IV. EMPIRICAL ISSUES AND ESTIMATION STRATEGY

The cross-sectional dataset used below offers a snapshot of income and labor decisions in 2004. It does not allow for a complete model of all intra-household domestic/unpaid activities by gender but it disaggregates individual income inflows and allows aggregation at the household and regional levels. Each household has several observations/rows across different members; questions (such as those about income source) were completed for each household member. We focus on labor force participation rates P for the working-age population in our sample of data.[6]

Individuals allocate time across work activities and leisure to maximize utility subject to a budget constraint. Following Acosta (2006), the latent decision of a person "i" in household "j" to work is akin to a reduced form time-use decision for participation P_{ij}*:

$$(1) \qquad P^*_{ij} = \alpha' X_{ij} + \beta' W_j + \gamma' R_j + u_{ij}$$

where P_{ij}* is related to a set of demographic characteristics (X_{ij}) for individual i in household j, a set of household characteristics (W_j), the variable of interest related to remittance receipts (R_j), and a term associated with unobserved heterogeneity for the individual (μ_{ij}). The decision function is unobservable, although the dichotomous variable P_{ij} ($P_{ij} = 1$ if $P_{ij}^* > 0$, and $P_{ij} = 0$ otherwise) is not. P_{ij} is observed from a survey question regarding activity condition. We first estimate several binary equations as:

$$(2) \qquad P_{ij} = b_0 + b_1 R_j + b_2 Z + e_{ij}$$

Household characteristic remittance effects

$$(3) \qquad P_{ij} = b_3 + b_4 R_{ij} + b_5 Z + e_{ij}$$

Individual remittance effects

where P_{ij} is the observed dichotomous (0,1) individual participation decision at the time of the survey; it is a binary variable indicating whether an individual "i" in a household "j" reported to be working in the last week. The R variable is the focus explanatory term; R_j is an observed dichotomous (0,1) variable indicating if the household received any remittances, and $= \sum_{i=1} R_{ij}$.[7] We also treat R in continuous form (the per capita level in the household or the exact amount received by an individual). Z is a vector of relevant area, household, and individual characteristics as control variables.

Possible endogeneity related to omitted variables and selection bias makes it difficult to determine the direct effects of the remittance transfer on labor supply decisions. Unobservable household (or individual) characteristics could jointly affect remittances and labor force participation. Cultural values, networks, or social connections (underlying casual effects) affecting a remittances outcome could also determine the labor supply outcome, for a significant cross-equation correlation. Treating remittances as exogenous could lead to biased estimates of the "b" coefficients using ordinary least squares (OLS) methods. Adams (2011) provides an overview of the methodological approaches

6. The hours variable in survey data is censored since over 40% of the observations are missing or report zero hours for the survey week; thus we consider labor supply at the extensive margin.

7. This implies $R_j = 1$ if any $R_{ij} = 1$.

to deal with these concerns; here we focus on how instrument variables have been used.[8] Past instruments include the overall percentage of remittance households as a measure of migration networks (Acosta 2011; Fajnzylber and López 2008),[9] distance to a railway line (Alcaraz et al. 2012), or the current number of Western Union offices in a state (Amuedo-Dorantes and Pozo 2006; Calero et al. 2009).

Our empirical strategy incorporates several factors to resolve identification problems. We need instruments which are linked to the observed remittance reception pattern but not directly with the labor force participation rate. Here we consider household demographic structure and village-level environmental shocks as factors which could prompt outmigration (and remittances) yet not impact comparative participation rates. Our instrumental variables approach integrates community and household variables and relies on 1998 and 2004 data, both being collected after human responses to a natural disaster.[10] The first instrumental variable is a household characteristic incorporating the proportion of members between 5 and 15 years of age. Households with a higher proportion of children (dependents) likely need external income sources. But Adams and Cuecuecha (2010) cite earlier studies around the migration life-cycle hypothesis; households with very young children are less likely to undertake migration for foreign employment; they also find significantly less (internal) migration for households with school-aged children. The later age group could be more useful for our analysis since the presence of a baby is likely to reduce a mother's labor force participation, but this is less so as children reach school-age.

We also rely upon data collected after Hurricane Mitch to instrument for the remittance patterns observed in 2004. Honduras was affected by the category IV Hurricane Mitch in October 1998 (Strobi 2012); economic outmigration increased sharply after this date (Endo et al. 2010). These "environmental refugees" received Temporary Protected Status (TPS) for U.S. immigration. Hurricane Mitch caused damage estimated at 38% of the Honduran GDP, or nearly $1 billion (Kugler and Yuksel 2008; Yang 2008). There were over 20,000 deaths, 1.5 million homeless, and extensive road damage (Kugler and Yuksel 2008).

A recent meta-analysis found residents in developing countries 60% more likely than those in developed countries to undertake international migration after a hurricane (Belasen and Polachek 2013). An exogenous natural disaster may offer a natural experiment since its damage is often localized, unanticipated, and unrelated to unobservable household characteristics like culture. Yang and Choi (2007) use rainfall shocks as instruments for exogenous changes in income in a study of whether remittances serve an insurance function. Kugler and Yuksel (2008) use post-Mitch immigration to the United States as an instrument for state Latin American-born population shares.

We use a physical measure of the hurricane's effect (area flooded) instead of damage monetary values which may be correlated with time-invariant household and personal characteristics. The Atlas of Honduras (CIAT 2001) created by CIAT (International Center for Tropical Agriculture) relies upon GIS (Geographic Information System) data to measure the extent of area flooding observed in aerial photographs after the hurricane.[11] The extent varied from 0 to 90% of a village; of those impacted, 47% of the zone suffered transportation bottlenecks, on average. We considered interactive and nonlinear specifications of these variables but found little significant improvement from these variations.[12]

Here we posit that the natural disaster would reduce temporary household income in 1998 and serve as a driver for subsequent outmigration by 2004. Several other reasons—related to migration motivations and the Mitch aftermath—support the choice of instrument.

8. For a further review of the instruments, see McKenzie et al. (2006).

9. Studies from other regions (i.e., Binzel and Assaad 2011 and Mendola and Carletto 2012) also instrument for migration networks as the proportion of males abroad in an area using external census and other databases.

10. Other household, municipal, and regional variables from other datasets (including assets, municipal Human Development Index components [UNDP 1998], internal migration rates, and present-day Western Union offices) were tested as IVs but found to not be exogenous from the pattern of labor force participation.

11. The Atlas allows us to match different shape files to the relevant village in which a household resides.

12. In particular when the instruments were interacted or used in quadratic form in the first-stage regressions, there was little improvement in overall fit and examination of the large value of the Hanson's *J*-statistics (10.08, 10.07, 9.74, and 12.13 in the interaction and quadratic models) suggest at least one of those instruments would not be valid. Additionally, the overall *F*-statistics created (9.46, 24.22, 9.46, and 24.82) are generally lower than those reported in the tables below and fail to reject the null hypothesis of weak instruments under the Stock-Yogo test critical values.

First, reconstruction efforts were designed so that markets would stabilize in affected areas (Locker 2009), and economic growth followed in the 1999–2004 period (Gindling and Terrell 2010).[13] Second, only 7.7% of households reported a loss of wage income due to Mitch (Morris et al. 2002), and many of the households affected were in urban areas.[14] Third, both push and pull factors likely are intertwined in the Hurricane Mitch-outmigration phenomenon; in this rare case Hondurans leaving their country had the opportunity to quickly become legalized in the United States under the TPS program (allowing them to work in the United States and not be removed).

A potential violation of the exclusion restriction when using weather shocks to instrument for changes in welfare is that all local households may be affected. Neighborhood conditions and returns to types of work (i.e., wage rates) could change.[15] If the 1998 Hurricane Mitch created both changes in a household's migration/remittance decisions and *persistent* changes in local labor market outcomes still affecting work decisions in 2004, the exclusion restriction would be violated. Measurements of the direct effects of (instrumented) remittances on labor force participation rates would be biased. It is difficult to determine the effects of any bias a priori. That is, if the natural disaster caused a nonrandom permanent reduction of employment in an area, estimates using the natural disaster instrument could be showing a downward bias regarding the role of remittances on labor force participation. If the natural disaster itself caused a skewed increase of employment in an area, our estimates would be too high. Thus care is needed in interpretation of the coefficient estimates obtained below through using the instruments.

Various multi-stage options exist to consider endogeneity between remittance reception and work patterns. If remittances are viewed in continuous fashion, an IV probit specification would address the linkages between the level of transfers and the dichotomous participation decision. 2SLS (two-stage least squares) offers results to tests the exogeneity of our instruments in a linear IV model, yet it presumes linearity of all dependent variables. A bivariate probit framework can incorporate dichotomous status remittance and labor force participation variables. We provide results from several estimations below to consider the robustness of our results and draw upon the expected overlap of findings regarding the coefficients (Angrist 2001).

Specifically, we use a recursive model in which remittances are determined and then treated as a (dummy) endogenous explanatory variable in the participation equation.[16] There are two equations: the first explaining remittance status (at the individual or household level) and the other relating labor force participation to remittances. The equations are linked by the cross-equation error correlation term ρ.

$$(4)\quad R^{*} = a_0 + a_1\mathbf{X} + u_{ij} \quad \text{where } R_j \text{ or } R_{ij} = 1 \text{ if } R_j^{*} \text{ or } R_{ij} * > 0 \quad 0 \text{ otherwise}$$

$$(5)\quad P_{ij}^{*} = b_0 + b_1 R + b_2\mathbf{Z} + e_{ij} \quad \text{where } P_{ij} = 1 \text{ if } P_{ij}^{*} > 0 \text{ and } P_{ij} = 0 \text{ otherwise,}$$

where (e_{ij}, u_{ij}) is independent of $\mathbf{X}$ and bivariate normal, $\rho = \text{corr}\,(e_{ij}, u_{ij})$, and the vector $\mathbf{X}$ represents relevant characteristics including factors not in $\mathbf{Z}$ (the vector of relevant area, household, and individual characteristics).

R_j, R_{ij}, and P_{ij} are indicator variables describing the state of the individual and household in 2004. The model restricts this coefficient to be the same across households, although we explore subgroup trends below. The endogenous bivariate probit system has been used to examine the linkages between Catholic high school attendance and high school completion (Altonji et al. 2005; Evans and Schwab 1995) as well as nutrition assistance and food security (Borjas 2004; Ratcliffe et al. 2011). Bivariate probit estimates are used in the 2011 child labor remittance study by Acosta, yet that work does not allow a recipient-based view of the cash flow.

13. Overall, Yang (2008) finds that within three years total capital inflows to hurricane-affected poor countries are roughly four-fifths of the estimated damage amounts.

14. Critiques of the use of natural shocks as instruments have focused on rural economies where substitutability between hired and family labor market conditions would need to be assumed (Rosenzweig and Wolpin 2000).

15. Yang and Choi (2007) tested the stability of the IV regression coefficients through the inclusion of control variables and concluded that rainfall affected remittances primarily through changes in household income (and not changes in household labor supply or size).

16. We estimate the model in STATA using the Seemingly-Unrelated Regression Bivariate Probit specification. Thus the b coefficient on remittances captures both the direct effect on participation and indirect effects such as income changes.

V. DATA

The 2004 *Encuesta Nacional de Condiciones de Vida* (ENCOVI) survey (INE 2004) includes 8,174 households with 39,125 individuals (which represents 1,405,429 households and a national population over 6 million). The sample was selected within the broad urban and rural areas of the country. It is a much more complex instrument than the biannual Permanent Household Survey (EPHM), which rarely includes remittance questions and does not resample.

The ENCOVI survey is comprised of eight modules related to residence building features, personal demographics, health, education, work and income, spending, community groups, migration, and agriculture. Completion rates on the last three modules were very low.[17] The data were collected well after Hurricane Mitch and before large minimum wage changes of 2008–2009.

The survey average monthly per capita income of 2318 lps ($124) is comparable to the 2004 Honduran monthly per capita income of $109 reported elsewhere (World Bank 2013).[18,19] We chose to identify households with remittance nonwage transfers if they report cash or in-kind remittances in the ENCOVI survey since so few completed the additional migration module questions. This means we are combining two remittance factors affecting labor force participation: how it responds if a household member is gone (migration) as well as the cash inflow effects. (The ENCOVI survey reports all external remittances received by the household, not just those sent by nuclear family members who have migrated abroad.) We also focus on working-age individuals only, which reduces the sample to 21,116 people.

Summary statistics of the survey person-level variables are presented in Table 1 divided by remittance status.[20] Individuals in remittance households tend to be significantly older, female, better educated, and less frequently married. Those individuals directly receiving remittances live in somewhat smaller households, as regard to fewer working-age adults.[21] This follows trends reported in Endo et al. (2010) citing most Honduran migrants as being male with higher educational achievement. Remittance households are more likely located in urban areas of the North (the cities of San Pedro Sula and El Progreso) (see also Endo et al. 2010). Recipient individuals are much like other members of their households expects as regard to being even older and better educated. The amount they receive is larger than the per capita level. In almost 20% of the households more than one person receives a transfer. A pattern emerges in the East in which more individuals are direct remittance recipients, with the reverse in the North.

Labor market statistics follow. We considered hours worked (in the last week) as the total summed up across all three possible jobs listed in the survey. The hours worked by individuals in remittance households (for those that did participate) are not significantly lower than those of men and women in nonremittance households. But imputed hourly wage rates (as the total monthly wage income/[hours in week*4.33]) are higher. Interestingly, for those in both remittance and nonremittance households, the total household size is about the same (>5 persons). Yet the total work income of the remittance-recipient households is higher, suggesting that the household has adjusted for the loss of a worker (the migrant). Remittance households have higher overall spending absolutely and per capita. This occurs despite their being located in the villages more affected by Hurricane Mitch.

Separately we considered personal and household factors across rural/urban areas and male/female gender. In rural areas, individuals receiving personal remittances (within column C in Table 1) tended to reside in areas harder hit by Hurricane Mitch, yet they received smaller remittance amounts (than their urban counterparts). These rural recipients were older, better educated, and more frequently female, compared to the nonrecipients. Women receiving personal remittances tended to be better educated and in

17. For instance, only 994 of the 8157 households sampled answered the migration module.

18. The average exchange rate in 2004 was $1 = 18.64 Honduran lempiras.

19. Later in 2006, the Permanent Survey of Multiple Households (INE 2004) reported 179,501 households with migrants and 330,938 households with remittances of which the range of the average remittance was US$100–200 per month.

20. Projections from the ENCOVI show 210,355 Honduran households received remittances in 2004 with an average household amount of 3,386 lempiras (US$185/month), representing about 36% of total income. The households are on the upside of the (post-remittance) income distribution; over 60% of the remittance-receiving households showed total income above the median of 1073 lps. (This income inequality between remittance and non-remittance Honduran households has also been noted in IDB 2012.)

21. The total household size across the full ENCOVI sample was six persons.

TABLE 1
Working-Age Individuals Summary Statistics

	Remittance Household ($N = 3,257$) (A)	Nonremittance Household ($N = 17,890$) (B)	Personal Remittance ($N = 1,366$) (C)
Individual Factors			
Male (Yes = 1)	0.40	0.47	0.29
	(.49)**	(0.50)	(0.45)**
Age (yrs)	32.86	32.90	36.41
	(14.4)	(13.07)	(14.29)**
Age 16–25	0.42	0.38	0.30
	(0.49)**	(0.49)	(0.46)**
Age 26–35	0.13	0.24	0.22
	(0.33)**	(0.43)	(0.41)
Age 36–45	0.15	0.18	0.19
	(0.36)**	(0.38)	(0.39)*
Age 46–55	0.12	0.13	0.15
	(0.33)	(0.33)	(0.36)**
Age 56–65	0.10	0.07	0.14
	(0.33)**	(0.26)	(0.35)**
Years study	8.32	7.28	8.29
	(3.83)**	(4.00)	(3.93)**
Under primary	0.06	0.12	0.08
	(0.24)**	(0.32)	(0.27)**
Completed primary	0.40	0.51	0.41
	(0.49)**	(0.50)	(0.49)**
Completed secondary	0.41	0.27	0.39
	(0.49)**	(0.44)	(0.49)**
Completed university	0.13	0.10	0.125
	(0.33)**	(0.30)	(0.33)**
Married (Yes = 1, No = 0)	0.48	0.58	0.56
	(0.50)**	(.49)	(0.50)
Imputed hourly wage	34.17	28.29	36.12
	(71)**	(159)	(61.60)**
Hours worked week	40.28	44.17	37.77
	(21.70)*	(69.50)	(23.21)*
Regional/Household Factors			
Instruments:			
Proportion of family aged 5–15 years	0.23	0.24	0.24
	(0.20)*	(0.20)	(0.22)
% Village area hurricane damaged	18.91	12.46	19.51
	(26.36)**	(21.87)	(26.69)**
Geography:			
Urban area			
(Yes = 1, No = 0)	0.79	0.67	0.78
	(0.41)**	(0.47)	(0.42)**
Center (Yes = 1, No = 0)	0.29	0.30	0.29
	(0.46)	(0.46)	(0.45)
North (Yes = 1, No = 0)	0.42	0.33	0.41
	(0.50)**	(0.47)	(0.49)**
West (Yes = 1, No = 0)	0.08	0.18	0.08
	(0.27)**	(0.28)	(0.27)**
South (Yes = 1, No = 0)	0.05	0.05	0.05
	(0.21)	(0.21)	(0.22)
East (Yes = 1, No = 0)	0.15	0.15	0.17
	(0.36)	(0.36)	(0.37)**
Household:			
Total persons	5.69	5.62	5.02
	(2.45)	(2.40)	(2.28)**
Remittance (lps)	757.18		2695.11
	(1824.29)		(5422.19)
	[Per capita]		[Actual]
1 individual receives transfer 80.43%, 2 individuals receive transfer 14.07%			
3 individuals receive transfer 4.1%, 4 individuals receive transfer 1.12%			
5 individuals receive transfer 0.3%, 6 individuals receive transfer 0.09%			
Work income (lps)	4967.21	4518.45	4726.28
	(7164.61)	(21572)	(8646.12)
Total income per capita (lps)	2998.29**	2250.30	3162.83**
	(5785.74)	(25999)	(6874.89)
Total spending per capita (lps)	2367.54**	1802.73	2474.24**
	(3055.63)	(2373.70)	(2197.72)

Notes: Data are from the ENCOVI survey of 2004. Standard errors are in parentheses.

*Significantly different subsample means (remittance vs. nonremittance) at 10%; **significantly different subsample means (remittance vs. nonremittance) at 5% using t-test or χ^2 statistic.

TABLE 2
Working-Age Individuals Participation Rates by Type

	Remittance Household ($N = 3,257$)	Nonremittance Household ($N = 17,890$)	Personal Remittance ($N = 1,366$)
Full sample group		59.88	
Participation (%)	54.27**	61	48.60**
Gender:			
Male	74.50**	82.77	73.67**
Female	40.77	41.48	38.45*
Highest education:			
None	50.49*	56.30	48.57
Primary	58.06**	62.51	49.73**
Secondary	48.58**	57.05	44.30**
University	62.65**	68.79	58.82**
Age (yrs):			
16–25	42.63**	51.53	32.10**
26–35	62.39*	66.21	55.67**
36–45	69.96	70.83	63.74**
46–55	62.28*	67.00	53.81**
56–65	51.76*	57.12	46.28**
Region:			
Center	57.54**	61.77	54.20**
North	53.19**	64.94	45.41**
West	48.16**	55.22	40.95**
South	58.49	58.59	65.71
East	53.08*	57.72	45.45**
Area:			
Urban	54.62**	61.97	47.88**
Rural	54.31**	58.71	51.32**
Types of participation			
Public work	5.50**	4.57	5.93*
Private work	21.74**	26.92	14.28**
Domestic work	1.96	2.04	0.70**
Self-employment	23.90**	26.12	29.14**
Unpaid labor	4.24	4.46	2.64**

Notes: Data are from the ENCOVI survey of 2004. Standard errors are in parentheses.
*Significantly different subsample means (remittance vs. nonremittance) at 10%; **significantly different subsample means (remittance vs. nonremittance) at 5% using *t*-test or χ^2 statistic.

households with young children (ages 5–15) compared to their nonremittance counterparts; these factors are less significant for men. Women receive a significantly larger amount of personal remittances than do men.

In Table 2 the overall participation mean for all subsamples comes close to the 60.10% participation rate for Honduras cited in Lora and Fajardo (2012).[22] The participation rates are highest for individuals in households without remittances, followed by individuals in remittance households, then individuals receiving remittances directly. Clear education differentials appear in Table 2; individuals completing only primary school (most likely unskilled workers) and those with a college degree (skilled) show the highest participation rates. Participation levels peak for 36–45 year old individuals, and younger adults (age 16–25) participate less if the household receives remittances. Regional effects show that workers in southern Honduras with any type of remittance flow are actually more likely to participate, but the impact of an individual receiving the transfer is negative in all other regions, particularly in northern Honduras. Remittances are associated with labor force declines in urban areas.

Finally, we observe the type of work varies by remittance status. In particular, as a person receives a remittance transfer his/her likelihood of doing domestic, unpaid, and private sector work declines, whereas a movement toward public sector employment and self-employment

22. We consider labor force participation as "having worked 1 or more hours" in the previous week. This idea of "being occupied" includes paid labor and self-employment. The specific activities of this participation then are associated with the occupational categories listed in Table 2.

TABLE 3
Exogenous Estimates of Remittances on Participation

	Binary Effect ($N = 18,753$)		Continuous Effect (ln) ($N = 18,753$)	
	Coefficient	**Marginal**	**Coefficient**	**Marginal**
Remittance				
Household	−0.18**	−0.07	−0.03**	−0.01
	(0.03)	(0.01)	(0.005)	(0.002)
Individual	−0.28**	−0.11	−0.04**	−0.015
	(0.04)	(0.02)	(0.0055)	(0.002)
Demographics				
Male gender	1.19**	0.45	1.18**	0.44
	(0.02)	(0.008)	(0.02)	(0.008)
Total persons	0.01**	0.004	0.01**	0.004
	(0.004)	(0.002)	(0.004)	(0.002)
Married	−0.18**	−0.07	−0.18**	−0.07
	(0.02)	(−0.009)	(0.02)	(0.009)
Age	0.17**	0.06	0.17**	0.06
	(0.005)	(0.002)	(0.005)	(0.002)
Age-sq.	−0.002**	−0.0008	−0.002**	−0.0008
	(0.00007)	(0.00003)	(0.0007)	(0.00003)
Years school	−0.0008	−0.00003	−0.0004	−0.0001
	(0.003)	(0.001)	(0.003)	(0.001)
Spending per capita (ln)	0.16**	0.06	0.17**	0.07
	(0.02)	(0.006)	(0.02)	(0.006)
Regional				
North	0.09**	0.035	0.10**	0.04
	(0.025)	(0.010)	(0.025)	(0.01)
East	−0.009	−0.0035	0.009	0.004
	(0.03)	(0.01)	(0.03)	(0.01)
West	−0.08**	−0.03	−0.08**	−0.03
	(0.03)	(0.01)	(0.03)	(0.01)
South	−0.01	−0.005	0.007	0.003
	(0.05)	(0.02)	(0.05)	(0.02)
Urban	−0.11**	−0.04	−0.12**	−0.04
	(0.03)	(0.01)	(0.03)	(0.01)
Constant	−4.19**		−4.24**	
	(0.15)		(0.15)	
	Wald $\chi^2(13) = 3952.46$		Wald $\chi^2(13) = 3977.20$	

Notes: Data are from the ENCOVI survey of 2004. Robust standard errors are in parentheses.
*Coefficient statistically significantly different from zero at the 10% level; **coefficient statistically significantly different from zero at the 5% level.

occurs. This is most significant when a person receives a transfer directly. Separately, the data suggest that the remittances/self-employment trend (representing 26% of the working-age sample) is nearly evenly split between men and women, while the increase in public sector work is more associated with remittance-receiving women.

VI. FINDINGS

In Tables 3 and 4 we report the parametric estimates regarding the impact of remittances on labor force participation probabilities using different versions of the explanatory variable, with controls for possible endogeneity. We start by providing estimates of Equations (2)–(3) with robust standard errors using the large individual-observations dataset of 21,147 working-age individuals (9,711 men and 11,436 women between 16 and 65 years old), 1,366 of which received remittances and 3,257 of which are in remittance-receiving households.[23] Control variables include individual human capital measures, household status, demography, and regional location factors.

23. We considered clustering standard errors at the household and regional levels but found little improvement in fit or no changes in coefficient significance. For instance, clustering by household showed no changes in the standard errors of the coefficients reported in Table 4, column (4); only two variables in column (3) had higher errors. Clustering by village slightly increased the standard errors of the village area damage, urban, regional dummies in column (3) and dummies in column (4). No significance levels changed.

TABLE 4
Endogenous Estimates of Remittances on Participation Probability, Bivariate Probit

	(1) Household Remit	(2) ($N = 18,753$) Participates	Marginal[a]	(3) Individual Remit	(4) ($N = 18,728$) Participates	Marginal[a]
Instruments						
Age 5–15 yrs	0.24**			0.53**		
	(0.07)			(0.08)		
Village area damage	0.006**			0.0047**		
	(0.0006)			(0.0007)		
Remittance status		−0.20	−0.08		0.72**	0.23
		(0.13)	(0.05)		(0.17)	(0.04)
Demographics						
Male	−0.13**	1.18**	0.44	−0.38**	1.19**	0.42
	(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.04)
Total persons	0.04**	0.01**	0.005	−0.04**	0.01**	0.005
	(0.005)	(0.005)	(0.001)	(0.007)	(0.004)	(0.001)
Married	−0.13**	−0.19**	−0.07	−0.01	−0.17**	−0.06
	(0.03)	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)
Age	−0.03**	0.16**	0.06	−0.01	0.16**	0.06
	(0.006)	(0.005)	(0.002)	(0.007)	(0.005)	(0.007)
Age-sq.	0.0005**	−0.002**	−0.0008	0.003**	−0.002**	−0.007
	(0.00008)	(0.00007)	(0.00003)	(0.00009)	(0.00007)	(0.00008)
Years school	0.0075**	−0.0006	−0.0002	0.01**	−0.002	−0.0007
	(0.003)	(0.003)	(0.001)	(0.004)	(0.003)	(0.0008)
Ln spending per capita	0.33**	0.17**	0.07	0.24**	0.13	0.05
	(0.01)	(0.02)	(0.008)	(0.02)	(0.02)	(0.008)
Regional						
North	0.07**	0.10**	0.04	0.02	0.07**	0.03
	(0.03)	(0.03)	(0.01)	(0.04)	(0.03)	(0.007)
East	0.11**	0.01	0.005	0.12**	−0.04	−0.01
	(0.04)	(0.03)	(0.01)	(0.05)	(0.04)	(0.008)
West	−0.02	−0.074**	−0.03	−0.07	−0.08**	−0.03
	(0.04)	(0.03)	(0.01)	(0.06)	(0.03)	(0.009)
South	0.35**	0.009	0.003	0.30**	−0.03	−0.01
	(0.06)	(0.05)	(0.02)	(0.08)	(0.05)	(0.01)
Urban	0.04	−0.115**	−0.04	−0.01	−0.11**	−0.04
	(0.03)	(0.03)	(0.01)	(0.04)	(0.03)	(0.008)
Constant	−3.34**	−4.25**		−3.20**	−3.94**	
	(0.16)	(0.15)		(0.20)	(0.16)	
Overall tests endogeneity	Wald $\chi^2_{(27)} = 4949.88$			Wald $\chi^2_{(27)} = 4837.48$		
	$\chi^2_{(1)} = 0.04$			$\chi^2_{(1)} = 26.85$		
	Prob > $\chi^2 = 0.85$			Prob > $\chi^2 = 0.0000$		
	Rho 0.01 (0.07)			Rho −0.50 (0.08)		

Notes: Data are from the ENCOVI survey of 2004. Robust standard errors are in parentheses.
[a]Marginal effects are computed at the mean of the explanatory variables.
*Coefficient statistically significantly different from zero at the 10% level; **coefficient statistically significantly different from zero at the 5% level.

The left side of Table 3 integrates remittances as a status (dummy variable) effect, while the right side measures the continuous effect. (For parsimony we present only the coefficients of the remittance effects and the other explanatory variable coefficients related to the household remittance regression; a separate regression on how individual remittance reception affects participation showed nearly the same coefficients on the other explanatory variables.) Male gender is the strongest factor determining work patterns. Next, remittance status reduces labor force participation. The receipt of remittances by the individual reduces the likelihood of participation by over 10 percentage points on the margin.[24] This is a large effect from the base of 61% participation rate for the nonrecipient group (Table 2). When (logged) remittances are treated as continuous, the same trends are observed. Individual reception provides the strongest marginal and total negative effect perhaps since it includes a larger amount of money directly to that person (as opposed to a per capita amount shared across all household members).

24. Marginals are calculated at the variable means, with standard errors using the Delta method. Separately we find slightly higher exogenous effects on the male subsample.

We next undertake estimations of Equations (4)–(5) in the bivariate probit framework using robust standard errors. Estimates were undertaken with the remittance indicator as the first stage and the participation indicator as the second stage; we report both stages in Table 4. When we instrument for remittance status, the results differ from the probit results in Table 3. Overall, remittances received by the household have a slight negative, but insignificant, effect on an individual's participation probability. But if that individual is the recipient, he/she is more likely to participate in the labor force. These results use the two instrumental variables discussed above; however, we tested the sensitivity of our findings by incorporating just the hurricane damage instrument in a just-identified model (see Table A3, Appendix). In general the signs of all variables listed in Table 4 remained the same, however, the estimates of the remittance impact on participation was larger.

Many of the factors explaining household remittance status (column (1)) also explain individual status (column (3)). Women and educated persons are more likely to be in a remittance household and to receive the money directly. An unmarried person is more likely to be in a remittance household, and individuals in the eastern and southern parts of the country are more-likely remittance recipients compared to the omitted Center region.

The instruments of family age structure and the damage caused by Hurricane Mitch are both individually significant in explaining remittance reception status. A household with a larger proportion of school-aged children is more likely to receive remittances, as do individuals within it. The effects of Hurricane Mitch are significant, and larger on the margin, in stimulating outmigration by a household member (and a later remittance flow). The instruments have adequate individual explanatory power, and they are jointly statistically significant by exceeding the critical value proposed by Stock and Yogo. Given the values of the F-statistics (Table A1, Appendix) we reject the null hypothesis of weak instruments. Since we have multiple instruments, we find that the overidentifying restriction on the instruments is valid since we do not reject the null hypothesis under Hansen's J-statistic.

The system linking individual remittance reception and participation more strongly indicates endogeneity with the Durbin–Wu–Hausman test, whereas classifying any person in a remittance household as "remittance recipient" does not (using the bivariate probit χ^2 statistics). We cannot reject the null hypothesis of household remittances being exogenous ($p < .14$). Using the Wald tests we reject the null hypothesis of individually received remittance transfers being exogenous ($p < .01$). Unobservable factors which affect the likelihood of remittance status also affect the likelihood of labor force participation. The 2SLS results (see Table A1, Appendix)[25] also point to an endogenous individual remittances-participation system.

The participation columns (2) and (4) in Table 4 demonstrate the expected signs regarding the demographics of the worker. Age (as experience) demonstrates a quadratic trend. Civil status is logical, with married men providing more work. The labor market in the North is the most vibrant, although participation rates appear higher in rural areas.

In Table 4 a working-age person's presence in a remittance household is insignificantly related to a reduced labor force participation probability.[26] But a different story emerges as regard to individually received remittances. The participation rates of working-age recipients actually increase by 23 percentage points on the margin.[27] This implies a 33% participation boost beyond the level of the baseline nonremittance households (Table 2). As noted in Borjas (2004), reversals can occur with endogeneity so there are different relationships across the univariate (Table 3) and bivariate probit (Table 4) results. When viewing the individual remittances transfer results there is a logical similarity of the signs and magnitude of the remittance transfer dummy, gender, and other 2SLS coefficients and the marginal impacts calculated under the bivariate probit framework, although the 2SLS results present larger standard errors.

25. Besides the accessibility of standard IV tests in 2SLS, Angrist (1991) shows the close approximation of average treatment effects for the 2SLS and binary probit models as a sensitivity test. In our 2SLS regressions, the coefficient (marginal) effect on the individual remit dummy variable is close to the marginal effects reported in Table 4, although the 2SLS standard errors were larger.

26. The Appendix A3 results using one instrument show a significantly negative effect of household remittances on participation. This follows the univariate probit estimates of Table 3, which are preferable given the acceptance of the null hypothesis of exogeneity of household remittances.

27. Marginals are calculated in Stata as the average difference in the predicted probability of participating for those with and without remittances. We estimate the marginal effects at the means using the Stata mfx command, with the option predict (pmarg2).

These coefficients must be interpreted with care, given a possible bias through the choice of the instruments. The robustness of the results is considered using personal age and education categories in Table A4, Appendix, as well as (natural log) remittances in continuous format (see Table A2, Appendix). Again, the instrumental variables are significant, and the focus on individual cash flows again provides stronger results. However, the value of specific remittance levels does not significantly impact the probability of labor force participation, either when viewed as a household per capita transfer or an amount received by the individual. Coefficients and significance of the other explanatory variables suggest male gender being negatively associated with the reception of remittances yet positively linked to participation.

Our findings follow recent cross-country analysis of a positive link between remittances and aggregate male labor supplies (Posso 2012). Binzel and Assaad (2011) also find a large 60 percentage points participation boost for remittance-associated rural women in Egypt, while the results in Cox-Edwards and Rodriguez-Oreggia (2009) for Mexico are smaller (+4.5 percentage points) using a propensity score matching technique. Apart from gender, remittances have the largest marginal impact on participation rates. Yet the small average amount of remittances received (less than $200 in the study month) could mean the recipients still need to work.

Our effects correct for significant endogeneity between the factors associated with individual remittance reception and participation probabilities. The negative correlation coefficient (ρ) implies positive-selection; it could be that individuals have unobservables which kept them out of the labor market previously but prompted their receipt of remittances and stimulated work effort. The fact that significant endogeneity exists in the regressions on individually received remittances, yet not household remittances, suggests the recipient's personal characteristics are important. We explore below how employment types and subgroups relate to these possible explanations.

In what follows, we focus only on estimates in which remittances are treated as an individual transfer. In Table 5 we disentangle the surprising trend of remittances prompting more labor force participation by focusing on the types of work. In the first row we see that recipients overall are likely to take up work in the public sector or self-employment (and abandon domestic work). There is not a clear-cut move between wage and nonwage work. The trend of cash transfers spurring an individual to move into self-employment follows the findings of Fajnzylber and López (2008) and Cox-Edwards and Rodriguez-Oreggia (2009). Specifically, previously unemployed individuals could be increasing work in their own enterprises due to the inflow (Funkhouser 2006).

The next rows of Table 5 report the coefficients on receipt of the individual transfer on participation type by subsamples along observable attributes.[28] Female remittance-recipients reduce market employment and the provision of (unpaid) domestic services, as noted in Binzel and Assaad (2011) and Mendola and Carletto (2012) regarding women in Eygpt and Albania. For women our instrument of the household age composition likely matters—women with many young children could have a higher reservation wage and market work opportunity cost; the receipt of remittance cash could allow a women to choose to not work outside the home. Using different job categories (a formal vs. informal sector work distinction) Amuedo-Dorantes and Pozo (2006) attribute the increased informal sector work by men in remittance households as possibly arising from the need to deal with migration disruption (and travel costs) in the face of formal work barriers. Posso (2012) also follows the cost explanation. Given the high incidence of male outmigration in the decade preceding the survey, our finding of the women left behind working independently could be related to this concern; some women still need to earn cash (albeit through self-employment).

We also see that those with a primary education show behavior which is like that of the whole sample. Nearly all subgroups of younger recipients have a lower probability of doing domestic work. Adults in rural areas, those with a secondary education, and women have a significantly higher probability of participation in self-employment due to the remittance effect; but the transfer tends to reduce the probability of involvement in public sector and private sector wage work. But remittance recipients in urban

28. We found the subsamples to be generally different using Chow test-statistics and thus chose not to consider differences by demographic groups using interaction terms. Note that the education and age variables are included in continuous format in Table 4 and the gender, regional, and area subsamples of Table 5. The education and age subsamples of Table 5 are separated by using the terms as threshold completion categories, which includes more observations (for instance, some individuals answered the question on school completion but not years).

TABLE 5
Subgroup Coefficients of Remittances on Participation

Group[a]	Public Work	Private Work	Domestic Work	Self-Employ	Nonpaid Work
Total					
Coefficient	0.80*	−0.20	−1.33**	0.66**	0.01
	(0.43)	(0.31)	(0.22)	(0.25)	(0.16)
Marginal	0.09	−0.06	−0.01	0.23	0.0007
	(0.08)	(0.08)	(0.002)	(0.10)	(0.01)
	(*n* = 18,728)	(*n* = 18,728)	(*n* = 18,728)	(*n* = 18,728)	(*n* = 18,728)
Gender					
Male	−0.08	0.11	−1.76**	−0.55	−0.21
	(0.85)	(0.73)	(0.33)	(2.46)	(0.61)
	(*n* = 8,571)	(*n* = 8,571)	(*n* = 8,571)	(*n* = 8,571)	(*n* = 8,571)
Female	0.68	−1.23**	0.96**	0.79**	−0.82**
	(0.54)	(0.27)	(0.43)	(0.26)	(0.35)
	(*n* = 10,157)	(*n* = 10,157)	(*n* = 10,157)	(*n* = 10,157)	(*n* = 10,157)
Education Level					
None	0.80	−1.19	−0.90**	−0.18	−0.02
	(0.88)	(0.80)	(0.34)	(1.21)	(0.60)
	(*n* = 2,344)	(*n* = 2,344)	(*n* = 2,344)	(*n* = 2,344)	(*n* = 2,344)
Primary	0.91*	−0.37	−0.90**	0.93**	0.10
	(0.49)	(0.37)	(0.34)	(0.27)	(0.30)
	(*n* = 10,423)	(*n* = 10,423)	(*n* = 10,423)	(*n* = 10,423)	(*n* = 10,423)
Secondary	−1.64**	−0.32	−5.26**	0.74**	0.12
	(0.21)	(0.69)	(0.18)	(0.29)	(0.29)
	(*n* = 6,184)	(*n* = 6,184)	(*n* = 6,184)	(*n* = 6,184)	(*n* = 6,184)
University	−1.31**	−0.47	−5.76**	−0.44	−0.22
	(0.26)	(0.88)	(0.19)	(1.06)	(0.55)
	(*n* = 2,155)	(*n* = 2,155)	(*n* = 2,155)	(*n* = 2,155)	(*n* = 2,155)
Age (yrs)					
16–25	−0.41	0.10	−1.73**	0.54	0.36
	(0.84)	(0.60)	(0.27)	(0.66)	(0.40)
	(*n* = 7,699)	(*n* = 7,699)	(*n* = 7,699)	(*n* = 7,699)	(*n* = 7,699)
26–35	0.88*	−1.14**	−2.03**	1.52**	−0.96*
	(0.50)	(0.45)	(0.27)	(0.22)	(0.60)
	(*n* = 4,539)	(*n* = 4,539)	(*n* = 4,539)	(*n* = 4,539)	(*n* = 4,539)
36–45	2.18**	0.74	−1.65*	−0.54	−0.38
	(0.19)	(0.56)	(0.37)	(0.84)	(0.63)
	(*n* = 3,245)	(*n* = 3,245)	(*n* = 3,245)	(*n* = 3,245)	(*n* = 3,245)
46–55	0.46	−1.94**	0.84	1.01**	−0.87**
	(1.22)	(0.10)	(0.73)	(0.50)	(0.24)
	(*n* = 2,170)	(*n* = 2,170)	(*n* = 2,170)	(*n* = 2,170)	(n = 2,170)
56–65	0.77	−0.44	2.59**	−0.10	−1.64**
	(1.95)	(0.93)	(0.22)	(1.23)	(0.39)
	(*n* = 1,075)	(*n* = 1,075)	(*n* = 1,075)	(*n* = 1,075)	(*n* = 1,075)
Region					
Center	1.10**	0.64	2.33**	0.91	−0.33
	(0.51)	(0.84)	(0.11)	(0.62)	(0.29)
	(*n* = 5,844)	(*n* = 5,844)	(*n* = 5,844)	(*n* = 5,844)	(*n* = 5,844)
North	1.10**	−1.56**	−1.55**	0.29	−0.32
	(0.50)	(0.28)	(0.28)	(0.79)	(0.39)
	(*n* = 6,686)	(*n* = 6,686)	(*n* = 6,686)	(*n* = 6,686)	(*n* = 6,686)
West	−0.42	−1.05**	−3.49**	0.96	0.44
	(1.11)	(0.43)	(0.99)	(0.73)	(0.34)
	(*n* = 2,825)	(*n* = 2,825)	(*n* = 2,825)	(*n* = 2,825)	(*n* = 2,825)
South	2.13*	−2.03**	0.18	1.91**	0.06
	(1.31)	(0.16)	(0.70)	(0.40)	(0.42)
	(*n* = 797)	(*n* = 797)	(*n* = 797)	(*n* = 797)	(*n* = 797)
East	−1.57**	0.04	−0.73	0.49	0.19
	(0.16)	(0.45)	(0.98)	(0.36)	(0.44)
	(*n* = 2,576)	(*n* = 2,576)	(*n* = 2,576)	(*n* = 2,576)	(*n* = 2,576)
Area					
Urban	1.09**	−0.19	−1.50**	0.32	−0.43*
	(0.35)	(0.51)	(0.18)	(0.55)	(0.25)
	(*n* = 13,574)	(*n* = 13,574)	(*n* = 13,574)	(*n* = 13,574)	(*n* = 13,574)
Rural	−1.54**	−0.55	−0.70	0.83**	0.28
	(0.20)	(0.68)	(0.58)	(0.37)	(0.37)
	(*n* = 5,154)	(*n* = 5,154)	(*n* = 5,154)	(*n* = 5,154)	(*n* = 5,154)

Notes: Data are from the ENCOVI survey of 2004. Robust standard errors are in parentheses.
[a]Other controls are listed in Table 4, column (4) with the relevant explanatory variable removed for each subsample.
*Coefficient statistically significantly different from zero at the 10% level; **coefficient statistically significantly different from zero at the 5% level.

areas and the Central zone increase work in the public sector (which is logical for the capital city of Tegucigalpa).

In summary, working-age adults who receive remittance income are likely to participate less in domestic and private sector work in most of the regions. Remittances received by an individual appear to stimulate a higher overall probability of labor force participation, but this is associated with a reallocation of work patterns (a movement

to the self-employment component of labor force participation, rather than job-seeking in the private sector). Thus, concerns regarding how remittances stimulate labor force withdrawals from export sector work (i.e., maquiladora industries in northern Honduras) remain valid.

VII. DISCUSSION AND CONCLUSIONS

Remittance flows to Central America have recovered following the Great Recession. Studies of how this international transfer affects economic growth and development offer diverse results. While the literature often has concluded that household remittances necessarily reduce the labor force participation rates or work hours of those left behind, we see a more complicated picture. Viewing remittances as an individually received transfer suggests the dollars stimulate independent work.

To sum up, we note several key trends:

(1) After controls for endogeneity, we find that a natural shock (Hurricane Mitch) can explain part of the pattern of outmigration from Honduras (and reception of remittances). Remittances are also more likely received by females, those with more education, and individuals living outside of the central region. The recipients often reside in larger households, with a higher proportion of younger children.

(2) Assuming the validity of our instruments, these international transfers have not significantly reduced the labor force participation rates of remittance-associated individuals in Honduras. While the transfer appears to have an insignificant effect on a working-age individual within a remittance-household, the actual recipient of the money is likely stimulated to increase his/her labor force participation.

(3) Individuals with a moderate education and urban residents are the subgroups most impacted by this overall participation/remittance reception pattern. We find that women tend to substitute their labor effort away from most market (private) work toward independent activities, either in providing greater home care or undertaking self-employment.

It is surprising that remittance recipients are not particularly attracted to private sector work, and this result contrasts studies of Honduran supply elasticities and real wage rates across time. Gagnon (2012) uses data from the yearly Permanent Multiple Household Surveys to calculate the emigration real wage elasticity as positive and large (0.5).[29] And the previous *fall* in remittance flows to Honduras (2008–2010) seemed to induce household behavior consistent with an income effects interpretation since Honduran remittance-receiving households were projected to increase their labor supply then so as to avoid poverty (IDB 2012).

Keeping all working-age individuals, especially remittance-recipients, interested in wage work remains an important policy task. Although the remittance-recipient subsample tends to be better educated than the overall sample, we find those with both moderate levels of human capital (primary and secondary completion) are most likely to undertake self-employment. Women receiving remittance transfers demonstrate the strong substitution from private sector work to self-employment. It remains unclear as to whether the apparent uptake in self-employment comes by default or choice among these remittance-reception individuals. Further research into the utility/status effect of receiving dollars and time-use decisions toward independent or supervised activities is needed.

One policy option would be to address the barriers to formal sector work facing women (especially those without a university degree). Transportation bottlenecks (which diminish recipients' interest in seeking wage work) should be reduced. Taxation policy is another option. Recent findings suggest changes in payroll tax rates in Latin America could increase participation rates particularly if entitlement benefits are included (Lora and Fajardo 2012). Even though we find remittance levels to have an insignificant effect on participation rates, a direct tax on remittance reception could still have negative labor supply effects.

Thus far we have only addressed labor supply changes from the remittance inflows. Analysis of consumption spending patterns across domestically produced and imported goods could provide insights into aggregate labor demand impacts from the cash inflow. Although self-employment activities may have small initial labor generation impacts, matching funds could allow such ventures to expand and increase the spillover effects of the original cash inflow.

In general, we urge methodological changes by remittance researchers to consider the dynamics of intra-household allocation in future studies

29. Keane and Rogerson (2012) note that such large national labor supply elasticities would be consistent with smaller effects found in micro studies.

of these cash flows. The different columns of Tables 3 and 4 together suggest that the person receiving a remittance transfer may be inclined to work more whereas other household members may not. Intra-household allocation of labor supplies could be changing, and work with different coding in national surveys for total participation could advance the intra-household analysis. Also, we have no data on whether the recipient asked for the money and stated the purpose of spending in discussions with the sender; our findings of women receiving individual remittances moving into self-employment could represent a trend suggested in Acosta (2006) in which potential entrepreneurs seek funds in this way. Thus, future survey design also should include questions regarding fund purpose. Additionally, governments could seek to utilize (gender-specific) company data on recipients picking up transfers through private channels such as Western Union and Gigante Express.

APPENDIX

TABLE A1

2SLS Estimates of Remittances on Participation

Variables	(1) Household Remit	(2) Participates ($N = 18{,}753$)	(3) Individual Remit	(4) Participates ($N = 18{,}728$)
Instruments				
Age 5–15 yrs	0.06**		0.07**	
	(0.02)		(0.01)	
Village area damage	0.0015**		0.0007**	
	(0.00015)		(0.0001)	
Remittances	0.03		0.17	
	(0.31)		(0.18)	
Demographics				
Male gender	−0.03**	0.39**	−0.04**	0.40**
	(0.005)	(0.007)	(0.003)	(0.01)
Total persons	0.009**	0.003*	−0.005**	0.004*
	(0.001)	(0.001)	(0.0008)	(0.001)
Married	−0.03**	−0.07**	−0.007	−0.06**
	(0.05)	(0.008)	(0.004)	(0.01)
Age	−0.008**	0.05**	−0.002**	0.05**
	(0.001)	(0.002)	(0.0001)	(0.002)
Age-sq.	0.0001**	−0.0007**	0.00005**	−0.001**
	(0.00002)	(0.00002)	(0.00001)	(0.0000)
Years school	0.002**	−0.0005	0.001**	−0.001
	(0.0008)	(0.001)	(0.0005)	(0.001)
Ln spending per capita	0.07**	0.05**	0.03**	0.04**
	(0.004)	(0.01)	(0.003)	(0.007)
Regional				
North	0.02**	0.03**	0.002	0.02**
	(0.007)	(0.01)	(0.005)	(0.009)
East	0.03**	−0.006	0.02**	−0.01
	(0.010)	(0.01)	(0.007)	(0.01)
West	0.07	−0.03**	0.002	−0.03**
	(0.008)	(0.01)	(0.005)	(0.01)
South	0.08**	−0.006	0.03**	−0.01
	(0.01)	(0.02)	(0.01)	(0.02)
Urban	0.0004	−0.03**	−0.006	−0.03**
	(0.007)	(0.009)	(0.005)	(0.01)
Constant	−0.32**	−0.82**	−0.10**	−0.81**
	(0.03)	(0.06)	(0.02)	(0.05)
Overall endogeneity	$R^2 = 0.22$		$R^2 = 0.21$	
2SLS Hansen's J	Wald $\chi^2(13) = 7240.74$		Wald $\chi^2(13) = 7144.67$	
1st-stage	$\chi^2(1) = 0.66$		$\chi^2(1) = 2.04$	
	Prob > $\chi^2 = 0.42$		Prob > $\chi^2 = 0.15$	
	$\chi^2(2) = 2.50$ ($p = .11$)		$\chi^2(2) = 1.62$ ($p = .20$)	
	Joint $F(3, 18738) = 49.94$		Joint $F(2, 18738) = 35.94$	

Notes: Data are from the ENCOVI survey of 2004. Robust standard errors are in parentheses.

*Coefficient statistically significantly different from zero at the 10% level; **coefficient statistically significantly different from zero at the 5% level.

TABLE A2

Endogenous Estimates of Continuous Remittances on Participation (IV Probit)

	Household Remittances Effect			Individual Remittances Effect		
	Selection Coefficients	**Participation ($N = 18,753$)**	**Marginal**	**Selection Coefficients**	**Participation ($N = 18,728$)**	**Marginal**
Age 5–15 yrs	0.45**			0.56**		
	(0.09)			(0.08)		
Village area damage	0.008**			0.005**		
	(0.0009)			(0.0008)		
Ln continuous		0.04	0.01		0.09	0.03
Remittance		(0.06)	(0.02)		(0.08)	(0.02)
Demographics						
Male	−0.18**	1.18**	0.37	−0.31**	1.19**	0.37
Gender	(0.03)	(0.025)	(0.006)	(0.025)	(0.03)	(0.007)
Total	0.02	0.009*	0.003	−0.04**	0.01**	0.004
persons	(0.007)	(0.0049)	(0.002)	(0.006)	(0.005)	(0.001)
Married	−0.20**	−0.17**	−0.05	−0.05	−0.17**	−0.05
	(0.03)	(0.03)	0.009)	(0.03)	(0.025)	(0.008)
Age	−0.05**	0.17**	0.05	−0.02**	0.16**	0.05
	(0.008)	(0.005)	(0.001)	(0.007)	(0.007)	(0.05)
Age-sq.	0.0007**	−0.002**	−0.0006	0.0004**	−0.002**	−0.0006
	(0.0001)	(0.00007)	(0.00002)	(0.0001)	(0.000085)	(0.00003)
Years school	0.016**	−0.001	−0.0004	0.01**	−0.0015	−0.0005
	(0.005)	(0.003)	(0.001)	(0.004)	(0.003)	(0.001)
Ln spending per capita	0.42**	0.14**	0.04	0.21**	0.14**	0.04
	(0.025)	(0.03)	(0.01)	(0.02)	(0.03)	(0.008)
Regional						
North	0.06	0.08*	0.026	0.02	0.08**	0.02
	(0.05)	(0.03)	(0.01)	(0.04)	(0.03)	(0.009)
East	0.11**	−0.02	−0.006	0.13**	−0.03	−0.009
	(0.055)	(0.04)	(0.01)	(0.05)	(0.04)	(0.01)
West	0.03	−0.08**	−0.024	0.03	−0.08**	−0.02
	(0.05)	(0.03)	(0.01)	(0.04)	(0.03)	(0.01)
South	0.41**	−0.02	−0.007	0.18**	−0.02	−0.007
	(0.07)	(0.06)	(0.02)	(0.06)	(0.05)	(0.02)
Urban	0.016	−0.11**	−0.03	−0.04	−0.10**	−0.03
	(0.04)	(0.03)	(0.009)	(0.03)	(0.03)	(0.009)
Constant	−1.66	−4.07**		−0.84**	−3.99**	
	(0.21)	(0.24)		(0.18)	(0.25)	
	$\rho = -0.15$, $\sigma = 2.11$			$\rho = -0.23$, $\sigma = 1.77$		
	Wald $\chi^2(13) = 4004.11$			Wald $\chi^2(13) = 4143;55$		
	$\chi^2(1) = 1.45$			$\chi^2(1) = 2.93$		
	Prob > $\chi^2 = 0.23$			Prob > $\chi^2 = 0.09$		

Notes: Data are from the ENCOVI survey of 2004. Robust standard errors are in parentheses.

*Coefficient statistically significantly different from zero at the 10% level; ** coefficient statistically significantly different from zero at the 5% level.

TABLE A3
Endogenous Estimates of Remittances on Participation Probability, Single Instrument, Bivariate Probit

	(1) **(*N* = 18,753)** **Household Remit**	**(2)** **Participates**	**(3)** **(*N* = 18,728)** **Individual Remit**	**(4)** **Participates**
Instrument				
Village area damage	0.006**		0.005**	
	(0.0006)		(0.0007)	
Remittance status		−0.24*		0.71**
		(0.13)		(0.17)
Demographics				
Male	−0.13**	1.18**	−0.39**	1.19**
	(0.02)	(0.02)	(0.03)	(0.02)
Total persons	0.05**	0.01**	−0.03**	0.01**
	(0.005)	(0.005)	(0.007)	(0.004)
Married	−0.13**	−0.19**	−0.01	−0.17**
	(0.03)	(0.02)	(0.03)	(0.02)
Age	−0.03**	0.16**	0.001	0.16**
	(0.006)	(0.005)	(0.007)	(0.005)
Age-sq.	0.0004**	−0.002**	0.0001	−0.002**
	(0.00007)	(0.00007)	(0.00009)	(0.00007)
Years school	0.0073**	−0.0005	0.01**	−0.002
	(0.003)	(0.003)	(0.004)	(0.003)
Ln spending per capita	0.32**	0.18**	0.22**	0.13
	(0.01)	(0.02)	(0.02)	(0.02)
Regional				
North	0.08**	0.11**	0.02	0.07**
	(0.03)	(0.03)	(0.04)	(0.03)
East	0.11**	0.02	0.13**	−0.04
	(0.04)	(0.03)	(0.05)	(0.04)
West	−0.02	−0.074**	−0.07	−0.08**
	(0.04)	(0.03)	(0.06)	(0.03)
South	0.35**	0.01	0.30**	−0.03
	(0.06)	(0.05)	(0.08)	(0.05)
Urban	0.04	−0.115**	−0.01	−0.10**
	(0.03)	(0.03)	(0.04)	(0.03)
Constant	−3.32**	−4.26**	−3.20**	−3.96**
	(0.16)	(0.15)	(0.20)	(0.16)
Overall tests endogeneity	Wald $\chi^2(27) = 4953.27$ $\chi^2(1) = 0.21$ Prob > $\chi^2 = 0.64$ Rho = 0.03 (0.07)		Wald $\chi^2(26) = 4780.17$ $\chi^2(1) = 23.79$ Prob > $\chi^2 = 0.0000$ Rho = 0.49 (0.08)	

TABLE A4
Endogenous Estimates of Individual Remittances on Participation Probability, Education, and Age as Categories

	(1) Individual Remit	(2) Works ($N = 21,082$)	Marginal	(3) Individual Remit	(4) Works ($N = 18,728$)	Marginal
Age 5–15 yrs	0.55**			0.53**		
	(0.08)			(0.08)		
Village area damage	0.005**			0.0047**		
	(0.0007)			(0.0007)		
Remittance status		0.65**	0.22		0.79**	0.25
		(0.14)	(0.04)		(0.17)	(0.04)
Male	−0.38**	1.24**	0.31	−0.38**	1.15**	0.25
	(0.03)	(0.02)	(0.04)	(0.03)	(0.02)	(0.04)
Total persons	−0.04**	0.01**	0.004	−0.04**	0.01**	0.003
	(0.006)	(0.004)	(0.001)	(0.007)	(0.004)	(0.001)
Married	−0.01	−0.15**	−0.04	−0.02	−0.05**	−0.01
	(0.03)	(0.02)	(0.008)	(0.03)	(0.02)	(0.006)
Age	−0.004	0.15**	0.04			
	(0.006)	(0.005)	(0.005)			
Age-sq.	0.0002**	−0.002**	−0.0005			
	(0.00009)	(0.00007)	(0.00006)			
Age 26–35				0.08*	0.54**	0.11
				(0.04)	(0.03)	(0.02)
Age 36–45				0.14**	0.70**	0.12
				(0.05)	(0.03)	(0.03)
Age 46–55				0.26**	0.53**	0.10
				(0.05)	(0.04)	(0.02)
Age 56–65				0.50**	0.13**	0.03
				(0.06)	(0.05)	(0.01)
Education yrs				0.01**	0.0004	0.0001
				(0.004)	(0.003)	(0.0007)
Completion						
Primary	0.07	0.14**	0.04			
	(0.05)	(0.03)	(0.01)			
Secondary	0.28**	−0.05	−0.01			
	(0.06)	(0.04)	(0.01)			
University	0.11	0.04	0.01			
	(0.07)	(0.05)	(0.01)			
Ln spending per capita	0.27**	0.16**	0.04	0.24**	0.13	0.03
	(0.02)	(0.02)	(0.008)	(0.02)	(0.02)	(0.008)
North	0.01	0.05**	0.01	0.02	0.07**	0.02
	(0.04)	(0.025)	(0.007)	(0.04)	(0.03)	(0.007)
East	0.10*	−0.06*	−0.015	0.12**	−0.05	−0.01
	(0.05)	(0.03)	(0.008)	(0.05)	(0.03)	(0.008)
West	−0.10*	−0.08**	−0.02	−0.07	−0.09**	−0.02
	(0.05)	(0.03)	(0.009)	(0.06)	(0.03)	(0.009)
South	0.33**	−0.05	−0.01	0.30**	−0.04	−0.01
	(0.07)	(0.05)	(0.01)	(0.08)	(0.05)	(0.01)
Urban	−0.07*	−0.08**	−0.02	−0.02	−0.09**	−0.02
	(0.04)	(0.03)	(0.007)	(0.04)	(0.03)	(0.007)
Constant	−3.63**	−4.00**		−3.30**	−1.46**	
	(0.19)	(0.15)		(0.17)	(0.13)	
Overall tests endogeneity	Wald $\chi^2(27) = 5572.52$ $\chi^2(1) = 31.39$ Prob > $\chi^2 = 0.00$ Rho = −0.45 (0.07)			Wald $\chi^2(27) = 4655.31$ $\chi^2(1) = 26.36$ Prob > $\chi^2 = 0.00$ Rho = −0.54 (0.08)		

Note: Data are from the ENCOVI survey of 2004.
*Statistically significantly different from zero at the 10% level; **statistically significantly different from zero at the 5% level.

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