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Evaluating the Economic Impact of International Remittances On Developing Countries Using Household Surveys: A Literature Review

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ABSTRACT *This literature review covers 50 recent empirical studies of the economic impact of international remittances on the developing world that are based on household survey data. It begins by reviewing the considerable methodological problems confronting economic work on international remittances, and then examines the strengths and weaknesses of various economic studies of the impact of remittances in the developing world on such outcomes as: poverty and inequality, health and education, investment and savings, labour supply and participation, and economic growth. It finds that while international remittances generally have a positive impact on poverty and health in the developing world, remittances can have negative effects on labour supply, education and economic growth.*

Remittances refer to the money and goods that are transmitted to households by migrant workers working outside of their origin communities, either in urban areas or abroad. At the start of the twenty-first century these resource transfers represent one of the key issues in economic development. While the total level of internal remittances in the developing world is unknown, in 2007 international remittances to the developing world amounted to US \$239 billion (World Bank, 2008). In that year the level of international remittances was about 50 per cent larger than the level of official development aid to the developing world.

The ever-increasing size of international remittances has led to a flurry of activity designed to analyse the impact of these income transfers on the developing world. Scores of academic and policy-oriented papers have evaluated the impact of remittances on developing countries in such areas as poverty, investment, labour supply, health and education. While many of these studies have found that remittances have a positive impact on poverty and health in the developing world,

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others have found that migration and remittances can have negative effects on labour supply, education and economic growth.

The purpose of this paper is to review all recent empirical studies on the economic impact of international remittances on the developing world that are based on household survey data.¹ The focus here is on recent economic studies – 1998 to 2010 – because the literature on remittances and development is too large to review older studies or to include work on the non-economic impact of remittances.² In recent years a number of methodological improvements (for example, controlling for selection) have helped to improve the reliability of economic studies on remittances, and so the choice here is to concentrate narrowly rather than more broadly. It should also be noted that the focus of this review is on international remittances, rather than international migration, because these two phenomena – while closely related – are also different. While international migration can be viewed as a necessary condition for the receipt of remittances, it is certainly not a sufficient condition for the receipt of remittances. Most household surveys suggest that only about half of all international migrants remit (Gubert, 2002; de la Briere et al., 2002); moreover, these studies also find that a large number of households receive remittances without having any migrant household member abroad (Adams, 2006; Amuedo-Dorantes and Pozo, 2010). (Households without international migrants can receive remittances from relatives and friends and for the repayment of migration loans.) Finally, the focus of this review is on empirical studies which are based on household survey data because household surveys provide the best means for evaluating the impact of international remittances on developing countries. Household surveys collect disaggregated data on a wide number of variables – consumption, wages, labour supply and education – making it possible to accurately identify the economic impact of remittances on people in the developing world.

This literature review covers 50 recent economic studies on international remittances in the developing world that use household survey data.³ The review proceeds as follows. Section I examines the considerable methodological problems that confront economic work on migration and remittances, and some of the solutions that have recently been used to overcome these problems. The methodological problems and solutions identified in this section are used to evaluate the strengths, weaknesses and findings of the various empirical studies presented in the rest of the paper. Section II examines some of the theoretical reasons for why migrants remit and how various empirical studies have tried to ‘test’ these explanations. Sections III through VII then examine the impact of international remittances on the following economic outcomes in the developing world: poverty and inequality, health and education, investment and entrepreneurial activity, labour supply and participation, and economic growth. The final section, section VIII, concludes.

I. Methodological Issues: Endogeneity, Reverse Causality and Selection Bias

There are at least four methodological problems that confront any economic work on international remittances. These problems include: simultaneity, reverse causality, selection bias and omitted variable bias. This section briefly reviews each of these

problems, and then describes the six approaches used in the literature to overcome these difficulties.

First, many of the decisions on international migration, remittances, labour supply and education are made simultaneously. For example, a household may decide to send its oldest male to work abroad at the same time that it decides to send its youngest daughter to school. As a result, variables that 'cause' international migration or remittances also 'cause' or 'explain' household patterns of consumption, education and health. Moreover, many of the characteristics which influence international migration and remittances are unobservable. For example, more ambitious individuals may have a higher propensity to migrate and to remit, yet it is very difficult to measure ambition at the individual level. These and similar issues make it difficult to establish causality in migration and remittance work, that is, to accurately pinpoint the factors that cause a household to produce international migrants and to receive remittances.

Second, reverse causality is also a problem. For instance, while international remittances may help reduce poverty in the developing world, the level of poverty may also influence the amount of remittances received by a particular household or country. Thus, any attempt to analyse the impact of remittances on poverty that fails to consider the reverse causality between these two variables might lead to erroneous conclusions.

Third, selection bias, which refers to the 'selectivity' of people who tend to migrate and to receive remittances, confounds work on migration and remittances. If, for example, households with more education or income are more likely to receive remittances, then it is impossible to identify the effects of remittances by just comparing the characteristics of migrant and non-migrant households. If there is 'positive selection', households with more education or income will be more likely to receive remittances, while if there is 'negative selection' the obverse will obtain. Determining the direction and extent of selection bias in migration and remittances work is an important empirical issue, one that needs to be addressed on a case-by-case basis.

Fourth, when households produce migrants or receive remittances on the basis of unobservable characteristics – characteristics like the risk averseness of the household head – then the problem of omitted variable bias arises. For example, it is possible that households with more risk adverse heads will be less likely to produce migrants and to receive remittances, but it is very difficult to gather reliable data on this issue. As a result, the omitted or lacking variable(s) in the analysis may well lead to biased conclusions.

Given all of the methodological problems bedevilling migration and remittances work, it may seem surprising that so much academic and policy work has been produced in this field. Fortunately, however, there are at least six possible solutions to these various methodological difficulties. Most of the studies covered in this literature review employ one or several of these solutions.

The first, and perhaps best, solution is to use a randomised experiment whereby individuals desiring to pursue international migration are denied the right to migrate (by a lottery system, for example), thereby creating a 'control group' of would-be-migrants to compare with a group of actual migrants. Comparing the characteristics of would-be-migrants to those of actual migrants would then yield accurate

information on the causal motives for migration. Unfortunately, however, such randomised experiments are quite rare in the developing world. To date, the only randomised experiment that has been conducted and analysed in the developing world is the migrant lottery system for Tonga to New Zealand (see, for example, McKenzie et al., 2006).

A second solution is to take advantage of a 'natural experiment', that is, to use an exogenous shock from 'nature' – like exchange rate shocks experienced by migrants or weather shocks experienced by origin households – that causes exogenous changes in the right-hand-side variables of interest.⁴ For example, Yang (2008) and Yang and Martinez (2006) use changes in exchange rates before and after the 1997 Asian financial crisis as an exogenous shock on migrant incomes in order to analyse the causal impact of these shocks on poverty and investment in the Philippines. However, natural experiments are difficult to replicate in the developing world and only a handful of these experiments actually exist.

A third, and slightly less difficult, solution to these methodological problems is to use panel data. Panel data, which includes repeated observations on the same household over two or more time periods, is a good solution because by taking 'first differences' between various variables it becomes possible to eliminate many of the biases that arise from endogeneity, selection and omitted variables (including unobservable characteristics). Unfortunately, however, panel household data sets on international migration and remittances in the developing world are relatively rare. Of the 50 studies on international remittances reviewed in this paper, only five use panel household data.⁵

A fourth solution is to construct a 'counterfactual' situation, that is, to artificially construct what the status of a migrant household would have been had that household not produced a migrant. For example, if the topic is remittances and income, then it would be necessary to estimate the income of a migrant household by imputing the value of that migrant had he stayed and worked at home (for example, Barham and Boucher, 1998). However, in practice, it is not easy to impute 'migrant incomes at home'. For this reason, another possible way to construct a 'counterfactual' situation is to use the technique of propensity score matching. Propensity score matching awards 'points' to households based on the similarity of various observed characteristics in order to compare a migrant household with an 'identical' non-migrant household. However, since this approach ignores the problem of selection, it is not clear if it produces the best results.

A fifth, and more common, solution to these methodological issues is to regress the outcome of interest (for example, poverty) on a set of independent variables using ordinary least squares (OLS), and then supplement this approach with a sample selection procedure, like the two-stage Heckman model. Here the selection model is used to estimate the size and direction of the selection bias. However, the difficulty comes in specifying an exogenous variable that 'causes' migration or the receipt of remittances in the first-stage equation, but has no direct impact on the dependent variable in the second stage equation. In most cross-sectional data sets on migration and remittances, it is usually difficult to identify such a variable for the selection model.

A sixth, and quite common, solution to these methodological problems is to use instrumental variables. A good instrumental variable, one that is correlated with the

explanatory variable but uncorrelated with the outcome variable except through the explanatory variable, can eliminate many of the biases that arise from endogeneity, selection and omitted variables. In practice, however, selecting a good instrumental variable in migration and remittances work can be quite challenging.⁶ For example, assume that receipt of remittances is the explanatory variable and poverty is the outcome variable of interest. The challenge is then to find an instrumental variable (like distance, for example) that is correlated with the receipt of remittances but exogenous to the outcome variable, poverty. The relevance of instrumental variables can be tested (by regressing the outcome on the instrument), while the exogeneity of the instrumental variable needs to be argued. Much of the empirical work on migration and remittances revolves around finding relevant and exogenous instrumental variables.

II. Theories of Remittances: Altruism, Insurance and Investment

A number of empirical studies examine the reasons for why migrants remit. According to a comprehensive review by Rapoport and Docquier (2006), these theoretical reasons for remitting include: (a) altruism, the desire of the migrant to help family members at home; (b) insurance, whereby migrants remit to insure their family against adverse risks and shocks at home; and (c) investment, whereby migrants remit either to invest at home or to receive potential family bequests. Given all the methodological problems listed above, it is difficult for empirical studies to discriminate between these various reasons for remitting. Most empirical studies therefore find that remittances are motivated by some combination of altruistic, insurance and investment motives.

Using a small survey of Tongan and Samoan migrant households living in Australia, Brown and Poirine (2005) present a theory of remittances called 'weak altruism', whereby children use international remittances to repay debts to their parents. The authors test a number of propositions derived from this 'weak altruism' model using a two-stage tobit model. On the decision to remit, the authors find that an inverted-U shaped curve exists between age of migrant and the decision to remit to parents. With respect to the amount remitted, results suggest that the amount sent home is positively related to migrant income and the intention to return, and is negatively related to the level of migrant education.

Brown and Poirine (2005) do not use an instrumental variables approach and so their findings may be biased. In a more nuanced study of the motivations to remit, de la Briere et al. (2002) use a small survey of rural households from the Dominican Republic to test between two different motives to remit: insurance, whereby migrants remit on the basis of an insurance contract with parents; and investment, whereby migrants remit on the basis of potential family bequests. Since only 50 per cent of the migrants in their rural survey from the Dominican Republic remit, remittances are treated as censored data using tobit and Powell's censored least absolute deviation estimator. The authors find that the motivation to remit varies by destination (internal vs. international migration), gender and household composition. Results suggest that female international migrants to the United States are motivated mainly by the insurance motive. Female migrants to the United States send more

remittances when their parents are ill, while male migrants to the United States do not do this unless they are the sole migrant from the household.

In a similar study based on a small survey of rural households from Mali, Gubert (2002) analyses the motivations to remit for both internal migrants (within Mali) and international migrants (outside Mali). Since only 60 per cent of the migrants remit, the author analyses remittances as censored data using tobit and Powell's censored least absolute deviation estimator. The main finding is that households in rural Mali use remittances to insure themselves against adverse shocks. For the average household, a 500 kilogram drop in grain output leads to a 48 per cent increase in remittances; if that drop in grain output is coupled with a death in the family, remittances rise by 124 per cent.

Neither the de la Briere et al. (2002) nor the Gubert (2002) studies control for selection in the receipt of remittances and so their findings may be biased. Moreover, all of the preceding studies may suffer from omitted variable bias because none of them have 'matched' data on both the migrant sending remittances and the origin household receiving remittances. While such matched data is typically lacking in most other migration and remittance studies, one unique work does have such matched data. Using data collected from both remittance-sending migrants (in the United States) and remittance-receiving households (in Nigeria), Osili (2007) analyses the motives for remitting and the impact of remittances on savings. The author finds that remittances and savings are dominated by different motives. On the one hand, remittances are dominated by altruism, because the amount sent home (to Nigeria) is inversely related to family assets (landholdings); however, savings in the home country are dominated by investment motives, because savings are positively associated with family assets (landholdings).

Another important problem in examining why migrants remit is reverse causation. All of the preceding studies are based on cross-sectional data, and so are subject to possible problems of reverse causality. For example, productive investments made by international remittances in the past can help raise household incomes in the present, thereby leading to positive (and possibly erroneous) correlations between household income and remittances at the time of the survey.

In perhaps the most credible study of the motivations to remit, Yang and Choi (2007) use two innovations to control for the problems of reverse causation, selection and omitted variable bias. First, they use a 'natural experiment' whereby changes in an exogenous variable – local rainfall – are used as a shock variable for household incomes, so that the bias due to reverse causation is not a problem. Second, the authors use panel household data (from the Philippines) to eliminate the influence of unobserved time-invariant household characteristics. Results suggest that in the Philippines households use remittances to insure themselves against income shocks; that is, remittances increase when domestic income falls, and remittances fall when domestic income rises. According to Yang and Choi (2007), the amount of insurance provided by international remittances is quite large: about 60 per cent of exogenous declines in domestic income are replaced by international remittance income.

While natural experiments like that of Yang and Choi (2007) offer convincing means for overcoming many of the methodological problems presented by migration and remittance studies, it is important to note the limitations of these experiments. For instance, the Yang and Choi (2007) study only shows the response of migrant

households to the temporary shocks experienced by changes in local rainfall. The results of this study do not show either the average impact of remittances on investment or that remittances in general are used for purposes of investment rather than consumption.

III. Remittances, Poverty and Inequality

Since international remittances typically account for 30 to 40 per cent of household incomes in the developing world, many empirical studies have examined the impact of remittances on poverty and inequality. Most of these studies find that remittances reduce poverty in developing countries, although the extent of poverty reduction is fairly modest. For example, when remittances are included in household income the share of people living in poverty in a country falls, on average, by 3 to 5 per cent. However, the impact of remittances on income inequality is more debated. Since international migration is typically expensive, migrants tend to come from the higher ends of the income distribution. As a result, many studies find that remittances lead to a slight increase in income inequality at the country level. However, some studies suggest that the negative impact of remittances on income inequality is not inevitable, and may dissipate over time.

In perhaps the broadest study, Adams and Page (2005) use the results of household surveys in 71 developing countries to analyse the impact of international remittances on poverty. To control for reverse causality, the authors use an instrumental variables approach using distance between remittance-sending and receiving countries to instrument for remittances. Results suggest that a 10 per cent increase in per capita international remittances in a developing country will lead, on average, to a 3.5 per cent decline in the share of people living in poverty (\$1.00/person/day).

The Adams and Page (2005) study does not attempt to control for selection in the household receipt of remittances. Acosta et al. (2008) therefore expand on this study by employing a two-stage Heckman model to control for selection in examining the impact of remittances on poverty in 10 Latin American countries. They find that international remittances have a positive, albeit 'modest' impact on poverty in Latin America: on average, poverty headcounts in Latin America fall by 0.4 per cent for each percentage point increase in the remittances to gross domestic product (GDP) ratio.

At the country level, various studies using household survey data by Lokshin et al. (2010) in Nepal, Adams (2006) in Ghana, and Taylor et al. (2005) in Mexico all find that international migration and remittances reduce poverty. All of these studies control for selection and reverse causality in the household receipt of remittances. For example, using a nationally-representative household survey from Nepal, Lokshin et al. (2010) employ an instrumental variables approach and a full information maximum likelihood model. Lokshin et al. (2010) find that migration reduces poverty in Nepal: almost 20 per cent of the decline in poverty between 1995 and 2004 in Nepal can be attributed to increased internal and international migration.

In a convincing study of remittances and poverty, Yang and Martinez (2006) take advantage of a 'natural experiment' – exchange rate shocks before and after the 1997

Asian financial crisis – to analyse how changes in remittance flows affect poverty in the Philippines. In this study changes in exchange rates (in countries outside of the Philippines) are assumed to be exogenous to household decision-making on remittances (in the Philippines). The authors find that a 10 percentage point increase in international remittances leads to a 2.8 percentage point decline in the likelihood that a migrant household will be in poverty. Yang and Martinez (2006) also find evidence of favourable spillover effects to non-migrant households. In regions with more favourable (positive) exchange rate shocks, aggregate poverty rates fall by 0.7 per cent.

While all of the preceding studies agree that international remittances reduce poverty in the developing world, the impact of remittances on income inequality is more debated. At the country level, most studies find that international remittances tend to increase income inequality. The reason for this finding is simple: cost. International migration tends to be expensive (for example, expenses for passport, travel, job search), and therefore international migrants tend to come from middle- to upper-income groups.

Empirical studies on remittances and inequality often attempt to construct a ‘counterfactual’ situation, whereby econometric techniques are used to impute the incomes of migrants had they stayed and worked at home. For instance, Barham and Boucher (1998) in Nicaragua, Rodriguez (1998) in the Philippines and Adams and Cuecuecha (2010a) in Indonesia construct counterfactual situations and find that the Gini coefficient of inequality increases with the inclusion of remittances in household income. For example, Barham and Boucher (1998), who add a non-significant random error component to their calculation of imputed incomes in order to increase the variance of counterfactual incomes, find that when remittances are included in household income the Gini coefficient rises by between 12 and 15 per cent.

However, since the Barham and Boucher (1998) and Rodriguez (1998) studies do not control for selection in the receipt of remittances, the findings of these studies are challenged by McKenzie and Rapoport (2007) and Jones (1998). According to these studies, which are based on large household surveys from rural Mexico, the nature of migrant selectivity changes over time. For example, McKenzie and Rapoport (2007), using a two-stage least squares model and an instrumental variables approach focusing on historic state-level migration rates, find that in communities with low levels of international migration, the initial effect of migration is to increase income inequality. However, as levels of migration increase, migration tends to reduce income inequality. The authors argue that as the incidence of international migration spreads, its effects on income inequality should become more equalising over time.

While it is quite possible that the nature of migrant selectivity does change over time, it should be noted that the findings of McKenzie and Rapoport (2007) and Jones (1998) are produced using cross-sectional data. The results of these studies therefore need to be confirmed using panel data with appropriate controls for selection and the endogeneity of remittances.

IV. Remittances, Health and Education

The impact of international remittances on health and education in developing countries is mixed. On the one hand, most studies find that international migration

and remittances improve infant mortality and child health, by raising household incomes and by increasing the health knowledge of mothers. On the other hand, the impact of migration and remittances on school enrolment and achievement is more controversial. While some studies find that international remittances raise school retention rates, other studies find that international migration has a negative effect on school attendance rates for teenage boys and girls because of the absence of parents during migration. Some of these latter studies also suggest that international remittances may create disincentives for investment in schooling.

In a large study using population census data from Mexico, Duryea et al. (2005) analyse the impact of international remittances on infant mortality in Mexico. To address the endogeneity of remittances, the authors use a two-stage least squares model and an instrumental variables approach focusing on historic state-level rates of migration in Mexico and distance to the US border. While the authors find that international remittances have a positive effect on reducing infant mortality in the first month of life, this impact is only statistically significant in large urban areas and not in rural locales. The authors also examine the channels through which remittances may affect infant survival. They find that remittances reduce infant mortality by improving housing conditions (for example, provision of tap water in the house and refrigerator acquisition) and by enabling the mother to stay at home.

In another study using nationally-representative data from Mexico, Hildebrandt and McKenzie (2005) produce slightly different results. Specifically, these authors find that remittances reduce infant mortality in rural areas. Using a large rural data set from Mexico, and employing an instrumental variables approach based on historic state-level rates of migration in Mexico, Hildebrandt and McKenzie (2005) find that international migration has positive effects on both infant mortality and child weight. For example, children born in international migrant households are 3 per cent less likely to die in their first year than children in non-migrant households. Similarly, children born in an international migrant household are estimated to weigh 364 grams more, on average, than children in non-migrant households.

Like many empirical studies, Hildebrandt and McKenzie (2005) use an instrumental variables approach to try to eliminate the problems that arise from endogeneity, selection and omitted variables. As noted above, in this approach it is always difficult to identify instrumental variables that are both relevant and exogenous to the outcome variable. For this reason, randomised experiments which compare an actual group of migrants with a 'control group' of would-be-migrants are often cited as a more credible way of identifying the causal impact of migration or remittances on health (or other outcomes). Randomised experiments eliminate the problems of endogeneity, selection and omitted variables by comparing a randomly-selected treatment (that is, migrant) group with a non-treatment, control group (that is, non-migrant).

In the only randomised experiment that has been conducted in the developing world, Stillman et al. (2006) use data from a migrant lottery system to examine the effects of international migration (Tonga to New Zealand) on mental health. In this study the authors identify the mental health of three different groups of people: Tongan migrants who were selected in the lottery, and migrated to New Zealand; Tongans who were selected in the lottery, but did not migrate; and those who did not

apply to the lottery. The authors then compare the mental health of these three groups of people by using intention-to-treat (ITT) effects and quantile treatment effects. Results suggest that Tonga-to-New Zealand migrants experience a gain in mental health, with the gains being larger for women and for those with lower levels of mental health in Tonga. For example, at the bottom of the mental health distribution, international migration increases mental health for people by 2.8 points versus only 1.0 points for those higher in the distribution.

While the previous studies evaluate the effects of migration and remittances on health, Lopez-Cordova (2005) broadens the analysis by using municipal-level data from Mexico to examine the impact of migration and remittances on health and education. Using an instrumental variables approach that employs rainfall patterns and distance to Guadalajara (in central Mexico) as instrumental variables, the author finds that remittances have mixed effects. On the one hand, international remittances have a positive impact on child health: a 10 per cent increase in the share of remittance-receiving households reduces infant deaths by 12 lives. On the other hand, however, the impact of remittances on schooling is more mixed. While an increase in the share of households receiving international remittances in Mexico reduces illiteracy among children six to 14 years of age, a similar increase in the share of remittance-receiving households reduces school attendance among teenagers 15 to 17 years of age. Lopez-Cordova (2005) suggests that the latter finding may be caused by remittances creating disincentives for investment in schooling for older children.

As noted above, the impact of international migration and remittances on education is much debated. In one of the more positive studies, Cox-Edwards and Ureta (2003) use nationally-representative household survey data from El Salvador to analyse the impact of remittances on school retention rates. Using a Cox proportional hazard model to compare how two types of income – income from remittances and income from other sources – affect school attendance, the authors find that income from remittances has a large, positive effect. In urban areas, the average level of remittances lowers the hazard that a child will drop out of elementary school (grades 1–6) by 54 per cent. According to Cox-Edwards and Ureta (2003), remittance income has a large and positive impact on school retention rates because households receiving remittances have a higher propensity to spend on education out of remittance income as opposed to other sources of income.⁷

The findings of Cox-Edwards and Ureta (2003) could be biased because they do not control for selection or the endogeneity of remittances. To address this problem, McKenzie and Rapoport (2006) use a nationally-representative data set from Mexico and an instrumental variables approach focusing on historic state-level rates of migration to analyse the effect of international migration on education. Their findings are similar to those of Lopez-Cordova (2005), namely, Mexico-to-United States migration has a significant negative effect on schooling attendance and attainment for 12 to 18 year-old boys and 16 to 18 year-old girls. Probit results show that living in an international migrant household in Mexico lowers the chances of boys completing junior high school by 22 per cent and of girls completing high school by 15 per cent. One reason for these lower rates of school attendance is that boys and girls from migrant households are more likely to become international migrants themselves, and rates of return to education are lower in the United States than in Mexico.

V. Remittances, Investment and Entrepreneurial Activity

The question of how migrants spend and invest their remittance earnings is a topic of lively debate. Some studies find that international migrants spend most of their remittances on consumption goods (for example, food and consumer goods), and that these patterns of expenditure have little positive effect on local economies. However, other studies find that households receiving remittances tend to spend them on investment goods (for example, education, housing), and that these patterns of expenditure can help build human and physical capital in developing countries. The issue of whether or not remittances can help stimulate investment in entrepreneurial activities is also an open one, with some studies finding that remittances help stimulate the creation of small businesses, while other studies find just the opposite.

In a recent study of how international remittances are spent, Chami et al. (2003) report that a 'significant proportion, and often the majority' of remittances is spent on 'status-oriented' consumption goods. These authors also find that the ways in which remittances are typically invested – in housing, land and jewellery – are 'not productive' to the economy as a whole.

However, these pessimistic findings are challenged by Adams and Cuecuecha (2010b) using nationally-representative household data from Guatemala. Using a two-stage Heckman model and employing an instrumental variables approach focusing on rainfall shocks and historic distance to the railroad, the authors find that households receiving international remittances spend less at the margin on one key consumption good – food – and more at the margin on two investment goods – education and housing – than what they would have spent on these goods without remittances. At the mean, Adams and Cuecuecha (2010b) find that households receiving international remittances spend 194 per cent more at the margin on education than what they would have spent without the receipt of remittances. According to the authors, households receiving international remittances tend to spend more at the margin on investment goods because they treat their remittance earnings as transitory (rather than permanent) income, and the marginal propensity to invest out of transitory income is higher than that for other sources of income.

In a convincing study, Yang (2008) uses a 'natural experiment' and panel household data from the Philippines to examine how remittances affect household expenditures in investment. This study is convincing because changes in 'nature' – migrant exchange rate shocks – are used as an exogenous source of household income variation and panel household data is employed to eliminate the influence of unobserved time-invariant household characteristics. Results suggest that a 10 per cent improvement in the exchange rate leads to a 5.5 per cent increase in a migrant household's expenditure on education. Improvements in the exchange rate are also associated with more child schooling in migrant households.

Empirical studies in developing countries have often found that a large portion of international remittances is spent on housing and land. For example, in a study that does not control for selection in the receipt of remittances, but does use matched data from both origin (Nigeria) and destination (United States) countries, Osili (2004) examines how international migrants invest remittances in housing. Using a probit model to analyse the likelihood of migrant investment in housing, the author

finds that older migrants and those with more income are more likely to invest in housing and to devote more of their income to housing. At the mean, a 10 per cent increase in migrants' income increases the probability of investing in housing by 3 percentage points in the country of origin.

One of the more controversial issues regarding remittances and investment concerns the extent to which remittances are used to stimulate entrepreneurial activity. In one of the more pessimistic studies, Amuedo-Dorantes and Pozo (2006b) use a small household survey from the Dominican Republic to analyse the impact of remittances on business formation. Employing a system of simultaneous probit models to control for simultaneity, these authors find that households receiving international remittances are *not* more likely to own a family business than households not receiving remittances. The authors suggest that one reason for this outcome may be that remittances increase the reservation wage of household heads, making them less likely to invest in business.

The Amuedo-Dorantes and Pozo (2006b) study does not control for selection in the household receipt of remittances. To address this issue, Woodruff and Zenteno (2007) use an instrumental variables approach focusing on historic distance to railroads to analyse migration and business formation in Mexico. Analysing a large survey of small business owners in urban Mexico, they arrive at more positive findings. Specifically, they find that a one standard deviation increase in the migration rate (Mexico-to-United States) is associated with a large, 35 to 40 per cent increase in the level of capital investment in small businesses in Mexico. According to Woodruff and Zenteno (2007), international remittances help supply migrant households in Mexico with the capital needed to grow and expand their small enterprises (those with fewer than 15 employees).

One way to reconcile the conflicting findings of Amuedo-Dorantes and Pozo (2006b) and Woodruff and Zenteno (2007) regarding the impact of remittances on entrepreneurial activities is contained in an earlier study by Massey and Parrado (1998). Using a Mexican data set and a two-stage probit-OLS model to control for the selectivity of migration, Massey and Parrado (1998) find that it is important to take into account the long term effects of remittances. On the one hand, they find that being a current migrant (Mexico-to-United States) lowers the odds of business formation by a household by about 2.5 per cent. However, they also find that – over the years – remittances earned from international migration lead to positive business formation: every unit increase in the log of remittances that a household has received in past years increases the odds of business formation by 3 per cent. On average, Massey and Parrado (1998) find that 21 per cent of the businesses in their Mexican sample are financed with international remittances.

VI. Remittances, Labour Supply and Participation

International remittances can have various effects on labour markets in developing countries. On the one hand, remittances may allow households to overcome the type of liquidity constraints that prevent the creation of new small enterprises. On the other hand, remittances can also reduce labour force participation by increasing the reservation wage at which members of migrant households are willing to work. In general, most empirical studies find that international migration and remittances

tend to reduce household labour supply and participation, although these effects are sometimes influenced by gender.

Using 'pseudo-panel' data from a series of nationally-representative household surveys in Jamaica, Kim (2007) finds that labour force participation falls with international migration and the receipt of remittances. Using a fixed effect regression for the period 1995–2002, the author finds that the effect of current remittances on labour force participation is negative and significant: about -0.022 . However, remittances do not have a significant impact on weekly working hours. The effect of remittances on weekly working hours per household is negative but not statistically significant. Kim (2007) concludes that households receiving international remittances in Jamaica are likely to have members with higher reservation wages, leading them to be less enthusiastic about finding jobs in the labour force.

In a similar study using panel data from two large household surveys in Nicaragua, Funkhouser (2006) also finds that labour force participation falls in international migrant households. Using fixed effects, Funkhouser (2006) finds that international migrant households in Nicaragua reduce their number of working members and their labour income when compared to non-migrant households. However, households with migrants also are less likely to be poor, because migrant households receive so much of their income from remittances. In Nicaragua households with an international migrant receive about half of their total labour income from remittances.

Neither Kim (2007) nor Funkhouser (2006) control for selection in the receipt of remittances and therefore their results could be biased. In an attempt to correct this problem, Cabegin (2006) uses a two-stage probit-OLS procedure to analyse the effect of international migration on labour force participation in the Philippines. Specifically, the author analyses the effect of migration on the labour force participation of the non-migrant spouse. Results suggest that migration has important gender-differentiated impacts on labour force participation. While women in migrant households with a school-age child are 28 per cent less likely than women in non-migrant households to work full-time, men in migrant households with a school-age child are 18 per cent more likely than men in non-migrant households to work full-time.

The Cabegin study (2006) does not control for selection using a standard instrumental variables procedure. Acosta (2007) therefore builds on this study by using a two-stage least squares model and an instrumental variables approach focusing on the percentage of households with migrants in a particular county (in El Salvador) to analyse labour force participation for households receiving remittances. The author finds that labour force participation falls for women – but not men – in households receiving remittances. In remittance-receiving households in El Salvador urban females are 42 per cent more likely to quit the labour market, while for rural females the corresponding decline is 44 per cent. Results also suggest that both males and females reduce their total hours worked per week when their households receive remittances.

As noted above, much of the empirical work on migration and remittances focuses on finding relevant and exogenous instrumental variables. In an effort to use what seems like a more exogenous instrumental variable than that used by Acosta (2007), Amuedo-Dorantes and Pozo (2006a) use the number of Western Union offices in a

(Mexican) state to instrument for the receipt of remittances. Analysing a large household survey from Mexico, the authors find that in urban areas a 100-peso increase in international remittances is associated with a 15 per cent decline in formal sector work by men, and with a 14 per cent increase in informal sector work. According to the authors, one explanation for these outcomes is that with the receipt of remittances men in migrant households prefer to leave the formal sector for the greater flexibility of informal jobs. For females in Mexico, the overall female labour supply tends to decline with changes in remittance income, but only in rural areas.

While all of the preceding studies find that international migration and remittances tend to reduce household labour supply and participation, one recent study comes to different conclusions. Using nationally-representative survey data from Mexico and employing a propensity scoring method to calculate the average treatment effect of remittances on migrant households, Cox-Edwards and Rodriguez-Oreggia (2009) find that 'persistent' international remittances – that is, 'regular' international remittances – have no significant effect on the labour force participation of non-migrants. According to the authors, this finding is consistent with the idea that migrant workers remit primarily to replace their lost income contribution to the household due to emigration, and that this should therefore have no impact on the labour participation of other household members.

It is possible that the findings of Cox-Edwards and Rodriguez-Oreggia (2009) differ from the other studies on remittances and labour force participation because this study is based on propensity score matching. Propensity score matching takes place by first estimating a probit equation for the probability of migration, and then matching each migrant to a non-migrant with similar predicted probabilities of migration. This enables migrants to be compared to non-migrants who are similar in terms of observed characteristics. The problem, however, with propensity score matching is that it ignores the problem of selection. For this reason, it is not clear if propensity score matching yields results which are as good as those based on instrumental variables. For example, in a recent study comparing various estimation methods with an experimental benchmark based on Tonga-to-New Zealand migration, McKenzie et al. (2006) find that a study using a good instrumental variable (pre-migration distance) worked best by overstating the gains from migration by only 9 per cent, while a propensity score matching approach had a much larger bias, overstating the gains from migration by 19 to 33 per cent.

VII. Remittances and Economic Growth

While empirical studies often find that international remittances have a positive effect on household welfare, the impact of remittances on macroeconomic growth is a question of considerable debate. Some studies find that international remittances have a negative effect on economic growth (GDP growth), while other studies find just the opposite. Part of the reason for this controversy may lie in the difficulty of disentangling the very complicated links between remittances and economic growth. For example, identifying the direction of the links between remittances and economic growth may not be fully solvable by using instrumental variables to control for endogeneity and reverse causation. Also, it might not be possible to identify the

impact of international remittances on a key component of economic growth – human capital formation – except over very long periods of time.

In a study covering up to 113 countries over the period 1970 to 1998, Chami et al. (2005) find that international remittances actually have a negative and significant effect on economic growth (per capita GDP growth). Using a variety of fixed effects models, the authors find a negative and significant relationship between international remittances and economic growth for different groups of countries over various sets of years. On the basis of this finding, Chami et al. (2005) conclude that remittances do not serve as capital for economic development, but rather as a type of compensation for countries with poor economic conditions.

However, in a similar study covering up to 101 countries for the period 1970 to 2003, Spatafora (2005) comes to slightly different conclusions. Using instrumental variables and a standard cross-country growth model, the author finds no statistically significant link between international remittances and per capita output growth. The author also finds no significant link between remittances and economic investment (investment/GDP), or between remittances and education. Spatafora (2005), however, cautions that identifying the impact of remittances on these and other outcomes may be difficult using macroeconomic data alone. Not only is it difficult when working with macro-data to solve the problem of reverse causation using an instrumental variables approach, but some of the channels whereby remittances affect outcomes, such as those focusing on human capital accumulation, may only be detectable over very long periods of time.

In an attempt to more explicitly control for the endogeneity of remittances, Giuliano and Ruiz-Arranz (2009) use a generalised method of moments approach to analyse the effect of remittances on economic growth. Using a data set covering 100 countries for the period 1975 to 2002, they arrive at more positive findings. Specifically, the authors find that remittances *do* promote GDP growth in less financially developed countries by providing an alternative way to finance development. According to Giuliano and Ruiz-Arranz (2009), international remittances can contribute to GDP growth by becoming a substitute for inefficient or non-existent credit markets.

One of the reasons why international remittances may have a negative effect on economic growth is that the country-level receipt of remittances can lead to real currency appreciation and a loss of competitiveness in tradable goods (Dutch disease) in the international market. For example, in a cross-national study of eight Latin American countries over the period 1990 to 2003, Lopez et al. (2007) find that large-scale remittances do lead to significant exchange rate appreciation. Using an instrumental variables approach to control for endogeneity and reverse causality, the authors find that a 1 percentage point increase in the remittances to GDP ratio would lead to a real effective exchange rate appreciation of between 18 and 24 per cent.

In a similar study using a panel of 13 Latin American countries, Amuedo-Dorantes and Pozo (2004) come to identical findings. Using an instrumental variables approach to control for endogeneity and reverse causality, these authors find that a doubling of international remittances would lead to a 22 per cent increase in the effective real exchange rate in their panel of Latin American countries. According to Amuedo-Dorantes and Pozo (2004), the willingness of international

migrants to remit may well have a negative effect on their home countries' ability to compete in the world market.

Since both the Lopez et al. (2007) and Amuedo-Dorantes and Pozo (2004) studies are based on Latin American data, it is possible that the effects of remittances on the real exchange rate are different in other areas of the world. To investigate this possibility, Rajan and Subramanian (2005) use a cross national dataset of three-digit industry value-added growth data from 33 developing countries to examine the impact of remittances on external competitiveness. Using an instrumental variables approach to control for endogeneity, they find that remittances – unlike other types of capital flows (particularly aid flows) – do *not* have a negative impact on external competitiveness. According to Rajan and Subramanian (2005) this could be the result of remittances being spent largely on unskilled-labour intensive activities and/or tradable sectors (like manufacturing), and thus having limited effects on the prices of skilled labour and other scarce resources.

VIII. Conclusion

This article has reviewed 50 recent empirical studies of the economic impact of international remittances on the developing world that are based on household survey data. Five key findings emerge.

First, because of the many methodological problems confronting migration and remittances work, it would seem like randomised experiments are the best way to proceed. Randomised experiments, like the migrant lottery system for Tonga to New Zealand, eliminate the problems of endogeneity, selection and omitted variables by comparing a randomly-selected treatment (that is, migrant) group with a non-treatment control group (that is, non-migrant). Unfortunately, however, randomised experiments are quite rare in the developing world; to date, only one such experiment has been conducted. It therefore seems unlikely that randomised experiments will dominate migration and remittances work in the developing world in the near future.

The second best way to overcome the methodological problems affecting migration and remittances work is to use a 'natural experiment', that is, to use an exogenous shock from 'nature' – like exchange rate shocks experienced by migrants – that causes exogenous changes in the right-hand-side variables of interest. For example, Yang (2008) and colleagues have used exogenous changes in exchange rates before and after the 1997 Asian financial crisis to analyse the causal impact of these shocks on poverty and investment in the Philippines. However, it should be noted that such natural experiments are difficult to replicate in the developing world. Not only do natural experiments require large and heterogeneous shocks on migrants, but they also require panel data on migrant and origin households before and after the shocks. Since panel household data on migration and remittances are still rare in the developing world, it seems unlikely that natural experiments on migration and remittances will become dominant in the near future.

Third, because of the preceding difficulties, it is likely that most studies on migration and remittances in the developing world will continue to use an instrumental variables approach. As noted above, a good instrumental variable

can eliminate many of the biases that arise from endogeneity, selection and omitted variables. In practice, however, selecting a good instrumental variable in migration and remittances work can be quite challenging, and so much of the near-term work in this field will continue to focus on finding instruments that are relevant (correlated with the explanatory variable) and exogenous (not correlated with the dependent variable except through the explanatory variable).

Fourth, many of the studies covered in this review use an instrumental variable approach to identify the impact of international migration and remittances on the developing world. These studies suggest that a consensus of opinion has developed in certain areas regarding the impact of remittances. For example, all of the studies reviewed here find that international remittances reduce poverty in the developing world. Most of the studies reviewed here also find that international migration and remittances improve child health and infant mortality. And virtually all of the studies reviewed here also find that international migration and remittances reduce labour supply and participation, because non-migrants substitute increased income for more leisure.

Fifth, and finally, this review shows that more work is needed to resolve controversies in other areas regarding the impact of remittances. For instance, while studies in Guatemala and the Philippines find that households receiving international remittances spend more on education, other studies in Mexico suggest that international migration reduces school attendance for teenage boys and girls. With respect to macroeconomic growth, some studies find that international remittances have a negative impact on GDP growth, while other studies find just the opposite. Clearly, more work, with appropriate attention to the methodological issues listed above, is needed in these areas.

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Notes

1. For the purposes of this literature review, household surveys include population censuses and labour force surveys.
2. Three earlier literature reviews of the impact of remittances on the developing world include Lopez-Cordova and Olmedo (2005), Ruiz and Vargas-Silva (2009) and Social Science Research Council (2009).
3. While the focus of this literature review is on published studies, some of the studies included are still in working paper form.
4. For more on randomised and natural experiments in migration and remittance studies, see McKenzie and Yang (2010).
5. The five studies using panel household data include: Funkhouser (2006), Yang (2008), Yang and Choi (2007), Yang and Martinez (2006) and Adams and Cuccuecha (2010a).
6. For a list of the instrumental variables that have been used in the literature, see McKenzie and Sasin (2007).
7. In a more recent study using nationally-representative household data from Ecuador, Calero et al. (2009) also find that international remittances have a positive effect on school enrolment, especially for girls and in rural areas.

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