Moving Forward, Looking Back:

The Impact of Migrants' Remittances on Assets, Consumption, and Credit Constraints in Sending Communities in the Rural Philippines

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Comments appreciated.

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Ang hindi marunong lumingon sa pinanggalingan
ay hindi nakakarating sa pinaroroonan.

(Translation: "One who does not know how to look back
to one's origins will never get to one's destination.")

Jose Rizál, 1861-1896, Filipino national hero

1. INTRODUCTION

Migration is an important livelihood strategy in the Philippines. Between 1980 and 1990, the number of persons over the age of five years who were not resident in the city or municipality they resided in five years ago increased from 2.85 to 3.24 million (Flieger 1995). Although the number of internal migrants has increased between 1980 and 1990, the proportion of the population above four years engaged in internal migration had decreased from 7.1 percent to 6.3 percent between 1980 and 1990. In comparison, more than 1.6 million international migrants over 15 years of age resided outside the Philippines in 1991, equivalent to 4% of the nonmigrant population of that age group residing in the country (Rodriguez and Horton 1996). In June 1997, about 6% of households in the Philippines had one or more members working overseas (Yang 2004). Migration has proved to be important to the nation's economy: in the 10-year period between 1990 and 1999, remittances from international migrants contributed an average of 20.3 percent to the country's export earnings and 5.2 percent of GNP (Go 2002).

What is the impact of migration on sending communities? Despite the large literature on the determinants of migration, there has been relatively little empirical work on the impact of benefits accruing to source countries and source communities. The early literature on migration typically posed the migration decision in terms of the costs and benefits to the individual migrant (e.g., Sjaastad 1962). Recent studies (Stark and Bloom 1985; Stark 1991; Lucas 1997) emphasize the role of migration as a family strategy.[1] In this framework, families decide which individuals migrate and the characteristics of the migrants and the family determine the amount of remittances that migrants send home. Migrants can help families smooth their consumption and therefore manage risk (Rosenzweig and Stark 1989). In general, more empirical work has been done on the consumption-smoothing or consumption-augmenting aspects of migrants' remittances than on their investment or productivity impact.

An emerging body of work draws from the New Economics of Labor Migration (NELM) to examine impacts of migration on the productivity of sending communities. The NELM posits that, in the presence of imperfect markets or credit constraints, migration may complement

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[1] See Lucas (1997) for a review of the literature on internal migration, and Stark (1991) for a discussion of migration as a family, rather than a purely individual, decision.

productivity growth in the farm sector by relaxing credit or risk constraints; however, it may also exacerbate labor shortages, leading to negative net impacts on farm incomes in sending communities (Stark 1991). Empirical tests of this hypothesis include Lucas (1987), Taylor (1992), Benjamin and Brandt (1998), Rozelle, Taylor, and de Brauw (1999) and Taylor, Rozelle, and de Brauw (2003). Understanding the impacts of migration and remittances on a broad range of outcomes in sending communities is an important contribution to the policy debate regarding migration. While some countries, notably China, have restrictions on migration, others, like the Philippines, visibly encourage it.

This paper is an initial exploration of the impact of remittances on the asset positions, consumption expenditures, and credit constraint status of households in origin communities, using a unique longitudinal data set from the Philippines. The Bukidnon Panel Study follows up 448 families in rural Mindanao who were first interviewed in 1984/85 by the International Food Policy Research Institute and the Research Institute for Mindanao Culture, Xavier University. The study interviewed the original respondents and a sample of their offspring, both those who have remained in the same area and those who have moved to a different location. Parents (original respondents) and children who formed separate households in the same locality were interviewed in 2003; offspring that migrated to other rural and urban areas were interviewed in 2004. This paper will concentrate on the impact of remittances from outside the original survey villages on parent households as well as households of children in the same locality, taking into account the endogeneity of remittances to characteristics of the origin households, characteristics of the migrant network, and shocks to both the origin households and migrants.

2. UNDERSTANDING MIGRATION PATTERNS IN THE RURAL PHILIPPINES

2.1 Motivation

In contrast to early models of migration that focused on an individual's decision to migrate, based on a comparison of the discounted value of the mover's expected income in a different location and the present value of the costs of migration (e.g., Sjaastad 1962), a growing literature has argued that individual migration is both an individual and a family decision. Taking family considerations into account has considerably expanded the scope of migration models. In their study of the migration of husbands and wives in peninsular Malaysia, Smith and Thomas (1998) discuss a number of scenarios in which family characteristics may influence the migration decision. For example, children and adolescents typically move with their parents, who decide where the family goes. For these younger migrants, parental characteristics, such as father's and mother's education, may be more important determinants of an individual's location than individual characteristics. The family also matters because individuals marry and mostly live and move with their spouses. Thus spousal characteristics may affect an individual's location decision, particularly for postmarital moves.

Families may also choose which of their members will migrate in order to diversify against risk (e.g., Lucas and Stark 1985; Hoddinott 1992). If parental investment and risk-diversification strategies are consistent, an individual's probability of migration, and eventual location, will be a function of individual and household characteristics. In India, Rosenzweig

and Stark (1989) find that Indian farm households with higher variability in profits tend to engage in longer distance marriage-cum-migration. Similarly, Rosenzweig (1993) and Rosenzweig and Stark (1989) find that children of poorer households are more likely to migrate far away. They propose that children of households that are more vulnerable to exogenous risk tend to migrate farther afield than other children. Likewise, children of households that are better able to self-insure against exogenous risk – an ability that generally increases with wealth – may choose to reside closer to the origin household. For example, children whose families live in areas that are inherently prone to weather risk, such as drought or floods, are more likely to migrate. In contrast, children whose families have more assets, and thus are better able to self-insure, do not need to live so far away from the parental household. This is another way families can use migration as insurance.

Gender may also play an important role in the family's choice of a migrant. Whether sons or daughters migrate depends on the family's perception of the migrant in its risk-diversification strategy. If, for example, daughters are socialized to be responsible for their parents, families may invest in daughters' migration. In the Dominican Sierra, female migrants make remittances to their parents' households if the latter experience income shocks; men insure parents only if there is no other migrant in the household (de la Briere et al. 2002). In the Philippines, the family's short-run need for a stable source of income motivates unmarried female migrants to seek wage-earning jobs, despite their lack of long-term stability, since parents expect remittances to decrease after daughters marry and have their own familial obligations (Lauby and Stark 1988). In rural India, where women migrate for marriage but men are lifetime residents in the household and village, daughters-in-law living in the village and daughters of the household head who have married and moved to their husbands' village embody the family's insurance capital, linking families of origin and destination of married women in mutual aid schemes (Rosenzweig 1993).

One of the tradeoffs that origin families have to face is the potential loss of labor due to migration, versus the positive impact of remittances from migrants. Empirical tests of the NELM in China (Taylor, Rozelle, and de Brauw 2003) finds that the loss of labor to migration has a negative effect on household crop income in source areas, although it does not reduce crop yields, in contrast to their earlier finding (Rozelle, Taylor, and de Brauw 1999). Remittances sent home by migrants partially compensate for the lost-labor effect, contributing to household incomes directly and indirectly by stimulating crop production.

2.2 The Bukidnon Panel Survey

Bukidnon is a landlocked province in Northern Mindanao, comprising 20 municipalities and two cities, Malaybalay and Valencia.[2] (See Figure 1 for a map of the Philippines and the location of the study area). Bukidnon has a land area of 829,378 hectares, making it the largest province in Northern Mindanao and the eighth largest in the Philippines. The 2000 census reported Bukidnon's population to be 1,059,355 with an average population density of 128 people per square kilometer. An earlier census from 1995 indicated that the province's population was split 70 percent to 30 percent between rural and urban areas. The national highway links Bukidnon to its neighboring provinces while the Sayre Highway links

[2] This description draws from Morales (2004).

Bukidnon to Misamis Oriental and North Cotabato. The Bukidnon–Davao road links the province to Lanao del Sur and North Cotabato. Inter-provincial travel is mainly by bus while inter-municipality and barangay travel is via public utility vehicles. Since Bukidnon is landlocked, it relies on Cagayan de Oro, the major metropolitan center in Northern Mindanao, as its nearest seaport.

Figure 1. Map of the Philippines, Indicating Study Area

The data used in this analysis draws from a survey conducted by the International Food Policy Research Institute (IFPRI) and the Research Institute for Mindanao Culture, Xavier University (RIMCU) of households residing in southern Bukidnon. The original survey in 1984/85 investigated the effects of agricultural commercialization on the nutrition and household welfare of these rural families. In 1977, the Bukidnon Sugar Company (BUSCO) began operating a sugar mill in the area, which had previously been dominated by subsistence corn production. The presence of the mill gave farmers the opportunity to adopt this cash crop, depending on their proximity to the mill. The survey was fielded in four rounds at four–month intervals from August 1984 to December 1985, so that each round corresponded to a different agricultural season. The survey contained information on food and non-food consumption expenditure, agricultural production, income, asset ownership, credit use, anthropometry and morbidity, education and 24–hour food consumption recall. The sample was drawn from 29 *barangays*[3] and was stratified by (i) agricultural production activities, particularly sugar (the cash crop) and corn (the food crop), (ii) proximity to the sugar mill (as

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[3] The *barangay* is the smallest local government unit in the Philippines and is similar to a village. Municipalities and cities are composed of *barangays*. Historically, *barangays* are relatively small communities of 50 to 100 families. Most villages have 30 to 100 houses and the population varies from one hundred to five hundred persons (Constantino 1975).

a proxy for access to the new crop), and (iii) access to land, including ownership, tenancy and landlessness. The initial sample included 510 households, although 448 households were interviewed in all four rounds. Bouis and Haddad (1990) provide a detailed description of the sample design and survey area.
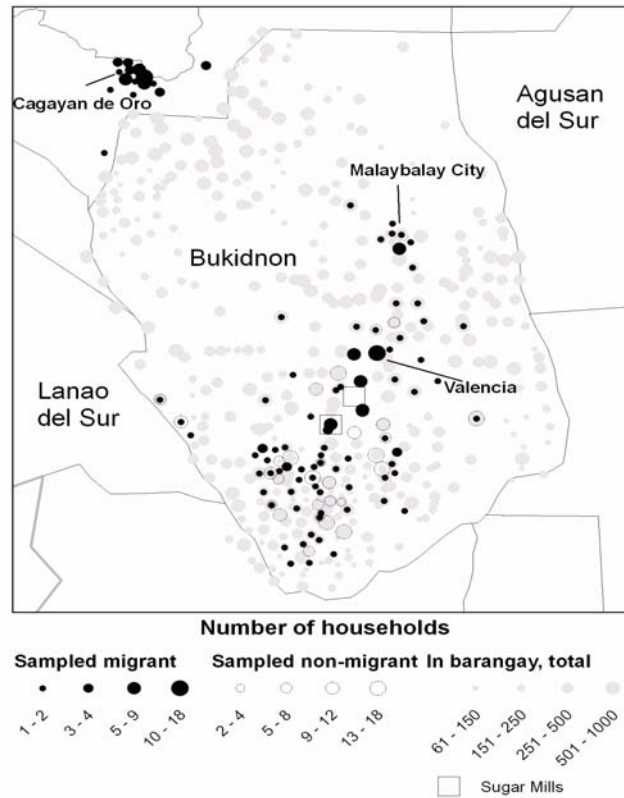
Following qualitative studies conducted in the study communities in early 2003, IFPRI and RIMCU returned to conduct two rounds of quantitative data collection using a survey questionnaire that closely reflected the one used in 1984/85.[4] The first wave of data collection in the fall of 2003 interviewed all original respondents still living in the survey area. We were able to contact 311, or 61 percent, of the original respondents.[5] The respondents listed all children who lived away from home, providing contact information for non-coresident children. We sampled at random up to two non-coresident children living in or near the origin household's village, yielding 261 households. The second wave of data collection began in April 2004 and ended in July 2004. In this wave, the survey team interviewed any household formed by children who no longer live in their origin *barangays*.. This included a large group of households in three major urban areas in Mindanao (Valencia, the commercial center of Bukidnon; Malaybalay, the provincial capital; and Cagayan de Oro in the province of Misamis Oriental, a major port and metropolitan area in northern Mindanao) as well as many households in *poblaciones* and other rural areas of Bukidnon. The sample size from this migrant wave consisted of 257 households—about 75 percent of potential migrants to be interviewed. Figure 2 presents a map of the survey area and the locations of original households, households formed by children in the original barangays, and households formed by children who migrated. While budgetary concerns did not allow us to interview all children, the survey nonetheless contains data on children who migrated to a variety of rural and urban locations. The initial interview with the parents obtained a basic set of information about all children, including location, educational attainment, and marital status. Obtaining this information from parents, plus assiduous follow-up of migrants and children residing in the community, avoided the common problem of sample selection bias if interviews were based only on residence rules (Rosenzweig 2003).[6]

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[4] In 1992, 352 of the original 448 households were reinterviewed in a study focusing on adolescents (Bouis et al. 1998). The 1992 survey included only one round of data collection and used a condensed survey instrument.

[5] Godquin and Quisumbing (2006) model the determinants of the probability of being reinterviewed in 2003, which is the complement of the attrition rate. They find that, relative to the richest quartile, the bottom first and second quartiles are more likely not to be reinterviewed, i.e. to be attritors. Households with a larger share of female working members in 1984 are more likely to be reinterviewed. For the limited set of outcomes that we have studied so far (group membership and consumption), we do not find significant impacts of attrition on estimated coefficients. However, we need to investigate whether the estimates reported in this paper are sensitive to attrition bias in further work.

[6] There is evidence suggesting that panel survey rules that condition on residence provide nonrandom subsamples of the baseline households (Thomas et al. 2001; Foster and Rosenzweig 2002). If households do not divide randomly, residence-based sampling rules may bias estimates of economic mobility (Rosenzweig 2003). One important source of selection bias is children's decision to marry and leave the parental home. Only those who remain in their original households are actually resurveyed, making estimates biased because they are based on "stayers." Panel surveys using

Figure 2. Sampled Child and Village Household Counts

2.3 Characteristics of Migrants and Migrant Networks

Table 1 presents descriptive information on all children, not just sampled children, of the original respondents (parents), regardless of location. In these tables, children are classified into nonmigrants, rural migrants, peri-urban migrants, urban migrants, and overseas migrants based on the addresses given by their parents. Because the original sample was rural, all migration in the present sample is necessarily rural to another destination.

Table 1 presents the distribution of children 15 and over of original respondents, based on their current location.[7] About 53 percent of children 15 and over are non-migrants: of these, two thirds coreside with parents and one third lives in the same barangay but in separate

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residence-based interview rules typically exclude both individuals who leave their parental residence, but remain in the same village, as well as those who have migrated to different localities. Studies of migrants also rarely link them back to the original household. There are, of course, exceptions, including the Malaysian Family Life Survey, the Indonesian Family Life Survey, the INCAP-based Human Capital Study and the Bangladesh Nutrition Survey of 2000, to name a few.

[7] The cut-off of 15 years old could overstate the "non-migrant" population because migration may occur more often at an older age, but this age is consistent with other demographic studies. An older cut-off would not change the results substantially.

households. A substantially higher proportion of males are nonmigrants (61.8 percent vs. 43.5 percent for females), consistent with national trends. The proportion of males coresiding with parents (44.6 percent) is much higher than the proportion of females (24.9 percent). Men have higher coresidence rates not because women marry earlier but because women are more likely than men to migrate as teenagers, with a high proportion of women's migration occurring well before marriage (Lauby and Stark 1988). Roughly equal percentages of males and females— between 17 to 18 percent--have formed separate households in the same village. Many of these live on a portion of the family farm or homestead that has been allotted to the child upon his or her marriage.

Approximately 15 percent of all children have migrated to other rural areas – a slightly higher percentage of females than males – and roughly 7 percent have migrated to *poblaciones* or peri–urban areas, with again, slightly more females than males. Twenty three percent of the children surveyed have moved to urban areas, with significantly higher migration rates among females. Finally, only 1.8 percent of children have gone abroad, with yet again, more females than males represented among overseas migrants. In another paper (Quisumbing and McNiven 2006), we analyze both the determinants of each individual's location—both migrants and nonmigrants—as well as the primary reasons for migration, based on the 2004 wave that surveyed migrant children. For both sexes, moves to urban areas are often for school, while moves to all areas are most commonly to start a new job. Women are more likely to migrate for marriage, especially to rural areas. The first time a person moved away from home, it is most likely for schooling, since better quality or higher levels of schooling are available in urban and peri-urban areas. Subsequent moves are rarely for education.

We use information from the household survey and the parents' listing of all children to characterize households and their migration networks. Recall that two types of households were interviewed in the 2003 survey: parent households, who were original respondents in the 1984/85 survey, and households of two of their children who had settled in the same or nearby survey communities. We restrict the parent households to the 279 were sampled in 2003 and in all 1984/85 rounds. Our analysis includes 251 households formed by the children of these parent households. Table 2 shows that in 2003, the mean age of the parents was almost 55 years old; their children were on average about 32 years old. Reflecting improvements in the educational system in the 1980s, children had 7.8 years of schooling compared to parents' 5.8. The household structure of the children's household also reflects their early stage in the life cycle, with 2.1 children under 15, compared to 1.7 in the parents' households.

Remittances are defined as total receipts received from outside the origin village in the past 12 months. Sixty-two percent of parent households and forty percent of child households receive remittances from outside the village. Among all parents, a mean of 11,869 pesos were received, 49% of which comes from their migrant children, 38% from their own parents, 9% from siblings, and 4% from others. In contrast, while the bulk of remittances to child households still comes from family members—of the 1385 pesos on average received, 13% comes from their children, 24% from their parents, 46% from their siblings—17% comes from outside the family.

Table 3 reveals that migrants to urban areas report sending more money (3,258 pesos) than migrants to other areas and children who stay in the same barangay (417 pesos). Looking at this from the perspective of the parent household, the story becomes less clear. Parent households with a migrant in an urban area receive more remittances than households without

a migrant in an urban area (14,513 pesos compared to 9,019 pesos), but this difference is not statistically significant, probably because of the high variability in remittance receipts in a given year.

We define the household's migrant network as follows: for parents, the network consists of its migrant children; for children, the network consists of its migrant siblings.[8] Very few households have no migrant network. Only 16% of parent households do not have children living in another locality; the corresponding figure is 14% for child households. This is in sharp contrast to the Chinese villages studied by Rozelle, Taylor, and de Brauw (1999), where households with migrants consisted only of 17% of the sample. Both parent and child families have one migrant son (brother), on average. Reflecting the higher propensity of women to migrate (Quisumbing and McNiven 2006), parent households have 1.5 daughters, and child households 1.7 sisters, who are migrants. A larger proportion of migrant daughters than sons are married, since marriage is one of the primary motives for female migration. Nevertheless, consistent with national trends, schooling attainment of migrant daughters is about two years higher than those of their brothers.

2.4 Characterizing Credit Constraints of Sending Households

One of the motivations of this analysis is examining the impact of remittances on credit constraints. To do so, one needs to define the household's credit constraint status.

Credit constraint status in 1984/85[9]

The data on credit use in the 1984/85 survey includes principal amount borrowed, source of loan and repayment conditions by round (only in rounds 2-4) in each of four crop-specific agricultural production modules: one each for sugar, corn, rice and other crops. Data on borrowing was also collected for non-production loans in survey modules on agricultural wage labor (for loans paid back through labor) and other income sources. Also, in the food consumption expenditure module, respondents were asked whether the foods listed were purchased with credit, but not the amount borrowed.[10] In rounds 2-4, farmers were also asked about credit constraints in the agricultural production modules. For each crop produced, they were asked:

1. "If more production credit had been available to you for [crop] production in the past four months, would you have used it?"

2. "If yes, how would you have used it?"

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[8] Interestingly, there are very few remittances from spouses who have migrated. Parent households report only 8 transfers from migrant spouses, and child households report only one transfer from a migrant spouse.

[9] This discussion draws heavily from Gilligan et al. (2005).

[10] Because credit data were collected by activity in the 1984/85 survey, it was not always possible to determine whether the same loans were being referenced in different modules of the survey. In most cases, it was possible to differentiate loans by principal amount borrowed, date borrowed, and repayment terms. When distinct loans could not be identified, we assumed each reported incidence of credit use represented a new loan.

3. "If no, why not?"[11]

This method of direct elicitation of credit constraints could capture most sources of credit constraints, including quantity rationing, transaction costs, and discouraged or risk-rationed borrowing, subject to several important caveats. In principle, households facing quantity rationing should answer yes to question 1. Households with zero borrowing because of high transaction costs for obtaining a loan should also answer yes to question 1, since the wording of the question suggests that transaction costs would be reduced to make the loan available. Less clear is how effective this question would be at capturing credit constraints due to a moderate level of transaction costs that leaves the household with positive borrowing. Pre-coded responses to question 3 included fear of losing collateral, so this question should be able to identify risk rationed or discouraged borrowers. [12]

Based on responses to the three questions listed above, Gilligan et al. (2005) developed two indicators of credit constraint status that are also used in the current paper. In the first, households answering "yes" to question 1 in any of the four crop modules were classified as credit constrained for that round of the survey. In the second approach, risk-rationed borrowers identified by question 3 are added to the list of constrained households. In the first classification, 245 households were credit constrained in at least one round and 130 households were never credit constrained. The remaining 73 households were not agricultural producers. These households did not have the opportunity to answer the credit constraint questions because they did not produce any crops. By round, 36.4% of those responding reported being credit constrained for at least one crop. However, many of these (43.2%) reported being unconstrained in credit access for at least one other crop. This combination of responses may arise if the household prioritizes financing for its primary crop, and does not expect to require financing on secondary crops. In some cases, these secondary crops require few purchased inputs. Indeed, only 6.5% of respondents indicated being credit constrained for more than one crop.

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[11] Question 3 was asked only in survey rounds 3 and 4.

[12] There are some shortcomings in using these three questions to capture credit constraints. The terms of the hypothetical loan that would be made available to the household are not clearly specified in question 1. Feder et al (1990) and Barham, Boucher and Carter (1996) add a phrase like "at going rates of interest" to this question. The omission of such a phrase is a limitation of the Bukidnon data, both in the 1984/85 survey and the 2003/2004 resurvey. However, even when similar phrases are included, it is unclear how the respondent chooses the loan characteristics (interest rates, length of repayment, collateral requirements) on which to judge his desire for more credit. From these questions, we do not know if the respondent considers the average terms of loans recently taken or the likely terms of his next best, or marginal, source of credit, which would be less favorable. For respondents with little or no recent experience in the credit market, errors in judging the probable terms of this hypothetical loan may be great. Moreover, the hypothetical nature of the question may lead to inflated reports of credit constraints because respondents are not immediately faced with the burden of paying back the hypothetical loan. Finally, the context in which these questions were asked in the Bukidnon survey (loans for production of specific crops) suggests that some households that were credit constrained for consumption or other purposes were inaccurately classified as unconstrained. In the 2003/2004 survey (discussed below), we attempt to rectify this shortcoming by asking about credit constraints in other production and consumption contexts.

The second classification, which includes risk-rationed borrowers in the credit constrained cohort, can only be constructed for rounds 3 and 4, when question 3 was included. For those households responding in rounds 3-4, 59.7 percent of completed household-round observations were constrained by the measure including risk-rationed borrowers, compared to 41.3 percent constrained by the first classification in these two rounds. This high frequency of risk-rationed borrowers suggests that elicitation methods based only on rejected loan applications may be missing a potentially large group of constrained borrowers.

Credit constraint status in 2003

The resurvey in 2003 provided the opportunity to modify the questions for directly eliciting credit constraint status. However, if the questions themselves were modified along the lines suggested by Boucher (2002), they would no longer be comparable to the 1984/85 questions. In the interests of comparability, we decided to use the same wording as in 1984/85, but to ask the following questions about credit constraints after the nonagricultural production, livestock production, assets, and nonfood consumption modules. [13]

1a. "If more production credit had been available to you in the past 12 months, would you have used it?[14]"

1b. "If more credit had been available to you for your business in the past 12 months, would you have used it?[15]"

1c. "If more credit had been available to you in the past 12 months to finance any of those items, would you have used it?[16]"

Each of the above questions was followed by:

2. "If yes, how would you have used it?"

3. "If no, why not?"

Question 1a was asked to households that reporting farming activity but not reporting a non-agricultural business (358 of the 572 survey households and 63% of the sample), while question 1b was asked to households reporting farming activity and a non-agricultural business (162 households, 28%). Question 1c was asked to all households following the nonfood consumption and nonland asset blocks. Answers to question 3 allow us to classify households according to type of credit rationing.

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[13] No question related to credit constraints affecting food consumption was asked in the food consumption module even though credit use was collected in this module.

[14] This question was asked at the end of the block collecting information on agricultural production activities and input use. It was also asked after the backyard production module (including livestock and home gardens) but responses in the backyard production module are likely to be unreliable because respondents do not typically borrow money for these activities. In some cases, respondents do not realize that they are engaged in quasi-tenancy arrangements (for example, acquiring livestock through tenancy arrangements in which the caretaker acquires alternate offspring of livestock left under his or her care).

[15] This question was asked at the end of the block collecting information on non-agricultural business.

[16] This question was asked at the end of the non-food expenditure, assets, and livestock production block.

For comparability with Gilligan et al. (2005), we limit our analysis to agricultural producers, here defined as those reporting farming activity but not reporting a non-agricultural business. Despite attempts to ensure comparability, the new questions differ slightly. The 1984/85 survey repeats the credit constraint questions, referring to the prior four months, for each of the four rounds for each crop under production. In contrast, the 2003 asks the questions only once per household in reference to an entire agricultural year.

Table 4 presents the distribution of households by credit constraint status in 1984/85 and 2003[17]. Depending how we define risk rationing, we arrive at one of two definitions of a constrained household, one being quantity- and risk-constrained households, the other being households that are quantity-constrained but not risk-constrained.. The first definition consists of those that were quantity-constrained or afraid of being unable to repay the loan. This amounts to 75 percent of parent households and 74 percent of child households. The second definition includes households that were quantity-constrained, unaccustomed to borrowing, afraid of losing collateral, or having too much debt. This definition is more exclusive, covering only 39 percent of parent and 36 percent of child households. Following Gilligan, we use the first definition. While the proportion of quantity-rationed households has changed little, decreasing from 36 to 34 percent, the proportion of quantity- or risk-rationed households has increased significantly from 59 to 75 percent. Fear of losing collateral is not an important motivation underlying risk rationing, since nearly 60 percent of loans do not involve collateral (Godquin and Sharma 2004).[18] Indeed, only 5 percent of parent households and 1 percent of child households mention fear of losing collateral as the reason for refusing additional credit.

Even though the proportion of quantity-rationed households has remained steady, many households have moved across credit constraint categories over the past twenty years (Table 5). For the 198 households for whom we have data on credit constraints in both periods, 53 percent have not changed credit constraint status. Twenty seven percent who were not credit constrained in the past are still unconstrained in 2003, whereas 28 percent of those who were constrained have remained so. Forty percent of those who were quantity-rationed in 1984/85 are no longer rationed, while six percent of those who were not quantity-rationed in 1984/85 report being rationed in 2003. In related work, Sharma (2006) shows that past credit constraint status affects neither current credit market behavior nor current credit constraint status, probably owing to the growth of the financial sector and the evolution of financial (and other) institutions over the past two decades.

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[17] The 1984/85 figures are an average over the relevant rounds, each of which has a recall period of four months, while the 2003 figures refer to the past 12 months.

[18] In 2003, nearly 60 percent of the loans transacted by households did not involve pledging any type of physical collateral (Godquin and Sharma 2004). When collateral was required, the season's standing crop or deduction from salary (12 percent) and consumer durables (10 percent) were the most common form. Land was used as collateral in only 5 percent of the transactions. Of course, the use of collateral is likely to depend on loan size. Generally, the larger the loan size, the more likely that collateral will be required. When loan size is used to weight observations the proportion of collateral-free loans decreases from 60 percent to 28 percent, and land emerges as the most important form of collateral (22 percent) followed by consumer durables (11 percent) and advance claim on the borrower's salary (11 percent). The use of collateral for larger loans is thus widespread in Bukidnon. In some cases land is mortgaged to obtain credit, and when this happens the lender may well acquire full cultivation rights on the mortgaged land until the loan is repaid in full. The use of consumer durables as collateral can be observed in the practice of buying these items on installment.

Nevertheless, credit constraints may have persistent long-term impacts. Ongoing work using this data set (Quisumbing 2006) suggests that past credit constraints, defined as being quantity rationed in at least one round in 1984/85, have negative impacts on current asset holdings, intergenerational asset transfers from parents to children, and current consumption. Table 6 compares predicted values of current asset holdings of parents and children, consumption of parents and children, and transfers of assets from parents to children from a Heckman switching regression model. In this model, past credit constraint status is treated as endogenous and household behavior regarding asset accumulation, intergenerational transfers and consumption is allowed to vary across credit constraint regime.[19] Credit constraint status in 1984/85 is a function of the log of the age of the household head in 1984, the years of schooling of the household head in 1984, household size in round 1, area cultivated and its square in round 1, the distance to town center in 1984, and whether the household had any debt in 1984.

Compared to unconstrained households, parent households that were credit constrained in 1984/85 have significantly lower predicted values of land and nonland assets in 2003 as well as significantly lower predicted values of nonland assets transferred to children. Predicted values of current weekly expenditure per adult equivalent are significantly lower for parents who were credit constrained in the past compared to those who were unconstrained. Similarly, predicted values of land and asset holdings are lower for children whose parents were credit constrained in the past, compared to those who were unconstrained; predicted values of current consumption are also significantly lower for children whose parents were credit constrained. Other evidence using this data set (Gilligan 2006) suggests that constrained households are also disadvantaged with respect to adult nutritional status and educational attainment, with children from constrained households having lower stature as adults, and fewer years of schooling, compared to those from unconstrained households. Remittances may therefore enhance welfare now and in the future by permitting households to make investments in assets as well as in children's human capital, if remittances have an impact on credit constraints, or a stronger positive impact on credit constrained households.

3. ANALYZING THE IMPACT OF REMITTANCES ON ASSETS, CONSUMPTION, AND CREDIT CONSTRAINTS

3.1 Model and Empirical Specification

We are ultimately interested in the impact of remittances on a vector of outcomes, Y. This vector consists of asset outcomes, consumption outcomes, and credit constraint status (we define these outcomes later in the empirical work). Levels of assets A, consumption per adult equivalent C, and credit constraint status K depend on remittances R, characteristics of the origin household X_o, shocks experienced by the origin household S_o, and an error term μ.

$$Y = \alpha_0 + \alpha_1 R + \alpha_2 X_o + \alpha_3 S_o + \mu \qquad (1)$$

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[19] This result is robust to estimation method; results from instrumental variables regressions and

For parent households, the vector of origin household characteristics X_o includes: age and age squared of the household head, household head's years of schooling, the log of the net worth of nonland assets in 1984/85, area cultivated per capita in 1984/85, and household demographic composition (males and females older than 15 years of age, household members 15 and below). We use 1984/85 values of land and nonland assets because current asset levels may be influenced by remittance receipts. Because the child households had not been formed in 1984/85, we use a slightly different, but analogous, specification of past asset positions. We use the value of nonland assets that parents had transferred to each child upon his or her forming a separate household, and the area of land bestowed upon household formation.

We include cumulative shocks from 1984 to 2002 in equation (1) because of the possibility that shocks experienced in the past may have long-term or persistent impacts. While a large literature has shown that poor people are generally able to insure against idiosyncratic shocks, but not against aggregate shocks (see Skoufias and Quisumbing 2005 for a review of the literature), most of this literature has been based on short-term panels. Case studies and casual observation suggest that a sequence of positive (negative) shocks may propel some households onto a rising (falling) welfare trajectory that results in changes in their long-term position in the welfare distribution, see Scott (2000) for an example. A "lucky few" may experience a run of positive shocks that enable them to escape poverty, while an "unlucky few" suffer a run of negative shocks that forces them into destitution. The majority of households will, however, experience a mixture of positive and negative shocks that partially offset themselves over time. Very few longitudinal studies are sufficiently long and collect enough retrospective information to allow such sequences of shocks to be identified. We take advantage of the detailed recall of shocks experienced by the household between 1985 and 2002 (the year preceding the resurvey year) to create the cumulative shocks variable.[20]

Remittances R are a function of the characteristics of the origin household X_o, shocks experienced by the origin household S_o, the number of migrants M, characteristics of the migrant network X_m, and shocks experienced by migrants S_m. The stock of migrants, characteristics of the migrant network, and shocks affecting migrants influence outcomes through their effects on remittances R. In the current version of the paper, we take the stock of migrants M as given, but will endogenize this in future work. We posit that remittances consist of permanent and transitory components. The permanent component of remittances is influenced by origin household and migrant network characteristics, while the transitory component is influenced by shocks to origin and migrant households

$$R=\beta_0 + \beta_1 X_o + \beta_2 S_o + \beta_3 M + \beta_4 X_m + \beta_5 S_m + \varepsilon \tag{2}$$

treatment effects regressions are similar.

[20] In the survey, households were asked the following question: "Since 1985, has this household been affected by a negative shock, an event that resulted in a loss of income or caused you to become serously concerned or anxious about your households' welfare? Those event or shocks can be related to agriculture, political or social events, family and other, as long as they have resulted in a loss of income or caused you to become seriously concerned or anxious about your households' welfare."

Because migration in the Philippines occurs along gender-differentiated lines, we distinguish between males and females in characterizing the number of migrants, the characteristics of the migrant network, and shocks experienced by migrants. Rewriting (2),

$$R=\beta_0 + \beta_1 X_o + \beta_2 S_o + \beta_{3m}M_m + \beta_{3f}M_f + \beta_{4m}X_m + \beta_{4f}X_f + \beta_{5m}S_{mm} + \beta_{5f}S_{mf} + \varepsilon \qquad (3)$$

where the migrant stock, migrant characteristics, and migrant shocks are distinguished according to whether they pertain to male (m) or female (f) migrants. We define remittances as the value of remittances received from outside the *barangay* in the past 12 months. Because remittances may respond to origin household characteristics as well as shocks experienced by the origin household, we include the same set of origin household characteristics from (1) in equation (3) as well as the cumulative shocks variable. The stocks of male and female migrants were obtained from the parents' listing of all children who have left the household. Migrant characteristics include the household's stock of migrant human capital, represented by the means of male migrants' years of schooling and of female migrants' average years of schooling, respectively, and the percentage of migrants that are married, also disaggregated by sex. If a family had no migrants, the stock of human capital was set to zero.

In creating the migrant shocks variables, we assume that shocks experienced in the current year affect current levels of remittances. Since remittances are defined with reference to the previous 12 months (i.e. 2002 in a survey conducted in 2003), migrant shocks refer to 2002 as well, and provides a snapshot of the shocks experienced by migrants in the previous year, rather than an assessment of the inherent variability of incomes in the destination. Following Yang (2006), who uses exchange rate shocks to identify remittances from migrants to different countries, we use regional GDP shocks in destination regions as one of the identifying instruments for remittances. Thus, migrant shocks are the average of the percentage deviation of destination GDP in 2002 from trend regional GDP in the migrants' destination regions, with averages computed separately for males and females.[21] For international migrants, percentage deviation of national GDP in 2002 from trend national GDP was used.

Because remittances are endogenous to origin household characteristics as well as shocks experienced by the origin households, if remittances respond to origin household shocks, it is likely that the error terms in (3) and (1) will be correlated. We use instrumental variables techniques to deal with the endogeneity of remittances in the outcome equation, using characteristics of the migrant network and shocks experienced by migrants as excluded instruments.

The cumulative shocks variable adds up the number of shocks mentioned by the household between 1985 and 2002.

[21] Yang (2006) uses exchange rate shocks to characterize shocks faced by Filipino migrants to international destinations. However, since most of the migrants in our sample are internal migrants, we use the percentage deviation from regional GDP.

Our data allow us to examine a wide range of asset and consumption outcomes. Asset outcomes include: values of farm and business equipment, livestock, housing and consumer durables, and land, in 2003 pesos. Consumption expenditures per adult equivalent are disaggregated into expenditures on food, clothing and footwear, health, education, family events, alcohol and tobacco. Following the discussion of credit constraint status above, we use two indicators of credit constraint status in 2003. The first indicates if the household is quantity- and not risk-constrained, while the second indicates if it is quantity-constrained or risk-constrained. All outcomes are as of the 2003 survey round. Means and standard deviations of variables used in the regressions are presented in Table 7.

3.2 Regression Results

3.2.1 Determinants of remittances

Table 8 presents regressions on the probability of receiving remittances and the amount of remittances received, separately for parent and child households. Age and age squared are important determinants of the probability of receipt for parent households, indicating strong life-cycle effects for parents. Wealthier parents—those who started out with more nonland assets and had larger areas cultivated per capita in 1984/85—are less likely to receive remittances, although parental wealth does not appear to affect the amounts received. Probably because adult males contribute to household livelihoods, households with more males above 15 are less likely to receive remittances, but the number of adult males does not affect amounts received. However, households with more adult females and with a larger number of children below 15 receive larger amounts of remittances. Cumulative shocks up to 2002 increase the likelihood of receiving remittances but not amounts received. Turning now to the characteristics of the migrant network, parents with a larger proportion of married sons among migrant sons are both less likely to receive remittances and to receive larger remittances. Upon marriage, children are expected to look after their own families' livelihood more than their parents' households. Interestingly, schooling attainment of migrant daughters increases both the probability of receipt and amounts receipt; the effect for males is insignificant. This is consistent with previous studies (Lauby and Stark 1988; Quisumbing 1997) that females, particularly better-educated females, are more likely to make remittances to parents. Finally, a positive shock to migrant income is positive only for male migrants, but is only weakly significant.

In contrast to the parent regressions, fewer variables are significant determinants of remittances received by child households. Better-educated households are more likely to receive remittances and to receive larger amounts. This may be partly due to the correlation between educational attainment of migrant siblings and one's own educational attainment. Households that experienced more shocks are weakly more likely to receive remittances, but shocks do not influence amounts received. Households located farther away from the town center are less likely to receive remittances, while remittances are larger in households with more adult males, a contrast to the results for the parents. None of the characteristics of the migrant networks significantly affect either the probability of receiving remittances or amounts received. However, positive shocks experienced by migrant sisters are associated with increased probability of receipts and higher amounts received.

3.2.2 Impacts of remittances on assets, consumption, and credit constraint status

Table 9 presents the coefficient estimates on remittances in both OLS and instrumental variables regressions for the various outcomes, separately for parent and child households. Remittances are treated as endogenous in the IV regressions. The excluded instruments are presented at the bottom of Table 9.

In each IV regression, the F-test on excluded instruments indicates that the instrument set is jointly significant in predicting the endogenous regressor. For all the parent regressions and one child regression, the Cragg-Donald F-test for weak instruments exceeds the critical value of 4.49, which implies a bias relative to OLS of less than 0.30 (Stock and Yogo 2002). For almost all outcomes, the p values for the Hansen J statistic for overidentification do not reject the null hypothesis that the instruments are independent of the second-stage disturbance term at the usual 0.05 significance level. Combined, these diagnostics suggest that our IV estimates, which we prefer to OLS on *a priori* grounds because they attempt to deal with the endogeneity of remittances, generally are fairly satisfactory. Though we ideally would like estimates that performed better on the weak instrument test, nevertheless, if, despite a 0.30 bias relative to IV they suggest different impacts of remittances on a number of outcomes than do the standard OLS estimates, this suggests some reason for being concerned about standard estimates and how well they represent the true causal impact of remittances on origin household outcomes.

Indeed, our results show that OLS and IV results are quite different. For parent households, OLS results indicate no significant impact on any of the asset outcomes or current credit constraint status, but suggest positive and significant impacts on a number of expenditure outcomes, namely total expenditure, food, clothing and footwear, and education (all per adult equivalent). In contrast, IV estimates for parents indicate that remittances have a positive and significant effect on livestock holdings and on educational expenditures per adult equivalent. OLS and IV estimates yield different results for children, the migrant's siblings, as well. OLS results suggest that remittances do not affect asset holdings, but increase total expenditure and clothing and footwear expenditures, per adult equivalent. In contrast, IV estimates show that remittances have a weak negative impact on livestock and land holdings, but a positive and significant effect on food expenditures and expenditures on clothing and footwear. While migrants (and older siblings, in general) are expected to make substantial contributions towards the schooling of younger siblings, expectations to support one's siblings who have married and formed their own households are much lower. Perhaps, migrants fulfill these (diminished) expectations by making only token contributions, which are then reflected in higher consumption of food, clothing, and footwear. Remittances received in the past year, however, do not have any impact on credit constraints in 2003.

These positive impacts on productive assets and schooling mirror the findings of Yang (2004). Adopting a reduced form approach, Yang (2004) finds that favorable exchange rate shocks for overseas Filipino migrants lead to greater child schooling, reduced child labor, and increased educational expenditure in origin households. He also finds that favorable exchange rate shocks raise hours worked in self- employment and lead to greater entry into relatively capital-intensive enterprises by migrants' origin households.

Why would remittances not have an impact on current credit constraints? It is possible that we are using an overly-restrictive definition of credit constraints, confined only to agricultural production. It is also possible that credit constraints may be persistent, and may not be

affected by short-term fluctuations in remittances, or that we are examining only very short-term impacts. It may also be the case that remittances do not affect credit constraint status directly, but may have differential impacts depending on a household's credit constraint status. Gitter (2006), for example, finds that transfers received through Nicaragua's Red de Proteccion Social, had a greater positive impact on enrollment of credit constrained households who experienced a drought shock, relative to those that were unconstrained. Yang (2006) finds that positive exchange rate shocks do not have a statistically significant impact on investment outcomes of Filipino households with the highest pre-crisis income levels; presumably, these households are the least likely to be credit constrained.

3.2.3 Impacts of remittances by credit constraint status

Because current credit constraint status is endogenous, we use parents' credit constraint status in 1984/85 to divide the sample into constrained and unconstrained households, and examine the impact of remittances separately for these subsamples.[22] These results are presented in Table 10 for the parent households and Table 11 for the child households.

Remittances appear to have a stronger impact on parent households that were constrained in the past, compared to those that were unconstrained. Remittances have a positive and significant effect on livestock holdings, the value of land and assets, and the value of owned land. Moreover, remittances have a positive and significant effect on educational expenditures. Remittances appear to help credit-constrained households accumulate productive agricultural assets—land and livestock—as well as invest in human capital. Remittances also have a positive impact on educational expenditures in unconstrained households, but have no impact on assets.

Results for the child households (Table 11) also suggest that remittances have a greater impact on children whose parents were credit constrained in the past. Remittances lead to greater values of housing and consumer durables and total nonland assets of constrained households. Remittances also increase clothing expenditures per adult equivalent for constrained households. In contrast, remittances have a weak negative effect on housing and consumer durables for unconstrained households. Finally, remittances appear to increase consumption of alcohol and tobacco for constrained and unconstrained households alike. It is interesting to note that remittances to parents appear to be channeled towards investments that are productive now or in the future—whether through land and livestock, that could affect current farm productivity, or in children's human capital, through the education of siblings. In contrast, remittances to children are almost always spent on consumption or consumer durables. This may be because remittances to children are so small—on average, a tenth of what parents receive--that they may not be worth spending on purchasing assets.

Perhaps because of smaller sample sizes, the instrumental variables diagnostics are not as favorable as in the regressions for the full sample. Nevertheless, the results are suggestive, although they should be treated with caution.

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[22] In the long term, of course, past credit constraint status is also endogenous to parental household characteristics. In future work we will also deal with the endogeneity of past credit constraint status.

4. CONCLUDING REMARKS AND AREAS FOR FURTHER WORK

Our preliminary investigation of the impact of remittances in the rural Philippines suggests that they play an important role in enabling investment in productive assets and human capital in sending communities. To some extent, our findings help allay fears that migration—particularly rural-urban migration—constitutes a brain drain for sending communities, with gains captured solely by migrants at the expense of sending communities. Our findings also suggest that migration and remittances have long-term effects that go beyond consumption-smoothing, allowing origin households to build up their stock of productive assets. The greater positive impact of remittances on credit-constrained households also implies that remittances may play a powerful role in relieving credit constraints of poor households.

Given that migration is likely to continue to be an important livelihood strategy for individuals and households in rural areas of the Philippines, the challenge may be to reduce barriers to migration as well as reduce transactions costs for migrants sending remittances. In the context of international migration, for example, Yang (2006) has pointed out that reducing the costs of sending remittances is effectively an improvement in the exchange rate faced by remittance senders. Reducing barriers to migration and creating employment opportunities for migrants in destination regions may stimulate investment in human capital, acquisition of productive assets, and entrepreneurship in sending regions.

In future work, we intend to examine the issue of endogeneity of the number of migrants and endogeneity of past credit constraint status. Moreover, so far we have focused on migration of children (siblings), and not other family members. The sensitivity of our results to the inclusion of remittances from other family members is a matter that deserves future investigation.

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Table 1. Distribution of children age 15 and over of original respondents, by location, 2003

Location	Males		Females		Total	Percent distribution
	Number	Percent	Number	Percent		
Nonmigrants	510	61.8	330	43.5	840	53.1
Coresident with parents	368	44.6	189	24.9	557	35.2
Same barangay as parents	142	17.2	141	18.6	283	17.9
Rural migrants	115	13.9	127	16.8	242	15.3
Different barangay, rural	81	9.8	95	12.5	176	11.1
Rural Mindanao outside Bukidnon	27	3.3	20	2.6	47	3
Rural Philippines outside Mindanao	7	0.8	12	1.6	19	1.2
Peri−Urban migrants	41	5.0	66	8.7	107	6.8
Different barangay, poblacion	37	4.5	59	7.8	96	6.1
Peri−Urban, outside Bukidnon	4	0.5	7	0.9	11	0.7
Urban migrants	156	18.9	209	27.6	365	23.1
Urban Bukidnon	24	2.9	31	4.1	55	3.5
Cagayan de Oro	51	6.2	59	7.8	110	6.9
Other Urban Mindanao	21	2.5	35	4.6	56	3.5
Urban Philippines outside Mindanao	60	7.3	84	11.1	144	9.1
Abroad	3	0.4	26	3.4	29	1.8
Total	825	100	758	100	1583	100

Source: Bukidnon Panel Survey, 2003 round

Table 2. Remittances, own characteristics, and characteristics of migration networks, parent and child households, 2003

	Parents who were farming in 1984/85 (n=279)	Children who formed separate households in same barangays (n=251)
Characteristics of origin households		
Age of household head	54.64	31.53
Education of household head	5.83	7.84
Males 15 years and older	2.48	1.10
Females 15 years and older	1.80	1.12
Household members less than 15 years	1.70	2.13
Probability of receiving remittances from outside village	0.62	0.40
Value of remittances received in 2003	11868.81	1385.80
Families without migrants		
No migrant sons (brothers)	0.41	0.42
No migrant daughters (sisters)	0.28	0.24
No migrant children (siblings)	0.16	0.14
Characteristics of migration networks		
Number of migrant sons(brothers)	1.08	1.00
Number of migrant daughters(sisters)	1.52	1.73
Percent of sons (brothers) married	0.31	0.38
Percent of daughters (sisters) married	0.45	0.54
Mean years of schooling of migrant sons (brothers)	5.28	5.04
Mean years of schooling of migrant daughters (sisters)	7.19	7.52

Table 3. Receipts of transfers by parent households, by location of children

	No		Yes		
Household has Children living:	Number	Receipts	Number	Receipts	p-value of difference
At home	52	11837	259	12568	0.90
In Same Barangay	164	12261	147	12653	0.93
In Rural Area	150	13767	161	11216	0.55
In *Poblacion*	226	11966	85	13724	0.71
In Urban Area	117	9019	194	14513	0.21

Remittances sent by children, by location

Location of Child Household	Number	Mean	SD	Median	Pct Sending More Than 500 Pesos
Same Barangay	205	417	1632	0	14
Rural Area	117	1425	3775	150	26
Poblacion	73	1476	2731	200	41
Urban Area	94	3258	10729	615	54
Total	489	1362	5349	100	29

Table 4. Distribution of households by credit constraint status, by type of constraint

Agricultural producers only

	Original 1984/85			Original 2003		Split 2003	
	Mean		SD	Mean	SD	Mean	SD
Credit constrained if desired more credit	0.36	a	0.48	0.33	0.47	0.32	0.47
Wants more credit, or avoiding default risk (definition 1)	0.59	b	0.49	0.75	0.43	0.74	0.44
Wants more credit, or avoiding default risk (definition 2)	0.60	b	0.49	0.39	0.49	0.36	0.48

Definition 1: does not want to avail of more credit because afraid cannot pay back

Definition 2: does not want to avail of more credit because of fear of losing collateral, too much debt, and not used to borrowing

a. Computed for rounds 2-4

b. Computed for rounds 3-4 only

Table 5. Transition matrices of past and current credit constraint status, quantity-constrained definition

Full sample

Quantity rationed in 1984/85	Quantity rationed now Not quantity rationed		Total in 2003
	0	1	
Not quantity rationed	53	11	64
	26.77%	5.56%	
Rationed	79	55	134
	39.90%	27.78%	
Total in 1984/85	132	66	198

Estimation sample

Quantity rationed in 1984/85	Quantity rationed now Not quantity rationed	Rationed	Total in 2003
Not quantity rationed	53	11	64
	27.89%	5.79%	
Rationed	75	51	126
	39.47%	26.84%	
Total in 1984/85	128	62	190

Percentages are in reference to the total number of households

Table 6. Predicted values of assets, intergenerational transfers, and expenditure per adult equivalent in 2003, parent and child households

Predicted based on switching regression model, Heckman two-step estimates

	Credit constraint status of parents in 1984/85		
	Quantity rationed		
	Constrained	Unconstrained	p-value
Parent households			
Asset holdings			
Value of land and assets	542.15	787.40	0.00
Value of non land assets	172.14	305.69	0.00
Intergenerational transfers			
Value of land transfers	79.41	103.56	0.23
Value of asset transfers	2.23	10.00	0.08
Consumption			
Weekly expenditure per adult equivalent	550.12	688.97	0.00
Child households (all children)			
Asset holdings			
Value of land and assets	420.74	659.27	0.00
Value of nonland assets	150.63	263.08	0.00
Consumption			
Weekly expenditure per adult equivalent	651.25	753.13	0.00

Source: Quisumbing (2006)

Table 7. Means and standard deviations of variables in regressions

	Parents who were farming in 1984/85 (n=279)		Children who formed separate households in same barangays (n=251)	
	Mean	Std. Dev	Mean	Std. Dev
Remittances (past 12 months, 2003)				
Probability of receiving remittances	0.62	0.49	0.40	0.49
Total remittances received	11868.81	37063.71	1385.80	3725.15
Assets (value in '000 pesos in 2003)				
Productive assets	35.41	466.65	38.74	491.72
Livestock assets	13.70	18.45	12.87	16.21
Other assets	185.63	363.82	191.49	392.42
Total nonland assets	230.84	710.98	239.71	752.22
Value of land owned	363.89	1008.52	476.85	1083.56
Value of land and assets	594.73	1443.80	716.56	1547.33
Weekly expenditures per adult equivalent				
Total expenditures	631.33	689.33	517.65	270.26
Food	283.24	155.09	326.42	177.62
Clothing and footwear	26.29	32.78	28.76	32.69
Health	30.12	80.88	18.00	37.98
Education	54.61	117.48	14.86	36.68
Family events	40.02	65.36	28.74	41.06
Alcohol and tobacco	5.84	23.28	0.75	4.01
Credit constraint status in 2003				
Quantity constrained	0.33	0.47	0.32	0.47
Quantity or risk constrained	0.75	0.44	0.74	0.44
Household characteristics in 2003				
Age of household head	54.64	7.78	31.53	6.71
Age squared	3045.69	871.12	1039.25	450.31
Education of household head (years)	5.83	3.15	7.84	3.29
Males older than 15 years	2.48	1.25	1.10	0.38
Females older than 15 years	1.80	1.06	1.12	0.40
Household members 15 years and younger	1.70	1.52	2.13	1.32
Distance to town center (poblacion)	5.19	3.38	5.51	3.67

(Table 7 cont.)

	Parents who were farming in 1984/85 (n=279)		Children who formed separate households in same barangays (n=251)	
	Mean	Std. Dev	Mean	Std. Dev
Initial assets				
Ln net worth in round 1 of 1984/85	3.44	1.57		
Value of owned land in 1984/85	15.88	25.75		
Area cultivated per capita, round 1, 1984/85	0.42	0.48		
Ln value of assets at household formation (2003 pesos)			0.23	0.84
Value of owned land at household formation (2003 pesos)			35.24	145.60
Area of land transferred at household formation			0.37	0.89
Characteristics of migrant networks				
Number of migrant sons(brothers)	1.08	1.23	1.00	1.08
Number of migrant daughters(sisters)	1.52	1.36	1.73	1.41
Percent of sons (brothers) married	0.31	0.43	0.38	0.46
Percent of daughters (sisters) married	0.45	0.44	0.54	0.43
Mean years of schooling of migrant sons (brothers)	5.28	5.00	5.04	4.89
Mean years of schooling of migrant daughters (sisters)	7.19	5.12	7.52	4.79

Table 8. Determinants of the probability of receiving remittances and total remittances received

Marginal effects reported

	Parents who were agricultural households in 1984/85				Children in the same survey barangays			
	Probability of receiving remittances		Total remittances received		Probability of receiving remittances		Total remittances received	
	Probit		Tobit		Probit		Tobit	
	dF/dx	z	dy/dx	z	dF/dx	z	dy/dx	z
Age of household head	-0.109	**-2.21**	-1217.240	-0.54	-0.002	-0.05	69.699	0.38
Age squared	0.001	**2.35**	11.981	0.60	0.000	-0.04	-0.757	-0.28
Years of schooling of household head	0.002	0.14	625.029	1.23	0.026	**2.53**	183.135	**3.46**
Ln net worth in round 1 of 1984/85	-0.042	**-1.65**	-220.186	-0.19				
Area cultivated per capita in 1984/85	-0.165	**-1.80**	-5266.430	-1.38				
Ln assets at household formation					-0.001	-0.03	7.938	0.04
Land area at household formation					0.000	0.01	211.294	1.08
Distance to town center	0.000	0.01	282.831	0.66	-0.016	-1.55	-118.017	**-2.50**
Males older than 15 years	-0.050	**-1.83**	-219.744	-0.18	0.019	0.20	785.359	**1.78**
Females older than 15 years	0.053	1.57	3830.429	**2.63**	0.101	0.95	421.888	1.04
Household members 15 and younger	0.015	0.67	2232.386	**2.18**	0.020	0.73	-60.108	-0.42
Shocks up to 2002	0.076	**2.93**	1241.194	1.16	0.071	**1.75**	226.229	1.18
Number of migrant sons (brothers)	-0.006	-0.15	974.059	0.64	-0.073	-1.56	-378.930	-1.55
Number of migrant daughters (sisters)	0.030	0.96	1147.813	0.86	0.001	0.04	-87.818	-0.59
Percent married sons (brothers)	-0.295	**-3.08**	-9245.806	**-2.16**	-0.163	-1.54	-617.284	-1.16
Percent married daughters (sisters)	0.008	0.09	-802.823	-0.20	0.035	0.32	637.707	1.26
Mean years of schooling of sons (brothers)	0.011	0.81	738.228	1.46	0.021	1.53	79.664	1.27
Mean years of schooling of daughters (sisters)	0.033	**2.80**	1746.439	**3.82**	-0.012	-1.01	-86.120	-1.55
Percent deviation from trend GDP in 2002, sons (brothers)	0.067	**1.69**	1048.590	0.86	0.002	0.06	132.359	0.64
Percent deviation from trend GDP in 2002, daughters (sisters)	-0.007	-0.34	-1404.924	-1.46	0.070	**2.83**	291.089	**3.26**

(Table 8 cont.)

Marginal effects reported

	Parents who were agricultural households in 1984/85							Children in the same survey barangays	
	Probability of receiving remittances		Total remittances received		Probability of receiving remittances		Total remittances received		
	Probit		Tobit		Probit		Tobit		
	dF/dx	z	dy/dx	z	dF/dx	z	dy/dx	z	
Observed probability	0.63				0.40				
Predicted probability	0.66				0.40				
Left censored observations			104				150		
Uncensored observations			174				101		
Number of obs	278		278		251		251		
LR chi2(18)	63.11		65.18		27.54		46.21		
Prob > chi2	**0.00**		**0.00**		**0.07**		**0.00**		
Pseudo R2	0.21		0.01		0.10		0.02		

z-values in bold are significant at 10% or better

Probit z values computed using robust standard errors

Table 9. Impact of remittances on asset holdings, consumption expenditures, and credit constraint status

Parent and child households

Instrumental variables estimates

	Parent households					Child households				
	Effect of remittances			Overid		Effect of remittances			Overid	
	OLS		IV		test	OLS		IV		test
Outcome	Coeff	t	Coeff	z	p-value	Coeff	t	Coeff	z	p-value
Assets in 2003										
Farm and business equipment	0.000	0.08	0.001	0.77	0.64	-0.002	-0.26	0.004	0.17	0.64
Livestock	0.000	0.02	0.000	**1.96**	0.30	0.000	0.40	-0.004	**-1.67**	0.22
Housing and consumer durables	0.000	0.08	-0.003	-1.06	0.39	0.014	0.87	0.019	0.67	**0.02**
Total nonland assets	0.000	0.11	-0.001	-0.47	0.41	0.011	0.52	0.022	0.62	**0.06**
Value of land and assets	0.000	-0.19	-0.005	-0.39	0.60	0.114	1.39	-0.079	-1.11	0.16
Value of land	0.000	-0.25	-3.267	-0.33	0.71	0.103	1.61	-0.101	**-1.72**	0.42
Expenditures per adult equivalent in 2003										
Total expenditure	0.004	**3.79**	-0.005	-0.79	0.51	0.014	**1.69**	0.023	0.72	0.87
Food	0.000	**1.79**	0.000	0.26	0.23	0.005	1.62	0.035	**1.92**	0.81
Clothing and footwear	0.000	**3.72**	0.000	0.02	0.12	0.002	**1.82**	0.012	**2.91**	0.30
Health	0.000	0.90	0.000	0.21	0.52	0.000	-0.70	-0.002	-0.66	0.79
Education	0.001	**2.48**	0.001	**1.79**	0.49	0.000	0.88	-0.005	-1.32	0.82
Family events	0.000	1.23	0.000	-0.60	0.41	0.001	1.11	0.000	-0.12	0.77
Alcohol and tobacco	0.000	1.24	0.000	0.08	**0.07**	0.000	1.34	0.000	0.62	0.46
F-test on excluded instruments (p-value)			5.04	**0.00**				7.63	**0.01**	
Shea partial R2 (p-value)			2.81	**0.03**				3.1	**0.05**	
Cragg-Donald weak identification statistic			5.04					4.35		

(Table 9 cont.)

Parent and child households

Instrumental variables estimates

Credit constraint status in 2003

Quantity constrained	0.000	0.92	0.000	-0.15	0.37	0.000	1.16	0.00	0.69 0.87
Quantity or risk constrained	0.000	1.45	0.000	0.24	0.94	0.000	-0.63	0.00	1.29 0.13
F-test on excluded instruments (p-value)			4.49	**0.00**				8.38	**0.00**
Shea partial R2 (p-value)			3.03	**0.02**				2.6	**0.08**
Cragg-Donald weak identification statistic			4.49					4.69	

z-values and p-values in bold indicate significance at 10% or better

Parent regressions:

Regressors in outcome equation: age of household head, age squared, education of household head, ln net worth

in round 1 of 1984.85, area cultivated per capita, distance to town center, males older than 15,

females older than 15, household members 15 and younger, cumulative shocks up to 2002

Instruments: mean education of migrant sons, mean education of migrant daughters,

percent GDP deviation of migrant sons, percent GDP deviation of migrant daughters

Child regressions:

Regressors in outcome equation: age of household head, age squared, education of household head, ln value of

assets at household formation, land area bestowed at household formation, distance to town center,

bestowed when left household, distance to town center, males older than 15, females older than 15,

household members 15 and younger, cumulative shocks up to 2002

Instruments: mean education of migrant sisters, percent GDP deviation of migrant sisters

Table 10. Impact of remittances on asset holdings, consumption expenditures on parent households, by credit constraint status

Instrumental variables estimates

Credit constrained households defined as being quantity constrained in 1984/85

Outcome	Constrained (n=154)					Unconstrained (n=89)				
	Effect of remittances				Overid test	Effect of remittances				Overid test
	OLS		IV			OLS		IV		
	Coeff	t	Coeff	z	p-value	Coeff	t	Coeff	z	p-value
Assets in 2003										
Farm and business equipment	0.000	1.03	0.000	1.14	**0.04**	**0.000**	-0.34	-0.004	-0.82	0.70
Livestock	0.000	-0.46	0.001	**2.18**	0.79	0.000	-0.43	0.000	1.25	0.65
Housing and consumer durables	0.000	0.69	0.001	0.61	0.47	-0.001	**-1.68**	-0.007	-1.63	0.76
Total nonland assets	0.001	0.70	0.002	0.82	0.43	-0.001	-1.21	-0.011	-1.43	0.80
Value of land and assets	0.001	0.64	0.014	**2.10**	0.36	-0.004	-1.56	-0.024	-1.20	0.96
Value of land	0.001	0.48	12.253	**1.97**	0.65	-0.002	-1.04	-13.925	-0.90	0.44
Expenditures per adult equivalent										
Total expenditure	0.004	**4.33**	0.005	1.37	0.99	0.004	1.62	-0.003	-0.36	0.62
Food	0.000	0.90	0.002	1.27	0.83	0.001	**2.02**	0.000	-0.29	0.72
Clothing and footwear	0.000	**4.59**	0.000	0.45	0.27	0.000	1.25	0.000	0.02	0.13
Health	0.000	1.63	0.000	-0.36	0.56	0.000	-0.76	0.002	0.98	0.77
Education	0.001	**3.47**	0.002	**2.50**	0.60	0.001	1.12	0.004	**1.78**	0.28
Family events	0.000	1.19	0.001	1.44	0.11	0.000	0.97	-0.001	-1.25	0.89
Alcohol and tobacco	0.000	1.14	0.000	0.68	0.22	0.000	0.93	0.000	0.51	0.74

(Table 10 cont.)

Instrumental variables estimates

Credit constrained households defined as being quantity constrained in 1984/85

Outcome	Constrained (n=154)					Unconstrained (n=89)				
	OLS		Effect of remittances IV		Overid test	OLS		Effect of remittances IV		Overid test
	Coeff	t	Coeff	z	p-value	Coeff	t	Coeff	z	p-value
F-test on excluded instruments (p-value)			2.140	0.12				1.82	0.13	
Shea partial R2 test (F statistic, p-value)			3.58	**0.03**				1.38	0.25	
Cragg-Donald weak identification statistic			3.53					1.81		

z-values and p-values in bold indicate significance at 10% or better

Parents:

Regressors in outcome equation: age of household head, age squared, education of household head, ln net worth in round 1 of 1984/85, area cultivated

per capita, distance to town center, males older than 15, females older than 15, household members 15 and younger, cumulative shocks

up to 2002

Instruments: mean education of migrant daughters, percent GDP deviation of migrant daughters

Table 11. Impact of remittances on asset holdings, consumption expenditures on child households, by credit constraint status

Instrumental variables estimates

Credit constrained households defined as parent being quantity constrained in 1984/85

Outcome	Constrained (n=157)					Unconstrained (n=68)				
	Effect of remittances				Overidentification test	Effect of remittances				Overidentification test
	OLS		IV			OLS		IV		
	Coeff	t	Coeff	z	p-value	Coeff	t	Coeff	z	p-value
Assets in 2003										
Farm and business equipment	0.002	1.03	0.002	1.44	0.57	-0.012	-0.60	-0.015	-0.40	**0.08**
Livestock	0.001	0.71	0.001	0.98	0.20	0.000	-0.27	-0.001	-1.32	0.56
Housing and consumer durables	0.036	1.29	0.064	**1.86**	**0.04**	0.003	0.24	-0.025	**-1.65**	0.26
Total nonland assets	0.038	1.36	0.067	**1.87**	**0.05**	-0.009	-0.29	-0.042	-0.90	0.11
Value of land and assets	0.091	1.35	0.129	1.44	0.28	0.083	1.16	-0.025	-0.37	0.19
Value of land	0.053	0.97	0.061	1.03	0.73	0.092	**1.91**	0.017	0.35	0.84
Total expenditure	0.025	**1.71**	0.036	1.46	0.65	0.014	1.14	0.022	1.26	**0.03**
Food	0.016	**2.00**	0.017	0.93	0.41	-0.004	-1.04	-0.007	-0.70	0.56
Clothing and footwear	0.006	**2.19**	0.013	**5.31**	0.39	0.002	1.60	0.002	0.77	0.39
Health	-0.001	-0.98	0.000	0.17	0.29	0.000	0.57	0.001	1.44	**0.05**
Education	0.001	0.50	-0.001	-0.66	0.13	0.001	**2.99**	0.000	0.14	0.28
Family events	0.001	0.94	0.002	0.67	0.72	0.003	1.57	0.002	0.47	0.12
Alcohol and tobacco	0.000	**1.65**	0.001	**2.44**	0.92	0.000	1.52	0.001	**1.94**	**0.06**

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(Table 11 cont.)

Instrumental variables estimates

Credit constrained households defined as parent being quantity constrained in 1984/85

Outcome	Constrained (n=157)					Unconstrained (n=68)				
	Effect of remittances				Overidentification test	Effect of remittances				Overidentification test
	OLS		IV			OLS		IV		
	Coeff	t	Coeff	z	p-value	Coeff	t	Coeff	z	p-value
F-test on excluded instruments (p-value)				15.3	**0.00**				2.55	**0.07**
Shea partial R2 test (F statistic, p-value)				3.83	**0.02**				1.26	0.30
Cragg-Donald weak identification statistic				16.49					2.56	

z-values and p-values in bold indicate significance at 10% or better

Children:

Regressors in outcome equation: age of household head, age squared, education of household head, ln value of assets at household formation,

area of land transferred at household formation, distance to town center, males older than 15,

females older than 15, household members 15 and younger

Instruments: cumulative shocks up to 2002, percent GDP deviation of migrant sisters