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REMITTANCES, INCOME DISTRIBUTION, AND RURAL ASSET ACCUMULATION

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ABSTRACT

This paper examines the direct, first-rounds impact of two types of remittances—internal and external remittances—on income distribution and asset accumulation in rural Pakistan. Using income decomposition techniques on a three-year panel household data set, the paper finds that internal remittances have a positive effect on equity and that external remittances have a negative effect. The study also uses an asset-accumulation model to pinpoint the effect of remittances on five types of rural assets: irrigated land owned, rainfed land owned, livestock assets, agricultural capital, and nonfarm assets. The results show that remittances *do* have an effect on rural asset accumulation. While external remittances have a positive and significant effect on the accumulation of land, internal remittances have a positive and significant effect on the accumulation of agricultural capital.

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1. INTRODUCTION

Internal and international migration can have a profound impact upon the rural economies of most Third World countries. In many African, Asian, and Latin American countries, the bulk of the labor force still lives in the countryside. As the Harris and Todaro model (1970) has hypothesized, in these countries, it is the difference between expected rural and urban incomes that causes workers to migrate, either to urban centers or abroad. The remittances–defined as the money and/or goods sent home by migrant workers–can have a large effect on income distribution and asset accumulation in these rural areas. For example, an inflow of external remittances to rural households at the upper end of the income distribution could both increase income inequality and land accumulation by the rich.

In general terms, the distributional impact of remittances on the rural economy depends on answers to three questions: (1) who migrates?; (2) how much do different income groups of migrants remit?; and (3) how are these remittances used (that is, consumed or invested) in the rural community? Because of data limitations, this study proposes to examine only the first and third questions; other researchers (Banerjee 1984; Hoddinott 1992) have addressed the second issue.

At the outset, it should be noted that the distributional impact of remittances is *not* the same for all rural Third World areas; moreover, as Stark, Taylor, and Yitzhaki (1986) have suggested, the impact of remittances may well vary at different points in time for the same rural area. These considerations tend to militate against the elaboration of any general consensus regarding the distributional impact of remittances.

Why is this so? To begin with, consider the question of who migrates. The issue of whether it is the rich or the poor, the educated or the uneducated who migrate

depends on a host of intervening (and often conflicting) variables. These variables include, inter alia, the role of information, the influence of risk, and the costs (social, psychological, and financial) of migration.[1] According to Katz and Stark (1986; 1989), information about migration opportunities tends to be asymmetrical. In other words, some agents (e.g., rich peasants) have access to better information than others, and hence they are the first to migrate. Thus, at the beginning of a rural area's migration history, the distribution of remittances is likely to be unequal. However, as migration proceeds, asymmetries in information decline and the twin desires for risk aversion and portfolio diversification motivate poorer villagers to participate. According to Stark and Levhari (1982), since the risks (and income) derived from employment in urban areas or abroad are not highly covariant with the risks (and income) derived from agriculture, risk-averse rural families may choose to control their risk by sending one of their members to work in urban areas or abroad.[2] In this sense, migration and the remittances that it produces represent an important means of diversifying the limited income portfolio of a poor rural household. Yet, as most researchers recognize, migration is not without its costs. While the social and psychological costs of migration have been well investigated, the financial costs of entry to migration have not. This present study hopes to show how the different entry costs of internal versus external migration have an important effect on the first-order distributional impact of migration.

In the past, relatively little attention has been focused on the question of how remittances are used. This inattention is largely due to three methodological

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[1] For a useful review of the effect of these, and other, variables on migration, see Massey et al. (1994).

[2] In another work, Stark and Taylor (1989) claim that in some situations, the desire to increase absolute individual (or family) income may play a less important role in influencing migration than the desire to reduce the "relative deprivation" of a particular individual (or family) vis-à-vis other villagers.

problems. The first is fungibility: because remittances are like any other form of cash income, it is difficult to associate this income source with any particular changes in expenditure behavior. The second problem relates to the multiple-round effects of remittances on the local economy. For example, an inflow of remittances into a rural area may lead to a surge in expenditures in housing, which may, in turn, benefit those at the lower end of the income distribution by creating new income and employment opportunities for the unskilled. Unfortunately, however, few studies have evaluated the second- and third-order effects of remittance expenditures on wage, employment, and income distribution.[3] Finally, as Appleyard (1989, 493) notes, research that has attempted to determine how remittances are used "tends to be poorly devised (in the sense of using imprecise analytical frameworks) and to lack theoretical underpinning." One particular difficulty here is that much remittance research is based on data gathered at one point in time; such research is unable to measure the various ways in which remittances are consumed or invested over time. Perhaps because of these three interrelated problems, most remittance studies have tended to take a dim view of the economic impact of remittances: these studies have found that the bulk of such income transfers are spent on consumption and not on investment in rural assets.[4]

In this study, a framework is proposed and techniques are developed for clarifying the effects of remittances on rural income distribution and asset accumulation. The study attempts to do two things. First, it applies income decomposition techniques to a longitudinal household data set from rural Pakistan to pinpoint the effect of different sources of income–including internal and external remittances–on rural income distribution. This analysis reveals that remittances have

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[3] For notable exceptions to this statement, see Taylor (1992) and Stahl and Habib (1989).

[4] Among the studies that take a negative view of the economic effect of remittances are Amin and Awny (1985) and Lipton (1980). For a more positive view, see Taylor (1992) and Adams (1991).

a differential effect on first-order equity: while internal remittances have an equalizing impact on rural income distribution, external remittances have just the opposite effect. Second, the paper models the effect of internal and external remittances on various types of asset accumulation over a two-year time period in rural Pakistan. This examination suggests that while external remittances have a positive and significant effect on land accumulation, internal remittances have a positive and significant effect on the accumulation of agricultural capital.

The analysis pursued in this paper is quite focused. Most notably, the study concentrates on the direct, first-order effects of two kinds of remittances–internal and external remittances–on income distribution and rural asset accumulation. While the author is quite aware of the second- and third-order effects of remittances on equity and assets, because these effects are best measured in a general equilibrium model, they are largely ignored in this study.

The study proceeds in five sections. Section 1 presents the methodology for decomposing income inequality. Section 2 discusses the data set and Section 3 analyzes the effect of internal and external remittances on income distribution. Section 4 analyzes the effects of internal and external remittances on rural asset accumulation. Section 5 summarizes.

2. THE DECOMPOSITION OF INCOME INEQUALITY

In order to identify the effect of internal and external remittances on income distribution, it is useful to decompose one or more inequality measures. Such a decomposition exercise can answer the question: what is the contribution of any particular income source–like internal or external remittances–to overall inequality?

A number of different inequality measures have been proposed in the literature. Which one of these measures should be chosen for decomposition? According to

Foster (1985), the selected inequality measure should have five basic properties: (1) Pigou-Dalton transfer sensitivity, (2) symmetry, (3) mean independence, (4) population homogeneity, and (5) decomposability.

Pigou-Dalton transfer sensitivity holds if the measure of inequality increases whenever income is transferred from one person to someone richer. Symmetry holds if the measure of inequality remains unchanged when individuals switch places in the income order. Mean independence holds if a proportionate change in all incomes leaves the measure of inequality unchanged. Population homogeneity holds if increasing (or decreasing) the population size across all income levels has no effect on the measured level of inequality.

The property of decomposability allows inequality to be partitioned either over subpopulations or sources. It is the latter type of decomposition that is the subject of this analysis. Ideally, an inequality measure can be regarded as source decomposable if total inequality can be broken down into a weighted sum of inequality by various income sources (e.g., internal and external remittances). However, since activities that influence a particular source of income are likely to have an impact on other activities from which total income is comprised, any inequality measure that is source decomposable must address covariance among the income sources.

Among the inequality measures that meet the five preceding properties are Theil's entropy index T, Theil's second measure L, the coefficient of variation, and the Gini coefficient.[5] The two Theil measures, however, are not decomposable when sources of income are overlapping and not disjoint. While the need for non-overlapping groups is not restrictive when inequality is decomposed over regions, this restriction rules out using the two Theil measures in this study, because many of the survey households receive income from several different sources. The decomposition

[5] For a review of these four inequality measures, see Anand (1983, 89-92).

analysis in this study is therefore based on the two remaining inequality measures: the coefficient of variation and the Gini coefficient.

The source decomposition based on the coefficient of variation can be developed following Shorrocks (1982, 1983) and Ercelawn (1984). Let total income, *y*, consist of income from *k* sources. The variance of total income, σ^2, can be written as the sum of variances of each source of income, σ_i^2, and of the covariances between sources of income, σ_{ij}:

$$\sigma^2 = \sum \sigma_i^2 + \sum_{i..j} \sigma_{ij}. \qquad \textbf{(1)}$$

The contribution of the i-th source of income to total income variance consists of the i-th income variance and the part of the covariances allocated to the i-th source. According to Shorrocks (1982), the "natural" decomposition of the variance assigns to the i-th source exactly one-half of all covariances involving the i-th income source. This leads to the expression:

$$\sigma^2 = \Sigma\sigma_{iy} \qquad \textbf{(2)}$$

where the (absolute) contribution of the i-th source is measured by its covariance with total income, *y*. This relationship can be rewritten so as to express the contribution in relative terms. As is apparent, the relative contributions remain the same whether inequality is measured by the variance or by the coefficient of variation. Since the variance does not meet the axiom of mean independence (i.e., it is not invariant to proportional changes in all incomes), the coefficient of variation will be adopted here. The decomposition corresponding to the coefficient of variation can be further elucidated by defining the following terms:

$$\sum w_i c_i = 1;\ w_i = \frac{\mu_i}{\mu};\ c_i = p_i \frac{\sigma_i/\mu_i}{\sigma/\mu}, \qquad \textbf{(3)}$$

where $w_i c_i$ is the so-called "factor inequality weight" of the i-th source in overall inequality; μ_i and μ are the mean income from the i-th source and from all sources, respectively; c_i is the relative concentration coefficient of the i-th source in overall inequality; and ρ_i is the correlation coefficient between the i-th source and total income.

The decomposition of the Gini coefficient can be developed as follows. Pyatt, Chen, and Fei (1980) have shown that the Gini coefficient of total income, G, can be written as

$$G = \frac{2}{n\mu} Cov\ (y,r), \qquad \textbf{(4)}$$

where n is the number of observations, y refers to the series of total incomes, and r refers to the series of corresponding ranks. On this basis, the Gini coefficient of the i-th source of income, G_i, can be expressed as:

$$G_i = \frac{2}{n\mu_i} Cov\ (y_i, r_i), \qquad \textbf{(5)}$$

where y_i and r_i refers to the series of incomes from the i-th source and corresponding ranks, respectively. Since total income is the sum of source incomes, the covariance between total income and its rank can be written as the sum of covariances between each source income and rank of total income. Equations (4) and (5) can then be used to express the total income Gini as a function of the source Ginis:

$$G = \sum \frac{\mu_i}{\mu} R_i G_i, \quad \textbf{(6)}$$

where R is the "correlation ratio" expressed as

$$\frac{cov(y_i,r)}{cov(y_i,r_i)} = \frac{covariance\ between\ source\ income\ amount\ and\ total\ income\ r}{covariance\ between\ source\ income\ amount\ and\ source\ income\ r} \quad \textbf{(7)}$$

The decomposition corresponding to the Gini coefficient can then be expressed by defining the following terms:

$$\sum w_i g_i = 1;\ w_i = \frac{\mu_i}{\mu};\ g_i = R_i \frac{G_i}{G}, \quad \textbf{(8)}$$

where $w_i g_i$ is the "factor inequality weight" of the i-th source in overall inequality; and g_i is the relative concentration coefficient of the i-th source in overall inequality.

Assuming that additional increments of an income source are distributed in the same manner as the original units, an income source can be defined as inequality-increasing or inequality-decreasing on the basis of whether or not an enlarged share of that income source leads to an increase or decrease in overall income inequality. From the decomposition equations (3) and (8), it follows that the i-th income source is inequality-increasing or inequality-decreasing according to whether c_i (or g_i) is greater than or less than unity.[6]

[6] This analysis ignores feedback effects, that is, the effects that a change in any source income share might have on distribution within any source income. Of course, such an assumption might be quite unrealistic for large changes in any source income share.

3. DATA SET

Data for this study were collected in a series of 12 interviews with 727 households over a three-year time period (1986-87 to 1988-89) in rural Pakistan.[7] In these interviews, data were collected on a wide range of topics, including income, expenditures, education, employment, migration, and household assets.

While intensive in nature, the survey was *not* designed either as a migration/remittances study or as one that would be representative of rural Pakistan as a whole. Rather, the purpose of the study was more limited, namely, to analyze the determinants of poverty in rural Pakistan. To these ends, the "poorest" district in each of three Pakistani provinces was selected for surveying, with poverty being defined on the basis of a production and infrastructure index elaborated by Pasha and Hasan (1982). The selected districts included Attock (Punjab Province), Badin (Sind Province), and Dir (Northwest Frontier Province). Since rural poverty also exists in more prosperous areas, a fourth district, Faisalabad (Punjab Province), was also added to the survey.[8]

Table 1 presents summary data for the seven sources of income in the survey:

1. Nonfarm, including wage earnings from nonfarm labor, government, and private-sector employment plus profits from nonfarm enterprises;

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[7] This study was undertaken by the International Food Policy Research Institute (IFPRI) working in collaboration with Pakistani research institutes: Applied Economic Research Centre (University of Karachi), Punjab Economic Research Institute (Lahore), the University of Baluchistan (Quetta) and the Center for Applied Economic Studies (University of Peshawar). For more details, see Adams and He (1995).

[8] The 727 households were distributed as follows: 148 from Attock District (Punjab Province), 239 from Badin District (Sind Province), 193 from Dir District (Northwest Frontier Province), and 147 from Faisalabad District (Punjab Province).

2. Agricultural, consisting of net income from all crop production, including imputed values from home production and crop by-products plus wage earnings from agricultural labor;
3. Livestock, including net returns from traded livestock (cattle, poultry) plus imputed values of home-consumed livestock plus bullock traction power;
4. Rental, including rents received from ownership of assets such as land, machinery, and water;
5. External remittances, including income (money and goods) received from an international migrant;
6. Internal remittances, including income (money and goods) received from an internal migrant in Pakistan; and
7. Other, including pensions (government), cash, and *zakat* (alms payments to the poor).

All income figures in Table 1 are in net terms. This means that the remittance figures are calculated net of any household-to-migrant flows and direct migration costs. However, it should be noted that the remittance figures in this table refer *only* to the income and goods that households reported receiving from migrants. Remittance figures in Table 1 do *not* include the value of savings held outside the household by migrants. In all likelihood, this data limitation tends to

Table 1 Summary of income data from 1986-87, 1987-88, and 1988-89 surveys in rural Pakistan

Source of Income	1986-87 Mean Annual Per Capita Household Income[a] in Rupees[b]	1986-87 Standard Deviation	1987-88 Mean Annual Per Capita Household Income[a] in Rupees[b]	1987-88 Standard Deviation	1988-89 Mean Annual Per Capita Household Income[a] in Rupees[b]	1988-89 Standard Deviation
Nonfarm	1,007.39	1,158.40	1,204.65	1,364.28	959.54	1,086.19
Agricultural	763.75	2,170.35	851.39	2,188.16	832.90	2,048.37
Livestock	534.88	641.98	444.21	832.35	435.05	718.71
Rental	425.07	1,429.80	405.46	1,357.63	473.84	1,610.71
External remittances	289.11	1,448.68	319.50	1,391.91	202.94	928.83
Internal remittances	232.79	493.39	197.56	664.68	109.79	347.85
Other[c]	32.11	139.29	56.29	419.70	56.65	642.71
Total	3,285.10	3,015.60	3,479.06	3,288.21	3,070.71	3,107.57

N = 727 households

[a] Mean income figures include negative source incomes recorded for some households in various years.

[b] In 1986, Pakistani Rupee = US$0.062. All rupee figures are in constant 1986 terms.

[c] Other income includes government pensions, cash, and *zakat* (payments to the poor).

underestimate the actual value of remittances—defined as money, goods, *and* savings—received by migrant households.

According to Table 1, external and internal remittances account for relatively small shares of household income. Depending on the year, external remittances

account for between 6.6 and 9.2 percent of mean annual per capita household income, while internal remittances account for between 3.6 and 7.1 percent of such income.

In the sample, the Gini coefficient for three-year mean per capita household income is 0.381. This Gini is slightly higher than that (0.327) which can be calculated from the rural portion of the 1987-88 Pakistan Household Income and Expenditure (HIES) Survey.[9]

In Table 2, the seven sources of income are presented by quintile group, based on three-year mean per capita household income. The results reveal the very different effects of internal and external remittances on income distribution. While the share of mean per capita household income from internal remittances falls steadily with income group, the share of such income from external remittances rises with income group.

Why do external remittances go mainly to upper-income households? One of the main reasons has to do with the high "entry costs" to international migration in Pakistan. In this study, most international migrants went to work in the Arab Gulf (e.g., Saudi Arabia, the United Arab Emirates, Kuwait).[10] For these international migrants, the average costs of migration were 21,000 rupees (US$1,300). These costs, which include travel expenses (8,000 rupees) plus fees paid to a Pakistani agent for visa, work permit, and other documentation (13,000 rupees), were too onerous for many lower-income households. Poorer households with a desire to send a member outside of their rural communities were thus forced to pursue internal migration, where the entry costs were lower because there was no need to

[9] This 1987-88 Household Income and Expenditure (HIES) Survey was a national-level survey, which included 9,760 rural Pakistani households.

[10] For an overview of Pakistani international migration to the Arab Gulf states, and the effect of such migration on the Pakistani economy, see Addleton (1992).

Table 2 Sources of income ranked by three-year mean average per capita household income quintile group

Percent of 727 Households Ranked by Three-Year Mean Average Per Capita Income	Three-Year Mean Average Per Capita Income[a] in Rupees[b]	Percent from Nonfarm Income	Percent from Agricultural Income	Percent from Livestock Income	Percent from Rental Income	Percent from External Remittances	Percent from Internal Remittances	Percent from Other Income[c]
Lowest 20 percent	1,008.47	49.9	6.8	24.5	4.9	1.0	10.7	2.2
Second 20 percent	1,818.35	48.4	9.3	23.5	5.3	3.6	8.4	1.5
Third 20 percent	2,536.99	43.6	14.3	18.3	8.7	7.3	6.4	1.4
Fourth 20 percent	3,638.61	42.7	21.4	15.6	7.6	6.4	4.1	2.2
Highest 20 percent	7,353.50	16.8	36.5	8.8	20.8	11.6	4.5	1.0
Total	3,271.18	40.3	17.7	18.2	9.4	6.0	6.8	1.6

N = 727 households

[a] Mean income figures are calculated by averaging household income over the three years and then dividing by the average household size.

[b] In 1986, 1 Pakistan Rupee = US$0.062. All rupee figures are in constant 1986 terms.

[c] Other income includes government pension, cash, and *zakat* (payments to the poor).

hire an agent. However, the wages (and remittances) received for work in Pakistani cities like Karachi or Quetta were also much lower than those from abroad.

Table 3 presents data on these issues. Here, households are classified according to whether they receive no remittances, internal remittances, or external remittances. In terms of income, row (2) shows that households receiving internal remittances *are* indeed poorer than those receiving external remittances. However, the results suggest that poverty should not be just defined in terms of income; households receiving internal remittances are also "poorer" than those receiving external remittances in terms of human capital, such as household size (row [7]) and number of males over 15 years (row [8]).

Even more importantly, row (9) of the table shows that the quality of human capital differs: households receiving internal remittances have fewer educated males than households receiving external remittances. Unlike other Third World rural areas, there are evidently positive rewards to schooling for external migration in rural Pakistan. For example, while it is the less educated who tend to migrate abroad in rural Mexico and rural Egypt,[11] in rural Pakistan, it is the more educated who pursue external migration. One reason for this may be that many rural Pakistanis find jobs as clerks and small business operators in the Arab Gulf, positions for which some educational skills are appropriate. As a result, in this sample, external remittances to households with at least one middle-school educated male are twice as large, on average, than external remittances to households with no educated males. This difference is significant at the 0.05

[11] In rural Mexico, Stark, Taylor, and Yitzhaki (1986) found that the economic rewards to schooling were higher for internal than external migrants. In rural Egypt, Adams (1993) found that the *least* educated had the highest propensity to pursue external migration.

Table 3 Selected characteristics of nonmigrant, internal migrant, and external migrant households, based on three-year mean data

Item	Households with No Remittances	Households Receiving Internal Remittances	Households Receiving External Remittances
Migration and remittances			
1. Number of households	181	487	146
2. Three-year mean annual per capita income (rupees)	3,148.31	3,214.78 (-0.29)	3,730.67 (-1.88)
3. Three-year mean annual per capita remittances (rupees)	...	409.98	1,537.99
Socioeconomic			
4. Percent of three-year mean annual per capita income from agricultural income	26.8	27.2	9.1
5. Mean irrigated land owned (acres)	5.52	4.22 (1.26)	1.88 (3.26)**
6. Mean rainfed land owned (acres)	3.08	5.59 (-1.49)	5.32 (-1.69)*
7. Mean household size	9.06	9.15 (-0.23)	10.84 (-3.39)**
8. Mean number of males over 15 years in household	2.29	2.80 (-3.88)**	3.37 (-5.91)**
9. Mean number of males in household with middle school or higher education	0.72	0.85 (-1.16)	1.55 (-5.09)**

Notes: N = 727 households; 1 Rupee = US$0.062. The sum of households in the first row exceeds 727 because some of the household receive both internal and external remittances. The numbers of parentheses are t-statistics (two-tailed), which measure differences between nonmigrant households and internal migrant or external migrant households.

* Difference significant at the 0.10 level.
** Difference significant at the 0.01 level.

level. Since upper-income households are more educated,[12] the fact that external migration in Pakistan contains a large, positive reward to education may help to explain why the share of income from external remittances rises with income group.

4. REMITTANCES AND INCOME DISTRIBUTION

Decomposing the coefficient of variation and the Gini coefficient provides two ways for measuring the contribution of any income source to overall income inequality. First, it can be asked whether inequality in an income source serves to increase or decrease overall income inequality.[13] Second, it is possible to identify how much of the overall inequality is due to any particular income source.

Table 4 reports the decomposition results for the relative concentration coefficients based on three-year mean per capita income. The decomposition of the coefficient of variation (c) and the Gini coefficient (g) both agree that external remittances represent an inequality-increasing source of income. This means that, ceteris paribus, additional increments of external remittance income will increase overall income inequality. Both decompositions also agree that internal remittances represent an inequality-decreasing source of income. With everything else held constant, additional increments of internal remittances will reduce overall income inequality.

Table 4 also presents the decomposition results for relative factor inequality weights of source incomes. The data show that external remittances make a

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[12] In this data set, education and income are highly correlated: a simple correlation between mean level of household education and total three-year mean per capita income is positive and significant at the 0.01 level.

[13] In analyzing whether an income source is inequality-increasing or -decreasing, it is assumed that additional increments of that income source are distributed in the same fashion as the original units.

Table 4 Decomposition of overall income inequality based on three-year mean per capita household income

Source of Income	Relative Concentration Coefficients		Factor Inequality Weights	
	c	g	wc	wg
Nonfarm	0.195	0.436	0.063	0.141
Agricultural	1.804	1.619	0.449	0.403
Livestock	0.272	0.435	0.039	0.063
Rental	2.223	1.701	0.295	0.226
External remittances	1.442	1.543	0.119	0.127
Internal remittances	0.513	0.528	0.028	0.029
Other[a]	0.553	0.807	0.008	0.012
Total	...	...	1.000	1.000
N = 727 households				

Notes: All estimates are based on three-year mean per capita household income expressed in constant 1986 terms.

$$w_i c_i \ \textit{where}\ w_i = \frac{\mu_i}{\mu},\ c_i = p_i \frac{\frac{\sigma_i}{\mu_i}}{\frac{\sigma}{\mu}};$$

$$w_i g_i \ \textit{where}\ w_i = \frac{\mu_i}{\mu},\ g_i = R_i \frac{G_i}{G}.$$

[a] Other income includes government pensions, cash, and *zakat* (payments to the poor).

moderate contribution to overall income inequality. External remittances account for between 11.9 and 12.7 percent of overall income inequality. By contrast, internal remittances account for a very small share—between 2.8 and 2.9 percent—of income inequality.[14] Among the seven sources of income, only "other income" accounts for a smaller percentage of overall income inequality.

Why do external remittances make a much larger contribution to income inequality than internal remittances? This question can be answered by analyzing the three elements of the Gini decomposition procedure: (1) source income weight, (2) source gini (G_i), and (3) correlation ratio between source income and total income (R). These three elements of the Gini decomposition are shown in Table 5.

Column (1) of Table 5 reveals that both external and internal remittances have relatively small source income weights. However, column (2) shows that the two types of remittances have very different source ginis. Among the seven sources of income, only "other income" has a higher source gini than external remittances. External remittances is a very unevenly distributed source of income because, in any given year, less than 12 percent of households receive external remittances and the standard deviation of external remittance income is between four and five times the mean of such income (see Table 1). By contrast, internal remittances has a much lower source gini. In any given year, between 23 and 58 percent of households receive internal remittances, and the standard deviation of such income, is only two to three times the mean (Table 1).

[14] Decomposition results based on annual mean per capita income data yield identical results. In each year of the study, external remittances represent an inequality-increasing source of income and internal remittances represent an inequality-decreasing source. Depending on the year, external remittances account for between 7.2 and 18.4 percent of overall income inequality, and internal remittances account for between 0.8 and 4.7 percent of such inequality.

Table 5 Decomposition of overall income inequality using Gini coefficient and based on three-year per capita household income

Source of Income	Weight (1)	Gini[a] (2)	Correlation Ratio Between Source Income and Total Income (R) (3)
Nonfarm	0.322		
Agricultural	0.249		
Livestock	0.144		
Rental	0.133		
External remittances	0.083		
Internal remittances	0.055		
Other[b]	0.015		
	1.000		
Other[b]		0.943	
External remittances		0.936	
Rental		0.876	
Agricultural		0.844	
Internal remittances		0.763	
Livestock		0.580	
Nonfarm		0.510	
Rental			0.740
Agricultural			0.731
External remittances			0.628
Nonfarm			0.326
Other[b]			0.326
Livestock			0.286
Internal remittances			0.264

N = 727 households

Notes: All estimates based on year-year mean per capita household income expressed in constant 1986 terms.

$$G_i = \frac{2}{n\mu_i}\, cov(y_i, r_i),\ R = \frac{cov(y_i, r)}{cov(y_i, r_i)}.$$

[a] Source Ginis are high because they include households with zero or negative incomes from different income sources.

[b] Other income includes government pensions, cash, and *zakat* (payments to the poor).

Column (3) of Table 5 reports the correlation ratios between source income and total income. As might be expected, external remittances has a much higher correlation ratio with total income than internal remittances. Of the seven sources of income, internal remittances has the lowest correlation ratio with total income.

The data in Table 5 serve to explain the factor inequality weights reported above. External remittances has a moderate factor inequality weight because it has a high source gini and is strongly correlated with total income. By comparison, internal remittances makes a much smaller contribution to overall income inequality because it has a low source gini and is poorly correlated with total income.

5. REMITTANCES AND RURAL ASSET ACCUMULATION

Using an expanded version of the Taylor model (1992), the effect of internal and external remittances on the accumulation of income-producing rural assets can be estimated as follows:

$$x_3 = \beta_0 + \beta_1 x_1 + \beta_2 y_1 + \beta_3 z_1 + \beta_4 m_1 + \beta_5 e_1 + \beta_6 a_1 + \beta_7 a_1^2, \qquad \textbf{(11)}$$

where

x_3 = asset holding in Year 3,

x_1 = asset holding in Year 1,

y_1 = total mean per capita household income (excluding internal and external remittances) in Year 1,

z_1 = mean per capita household income from remittances (internal, external) in Year 1,

m_1 = number of males over 15 years of age in household in year 1,

e_1 = number of males in household with middle school or higher education in Year 1,

a_1 = age of household head in Year 1,

a^2_1 = age of household head in Year 1 squared.

In this study, equation (9) can be estimated for five different types of rural assets: irrigated land owned (number of acres); rainfed land owned (number of acres); livestock assets (number of local cow, male and female buffalo, bullock); agricultural capital (value of tubewell, tractor, and machinery); and nonfarm assets (value of vehicle, shop or business, and building outside of village).[15]

Two aspects of the model merit attention. First, on the positive side, the model addresses the problem of fungibility. Since money can be spent in many different ways, simply observing that remittances are not used to invest in rural assets does not mean that they cannot be credited with this result. Remittances may well have freed other resources for expenditure on assets. The model overcomes this problem by controlling for both remittances *and* total income in Year 1; in other words, if remittances are received in Year 1 and rural assets are accumulated in Year 3, then remittances are credited with the result. Second, on the negative side, an unfortunate limitation with the model is the relatively short time lag—two years—between receipt of remittances (in Year 1) and the change in rural assets (in Year 3) being measured. Given the longer time lag usually needed for investment in "lumpy" assets (like land), it would have been preferable to estimate the model over a longer time period. Unfortunately, this was impossible given the nature of the data set.

Table 6 presents means and standard deviations for the variables in the model. Only two variables have mean values that are significantly different between years 1 and 3: number of educated household males (EDUC) and internal remittances (INTREMIT). The change in the first variable may reflect the increasing spread of

[15] For an analysis of the effect of remittances on consumption smoothing and rural savings in Pakistan, see Alderman (1994).

education in rural Pakistan; however, the reasons for the change in the level of internal remittances are unclear. Between years 1 and 3, household income from internal remittances fell by over 50 percent.

The model was estimated on the 727 households in the sample, using two methods: ordinary least squares (OLS) and tobit. OLS was chosen because of its simplicity and tobit was chosen because several of the variables being estimated have many zero values.[16]

The presence of zero values for many of the dependent and independent variables in the model made it necessary to test the OLS estimates for bias, using a DFFITS procedure. DFFITS is a standardized measure of the effect of dropping the ith observation on the predicted value of the dependent variable. The basic idea behind this procedure is to identify observations that have an "influential" or unusual effect on the dependent variable, and then to omit those observations that might create OLS bias by affecting the overall regression fit and the parameter estimates. The equation used here is

$$DFFITS_i = (Y_i - y_i)\ (H_{ii}^{1/2}/S_i), \qquad \textbf{(10)}$$

[16] Of the 727 survey households, 88 percent receive no external remittances and 41 percent receive no internal remittances. Similarly, when the dependent variable in the model is nonfarm assets in Year 3, 86 percent of the households have zero values.

Table 6 Means of variables for rural asset accumulation model

Variable	Year 1 (1986-87)	Year 3 (1988-89)	t-Statistic (Two-tailed)
Irrigated land owned (acres) (IRLND)	4.17	4.49	-0.53
Rainfed land owned (acres) (RNLND)	5.03	5.03	...
Livestock assets (number of local cow, male and female buffalo, bullock) (LIVE)	4.09	3.82	1.47
	(3.75)	(3.56)	
Agricultural capital (value of tubewell, tractor, machinery) (rupees[a]) (AGRCAP)	7,686.3	8,051.6	-0.21
	(28,482.70)	(37,365.90)	
Nonfarm assets (value of vehicle, shop, building) (rupees) (NONFARM)	11,091.82	7,271.00	1.36
	(60,974.70)	(44,581.06)	
Number of males over 15 years in household (MALE15)	2.62	2.82	-2.65
	(1.63)	(1.48)	
Number of males in household with middle school or higher education (EDUC)	0.78	0.99	-2.97**
	(1.25)	(1.49)	
Age of household head (AGEHH)	43.25	44.83	-1.81
	(16.62)	(16.60)	
Mean per capita household income from internal remittances (rupees[a]) (INTREMIT)	232.79	109.79	5.49**
	(493.39)	(347.85)	
Mean per capita household income from external remittances (rupees[a]) (EXTREMIT)	289.11	202.94	1.35
	(1,448.68)	(928.83)	
Total mean per capita household income (excluding internal and external remittances) (rupees) (TOTINC)	2,763.20	2,757.98	0.03
	(2,667.07)	(3,016.37)	
N = 727 households			

Notes: Standard deviations in parentheses; ** = difference is significant at the 0.01 level.

[a] In 1986, 1 Pakistan Rupee = US$0.062. All rupee figures are in constant 1986 terms.

where

Y_i = ith observation on the dependent variable,

y_i = predicted value of Y, after deleting the ith observation,

H_{ii} = ith diagonal of projection matrix, and

S_i = estimated standard error of OLS residuals.

As a result of this procedure, a small number of observations were omitted from each OLS equation by using the suggested 0.34 DFFITS cutoff.

To test for the possibility of differing marginal propensities to invest for different income groups, the OLS and tobit equations were estimated as follows: (1) with all variables in linear form; (2) with the income variables (that is, internal remittances, external remittances, and total income) expressed in log form. Since zero values cannot be expressed in log form, those income regressors—such as internal or external remittances—with zero quantities were arbitrarily assigned small positive values.

Table 7 presents the results of the model for irrigated land owned (number of acres) (IRLND). Controlling for irrigated land owned in Year 1, part (a) of the table shows that in one out of four cases, internal remittances received in Year 1 have a positive and statistically significant effect on the accumulation on irrigated land in Year 3. Similar findings appear in part (b): in one out of four cases, external remittances received in Year 1 have a positive and significant effect on the accumulation of irrigated land in Year 3.

These results, which parallel those of other studies regarding the propensity of migrants to invest in land,[17] are important. They show that despite the high

[17] In a study of the expenditure patterns of external migrants in rural Egypt, Adams (1991) found that 73 percent of total per capita expenditures on investment by external migrants went into the purchase of agricultural or building land. For similar results in other countries, see Russell

Table 7 Remittances and irrigated land owned (dependent variable: irrigated land owned [IRLND], Year 3)

	Internal Remittances				External Remittances			
INTREM (year 1)	0.001		-0.006					
	(0.667)		(-1.512)					
Ln (INTREM)		0.279		0.237				
		(2.497)*		(0.330)				
EXTREM (year 1)					-0.001		0.001	
					(-0.722)		(0.672)	
Ln (EXTREM)						-0.015		2.219
						(-0.113)		(2.775)**
TOTINC (year 1)	-0.001		0.002		-0.001		0.001	
	(-0.626)		(2.202)*		(-0.587)		(2.014)*	
Ln (TOTINC)		0.300		5.025		0.301		6.352
		(1.190)		(2.431)*		(1.211)		(2.853)**
IRLND (year 1)	-0.070	-0.083	-1.355	-1.264	-0.071	-0.080	-1.338	-1.256
	(-2.418)*	(-2.916)**	(-3.894)**	(-3.771)**	(-2.406)*	(-2.852)**	(-3.851)**	(-3.706)**
MALE15 (year 1)	-0.456	-0.578	-4.764	-5.192	-0.441	-0.442	-4.953	-5.403
	(-1.992)*	(-2.462)*	(-2.892)**	(-3.133)**	(-1.932)*	(-1.939)*	(-2.996)**	(-3.234)**
EDUC (year 1)	1.396	1.575	12.050	12.127	1.445	1.397	11.727	11.245
	(5.151)**	(5.697)**	(6.662)**	(6.669)**	(5.218)**	(5.051)**	(6.379)**	(6.128)**
AGEHH (year 1)	0.016	0.011	0.110	0.130	0.013	0.012	0.145	0.334
	(0.255)	(0.169)	(0.263)	(0.310)	(0.195)	(0.185)	(0.343)	(0.438)
AGEHHSQ	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-0.001
	(0.497)	(0.663)	(0.229)	(0.142)	(0.548)	(0.543)	(0.130)	(-0.318)
SIGMA			40.136	40.252			40.279	40.374
			(19.135)**	(19.165)**			(19.117)**	(19.154)**
CON	1.988	-0.957	-31.201	-65.641	2.119	-0.251	-32.296	-80.188
	(1.451)	(-0.409)	(-3.437)**	(-3.708)**	(1.539)	(-0.110)	(-3.500)**	(-4.158)**
Est method	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
Adjusted R square	0.049	0.064			0.049	0.050		
Log likelihood			-1,304.9	-1,304.5			-1,305.9	-1,300.7
F-statistic	6.3	8.0			6.3	6.4		
N	715	716	727	727	715	715	727	727

Notes: Numbers in parentheses are t-statistics (two-tailed); * = significant at the 0.10 level; ** = significant at the 0.01 level.

(1986).

cost of irrigated land—for example, an estimated 55,000 rupees (US$3,420) per acre in Punjab Province—internal and external remittances can and *do* lead to rural asset accumulation, in this case, land accumulation. Indeed, in the sample, the high cost of irrigated land means that only those households with either large remittance income or large savings are able to buy more irrigated land during the short time span (two years) covered by the model. In this vein, it is interesting to note that in all of the tobit equations in Table 7, the total household income variable (excluding remittances) (TOTINC) has a positive and statistically significant effect on the accumulation of irrigated land. In rural Pakistan, households with the financial means to do so tend to invest in irrigated land: not only are the rates of return on such investment high, but increased landownership bears an important element of social prestige.

Table 8 reports the model results for rainfed land owned (number of acres) (RNLND). The table reveals that internal and external remittances have different effects on the accumulation of rainfed land. Controlling for rainfed land owned in Year 1, part (a) of the table shows that in one out of four cases, internal remittances received in Year 1 has a *negative* and significant effect on the accumulation of rainfed land in Year 3. However, part (b) of the table reveals that in two out of four cases, external remittances have a positive and significant effect on the accumulation of rainfed land in Year 3. The results for external remittances are consistent with those of the previous table and reflect the desire of external migrants to invest in land. The results for external remittances may also reflect the greater ability of external migrants—as compared to internal migrants—to buy land. For example, as shown in Table 3, on average, external migrant households receive almost four times as much mean per capita income from remittances than internal migrant households (1,537 rupees per year versus 409 rupees per year).

Table 8 Remittances and rainfed land owned (dependent variable: rainfed land owned [RNLND], Year 3)

	Internal Remittances				External Remittances			
INTREM (year 1)	-0.001		-0.001					
	(-1.878)*		(-0.303)					
Ln (INTREM)		-0.020		-0.008				
		(-0.512)		(-0.054)				
EXTREM (year 1)					0.001		0.001	
					(0.007)		(1.890)*	
Ln (EXTREM)						-0.026		0.618
						(-0.527)		(3.940)**
TOTINC (year 1)	0.001		-0.001		0.002		-0.001	
	(0.959)		(-2.256)*		(0.624)		(-2.094)*	
Ln (TOTINC)		0.032		-0.067		0.028		0.210
		(0.358)		(-0.188)		(0.318)		(0.558)
RNLDN (year 1)	0.951	0.953	1.095	1.086	0.952	0.952	1.097	1.088
	(147.291)**	(145.907)**	(62.132)**	(64.101)**	(145.984)**	(145.979)**	(62.462)**	(64.406)**
MALE15 (year 1)	0.012	-0.014	-1.251	-1.186	-0.017	-0.018	-1.263	-1.275
	(0.149)	(-0.171)	(-3.627)**	(-3.498)**	(-0.217)	(-0.228)	(-3.673)**	(-3.725)**
EDUC (year 1)	0.049	0.056	1.742	1.653	0.058	0.074	1.606	1.411
	(0.504)	(0.572)	(4.685)**	(4.522)**	(0.580)	(0.733)	(4.255)**	(3.808)**
AGEHH (year 1)	-0.010	-0.007	0.007	-0.006	-0.007	-0.008	0.023	0.053
	(-0.449)	(-0.299)	(0.091)	(-0.072)	(-0.328)	(-0.361)	(0.279)	(0.622)
AGEHHSQ	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.608)	(0.492)	(0.734)	(0.894)	(0.522)	(0.556)	(0.579)	(0.209)
SIGMA			7.908	7.869			7.883	7.837
			(20.749)**	(20.804)**			(20.770)**	(20.856)**
CON	0.034	-0.148	-6.511	-6.920	-0.019	-0.136	-7.056	-10.444
	(0.069)	(-0.180)	(-3.554)**	(-2.186)*	(-0.040)	(-0.165)	(-3.787)**	(-3.071)**
Est method	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
Adjusted R square	0.969	0.968			0.968	0.968		
Log likelihood			-909.9	-913.2			-908.3	-905.3
F-statistic	3,240.2	3,178.1			3,178.0	3,178.2		
N	722	723	727	727	723	723	727	727

Notes: Numbers in parentheses are t-statistics (two-tailed); * = significant at the 0.10 level; ** = significant at the 0.01 level.

Considered together, the results of Tables 7 and 8 suggest that external remittances may have the undesirable effect of increasing land accumulation by the rich in rural Pakistan. As shown in Table 3, in this data set, households receiving external remittances have higher mean incomes than either internal migrant households or nonmigrant households. Over time, then, external remittances could increase inequality by worsening the already skewed distribution of one of the main sources of income in rural Pakistan: land.[18] This is a disturbing finding, but one that is consistent with the results of the income decomposition analysis reported above.

Table 9 reports the model results for livestock assets (number of local cow, male and female buffalo, bullock) (LIVE). Initially, one might expect that internal and external migrants would invest their remittance earnings in livestock: in the past, numerous studies have found that livestock represents a key asset in the portfolios of most rural households.[19] For these reasons, it is somewhat disappointing to note that *neither* type of remittances received in Year 1 have a statistically significant effect on the accumulation of livestock assets in Year 3. In both parts of the table, the model is dominated by the coefficients for three variables: livestock assets in Year 1 (LIVE), number of household males (MALE15), and number of educated males (EDUC). The relative importance of the last two variables is interesting. Evidently, the number of household males and their level of education has a more important effect on the accumulation of livestock assets than the presence of remittance income.

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[18] The distribution of landownership in rural Pakistan is quite unequal. In this data set, the Gini coefficient of landownership (including irrigated and rainfed land) is 0.769. This figure is quite similar to the Gini coefficient of landownership reported by Ercelawn (1984) for rural Pakistan as a whole: 0.780. In this data set, landownership and income are highly correlated: a simple correlation between landownership and total three-year mean per capita income is positive and significant at the 0.01 level.

[19] For example, see Rosenzweig and Wolpin (1993) and Singh (1990).

Table 9 Remittances and livestock assets (dependent variable: livestock assets [LIVE], Year 3)

	Internal Remittances				External Remittances			
INTREM (year 1)	-0.001		-0.001					
	(-1.003)		(-0.494)					
Ln (INTREM)		-0.012		-0.021				
		(-0.412)		(-0.552)				
EXTREM (year 1)					0.001		0.001	
					(0.213)		(1.003)	
Ln (EXTREM)						-0.002		0.020
						(-0.054)		(0.412)
TOTINC (year 1)	0.001		0.001		0.001		0.001	
	(0.204)		(1.699)*		(0.722)		(1.730)*	
Ln (TOTINC)		0.235		0.231		0.239		0.239
		(3.294)**		(2.579)**		(3.332)**		(2.648)**
LIVE (year 1)	0.644	0.631	0.771	0.769	0.642	0.624	0.773	0.770
	(27.165)**	(27.067)**	(25.591)**	(25.835)**	(27.077)**	(26.717)**	(25.593)**	(25.757)**
MALE15 (year 1)	0.278	0.280	0.349	0.341	0.279	0.273	0.344	0.334
	(4.191)**	(4.203)**	(4.236)**	(4.148)**	(4.199)**	(4.155)**	(4.193)**	(4.086)**
EDUC (year 1)	-0.266	-0.260	-0.213	-0.212	-0.267	-0.253	-0.236	-0.215
	(-3.510)**	(-3.446)**	(-2.244)*	(-2.232)*	(-3.459)**	(-3.308)**	(-2.422)*	(-2.223)*
AGEHH (year 1)	-0.020	-0.023	-0.052	-0.049	-0.222	-0.022	-0.050	-0.048
	(-1.078)	(-1.278)	(-2.189)*	(-2.117)*	(-1.198)	(-1.171)	(-2.115)*	(-2.036)*
AGEHHSQ	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.728)	(0.926)	(2.026)*	(1.941)*	(0.922)	(0.770)	(1.965)*	(1.867)*
SIGMA			2.759	2.750			2.759	2.751
			(32.626)**	(32.633)**			(32.633)**	(32.636)**
CON	1.097	-0.531	0.374	-1.132	1.025	-0.575	0.311	-1.284
	(2.748)**	(-0.814)	(0.738)	(-1.370)	(2.553)*	(-0.880)	(0.608)	(-1.540)
Est method	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
Adjusted R square	0.566	0.567			0.566	0.563		
Log likelihood			-1,511.3	-1,509.2			-1,511.3	-1,509.2
F-statistic	133.7	134.8			133.9	132.2		
N	714	715	727	727	715	714	727	727

Notes: Numbers in parentheses are t-statistics (two-tailed); * = significant at the 0.10 level; ** = significant at the 0.01 level.

Table 10 reports the results of the model for agricultural capital (value of tubewell, tractor, machinery) (AGRCAP). The table reveals that internal and external remittances have different effects on the accumulation of agricultural capital. Part (a) of the table shows that in three out of four cases, internal remittances received in Year 1 has a positive and significant effect on the accumulation of agricultural capital in Year 3. However, part (b) of the table reveals that in one out of four cases, external remittances received in Year 1 has a *negative* and significant effect on the accumulation of agricultural capital in Year 3.

The results of Table 10 are suggestive. Since internal remittances tend to go to the poorer elements of the income distribution, over time such increases in agricultural capital could help counteract the disturbing trend in land accumulation by upper-income groups noted above. In this data set, households receiving internal remittances are, on average, both "poorer" than those receiving external remittances and they receive smaller amounts of income from remittances (Table 3). Despite these constraints, internal migrant houses can and do invest in rural assets; they both invest in an expensive and lumpy asset like irrigated land (Table 7) and they also invest in a more inexpensive and divisible asset like agricultural capital.

One reason why internal migrant households tend to invest in agricultural capital can be seen in Table 3. Row (4) of Table 3 shows that, on average, internal migrant households receive much more of their total household income from agriculture than external migrant households. Internal migrant households thus have an incentive to invest in agriculture, *especially* in those more affordable agricultural assets like tubewells, tractors, and farm machinery.

Table 10 Remittances and agricultural capital (dependent variable: agricultural capital [AGRCAP], Year 3)

	Internal Remittances				External Remittances			
INTREM (year 1)	0.384		13.011					
	(0.333)		(5.102)**					
Ln (INTREM)		590.851		1,590.38				
		(3.002)**		(3.389)**				
EXTREM (year 1)					-0.629		0.366	
					(-1.519)		(0.410)	
Ln (EXTREM)						-477.257		-614.916
						(-1.794)*		(-1.036)
TOTINC (year 1)	0.287		1.051		0.401		1.557	
	(1.465)		(2.159)*		(1.792)*		(3.208)**	
Ln (TOTINC		352.352		845.50		644.517		442.866
		(0.804)		(0.821)		(1.375)		(0.422)
AGRCAP (year 1)	0.492	0.503	0.779	0.782	0.482	0.498	0.761	0.778
	(23.713)**	(22.834)**	(17.598)**	(17.379)**	(20.403)**	(21.254)**	(16.931)**	(17.154)**
MALE15 (year 1)	479.835	383.565	1,310.02	1,206.65	562.723	311.868	1,777.38	1,702.21
	(1.231)	(0.922)	(1.386)	(1.247)	(1.278)	(0.714)	(1.855)*	(1.763)*
EDUC (year 1)	-689.110	-328.637	2,329.01	3,158.05	-473.738	-341.337	2,454.53	3,007.66
	(-1.484)	(-0.664)	(2.048)*	(2.720)**	(-0.878)	(-0.638)	(2.073)*	(2.528)*
AGEHH (year 1)	-70.768	-62.772	-197.281	-172.664	-65.249	-31.448	-222.124	-214.886
	(-0.645)	(-0.539)	(-0.723)	(-0.623)	(-0.522)	(-0.253)	(-0.798)	(-0.762)
AGEHHSQ	0.281	-0.016	-0.512	-0.616	-0.021	-0.517	-0.106	--0.193
	(0.225)	(-0.012)	(-0.163)	(-0.193)	(-0.015)	(-0.363)	(-0.033)	(-0.060)
SIGMA			32,451.1	33,054.9			33,070.8	33,310.8
			(34.162)**	(34.131)**			(34.124)**	(34.117)**
CON	1,022.357	-2,018.225	-4,596.59	-11,010.7	1,439.303	-2,065.514	-4,079.10	-3,013.64
	(0.445)	(-0.495)	(-0.808)	(-1.147)	(0.549)	(-0.476)	(-0.700)	(-0.309)
Est method	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
Adjusted R square	0.455	0.435			0.384	0.399		
Log likelihood			-7,058.1	-7,070.0			-7,070.8	-7,075.1
F-statistic	85.6	79.1			64.3	68.5		
N	709	711	727	727	711	711	727	727

Notes: Numbers in parentheses are t-statistics (two-tailed); * = significant at the 0.10 level; ** = significant at the 0.01 level.

Table 11 reports the model results for nonfarm assets (value of vehicle, shop, or business, and building outside of village) (NONFARM). In part (a) of the table, the findings for internal remittances are rather puzzling. Controlling for nonfarm assets owned in Year 1, the data show that in two out of four cases, internal remittances have a *negative* and significant effect on the accumulation of nonfarm assets in Year 3. The reasons for this outcome are unclear, but may be related to the phenomena noted above. Since internal migrant households receive more of their household income from agriculture than external migrant households, they may have an incentive to invest in agricultural capital and to "disinvest" in nonfarm assets. If this hypothesis is correct, households receiving external remittances should display a greater incentive to invest in nonfarm assets. Part (b) of Table 11 provides some support for this hypothesis: two of the four results show that external remittances received in Year 1 have a positive and significant effect on the accumulation of nonfarm assets in Year 3.

6. CONCLUSION

This paper has used longitudinal data from 727 households to examine the direct, first-rounds effects of two types of remittances—internal and external—on income distribution and asset accumulation in rural Pakistan.

With respect to equity, the study finds that internal remittances have a positive effect on income distribution, and that external remittances have a negative effect. Internal remittances are earned mainly by lower-income groups and represent an important component of the incomes of households in the bottom income quintile. As a result, internal remittances account for only a small proportion of overall income inequality: less than 3 percent. Among the seven sources of income identified in this study, only "other income" accounts for a smaller share of overall income inequality. On the other hand, because of the high

Table 11 Remittances and nonfarm assets (dependent variable: nonfarm assets [NONFARM], Year 3)

	Internal Remittances				External Remittances			
INTREM (year 1)	-0.836		-41.452					
	(-0.736)		(-1.994)*					
Ln (INTREM)		-171.754		-5,345.92				
		(-0.989)		(-1.729)*				
EXTREM (year 1)					-0.147		0.433	
					(-0.427)		(0.083)	
Ln (EXTREM)						658.138		5,638.97
						(3.016)**		(1.713)*
TOTINC (year 1)	-0.151		4.099		-0.123		3.094	
	(-0.705)		(1.401)		(-0.671)		(1.062)	
Ln (TOTINC)		152.571		16,493.2		349.167		20,207.8
		(0.394)		(1.811)*		(0.899)		(2.111)*
NONFARM (year 1)	0.012	0.012	0.291	0.286	0.002	0.008	0.317	0.297
	(1.006)	(1.206)	(2.949)**	(2.893)**	(0.199)	(0.887)	(3.194)**	(3.022)**
MALE15 (year 1)	-209.934	-81.659	-1,365.10	-1,236.49	-477.648	-163.854	-1,900.50	-2,964.05
	(-0.494)	(-0.222)	(-2.892)	(-0.197)	(-1.300)	(-0.451)	(-0.302)	(-0.470)
EDUC (year 1)	1,343.309	1,387.591	28,863.7	27,537.7	1,348.405	1,164.473	27,673.5	26,228.0
	(2.646)**	(3.171)**	(3.999)**	(3.858)**	(3.008)**	(2.634)**	(3.791)**	(3.617)**
AGEHH (year 1)	103.662	64.321	7,248.11	7,242.94	171.850	107.614	6,992.54	7,500.72
	(0.862)	(0.621)	(2.264)*	(2.269)*	(1.644)	(1.035)	(2.205)*	(2.346)*
AGEHHSQ	-0.716	-0.486	-65.773	-66.690	-1.488	-0.980	-63.496	-69.140
	(-0.520)	(-0.411)	(-1.966)*	(-1.998)*	(-1.244)	(-0.824)	(-1.914)*	(-2.069)*
SIGMA			140,283.0	139,905.0			141,583.0	140,541.0
			(12.770)**	(12.780)**			(12.737)**	(12.780)**
CON	198.191	-477.450	-373,173.0	-476,803.0	-938.293	-3,394.434	-371,747.0	-526,486.0
	(0.079)	(-0.132)	(-4.738)**	(-4.409)**	(-0.428)	(-0.940)	(-4.760)**	(-4.702)**
Est method	OLS	OLS	Tobit	Tobit	OLS	OLS	Tobit	Tobit
Adjusted R square	0.009	0.017			0.010	0.028		
Log likelihood			-1,477.7	-1,477.1			-1,480.1	-1,477.3
F-statistic	1.9	2.8			2.0	3.9		
N	718	717	727	727	716	717	727	727

Notes: Numbers in parentheses are t-statistics (two-tailed); * = significant at the 0.10 level; ** = significant at the 0.01 level.

"entry costs" to external migration in Pakistan, external remittances are earned mainly by upper-income groups. As a result, external remittances represent an inequality-increasing source of income and account for a moderate share (12 percent) of overall income inequality.

With respect to rural assets, the study shows that remittance income can and *does* play a role in rural asset accumulation. To be sure, the model results show that other variables—such as assets held in Year 1, number of educated household males, and total household income (excluding remittances)—have a more important statistical effect on rural asset accumulation than remittance income. Nevertheless, controlling for assets held in Year 1, the model results show that external remittances received in Year 1 have a positive and statistically significant effect on the accumulation of two types of land assets in Year 3: irrigated land owned and rainfed land owned. Since households receiving external remittances in this data set have, on average, higher mean per capita incomes than either internal migrant or nonmigrant households, over time, this process could exacerbate inequality by worsening the distribution of one of the main sources of income in rural Pakistan: land.

For internal remittances, the results show that when controlling for assets held in Year 1, internal remittances received in Year 1 have a positive and significant effect on the accumulation of agricultural capital (value of tubewell, tractor, machinery) in Year 3. Since internal remittances tend to go to the poorer elements of the income distribution, over time such increases in agricultural capital could help counteract the disturbing trends in land accumulation by upper-income groups.

Nevertheless, from the standpoint of equity and income distribution, policymakers in Pakistan would be well-advised to take steps to encourage internal migration and to more carefully consider the consequences of external migration. Internal remittances have a positive effect on both rural income distribution and rural asset accumulation. By means of contrast, external remittances have a negative effect on income distribution and may lead to a process of rural land accumulation by the rich.

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