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Migration, Remittances, and the Family*

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I. Introduction

The importance of remittances in the development process is due to a number of factors: first, the scale and pace of rural-to-urban migration; second, the magnitude of urban-to-rural remittances—urban-to-rural remittances are usually transferred over quite a considerable period of time and amount to 10%–30% of migrants' income;¹ third, the widespread interest in transfers of incomes and in mechanisms that generate changes in the distribution of income; fourth, the impact of remittances on the resource constraint in the economy at large where savings are suboptimal and, in particular, in the agricultural sector, especially with respect to technological change in agricultural production;² and fifth, the role of children as migrants enhancing returns to the bearing and rearing of children.³

In spite of these factors, no comprehensive theory of urban-to-rural remittances exists. The need for at least some analytical clues regarding observed phenomena has partly been met by a number of recent studies that provide useful descriptive evidence and regression analyses.⁴ But these endeavors fall short of a complete theory generating testable hypotheses. We have no rigorously derived answers to basic questions such as, Why do migrants remit? Why do some migrants remit much more than others? Why do some migrants remit for a long period of time, others for a relatively short one? Why do remitting migrants stop remitting?

The theory developed below views remittances as part of, or one clause in, a migrant family's self-enforcing, cooperative, contractual arrangement. Indeed, the act of migration itself is an element in this contractual arrangement. In order to understand urban-to-rural remittances, it is necessary to understand the migrant-family contract and its

properties. In Section II the migrant-family contractual arrangement is taken as given, and the main interest is in issues of self-enforcement. The topic of what determines the precise contractual arrangement the parties eventually strike and, in particular, what determines its remittances provision is taken up in Section III. Tests on several specific implications are presented in Section IV, using household survey data from Botswana, and concluding remarks are offered in Section V.

II. Rural-to-Urban Migration and Urban-to-Rural Remittances as Elements in a Self-enforcing, Cooperative, Contractual Arrangement

The relation between the modal rural-to-urban migrating unit in the LDCs—a young, single family member—and the rest of his family are modeled through a cooperative contractual arrangement. The migrant and the family enter into a voluntary contractual arrangement with each other because they expect to be better off with the contractual arrangement than without it.⁵ Furthermore, the migrant expects to be better off by covering a given set of transactions or contingencies through an agreement with his family rather than with a third party, and likewise from the family's point of view. Although the term "contract" is applied here to such understandings, this is not meant necessarily to imply any explicit form or even terms: indeed, a less formal understanding may well be strengthened precisely by retaining greater flexibility.

Since the assumption here is that such a contractual arrangement covers a series of transactions that stretch over time, the migrant or the family may find it worthwhile to breach the contractual arrangement after it has run its course for some time. In principle, two mechanisms can deter violation: (a) an institution other than the two parties to the agreement, for example, the legal powers of the state; and (b) a calculation that the loss (e.g., due to reprisal) entailed by such a breach outweighs the benefits. We shall rule out the first deterring device for the problem at hand and identify conditions under which, at any point in time, a migrant-family contractual arrangement will be self-enforcing.

Each party is assumed to face an income-time profile such that a higher risk has to be incurred first, whereas the increased benefit accrues subsequently. Each party can adopt an income-generating, expected income-increasing technology but is deterred from doing so by the high degree of the initial subjective risk associated with the generation of income through that technology. Thus each party is assumed to be risk averse.

Consider the migrant. On migrating, risks are at first very high: entry attempts into high-paying sectors may fail; entry into low-paying

sectors, which may be relatively easy, entails high probability of discontinuity of employment due to the high sensitivity of these sectors to market fluctuations; and there is, of course, the distinct possibility of involuntary unemployment. But as the migrant establishes himself, obtains more secure employment, and accumulates location-specific capital, the risks associated with urban employment and future urban earnings typically diminish.⁶ Next, consider the family. We assume that its desire to adopt a new production technology in agriculture (high-yield varieties, for example) is strong but that the high-risk content of this technology acts as a deterrent. To facilitate technological transformation, it is thus necessary to resolve the familial aversion to the risk inherent in pursuing an initially risk-increasing strategy.

Assume that urban and rural incomes do not move in tandem, that both the head of the family and the migrant are unable (sufficiently) to self-insure, cannot make insurance-type arrangements with a third party, and, in particular, cannot insure against the increased risk in the marketplace. Provision of the required insurance may be impossible if markets are incomplete or the transaction costs of purchasing any insurance on the open market may be prohibitive. It is beyond the scope of the present paper to explore the reasons why insurance markets for particular risks do not come into existence, but it is likely that the very nature of the particular risks described here (association with future earnings) contributes to this paucity.⁷

Given this assumption, can the parties turn to each other and act, in turn, as insurer and insuree? Consider the following arrangement. In the period immediately following migration, the migrant—the insuree—receives a less variable set of outcomes; the head of the family, who acts as the insurer, a somewhat more variable set of outcomes (in comparison to what each party would have received in the absence of such an exchange). In the next period, when the migrant has established himself in the urban sector, he acts as insurer. The head of the family—now the insuree—introduces technological change on the family farm, a risk-increasing venture, but, because the migrant is acting as the insurer, the head of the family receives a less variable set of net outcomes. The parties can have identical attitudes toward risk, but, because of the difference in their time profile of risks, their behavior is analogous to what it would have been had they differed in their attitudes toward risk. Thus, in the period following migration, the head of the family may offer to pay the migrant a certain amount, often revealed through rural-to-urban remittances, under certain conditions (the event of unemployment). In return, once established, the migrant accepts a lower expected payoff because of his remitting to his family in the rural sector. Urban-to-rural remittances can thus be interpreted as delayed payment of a premium for the insurance taken up by the

migrant in the first period and/or as a transfer of the insurance payment to the head of the family once the rural unfavorable state of nature has occurred.

Whereas none of the parties would have been able to bear the risk of failure alone, the exchange of risks permits the parties to engage in activities that are highly risky in the short run. This would not have been otherwise undertaken. Although each party has first to incur the higher risk in order to be able to reap increased benefit in the future, it incurs the higher risk while the other party is in a relatively less risky state. This is what we have in mind when we refer to a mutually advantageous cooperative agreement.

Note that this example illustrates the unusual flexibility and resourcefulness of the family unit—not only in overcoming market deficiencies but also in overcoming inherent scale deficiencies. The family whose capacity to spread risks is constrained by its limited *size* enlarges scale via broadening the relevant *space*; inability to realize scale economies is thus ameliorated via ability to realize space or scope economies. Migration of a family member facilitates effective pooling of risks and insurance in both alleviating the size constraint and gaining access to independence of risks.⁸

An obvious difficulty in this example has to do with adherence. Once reached, will the contractual arrangement be binding? Will it be worthwhile to one party to deviate from a contractual arrangement even if the other party immediately detects the violation, interprets it as a fundamental breach, and terminates the agreement, inflicting a cost on the violator? In our example, after being supported by his family while pursuing the short-run risky urban employment strategy and succeeding, the migrant may decide to retain all urban-earned income and withdraw his commitment to act as a reliable insurer. Will he?

Since our interest in this paper is whether the migrant will fulfill the remittances provision of the contractual arrangement, we shall try to identify conditions under which he will find it advantageous to adhere to his commitments. The argument that the family will find adherence a rewarding strategy is symmetrical.

A migrant will violate his agreement at any moment only if his discounted, net expected benefits from the arrangement are negative. If we assume that the family would have discontinued the arrangement prior to this if they did not consider themselves net gainers, then violation of the agreement by the migrant would clearly impose a loss on the family.

But part of the benefits perceived by the migrant may stem from his altruism toward his family. Thus, avoiding imposing a cost on the family may benefit the migrant and encourage continuation of the arrangement. Hence, altruism may either reinforce an already self-

enforcing contractual arrangement or may be the sine qua non of the agreement.⁹

This is a convenient point for a moment's reflection. When the nature of the transactions the parties wish to enter into is such that intertemporal transfers and intertemporal contracts must be involved, the parties will be duly concerned about the issue of enforcement. This concern would lead to preference for a partner with whom a contract will be (more) self-enforceable. Both migrant and family are endowed with a highly specific asset: mutual altruism. The value of this asset is realized when they trade with each other but would be lost if they were to enter into an exchange relationship with a third party. As it enforces a self-enforcing contractual arrangement, altruism reduces the need for costly contractual safeguards. Other things being equal, it thus renders a migrant-family contractual arrangement more cost efficient than alternative contractual arrangements. In creating an effect similar to trust or loyalty, altruism assists the parties in solving problems that emerge when legally enforced property rights and contingent contracts cannot be written.¹⁰

But since both migrant and family gain more from a lower-transaction costs contractual arrangement with each other than from one with a third party, they should be willing to give more to each other than to a third party. Hence the migrant furnishes his family with more remittances, the family furnishes the migrant with more insurance, and so forth. Thus, in terms of our trade-in-risks example, we now clearly see that the migrant and the family have an incentive to turn to each other even when the set of alternative parties is not empty. By entering into an exchange agreement with each other, they are relatively assured about fulfillment of the provisions of this exchange.

Now that we have noted the reinforcing effect of altruism, we may briefly check how crucial it is in generating the continuity properties of the exchange relation, how stable it is as an intertemporal self-enforcing device.

We have not yet said much about the nature of altruism. It is perhaps reasonable to assume that, in general, altruism will wane through time. This waning of the migrant's altruistic motive would then tend to weaken the self-enforcing property of the migrant-family contractual arrangement. However, since, as in our example, the value of the insurance benefits to the family may rise over time, the altruism-generated reinforcement mechanism may not break down even if the altruism weight itself declines.

III. Striking the Migrant-Family Contractual Arrangement

Beyond any altruistic concerns, there are a number of reasons why the migrant may derive utility from an arrangement with his family. First, though immune to the vagaries of weather that strongly affect agricul-

ture, urban labor markets are often subject to upheavals brought about by economic cycles. Some urban subsectors (e.g., construction) are more vulnerable than others. It is fairly likely that for quite a long period of time the migrant will belong to these, rather than to more secure subsectors. Familial support when the downswing hits hard could be quite important. Intertemporally provided family insurance is an invaluable hedge against the not too steady, sometimes even turbulent, urban labor markets. Moreover, the migrant may wish to reduce his vulnerability through enhanced labor mobility that could involve voluntary layoff, intensive job search, and lapse in employment. Engagement in such an attempt may crucially depend on tacit or explicit familial support.

Second, there are numerous indications that, for quite a long period of time after moving to the urban sector, migrants retain a strong degree of identification, allegiance, and social connectedness with their village of origin.¹¹ Their social status and prestige depend on their standing in their home village, over which a migrant's family exercises great power. It may even hold a natural monopoly position in determining the migrant's standing. This empowers the family to provide or deny the migrant an asset, albeit an intangible one.

Third, the family—or more precisely, the head of the family—usually keeps tight control over the family's rural property. Bequests are normally deferred to a very late stage in life. The deed to the family land is usually not passed on before the head of the family dies or becomes too old to support himself. Claims by a migrant to family property rights are likelier when the family farm is subjected to technological advance that, as intimated in the example of Section II, may have been facilitated by the migrant himself.

We thus see how the family may continue to be a source of economic security, emotional satisfaction, and tangible assets to the migrant long past his departure for the urban sector. In addition, the migrant is often supported by his family during his formal education, perhaps both before and after leaving home. Again, this undertaking may be seen as a component in an intertemporal understanding: the family makes the initial sacrifice; the migrant benefits from augmented subsequent earnings; the family is recompensed through remittances.

Hence, there is a set of reasons why the migrant may, in principle, be willing to commit himself to the transfer of remittances. But it is the fact that the sequencing of net gains to migrant and family may thus oscillate intertemporally, which provides for self-enforcement even beyond altruistic concerns. Indeed, the sequencing of certain events may well be viewed as endogenous to the enforcement of the long-term understanding.

For example, with respect to disposition of family property, the head of the family has the last word—he controls the last action taken

in a temporal sequence. Realizing that the head of the family will react at a later stage, the migrant will be induced to condition his prior behavior. In a different context, a similar point has been made by Becker and Hirschleifer.¹² However, what they both capture may be a necessary but not a sufficient condition. For suppose that the migrant knows with certainty when the head of the family will die and that bequests, assumed throughout to be conditioned on behavior, are made by the head of the family immediately before his death. The migrant may decide not to remit until a short while prior to that date and only then make up for his "rotten" behavior. The threat of reprisal under full certainty concerning the timing of bequests cannot then guarantee the desired conduct will occur in the preferred time periods. What may help to ensure such conduct is if the migrant does not know in advance when bequests are going to be made. In every period there is a positive probability that the decisions concerning bequests will be made in the subsequent period. Therefore, in terms of the contractual arrangement reached between himself and his family, in each and every moment in time the migrant is bound to be "in the black."¹³

In principle, several contractual arrangements could be Pareto efficient, that is to say, neither of the parties is worse off and at least one of them is better off with the contractual arrangement than without it. How then do the migrant and family agree on one particular arrangement?

The choice between the many feasible equilibrium points is a matter of bargaining between the migrant and the family. The parties use their bargaining power in pursuit of their self-interests. There is absolutely no contradiction between this and our mutual altruism assumption of Section II. Each party prefers the contractual arrangement that best suits its interests, which include anything, both selfish and altruistic, to which its utility function assigns positive utility. This implies that in some sense the outcome of the bargaining process is a reflection of the relative bargaining powers of the parties.

The bargaining power of each party depends, in turn, on the utility with which it can provide the other, on the cost it will incur in providing this utility, and on its willingness to risk a conflict. This ties in nicely with our trade-in-risks example. If the migrant considers his entry into the urban labor market highly risky, he would attach a high value to the family-provided insurance and would be less willing to risk conflict with, or more willing to make concessions to, the family. Similarly, if the subjective risk that the family associates with a new technology is high, the family would be willing to go quite a long way in appeasing the migrant in order to gain his agreement to act as insurer.

It is now easy to see how this approach furnishes predictions about remittances. Since the outcome, the contractual arrangement the parties strike, reflects their bargaining powers, variables enhancing the

bargaining power of the family or weakening that of the migrant will positively influence the magnitude of migrant-to-family remittances, and variables enhancing the bargaining power of the migrant or weakening that of the family will affect them negatively. Highly valued family property, unstable urban labor markets, capital markets requiring reliance on the family to finance education, and close social cohesion illustrate the former. Tight rural insurance (financial) markets, great dependence of the new agricultural technology on specific and indivisible investments, and high subjective and objective risk associated with the new technology illustrate the latter.

IV. Empirical Illustrations from Botswana

In this section, some empirical illustrations are provided of selected aspects of hypothesized intertemporal understandings sustained between the migrant and the family group. In particular, evidence relating to the notions of coinsurance, repayment of schooling costs, and of behavior conditioned by a concern to inherit is presented. The data are from the National Migration Survey (NMS) conducted in Botswana in 1978–79.¹⁴

The remittances examined are amounts received in cash and kind at rural homes from each adult reported absent from that home. Each observation is one adult with a total of 3,179 adults in the sample. In each of the following regressions, the dependent variable is logarithm of monthly remittances, measured in pula averaged over the number of rounds in which the person was absent.¹⁵ If no remittances occurred, the dependent variable is set equal to zero.

Results on Repayment of School Costs

To test whether remittances are part of an intertemporal understanding to recompense the family for initial sacrifices during the migrant's schooling, it is essential to distinguish groups for whom the family has made such sacrifices. This distinction cannot be made definitively from the NMS data or, indeed, from most household surveys. But groups for whom the costs of schooling are more likely to have been borne by the migrant's family may be defined. In the present context, the more likely group is assumed to consist of children of the household head (or his or her spouse), grandchildren, and nieces and nephews, as opposed to all others (parents, grandparents, uncles and aunts, brothers and sisters, cousins, sons and daughters-in-law, unrelated individuals, the household head him- or herself, etc.). In table 1 the former group is labeled "own young," the remainder "others." The *t*-statistics for a zero null hypothesis appear in parentheses beneath estimated coefficients. The first four columns report results for all absentees, no matter whether in urban or rural areas; the last four columns are for urban absentees only.

TABLE 1
REPAYMENT OF SCHOOLING COSTS

	ALL ABSENTEES						URBAN ABSENTEES ONLY					
	Male			Female			Male			Female		
	Own Young	Others	Own Young	Others	Own Young	Others	Own Young	Others	Own Young	Others	Own Young	Others
Intercept	-.228 (.78)	-.272 (.40)	-1.113 (3.04)	-.750 (1.28)	-.032 (.09)	-.483 (.51)	-.974 (2.22)	-.336 (.35)				
Years of schooling	.071 (4.26)	.112 (3.26)	.114 (5.06)	-.039 (.97)	.012 (.41)	-.075 (.96)	.126 (3.01)	-.033 (.34)				
Years since leaving school	.022 (1.05)	.071 (1.63)	.088 (2.85)	-.099 (2.53)	.021 (.75)	-.079 (1.29)	.091 (2.21)	.082 (1.20)				
Years since leaving school squared	-.0003 (.73)	-.0008 (.99)	-.0014 (1.83)	-.0017 (2.39)	-.0003 (.50)	-.0007 (.66)	-.0013 (1.28)	-.0013 (.99)				
Statistical hazard rate	27.3 (2.21)	34.2 (1.01)	28.5 (1.53)	2.02 (.06)	66.4 (2.53)	-13.8 (.15)	11.3 (.26)	-5.5 (.05)				
R ²	.08	.09	.14	.08	.05	.09	.13	.19				
F-statistic	12.6	5.1	12.4	1.7	5.3	2.3	7.0	1.4				
No. observations	594	220	303	82	379	99	195	27				

NOTE.—Dependent variable = logarithm of monthly remittances (truncated at zero). "Own young" = children of the household head or his or her spouse. "Others" = everyone else. *t*-statistics for a zero null hypothesis are in parentheses.

Remittances do tend to rise with the level of education in most cases in table 1.¹⁶ But this is not surprising, for wages also rise with education. This is certainly not sufficient by itself to support a hypothesis of repaying school costs, though elsewhere it has been taken to be so.¹⁷ The appropriate test is, rather, whether the coefficient on schooling is greater among own young than among others. For female absentees, both urban and overall, this difference is indeed positive in table 1, and a hypothesis of no difference is rejected at a 10% significance level, but for males the difference is indistinguishable from zero. At least for females, there is thus significant support for a hypothesis that the family invests in the education of its own young in return for an implicit understanding of subsequent remittance.

Moreover, among females the significant parabolic profile of remittances with years transpired since leaving school might suggest an ending to an agreement to repay. But, in fact, this is implausible. The turning point of the estimated parabola comes only 30–35 years after leaving school, and the turning point is almost identical for own young and others. Nor, if the equation is extended to include an interaction between years of school and time lapsed since school, does any obvious interaction or shift in turning point emerge.

It remains quite plausible that the family does educate its girls, in particular, with an understanding that the family will be subsequently recompensed. However, there is no clear evidence to suggest a time profile or deadline on such arrangements.

Aspiration to Inherit

Inheritance customs and laws among the Batswana are neither universal nor immutable. Practices vary from tribe to tribe and within a given tribe. Indeed, a statistical study of inheritance, whether in Botswana or elsewhere, truly requires a specialized survey, if only to record existence of and links with children who are no longer members of the head's household.

Nonetheless, some limited, suggestive evidence may be obtained from the NMS. On average, sons are more likely to inherit than daughters or other household members, though their inheritance is not assured. It may therefore be asked of the data whether sons (and their spouses) remit more to families with greater amounts of inheritable wealth and whether this differs from practices of daughters (and their spouses) and of others.

This question is explored in table 2. Cattle are the dominant form of inheritable wealth in Botswana. All land (other than towns and freehold farms) is common property of the tribes and is assigned traditionally in *kgotla* (the tribal council) and now by land boards.

In the regressions of table 2, a dummy variable is included for whether the household has a larger cattle herd of more than 20 beasts.¹⁸

TABLE 2
ASPIRATION TO INHERIT

	ALL ABSENTEES				URBAN ABSENTEES ONLY			
	Head and Spouse	Sons and Spouses	Daughters and Spouses	Others	Head and Spouse	Sons and Spouses	Daughters and Spouses	Others
Intercept	.094 (.73)	-.295 (2.65)	-.004 (.04)	-.001 (.01)	.145 (.53)	-.311 (1.71)	.095 (.58)	.061 (.40)
Log absentee's wage ($l\omega$):								
0 < $l\omega$ ≤ 3	.160 (.61)	.182 (.82)	.307 (3.64)	.134 (1.28)	1.541 (1.73)	.398 (1.17)	.442 (3.27)	.053 (.24)
3 < $l\omega$ ≤ 4	1.063 (7.61)	.415 (5.51)	.604 (7.60)	.336 (4.84)	1.456 (3.68)	.501 (3.48)	.672 (5.04)	.445 (2.92)
4 < $l\omega$	1.625 (10.98)	.775 (9.83)	1.138 (10.40)	.753 (7.84)	1.379 (4.19)	.706 (5.01)	1.233 (6.70)	.702 (4.24)
Spouse	-.143 (1.40)	.015 (.16)	-.274 (1.31)	...	-.433 (1.35)	.026 (.14)	-.168 (.33)	...
No. cattle owned > 20	.146 (1.61)	.146 (2.32)	-.148 (2.28)	.079 (1.40)	.374 (1.26)	.195 (1.81)	-.123 (1.04)	.114 (.81)
Head age:								
46-60	.073 (.76)	.120 (1.39)	.052 (.62)	.024 (.31)	.076 (.28)	.203 (1.35)	.071 (.47)	.174 (1.06)
61+	-.034 (.23)	-.037 (.45)	.010 (.12)	-.032 (.54)	.202 (.41)	-.033 (.22)	-.064 (.43)	-.101 (.74)
Statistical hazard rate	.366 (.03)	28.6 (4.47)	12.3 (1.68)	4.79 (.77)	5.69 (.11)	48.2 (3.78)	4.84 (.25)	8.41 (.52)
R ²	.33	.17	.22	.14	.32	.15	.20	.14
F-statistic	28.3	24.3	22.5	13.0	6.4	10.0	8.7	4.3
No. observations	472	977	652	564	117	462	290	192

NOTE.—Dependent variable = logarithm of monthly remittances (truncated at zero). *t*-statistics are in parentheses.

Both overall and from urban areas only, sons do remit more to families with larger herds; the effect passes a 7% significance test. Neither daughters nor "others" remit significantly more to families with larger herds. Moreover, the size of the coefficient on the cattle ownership dummy is larger for sons than for either daughters or "others," and the differential with daughters' behavior is significant at a 5% level though the comparison with others is statistically weaker. Together, these results suggest a particular concern of sons to remit to families with large herds, which is consistent with a strategy to maintain favor in inheritance.

No significant pattern of remittance with respect to age of the household head is found, nor, in an extension of the regressions in table 2, is a significant interaction between age of head and number of cattle discerned. If remittance is to curry favor, it seems that this must be independent of the head's age. This would be consistent with the fact that some cattle are often dispensed long before the head can reasonably expect to die while others are kept as a bequest: it may be essential to sustain favor continuously under such circumstances as discussed in Section III.

Response to Drought

The year of the survey, 1978-79, happened to be a year of serious drought. Such droughts are frequent in Botswana and can be devastating, such as the great drought of the mid-1960s. But Botswana covers a large area, equal to that of Texas or France, and the incidence of drought is not uniform: some areas even receive above normal precipitation during years of drought.

For most of the village areas sampled in the NMS, rainfall for the 1978-79 year is also recorded. An index of drought may then be defined for each village area, so that a higher value of the index indicates greater severity of drought. In table 3, this index is included in remittance equations. In this case, only urban absentees are analyzed, for two reasons: (a) for the household to spread risks, it may well be wiser to send migrants to town (or to South Africa, if possible) rather than elsewhere within the rural sector, where outcomes are probably more highly, positively correlated; and (b) the extent of drought in each absentee's rural destination is not known.¹⁹

In the first equation in table 3, drought is estimated to be significantly, positively associated with amount remitted: the worse the drought, the more is remitted. However, such a result is also consistent with a pure altruism theory: drought lowers income, and ensuing remittance may simply reflect the desire of the migrant to alleviate special hardships imposed on the family.

But in the remaining two regressions in table 3 such a pure altruism interpretation is denied. The second equation adds two vari-

TABLE 3
RESPONSES TO DROUGHT

	URBAN ABSENTEES ONLY		
	(1)	(2)	(3)
Intercept	-.292 (2.96)	-.241 (2.06)	-.202 (1.61)
Log absentee's wage (ω):			
$0 < \omega \leq 3$	.365 (3.12)	.364 (3.17)	.358 (3.12)
$3 < \omega \leq 4$	.559 (6.76)	.572 (7.01)	.570 (6.99)
$4 < \omega$	.803 (8.82)	.823 (9.21)	.819 (9.16)
Close kin of household	.129 (1.72)	.123 (1.67)	.119 (1.61)
Duration of absence	.187 (2.13)	.165 (1.91)	.169 (1.96)
Duration squared	-.022 (2.28)	-.020 (2.09)	-.021 (2.15)
Current drought index	.485 (3.41)	.267 (1.14)	.044 (.17)
Log cattle	...	-.023 (.79)	-.017 (.56)
Drought · log cattle	...	.174 (1.99)	.130 (1.44)
Log crop acres	...	...	-.028 (.78)
Drought · log acres	...	...	.224 (2.00)
Statistical hazard rate	34.3 (3.79)	27.5 (3.02)	27.2 (2.99)
R^2	.16	.17	.17
F-statistic	24.4	20.4	17.5
No. observations	1,051	1,036	1,036

NOTE.—Dependent variable = logarithm of monthly remittance (truncated at zero). *t*-statistics are in parentheses.

ables: logarithm of number of cattle owned (set equal to zero for no cattle) and the interaction of that logarithm with a drought index. The third equation adds two more: the logarithm of number of crop acres “possessed” and its interaction with drought. The existence of drought conditions and the possession of more cattle or more crop land have nothing to do with stimulating greater remittances per se. The interactions of drought with these drought-sensitive assets do. Families that are at risk of losing cattle unless feed and water rights can be purchased and those who are at risk because they customarily rely on crops for more of their sustenance receive greater remittances during the drought. This is precisely the response one should expect if households

allocate members to urban migration in order to insure against adopting risky asset portfolios at home.

This is not to deny a role for altruism, for table 3 also shows that given the degree of drought and assets at risk, more is received from close kin (defined as the immediate family—head, spouse, and own children). That such closer members care helps to make them more responsible and more reliable coinsurers, as outlined in Section II.

The duration-of-absence terms (measured in months/100) in table 3 indicate that remittances at first rise, then subsequently decline with time away. But, as with schooling, the implied turning point is again some 30 years. For all practical purposes, the pattern is one of dwindling rise rather than decline in remittance with time. It seems those who continue to be regarded as members of their original household are robust remitters. Indeed, robustness and sustained acceptance as a member are probably simultaneously determined: those who wish to maintain a link with home continue to remit.

V. Concluding Remarks

The thesis of this paper is that remittances may be seen as one component of a longer-term understanding between a migrant and his or her family, an understanding that may involve many aspects including education of the migrant, migration itself, coinsurance, and inheritance. The family group as a whole can potentially gain from such arrangements, though the distribution of gains between migrant and home may be a matter for bargaining, and each may be the net beneficiary at different phases. Indeed, it is precisely this sequencing of gains that helps to render an understanding self-enforcing in addition to any feelings of mutual altruism. Thus, the empirical illustrations from Botswana indicate that having been educated by the family, the migrant gains from higher wages but is then expected to repay them; the family gains assurance in undertaking riskier agricultural activities, knowing the migrant will support them during drought; sons remit in the hope of maintaining favor in ultimate inheritance.

The efficiency of an intrafamilial implicit contract comes partly from the fact that much of it has to do with unwritten understandings about the obligations of the two parties, and it is probably true that mutual familiarity will support, enhance, and ease these understandings.

Migration may thus be fruitfully viewed as an intertemporal proposition generating streams of various benefits to both migrants and their families, rather than an ad hoc, once-and-for-all adjustment to an intersectoral wage differential so often taken to be *the* explanatory variable of rural-to-urban migration in LDCs. We are accustomed to viewing migration as an indication that the family splits apart as the young move away and dissociate themselves from familial and traditional

bondage, regardless of the negative externalities thus imposed on their families. Our work instead emphasizes the efficiency, flexibility, and what we might call the dynamic comparative advantage of the family. And it shifts the focus of migration theory from individual independence to mutual interdependence.

Notes

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1. Oded Stark, *Economic-Demographic Interactions in Agricultural Development: The Case of Rural-to-Urban Migration* (Rome: UN Food and Agriculture Organization, 1978), chap. 3 and the references cited there.

2. A. S. Oberai and H. K. Manmohan Singh, "Migration, Remittances and Rural Development," *International Labour Review* 119, no. 2 (March–April 1980): 229–41; Oded Stark, "On the Role of Urban-to-Rural Remittances in Rural Development," *Journal of Development Studies* 16, no. 3 (April 1980): 369–74; Robert E. B. Lucas, "Emigration, Employment and Accumulation: The Miners of Southern Africa," in *Migration, Human Capital and Development*, ed. Oded Stark (Greenwich, Conn.: JAI Press, 1986).

3. Oded Stark, "The Asset Demand for Children during Agricultural Modernization," *Population and Development Review* 7, no. 4 (December 1981): 671–75; Eliakim Katz and Oded Stark, "Desired Fertility and Migration in LDCs: Signing the Connection," in *Proceedings of the Florence 1985 General Conference* (Liege: International Union for the Scientific Study of Population, 1985); Eliakim Katz and Oded Stark, "On Fertility, Migration and Remittances in LDCs," *World Development* 14, no. 1 (1986): 133–35.

4. See, e.g., James C. Knowles and Richard Anker, "An Analysis of Income Transfers in a Developing Country," *Journal of Development Economics* 8 (1981): 205–26.

5. In some contexts, precisely who constitutes the family unit is not immediately obvious. Complex household arrangements that have different composition and decision-making structures for different kinds of decisions may well prevail. Coalition formation and composition with respect to control of specific resources cannot then be assumed away. The approach adopted here is guided by analytic convenience: simplifying the analysis into a two-person game. The reader should note, however, that we can sustain the approach in the text by assuming endogenous formation of a coalition: the family members excluding the migrant decide to act together, as one unit, relative to the migrant. The head of the family then assumes the role of a "representative

agent." The decision is fueled by the expectation that, by committing themselves to act together rather than separately, the members are in a much better position when bargaining with the migrant on how to divide the amount made available through pursuance of the migrant-family contractual arrangement (see Sergiu Hart and Mordecai Kurz, "Endogenous Formation of Coalitions," *Econometrica* 51 [July 1983]: 1047-64).

6. This stylized version of how migrants enter the urban economy is assumed to hold irrespective of whether "formal" employment or "informal" employment is preferred. See Oded Stark, "On Modelling the Informal Sector," *World Development* 10, no. 5 (May 1982): 413-16.

7. Incompleteness of futures markets implies that economic agents are typically "unable to realize on the current set of markets the full potential value of [their] future economic wealth" (Roy Radner, "The Role of Private Information in Markets and Other Organizations," in *Advances in Economic Theory*, ed. Werner Hildenbrand [New York: Cambridge University Press, 1982], p. 97). Migration can be seen to constitute a particular form of investment in human capital. It is usually impossible to trade this type of capital even in competitive markets.

8. Here we differ from Robert A. Pollak, "A Transaction Costs Approach to Families and Households," *Journal of Economic Literature* 23, no. 2 (June 1985): 581-608, who, because he does not consider migration, naturally attributes to the small size of the family a critical technical disadvantage in familial insurance provision capacity.

9. On the great multitude of altruistic equilibria in the repeated economy and attempts to narrow down the set of these equilibria, see Mordecai Kurz, "Altruism as an Outcome of Social Interaction," *American Economic Review* 68, no. 2 (May 1978): 216-22.

10. Albert Breton and Ronald Wintrobe, *The Logic of Bureaucratic Conduct: An Economic Analysis of Competition, Exchange, and Efficiency in Private and Public Organizations* (Cambridge: Cambridge University Press, 1982).

11. See, e.g., Joseph Gugler and William G. Flanagan, *Urbanization and Social Change in West Africa* (Cambridge: Cambridge University Press, 1978); Gordon F. DeJong and Robert W. Gardner, eds., *Migration Decision Making* (New York: Pergamon, 1981). This property is analytically exploited in Oded Stark, "Rural-to-Urban Migration in LDCs: A Relative Deprivation Approach," *Economic Development and Cultural Change* 32, no. 3 (April 1984): 475-86.

12. Gary S. Becker, "Altruism, Egoism and Genetic Fitness: Economics and Sociology," *Journal of Economic Literature* 14, no. 3 (September 1976): 817-26, "Reply to Hirshleifer and Tullock," *Journal of Economic Literature* 15, no. 2 (June 1977): 506-7, "Altruism in the Family and Selfishness in the Market Place," *Economica* 48, no. 1 (February 1981): 1-15; Jack Hirshleifer, "Shakespeare vs. Becker on Altruism: The Importance of Having the Last Word," *Journal of Economic Literature* 15, no. 2 (June 1977): 500-502.

13. Michael Intriligator (personal communication, September 1982) suggested to us that a strong demonstration effect could account for "proper" behavior by the migrant. A migrant may be aware that his children are likelier to adhere to a contractual arrangement with him if they observe him adhering to a contractual arrangement with his own father. The migrant would thus be induced to behave accordingly. Imitation and recurrent behavior are often critical elements in the formation of preferences and the evolutionary emergence of social norms of conduct.

14. For more details on the survey and data, see *National Migration Study*, proceedings of the conference held in Gaborone, Botswana, December 1982 (Gaborone, 1983); Robert E. B. Lucas and Oded Stark, "Motivations to Remit: Evidence from Botswana," *Journal of Political Economy* 93, no. 5 (October 1985): 901-18.

15. At the time of the survey, the pula was worth U.S.\$1.20. The survey comprised four rounds of interviews, one every 3 months for a year, revisiting all dwellings in each round. In the regressions, a statistical hazard rate is added as an explanatory variable. This is a correction factor for sample selection and is estimated from the probability of being an absentee (or urban absentee when considered separately) in the sample, given sex, years of schooling, age and age squared, whether head of household, and number of consumer units in the household. Since this hazard rate correction is purely a statistical adjustment, no economic interpretation of the associated coefficient need be offered here. It may be noted, however, that despite the statistical significance of the coefficients on the statistical hazard rate measure, whether this correction is made or not makes essentially no difference to estimates of other coefficients. Although the regression results here are presented as separate, non-nested tests for purposes of exposition, each of the tests reported also holds if a combined equation is estimated.

16. Missing data, and particularly missing data on education of migrants, reduced the sample size to 1,199, or some 38% of the total in table 1, as compared to a response rate of 84% in table 2.

17. G. E. Johnson and W. E. Whitelaw, "Urban-Rural Income Transfers in Kenya: An Estimated Remittances Function," *Economic Development and Cultural Change* 22 (1974): 473-79; H. Rempell and R. A. Lobdell, "The Role of Urban-to-Rural Remittances in Rural Development," *Journal of Development Studies* 14 (April 1978): 324-41.

18. A herd of 20 beasts is often adopted as a significant dividing line in Botswana. A common argument for this particular break point is that some 8 beasts are required for ploughing and a total herd of 20 is necessary to assure 8 adult, ploughing animals. Other variables included in the regressions of table 2 but not discussed in the text include three dummy variables respectively set equal to one if the logarithm of the absentee's wage is positive but ≤ 3 , > 3 but ≤ 4 , > 4 . The omitted category is therefore those with no earnings. Clearly, the results show that remittances rise with migrants' earnings though not necessarily in a fashion that would be strictly linear in logarithm of the wage. In addition, a dummy variable set equal to one for a spouse, within each group, zero otherwise, is included in table 2. This measure is inserted to see whether behavior, e.g., of daughters-in-law, is significantly different from that of their husbands, but in general this proves not to be the case.

19. Moreover, the sexes are combined in table 3. There is no inherent reason to anticipate different risk strategies with respect to male and female members (whereas, a priori, this was untrue for opportunity cost of schooling in table 1). In fact, if separate male-female regressions are estimated for the drought model, coefficients are not significantly different between sexes.