The Short and Long Run Effects of Migration and Remittances: Some Evidence from Northern Mali[1]

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Abstract

Exogenous shocks resulting from the death of household members, changing agro-climatic conditions and financial loss can have both short-term as well as lingering effects on households. Many poor households in developing countries cope with these shocks through the out-migration of family members. Migration and remittances can serve to smooth consumption for households affected by adverse shocks as well as overcome liquidity constraints in order to finance long-term human and physical capital investments. The inflow of remittances from international (external) migration and their potential development impacts has captured the attention of researchers for some time. This is due in part to the sheer magnitude of these financial flows, which has dwarfed official development assistance in many cases (Maimbo and Ratha, 2005). While domestic (internal) seasonal migration is also an important livelihood strategy, the short and long-term impact of remittance flows from this channel has received less attention in recent research, particularly in Africa.

Several recent studies have investigated the determinants and effects of migration and remittances (M&R) in Africa (Azam and Gubert, 2005; Gubert, 2002; Dillon et al., 2010). Harrower and Hoddinot (2005) use data from northern Mali to test both the responsiveness of self-reported household coping mechanisms (including migration) to idiosyncratic shocks as well as the full-insurance hypothesis put forth by Townsend (1995). In this context, full insurance implies that household-level consumption should be perfectly correlated with aggregate consumption in the village (or other co-insurance group) but uncorrelated with household-level fluctuations in income. These studies conclude that the decisions to migrate and remit are indeed responsive to household risk and shocks. Azam and Gubert (2005) use household-level data from Western Mali, with a long history international migration to Europe, to test for moral hazard on the part of households "left behind". They find that the more households are insured by migrants' remittances, the less incentive those households have to work.

This study uses six periods of panel survey data spanning a decade (1996-1998 and 2005-2006) on approximately 250 households in the arid Zone Lacustre (ZL) of Northern Mali. Households in the ZL rely primarily on rain-fed cereal production for their livelihood. Our objective is to evaluate both the short-run and persistent effects of migration and remittances—which are hypothesized to contribute to both inter-temporal consumption smoothing and human and physical capital investment. This study expands upon the previous studies outlined above, but makes several important distinctions that help to improve our understanding of the impacts of M&R in Africa. First, M&R decisions are both ex-ante and ex-post mechanisms to cope with observable and unobservable household shocks and therefore endogenous within the context of Townsend's (1995) full-insurance hypothesis test. We therefore pay close attention to the identification strategy of the parameters associated with these two key variables using an instrumental variable approach. Second, we recognize that households have different motivations for choosing seasonal versus long-term out-migration, and we estimate the different impacts of each. Third, there are several reasons why we might expect to find that M&R result in diminished consumption smoothing across time. For example, remittances may lead to increases in overall income (and expenditures) or changes in the basket of food and non-food items consumed through increased direct or indirect exposure to alternative consumption habits. Either of these are avenues through which households may shift away from their village co-insurance group. Thanks to the structure of our data, we are able to analyze on the one hand whether consumption-smoothing trends for several categories of goods (non-food, food, and cereals) are

comparable both prior to and following migration. We are likewise interested in the potential explanations for diverging trends and go on to examine the effect of past migration on the level of consumption for those same categories of goods.

This study uses three approaches to evaluate the effects of remittances on households in Northern Mali. First, in order to establish whether or not remittances are indeed responsive to household shocks, we first use both a linear and non-linear estimators to evaluate the responsiveness of remittances to current and lagged exogenous shocks (e.g. crop and livestock losses, household morbidity and mortality). Second, following Jalan and Ravallion (1998) we test the full-insurance hypothesis within a first-differenced framework. However, several of our key variables are endogenous to such a model potentially resulting in biased parameter estimates. We therefore adopt and an instrumental variable approach to identify the parameters associated with those key variables, with current and lagged environmental shocks, household size, seasonal rainfall variation and migrant network intensity as instruments for income, household size and migration duration respectively (deBrauw and Giles, 2008; Dillon et al., 2010; Munshi, 2003; Yang and Choi, 2007). The third component of the analysis uses a similar IV approach to investigate on the one hand whether there are diverging trends in consumption smoothing b and consumption levels, more generally, before and after migration.

Preliminary econometric results suggest that the probability of migrants remitting increases for female-headed households as well as for households experiencing health and income (crop) shocks. The level of remittances received is higher for female-headed households, for households experiencing the death of a family member and with livestock losses during the hungry season. Once we control for the endogeneity of the key variables in consumption smoothing equation, migrant-sending households are more able to self-insure than those without migrants. Households with long-term migrants are able to self-insure to the greatest degree. These findings are reversed when we ignore the potential endogeneity of income, household composition and migration patterns. This is likely because these variables are correlated with unobservable factors such as ability on the one hand and households' ability to modify their size and composition by sending members away during periods of distress. We find that the patterns of consumption smoothing as well as the levels of consumption before and following migration vary considerable across goods. This provides some evidence that the role of village-level insurance mechanisms vary for a given household depending on whether they participate in seasonal or long-term out-migration or not.

The role of internal migration in the process of economic development in West Africa has received limited attention. In parts of Mali (namely the Kayes region) international out-migration is not just an important livelihood strategy, but in many cases, it is *the* livelihood strategy—thereby undermining the development of the local economy. This research demonstrates that remittances sent through internal migration (which constitutes the bulk of out-migration from the Zone Lacustre) are indeed responsive to exogenous household-level shocks. In addition, we find that M&R play a role in short-run smoothing consumption but that the persistent effects of these activities on both consumption smoothing and consumption levels are more important, particularly for households with low purchasing power.

I. Introduction

Life in developing countries is plagued by risk of many forms. In the absence of formal insurance or credit markets, households may participate in a host of risk coping mechanisms and adopt risk-mitigating strategies (Townsend, 1994; Paxson, 1992; Fafchamps, 1999; deBrauw and Giles, 2008 and Wouterse and Taylor, 2008). Most self-insurance approaches fall, very generally, under the rubric of household portfolio diversification strategies (Fafchamps, 1999) in an effort to reduce correlation between different income sources (Rosenweig and Stark, 1989). These include, but are not limited to, crop diversification (Hardaker et al., 1997), adoption of improved production technologies, and participation in off-farm labor activities (Reardon et al, 1992). Households may likewise pool risk within a given co-insurance group. These include neighbors who can monitor behavior and therefore reduce moral hazard (Townsend, 1994; Jalan and Ravaillion, 1997; Azam and Gubert, 2005), members of the same ethnic group (Grimard, 1997), and family members who are spatially dispersed through migration (Rosenweig and Stark, 1989; Yang and Choi, 2007; Gubert, 2002).

This paper investigates both the short and long run effects of migration and remittances as informal insurance mechanisms. We use the Zone Lacustre of Northern Mali, with its long history of both seasonal and long-term out-migration, as an example. Indeed, results from a 2002 census noted that spatial movement (including migration) is an essential livelihood strategy given Mali's geographic, environmental and institutional setting (MEF, 2002). Although their study was descriptive in nature, one of the objectives was to understand the recursive relationship between migration and poverty. As alluded to by the 2002 study and noted by Hampshire and Randall (1999), there is no strong consensus about this relationship due large differences in migration motivation across West African households. Per capita household incomes in this landlocked West Africa country are low (less than two dollars per day) and

potentially volatile following vagaries in weather and market conditions, amongst others. Recent examples of covariate shocks range from the commodity (including staple food) boom of 2007/08, to pervasive locust infestations in 2005 and changes to climate conditions. Households likewise face idiosyncratic shocks such as crop failures, post-harvest crop losses, illness and death.

Within this context, both seasonal and long-term out-migration are therefore means of coping with poverty and vulnerability. But, how effective is it as a consumption smoothing mechanism and for how long are its effects felt? Understandably, this may depend on the specific motivations of the household members' out-migration as either a short run coping mechanism in response to a specific shock or as part of a long term livelihood strategy. In order to begin to answer this question, it seems fitting to first examine the extent to which migration remittances respond to household shocks; second, the extent to which seasonal circular migration versus long-run migration serve to smooth consumption; and third, the persistence of the effects of migration on consumption smoothing across time as well level and basket of goods consumed — exactly what this paper seeks to accomplish.

Although migratory behavior is felt in both the urban and rural milieus of Mali, this is a risk coping strategy that has been understudied in this part of the world in terms of both its direct effect as an insurance mechanism and its long-run effect on wellbeing. Likewise, the motivations of migration are often treated as homogenous despite evidence from qualitative studies suggesting fundamental differences in short-run seasonal and long run migration (Hampshire and Randall, 1999; Findley, 1994). Reardon et al. (1994) and Barrett et al. (2001) investigate barriers to and the short run effects and rural non-farm as a risk-diversification strategy. Taylor and Wouterse (2008) and Azam and Gubert (2005) each investigate the effect of

migration remittances on agricultural productivity. The latter conducted their fieldwork in the Kayes region of Mali and found evidence of moral hazard on the part of family members "left behind." Gubert (2002) also uses evidence from the Kayes region of Mali, where overseas migration is pervasive, to investigate the responsiveness of overseas workers to household shocks through remittances. Harrower and Hoddinott (2005), in their own study of consumption smoothing in the Lacustre zone, investigate the entire menu of risk coping mechanisms and test for pareto-efficient risk allocation using the village as a co-insurance group.

The present research is a deviation from these past studies in that it develops a risk theoretic model to examine the extent to which 1) spatial income diversification efforts insure again adverse shocks and 2) migration and remittances serve to smooth household consumption. Once the present analysis establishes that remittances indeed serve as a mechanism to partially insure against adverse income shocks, one can then establish whether it has a persistent effect on household wellbeing by testing for the long run effect of remittances on household consumption smoothing and consumption levels, more generally.

Understanding both the short-run and persistent effects of migration is important for the development community and to policy makers for several reasons. First, there is renewed policy interest in both the vulnerabilities facing households in developing countries as well as the breadth of risk coping mechanisms available to and adopted by rural agricultural households in response to recent agro-climatic shocks (locusts 2005, recurring droughts, desertification, land quality deterioration), price shocks (staple food price spikes of 2007/08) and morbidity, amongst others (e.g. SAP 2009). There is also interest in understanding the long run determinants of education, health and more general welfare outcomes of rural households. This presents somewhat of a challenge then to Lipton and Ravallion's (1995) proposition that policies to

encourage migration away from high risk areas and toward low risk environments are less preferred than policies focused on the provision of risk reducing inputs such as irrigation and the introduction of relief works schemes. Indeed, is it possible that out-migration is, like cash-crop production in some settings, an intermediate step that allows households greater access to those and other forms of risk reducing inputs?

The remainder of this paper is organized as follows: First, is an overview of the theoretical framework used to evaluate the role of migration and remittances on short-run household welfare. This section also presents the estimating equations that serve as the basis of the empirical exercise. Second, is a presentation and discussion of the paper's identification strategy. Third, is a description of the household survey and supplementary data, including descriptive statistics and some general trends. Fourth, is a discussion of potential robustness checks further support or challenge the initial estimation approach and results. In a final section, alternative approaches are presented for analyzing the long run effects of migration on household welfare.

II. Conceptual and Econometric Model

The objectives of this paper are three-fold. Very generally, this paper examines the risk-sharing behavior of households in Mali. More specifically, it seeks to establish both the role remittances play as an insurance mechanism against adverse (income) shocks and their long run effect on household welfare outcomes. The empirical analysis in this paper is motivated by the well-cited result of risk pooling as the pareto efficient outcome within a particular co-insurance group (Townsend, 1994; Jalan and Ravallion, 1997; Fafchamps and Lund, 2003; Harrower and Hoddinott, 2003). Under perfect insurance, individual consumption does not depend on

idiosyncratic variation of income or earnings, but rather the outcomes of the pool (Townsend, 1994).

Risk pooling can be achieved through informal insurance mechanisms such as transfers and gifts (in cash or in kind). In a developing country context where it is difficult to verify over long distances whether or not an income shock occurred, one might expect to see local informal co-insurance groups to dominate at the village level (Townsend, 1994). However, gifts, transfers and remittances can serve many other goals, resulting in co-insurance groups along ethnic ties (Grimard, 1997), through marriage (Rosenweig and Stark, 1989), across spatially disperse household members (Yang and Choi, 2007; Gubert, 2002; De Braw and Giles, 2008). The latter, including both migration and remittances, is the focus of this research.

Following Bardham and Udry (1999) and Fafchamps and Lund (2003) consider a stylized village where pareto-efficient allocation of risk is achieved, but where households have no access to storage or credit markets. There are N households in the economy indexed by *i*, T periods indexed by *t* and S states of nature occurring with probability Π_s. Let y_{ist} and c_{ist} represent the income and consumption of household *i* in state *s* during period *t*. Now suppose each household with pareto weight λ_i has a continuous and twice differentiable utility function $u^i(c_{ist})$, such that $u^{i\prime}>0$ and $u^{i\prime\prime}<0$, that is separable over time. In a pareto efficient allocation:

$$\frac{u^{i\prime}(c_{ist})}{u^{j\prime}(c_{jst})} = \frac{\lambda_j}{\lambda_i} \qquad \forall\ i,j,s,t \tag{1}$$

Under the equality in equation (1), transient changes in income are fully pooled across members of the said co-insurance group and so the only risk faced by the individual is faced by the group as a whole. Suppose also that household preferences can be characterized by the same constant absolute risk aversion (CARA) utility function:

(2) $$u_i(c_{ist}) = -\frac{1}{\gamma} e^{-\gamma c_{ist}}$$

Following Mace (1991), Cochrane (1991), Altonji et al. (1992), Townsend (1994), and Bardham and Udry (1999) the present analysis applies this utility function to the pareto optimal condition in equation (1) to yield:

(3) $$\mathrm{c}_{\mathrm{ist}} = \sum_{j=1}^{N} c_{jst} + \frac{1}{\gamma}(\ln \lambda_i - \frac{1}{N}\sum_{j=1}^{N} \ln \lambda_j)$$

Variants of equation (3) have been used extensively to test for efficient risk sharing within a given co-insurance group (Jalan and Ravaillion, 1997; Grimard, 1997; Harrower and Hoddinott, 2003). Our analysis will follow Yang and Choi (2007) and re-write equation (3) to investigate the role that spatially dispersed family members and neighbors play in smoothing household consumption over time (a test of whether risk is shared in a pareto-optimal fashion within a given co-insurance group).

(4) $$\mathrm{c}_{\mathrm{ist}} = \bar{\mathrm{c}}_{\mathrm{st}} + \frac{1}{\gamma}\left[\ln \lambda_i - 1/2(\ln \lambda_1 + \ln \lambda_2)\right]$$

Adapting the approach of Jalan and Ravallion (1998), equation (4) can be re-written in first differenced form as:

(5) $$\Delta c_{ivt} = \varphi + \sum\nolimits_{jk} \alpha_{jk} D_{ivt} + \beta \Delta y_{ivt} + \delta_1 \Delta y_{ivt} \Delta M^s_{ivt} + \omega_1 \Delta M^s_{ivt} + \delta_2 \Delta y_{ivt} \Delta M^l_{ivt} + \omega_2 \Delta M^l_{ivt} + \xi \Delta n_{ivt} + \Delta \varepsilon_{ivt}$$

where D_{ivt} is a village-time dummy equal to one when j=v and k=t and zero otherwise, y_{ivt} is income per capita, n_{ivt} is the household size and ε_{ivt} is an unobserved independently distributed random variable with zero mean. In order to distinguish between differences in motivation for seasonal versus longer-term migratory behavior, we denote M^s_{ivt} is a binary variable equal to one when at least one household member migrates in seasonal "circular" migration and zero otherwise, while M^l_{ivt} denotes long-term displacement of household members. In this

specification, aggregate income risk at the village level (one co-insurance group) is captured through (interacted) village-time dummies, while extended-household idiosyncratic income risk is captured by both the binary migration variable and the interacted income migrant term. As discussed by Townsend (1994), if there is perfect insurance within the village, the changes in household specific income will have no effect on consumption after controlling for village level effects ($\beta = 0$). On the other hand, if there is perfect insurance within the extended household, changes in household income (earned income and transfers) will have no effect on consumption after controlling for the effects of the household's migrant network.

After testing the full-insurance hypothesis, the analysis follows Gubert (2002), Fafchamps and Lund (2003) and Yang and Choi (2007) to understand (1) how risk is actually shared within spatially disperse migrant households and (2) the potential causes of departures from the fully efficient outcome. More specifically, this portion of the paper seeks to investigate the extent to which household transfers serve to share risk. Let TR_{ist} denote total household transfers. Transfers can be decomposed into remittances from migrant workers and household members received by household i in state s during time t (r_{ist}) and other gifts and transfers from friends, extended family, and others (g_{ist}) such that consumption can be rewritten as:

(6) $$c_{ist} = y_{ist} + TR_{ist}$$ where

(7) $$TR_{ist} = r_{ist} + g_{ist}$$

Suppose also that, in the spirit of Paxon (1992) household income can be decomposed into permanent and transient components:

(8) $$y_{ist} = \tilde{y}_i + \vartheta z_{ist}$$

Permanent income, $\tilde{y}_i$, is unaffected by s or t and can be captured by an individual household fixed effect, ϕ_i, while transient income is captured by exogenous household-level shocks, z_{ist}.

Substituting equations (4) and (6) into equation (3) allows us to express household transfers as a function of transient income, a household fixed effect, mean household consumption represented by the time effect, ψ_t and η_{ist}, an unobserved independently distributed random variable with zero mean:

(9) $$TR_{ist} = -\vartheta z_{ist} + \phi_i + \psi_t + \eta_{ist}$$

Using the extended family and neighbors as our primary risk-pooling group, equation (7) can be used to test the extent to which transfers respond to adverse shocks such as illness, death of a family member, unemployment, flooding, pest-infestation, and livestock losses. Given that these shocks are exogenous, equation (7) can simply be used as the basis of our empirical test of whether or not transfers by extended family and neighbors are indeed responsive to adverse income shocks by. Our estimating equation for this portion of the analysis will be equation (7) in first-differenced form:

(10) $$\Delta TR_{ist} = \zeta + \vartheta \Delta z_{ist} + \Delta \eta_{ist}$$

III. Identification strategy

In the treatment of equation (10) where we examine the effect of transient income shocks on transfer behavior, the explanatory variables were considered exogenous and so equation (10) can be estimated more or less directly after appropriately specifying the conditional mean of the first-differenced dependent variable ΔTR_{ist}. Conversely, income, migration and household size are all endogenous in equation (5). The following discussion will therefore focus on the identification strategy for this component of the analysis. The objective here is to identify exogenous variables, Θ_{ivt}, that are correlated with income, the decision to migrate, the migration-

income interaction term, and household size but uncorrelated with the error term in the structural equation of interest (equation 5).

Following deBrauw and Giles (2008) and Yang and Choi (2007), current and lagged environmental shocks as well as lagged household size are used for identification (Jalan and Ravaillion, 1997). Specifically, current rainfall shocks are used as instruments for current income shocks, with the assumption that rainfall affects current consumption only through its impact on household income. This is a departure from strategy of Harrower and Hoddinott (2003) who use current livestock losses as instruments for household level income shocks. K lagged rainfall shocks (t-k) are used as instruments for short-term migrations following Munshi (2001). This seems like a reasonable approach because of the lagged effect of shocks on migration decisions. For example, households cannot instantaneously adjust migration decisions to particular states of nature. Rather, after experiencing a bad crop as a result of poor rainfall in period t, it might take up to k periods to first identify where the migrant might relocate to and then collect the resources required to send someone away (Rozelle et al., 1999). Our identifying assumption here is that lagged rainfall shocks only affect current household consumption through household migration decisions. Given the observed role of migrant networks by anthropologists and geographers within the sub-region, both short-term and long-term migrant network intensity within a given village may serve as a reasonable instrument as well. This could be captured by the percentage of surveyed households within a village participating in a given migration scheme— a proxy for migration network intensity. The sum of the exogenous household shocks used in the previous discussion to explain household transfer behavior will be used as instruments for the migration-income interaction term. Finally, following Jalan and Ravaillion (1997) this paper will use lagged household size as an instrument for current household size.

In order to ensure these instruments are indeed valid, the first stage equation (reduced form model of our endogenous variables as a function of their instruments and other exogenous variables) will be estimated in order to empirically establish the correlation between these variables. Then, following the second step (be it via Two State Lease Squares, 2SLS, with optimal instrumental variables or a Control Function Approach, CF) we test the appropriate over-identifying restrictions using the Sargan test.

IV. Data and Descriptive Statistics

This section describes the data and sample construction and provides some descriptive statistics of the sample households. The empirical analysis uses household-level survey data collected in the Lacustre Zone of Northern Mali by researchers at the International Food Policy Research Institute between 1997 and 2006. [2] This particular zone of Mali is fairly remote and agro-climatic conditions are severe. Indeed the survey data was originally collected under *Projet du Développement de la Zone Lacustre* to gain an understanding of the vulnerabilities households face and the coping mechanisms they adopt. Later rounds have focused on evaluating the impact of widespread irrigation investments within the zone under the *Etude sur la Pauvreté et la Sécurité Alimentaire au Nord Mali 2006* (Dillon, 2008). A modified stratified sampling scheme was adopted to capture the diversity of agricultural systems within the area (rain-fed, water-recession with ponds, and irrigated) resulting in a two-step sampling procedure (Harrower and Hoddinott, 2003). First, 10 villages were purposefully selected. Second, one-third of the households in each village were randomly selected resulting in a sample of 275 households. Over the course of the initial survey period, twenty observations were lost due to out-migration by the entire household (Christiaensen and Boisvert, 2000). Another twenty observations were lost

[2] Luc Christiaensen and John Hoddinott in 1997 and 1998 and Andrew Dillion in 2006 and 2007.

(likely to due to outmigration) between the first and second survey data collection periods resulting in a six-period panel of 235 households.

The first round of survey data was collected during the hungry season, immediately before the 1997 harvest. This was followed by a second round during the post-harvest period of the same year, a third during the quiet period between agricultural seasons in early 1998, and a fourth during a second hungry season in 1998. Households were revisited a fifth and sixth time in 2006 (in February and August, respectively) within the context of a much larger household survey data collection effort throughout northern Mali to evaluate the impact irrigation infrastructure investments. Data collected include information on households' composition, income earning activities (including shocks), assets, food and non-food consumption, as well as anthropometric information. Household level data was supplemented with some additional village-level data.

Cumulative seasonal atmospheric humidity measures within the zone from NASA LARC (2010) are used as a proxy for seasonal rainfall and used to construct the instrumental variables for migration decisions of household members. These are aggregated to coincide with the timing of the survey data collection. Our rainfall shock variable is defined as the difference between the cumulative level of atmospheric humidity of the current season and the average humidity of the same season during the previous five years.

Table 1 presents summary statistics from the first survey round for the initial 275 households used in the empirical analysis. We first distinguish between migrant and non-migrant households. Migrant households are those with household members who have moved to either another a city within Mali, a neighboring country within the sub-region, or overseas in search of an alternative source of livelihood for at least one month of the survey recall period. The 142

migrant households represent 52% of the sample. The education of the household head, land holdings, the value of weekly food consumption, and prevalence of gifts and transfers from non-family members are similar across migrant and non-migrant households within the survey sample. However, while just 7% of non-migrant households have a female head, 13% of migrant households are female headed. Second, the reported value of total assets is higher on average (327,385 FCFA) for non-migrant households than for migrants (300,577 FCFA). Agricultural income during the first survey recall period is also higher on average for non-migrant households (113,898 FCFA) than migrant households (87,828 FCFA), as is the relative importance of agricultural income to total income. Migrant households report higher education, health related expenditures and total net income. A limited number of self-reported shocks are also presented by household type; including livestock deaths, crop losses and lost productive time due to illness. Thirty one percent of migrant households versus 26% of non-migrant households reported losses of livestock due to death or theft. Seventy-two percent of non-migrant households reported crop losses versus 83% of migrant households. Finally, 63 % of non-migrant households reported that at least one member lost productive time due to illness versus 55% of migrant households.

The descriptive statistics presented in **table 2** suggest some disparities between those households participating in domestic versus international migration. These are mainly with respect to the gender of the household head, assets, total net income, and average expenditures on health and education. **Table 3** presents an overview of the distribution of migrant and remittance receiving households across agricultural production systems. Thirty percent of households in the irrigated agriculture zone were migrant-households versus 53 % in the rain fed agricultural zone and 56% in the zone where ponds (without flood control) are used. Just 9% of households within the irrigated agricultural production zone received remittances from migrant

family members compared to 40% of households in the rain fed agricultural zone and 33% in the zone where ponds (without flood control) are used. These results provide some support for the notion that household members may out-migrate in response to agro-climatic shocks but that the decision to remit depends on other important household characteristics.

Monthly cumulative atmospheric humidity (our proxy for rainfall) for the survey region is presented in **figure 1**. This serves to illustrate the bimodal seasonality and high variability of rainfall for a given season across years. One can see that the initial survey data collection period (1997-1998) was one of unfavorable rainfall conditions, immediately following a year of favorable conditions. It is therefore a particularly interesting period to test for household and community level responsiveness to adverse shocks and the extent to which these informal insurance mechanisms act as buffers.

V. Results

In this section we present our estimation results of equations (5) and (10). We begin with a discussion of our results presented in **table 4** of the determinants of household-level out-migration. These results provide the basis of the reduced form out-migration model used as part of the identification strategy for migration in subsequent sections of this paper. As a result of the close proximity of households within the Zone Lacustre we are not able to use agro-climatic shocks (current deviation from a five year moving average). In order to create sufficient variation we interact household landholdings with our rainfall shock variable to proxy for the household-level intensity of a rainfall shock during given period. Our results suggest that after controlling for village-period specific effects, female-headed housholds are more likley to participate in out-migration and that village-level out-migration intensity (% of households with migrants during a given period; a proxy for the effect of household social networks) positively influnce migration

decisions. When we pool that data across periods, we find that sign of the effect of rainfall shocks depend on the period in question. More often that not, current deviations have no influence on out-migration whereas lagged deviations negatively affect out-migration. One interpretation is that while households generally can neither forsee nor respond to weather outcomes immediately, good rainfall deviations keep potential migrants at home while poor weather outcomes drive them away in search of alternative livelihood strategies. We likewise find that lagged rainfall deviations up to five periods are jointly significant across specifications. Overall, these results suggest that in addition to the many other factors that influence household decesions, exogenous current and lagged agro-climatic shocks as well as village-level migration intensity have a statistically signficant influnce on household out-migration decisions.

Next we present our findings of the determinatns of remittance in-flows for households in Mali's Zone Lacustre. In **table 5** we present our findings of the determinants of whether or not a household is a recipient of in-kind or in-cash remittance flows. In **table 6** we present our findings of the determinants of the level of remittance in-flows. Remittance flows are only observed for households with migrants, thereby potentially introducing a source of sample selection bias into our results. We therefore use Hekman's approach by first estimating a reduced form equation of the determinants of migration and generate the Inverse Mills Ratio (IMR). Second, we include the IMR in our structural equation of interest. These results are also for the purpose of comparison. We generally find evidence in support of a sample selection.

Our results indicate that female headed households are most likely to receive transfers. We also find that whether or not a household receives remittance in-flows appear to be most responsive to health shocks (current and lagged morbidity and mortality) as opposed other sources of exogenous shocks that directly affect agricultural output and income (e.g. crop losses

and livestock losses). These results suggest that migrants are responsive to a particular form of household shock (morbidity and mortaliy) which likely result in lost household productivity and income— potentially placing the household in a precarious situation in both in the short and long run. If the remittance inflows are simply used to pay funeral and medical bills at the expense of other household needs, they may be serve to improve household welfare. If, on the otherhand, in-cash and in-kind transfers are used to help households overcome generally difficult times in a more general sense they may play an important role in household welfare in both the sort and long term (e.g. smooth consumption in the short run and overcome liquidity constraints to make important human capital investments in the medium and long term).

We see a somewhat different story in **table 6** where we present the findings of the determinants of the level of remittance in-flows defined as the value of the sum of in-kind and in-cash household transfers. After controlling for sample selection (remittance levels are only potentially observed for migrant households during a given period), we find that the level of remittances flows increases for female headed households across specifications. After controlling for houshold fixed effects, we find that remittances flows increase with landholding and with our indicators of migrants' participation in entrepreneurial activities. Furthermore, remittance levels appear to increase following crop losses (pre or post-harvest). These results suggest that female headed households may rely on remittances as an important source of revenues across seasons. We also find evidence that the level of remittances flows respond to the agricultural activities of the household. For example, our results suggest that remittances may be used to help make agricultural larger investments before or during the growing season (ex-ante risk coping). On the other hand, the results from our pooled OLS specification suggest that remittances flows increase with crop loss tendencies (average crop losses over the entire study period). Therefore, whereas

remittance receipts are driven by household morbidity and mortality, the level of remittance flows appear to be more closely linked to the income-generating activities of the household (ex-ante or ex-post).

Our previous treatment of the determinants of out-migration as well as remittance receipts served as a first and second step in analyzing the main empirical question of interest in this paper: do household-level outmigration and remittances receipts serve to increase the extent to which smooth household consumption over time? As was presented in our discussion of the paper's identification strategy, analyzing these effects are complicated by the fact that on the one hand each of our independent variables of interest are endogenous. On the other hand, unobservable as well as time-invariant effects are likely to play an important role in how and to what extent household insure against income-based consumption risk in both the short and long term. In **tables 7 and 8** we begin by ignoring these endogeneity issues and divide households into those with contemporaneous (current) out-migration and those who do not. We go on to correlate income and consumption (total weekly food and non-food consumption in real 2000=100 FCFA terms) for each subgroup after controlling for household-level fixed effects.

We find that when we consider earned income (on or off-farm) alone, migrant households are better insured against income risk than non-migrant households. However, this reverses once we incorporate both earned and remitted income flows. Village and period level effects are jointly statistically significant and decrease the extent to which current income levels drive current consumption levels. These results generally indicate that non-migrant household consumption is better insured through the village-based co-insurance group than migrant households. This story holds when we use the natural log of both consumption and income mesures, with one exception. Specifically, once we consider both earned and remitted income the

percentage change in consumption levels associated with a one percent change in income is much higher than when we consider earned income alone for migrant households (.29 versus .25 percent). This is suggests that remitted income flows may not serve to smooth consumption, but rather lead to an overall increase in both food and non-food consumption— a topic we will return to.

The results presented in **tables 9 and 10** explicitly include current household out-migration as an explanatory variable in the test of full insurance (in level and log form, respectively). We do so within a first-differenced framework and therefore difference out all time-invariant effects that could influence changes in consumption over time. In columns I-IV of both tables we treat all variables as exogenous while the results in columns V-VII were estimated using an instumental variable approach. More specifically, earned as well as earned and remitted income, migration status, interacted income and migration status, household size (# of household member present, by head) and the number of household members with some education were treated as endogenous to our model. Our exogenous instrumental variables are current rainfall interacted with household landholdings, the deviation of currental rainfall from a five year moving average interacted with household landholdings, village migration intensity (% of households participating in out migration during a given period), lagged household size and village education intensity (% of households with at least member with some education), respectively.

When we treat income as exogenous, we find that household consumption is better insured through both income and remittances than through remittances alone. However, neither current earned income nor income and remittances have as statistically signficant effect on consumption smoothing when we consider the level of total consumption and income using

instrumental variable methods. Household out-migration likewise has a negative and statistically significant effect on consumption only when it is treated as endogenous and village-period specific effects are ommited from the model. One interpretation may be that the level of the change in consumption between periods is reduced (level) with changes in household out-migration status. We also find that effect of household earned income (.74) is less than the effect income and remittances (.88) on consumption for migrant households. Overall, this leaves us with a somewhat ambiguous description of the overall effect of migration on consumption smoothing over time when we consider the level of income and consumption.

In **table 10** we present our findings using the natural log of total consumption and income. We find that when we omit village and period level effects, the change in earned income as well as earned and remitted income have the same effect on consumption. The effect of migration as well as the interacted inome-migration term are only statistically significant when we consider both earned and remitted income and omit the village-period level effects. If we consider the average level of income and remittances, this results in near perfect consumption insurance against fluctuations in income for migrant households (net effect of .02, versus .33 for non-migrant households). These results are consistent with the notion that through out-migration and remittance receipts households are not only better able to smooth their consumption over time, but that they may actually shift co-insurance groups altogether (away from village-level mechanisms and towards spatially dispersed family members as a co-insurange group).

VI. Robustness Checks

This section seeks to evaluate the robustness of the results estimated using the methods outlined above. In Gubert's (2002) examination of the relationship between income shocks (positive or negative) on remittance flows, the author investigated several alternative

specifications of the conditional mean of remittance flows— Tobit, Heckman's 2-step procedure and Powell's censored absolute least deviations, CLAD. Yang and Choi (2007) explicitly test the validity of the exclusions restrictions that motivate their instrumental variable approach. Other authors have estimated alternative conditional mean effects across income levels (e.g. quantile or deciles). The present discussion first focuses on alternative measures of household consumption that may be more appropriate in context of Mali's Lacustre Zone: food consumption and staple food calorie consumption. In other words, do short and long-term migration and remittances receipts contribute to or detract from transient food insecurity.

Figures 2 and 3 present average monthly real (2000=100) rice and millet prices at one of the Market Information System outposts located in the Lacustre Zone. This helps to illustrate the somewhat erratic nature of staple food prices over the course of a given year. This also provides some support for the idea that simply using the monetary (FCFA) value of consumption may not be sufficient to understand the mechanisms through which households are insured. Although the theory presented in section II predicts the income shocks and insurance groups will affect consumption (in terms of expenditure on food and both durable and non-durable non-food items), the difficulties and vulnerabilities of households to food insecurity in particular throughout the year is likely more relevant (Christaensen and Boisvert, 2000). In particular, households may sell the bulk of their cereal crop immediately following harvest in order to pay off accured debts and then rely on thin rural cereal markets in order to purchase staple foods for the remainder of the year. If this is the case, and esimate of the caloric consumption per household member may be a better indicator to use in our test of pareto efficient pooling of risk within a given co-insurance group. Therefore, the following robustness checks serve to evaluate

whether migrants' remittances play differential roles as households smooth food versus non-food consumption.

In **tables 11 and 12** we again treat each of our independent variables as exogenous and establish the correlation between income and food consumption changes for migrant and non-migrant households during a given period. We find that for overall weekly food consumption (measured as the real, 2000=100, FCFA value of food), income and remittances do a better job of insuring again food consumption risk for migrants than earned income alone. However, we find that (after controlling for village and period level effects or not), the consumption of food for non-migrant households appear to be better insured than that of migrant households. These results are reversed when we consider the effect of different incomes streams on household calorie consumption from staple foods for our two subsamples. Indeed, it appears as though changes in earned income are transmitted to a much greater degree to changes in calories derived from staple foods for non-migrant households when we omit the village period-level effects from our estimated equation. Our results therefore suggest that when all of our explanatory variables are treated as exogenous, current non-migrants are better insured against changes in the monetary value of food consumption, the same is not true for number of calories derived from staple food sources.

We now turn to the explicit test of the role of migration in smoothing food consumption shocks in the Zone Lacustre. In **tables 13 and 14** we present our findings with respect to overall food consumption and cereal calories consumption, respectively. These results, as they currently stand, support the notion that the natural log of household food consumption may be better insured through earned income and remittances than through earned income alone. This supports (albeit weakly) our earlier findings that are even further supported from our results with respect

to weekly staple food calories consumed. Specifically, we find that overall, the food consumption of non-migrant households is better insured against income risk when we consider earned income within an instrumental variables framework (.16 and .70 overall effects of earned income from these two subgroups. This trend reverses when we consider the effect of both earned and remitted income flows on staple food caloric consumption. Indeed, the effects of the natural log of both income and remittances on cereal consumption are nearly zero for migrant households and .21 for non-migrants. These alternative specifications of household consumption, which relate directly to household food security and therefore wellbeing, suggest that remittances do play an important role is helping households smooth consumption overtime and that households participating in out-migration may actually be transitioning from one coinsurance group (village) to another (spatially dispersed household members). These results also indicate a possibility that households participating in out-migration may not smoothing consumption because they have increased food and non-food consumption overall. The next section will explicitly test whether our data from the Zone Lacustre convincingly support either of those two scenarios as two of the longer-term impacts of out-migration: increased consumption smoothing during the periods after migration and increases in the overall all basket of goods consumed. (which can also theoretically weaken village co-insurance mechanisms).

VII. Evaluating the Long Run Effect of Migration and Remittances on Wellbeing

As discussed above, the third objective of this research is to investigate the persistence of informal household insurance mechanisms on household wellbeing. In recent work by Chauvet et al. (2009), the authors demonstrate with aggregate (national level) panel data that lagged but not contemporaneous remittances (as well as other explanatory variables) improve child welfare (mortality). This is consistent with the notion that the process of migrating, establishing oneself

in a host community and then sending money (or goods) home is not instantaneous. And, at the same time, the other, more general determinants of child welfare (including morbidity) accumulate over time. Therefore, the lagged or persistence of the effects of migration may be more appropriate to investigate in order to motivate future explicit studies of, say, the effect of migration and remittances on welfare indicators related to health, nutrition and education status. In other words, does consumption smoothing insurance through migration in period t (1997-1998) have an effect on measures of households' wellbeing in period t+n (2006)? And if so, what are the avenues through which this process occurs? This is consistent with the notion that it may take several periods for a household to recover from a given (or a multitude of) adverse shocks. Therefore insurance against such setbacks may likewise have persistent effects. Migration may also have a lagged effect because of the dynamic nature of out-migration and the tendency for migrants to maintain strong ties with their home community and often return with important sums of cash and in-kind gifts once they move back to settle. Likewise, remittances may have other effects aside from allowing households to smooth consumption, such as overcoming credit constraints to make investments related to production agriculture or gaining valuable human capital through off farm work. Both may lead to long-term improvements in household members' wellbeing.

Given the structure of the present survey data, it is possible to examine how spatially diversifying income through migration in this zone has affected policy relevant measures of wellbeing. First, we consider the persistence of the effect of migration as it relates to household consumption smoothing (food both and non-food items). We do so by analyzing whether or not our data provide evidence that households that have previously participated in migration are better able to smooth their consumption during later time periods. As discussed above, this may

occur through a number of avenues such as overcoming credit constraints to make long-term productive investments (in physical and/or human capital) or by allowing households to overcome and otherwise difficult periods and therefore avoid a poverty-trap type situation. On the other hand, it is possible that past migration does not contribute to improved consumption smoothing because consumption levels have increased overall. Indeed, increased overall consumption would naturally lead us to reject a hypothesis of perfect insurance. At the same time, increased consumption or a shift in the basket of goods consumed could drive households away from their village-level co-insurance group and therefore depend to a greater degree on spatially distant household members.

Our results are presented in **tables 15 and 16** in two separate formats that nonetheless tell us a similar story. In **table 15**, we again break our sample into those observations (by household and period) that have experienced past migration and those that have not. We again use first-differences, which theoretically removes all time-constant factors from our estimating equation. These results generally tell us the same story across specifications (e.g. exogenous versus endogenous treatment of our explanatory variables): that, on average, households' consumption is generally better insured following migration than before. **Table 16** presents similar results, with the exception that past household migration status is explicitly included as an explanatory variable. Although the sign of past migration changes across specifications, we find no cases in which it alone is statistically significant. On the other hand, our interacted past migration status and income (earned and/or remitted) terms are negative in each model specification. This therefore further supports the findings in **table 15** that households that had previously participated in out-migration were, on average, better able to smooth their (food and non-food) consumption following than before. Therefore, although our previous discussions focused on the

role of contemporaneous (current) migration and remittances flows on smoothing household consumption between periods left us with somewhat ambiguous results, the role of past migration on future consumption smoothing appears to be unambiguously positive. This is unsurprising in many ways as household out-migration is itself not instantaneous, nor are remittances receipts or the results of physical and human capital investments made as a result of this activity that accrue gradually over time.

Now, although we are primarily interested in the role of out-migration on consumption smoothing across time, our previous analyses and discussion suggest that it could have an important effect on the level of consumption as well. **Table 17** presents basic descriptive results on the distribution of food and non-food consumption (real 2000=100 FCFA) before and following out-migration. We find that on average consumption increases following out-migration, however we see a slightly different story once we consider the distribution of expenditures across sub-samples. More specifically, we find that while both food and non-food consumption at the 25^{th} and 50^{th} percentile (median) increases following out-migration, the reverse is true for higher levels of the distribution (75^{th} and 90^{th} percentiles, respectively). Although these are only descriptive results, they do provide suggestive evidence that household out-migration has a persistent effect both on consumption smoothing and on the level of consumption, more generally. This appears to be especially the case among households with very low incomes and purchasing power.

VIII. Discussion

This paper was motivated by some of the stylized that have been well established in the development economics literature: that life in developing countries is characterized by risk and uncertainty of many forms and that households can be quite resilient and innovative in

responding to new conditions. In this paper we treat one such response, that of household member out-migration, which can be seen as both an ex-ante and ex-post coping mechanism. Our findings suggest that out-migration from our sample in Mali's Zone Lacustre is itself driven by agro-climatic conditions on the one hand and social ties on the other. On the other hand, after controlling for sample selection bias, household remittance receipts are strongly driven by exogenous household shocks; morbidity and mortality in particular. We therefore have evidence that spatially dispersed household members indeed respond by sending money and in-kind transfer during times of difficulty. Although our results provide only weak evidence in support of the hypothesis that outmigration and remittances improve contemporaneous (current) consumption smoothing across consumption baskets, we find that is has a strong persistent effect. In many ways this is unsurprising as neither migration nor remittances occur instantaneously. This is particularly the case for households participating in long-term migration, versus seasonal domestic out-migration. We would likewise not expect the effects of any physical or human capital investment made as a results of these activities to take effect immediately. Finally, descriptive statistics on the distribution of household consumption before and after migration indicate past migration positively effects consumption at the lower end of distribution while it negatively effects consumption at the higher end of the distribution, and that the magnitude and percentage change is greatest in the case of the former.

Although the Zone Lacustre of Mali is a particularly difficult one to live in and size of the sample analyzed for this research is fairly small (250 households), there are at least two important policy implications that can be drawn from our findings and discussion. First, household out-migration is very common strategy, but both the short and longer-term impacts are not uniform across households. We have some evidence that past out-migration increases

households' ability to smooth consumption and that it actually increases the level consumed among the very poor. The financial sector can further facilitate this process by developing or supporting existing mechanisms through which migrants can quickly and securely remit funds. Second, we found that the effect of migration is not particularly strong in the short run, but its longer-term, persistent effects are. This along with a better understanding the interaction between the long-term effects of out-migration and household human and physical capital investments may have important implications the effective development and targeting of social safety nets for remote communities in Mali and across West Africa more generally.

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X. Figures

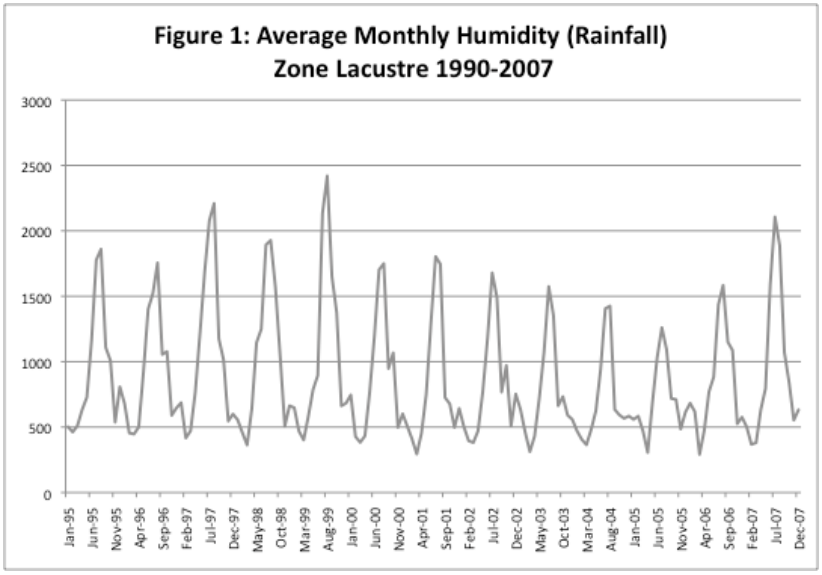

Figure 1: Average Monthly Humidity (Rainfall) Zone Lacustre 1990-2007 (NASA LARC, 2011)

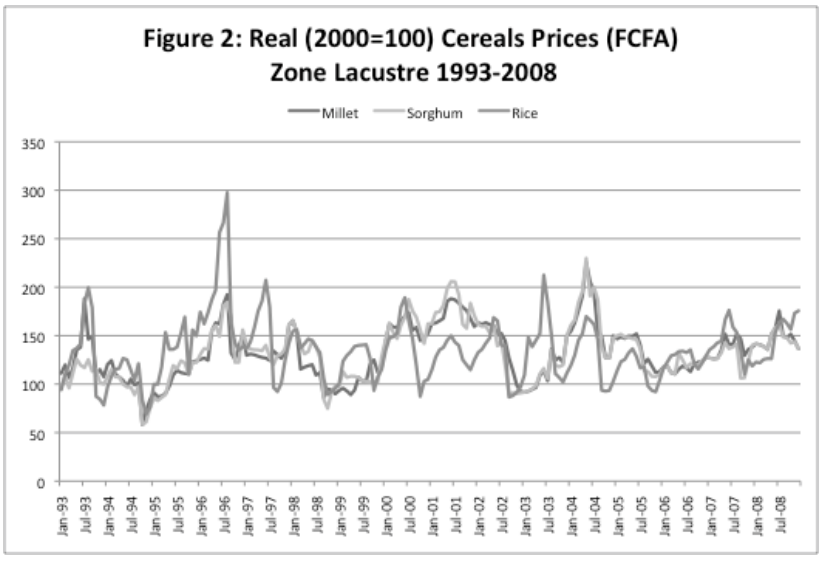

Figure 2: Monthly Average Real cereals prices (FCFA) Lacustre Zone (OMA, 2010)

XI. Tables

Table1: Sample Household Characteristics in the Zone Lacustre (Survey Round 1)						
	Migrant (n= 142)			Non-Migrant (n=133)		
Household Descriptives 1/	**Mean**	**SE**	**Median**	**Mean**	**SE**	**Median**
Household Members	6.3	3.8	6.0	5.5	3.4	5.0
Gender of Household Head (% female)	13%	--	--	7%	--	--
% of households in which the household head has some schooling	15%	--	--	16%	--	--
Assets	300,577	411,712	184,038	327,385	632,183	171,625
Household Land (ha)	4.2	5.2	2.6	3.8	5.2	2.1
Household Total Expenditure (Nominal FCFA)	115,915	162,081	69,350	105,379	141,840	63,104
Value of Weekly Household Food Consumption	12,098	7,720	10,330	11,644	6,509	11,062
Value of Weekly Household Food Expenditure	9,158	6,167	7,613	9,377	5,383	8,773
Net-Income	225,498	226,188	173,634	197,329	234,503	132,500
Crop Income	80,538	109,396	49,250	101,403	162,041	53,300
Livestock Income	7,290	28,383	0	12,466	45,049	0
Non-Farm Income	72,379	102,822	44,000	84,582	136,687	49,000
% Remittances in Total Income 2/	33%	23%	29%	0	--	--
Transfers Other Than Remittances (%Yes)	53%	50%	--	57%	50%	--
Average Role of Transfers other Than Remittances in total Income (%)	8%	15%	0%	7%	14%	1%
Education Expenditures	418	4,619	0	196	1,292	0
Percent of households with school age children with some schooling	20%	--	--	32%	--	--
Health Expenditures	1,756	7,036	0	1,395	3,991	0
Households that reduced children's food consumption as a coping mechanism	65%	--	--	68%	--	--
% of Households with Livestock Deaths	31.0%	--	--	26.0%	--	--
% of Households faced with Pre- or Post Harvest Crop Losses	83.0%	--	--	74.0%	--	--
% of Households with Lost Productive Time due to Illness	55.0%	--	--	63.0%	--	--
Household experienced the death of a family member	5.0%			1.0%		

1/ Income, assets, expenditures and remittances are reported in nominal FCFA

2/ Remittance receiving households only

Table 2: Sample Household Characteristics in the Zone Lacustre (Survey Round 1)						
	Domestic Migrant (n=117)			International Migrant (n=43)		
	Mean	SE	Median	Mean	SE	Median
Household Descriptives 1/						
Household Members	6.5	3.7	6.0	6.6	4.0	6.0
Gender of Household Head (% female)	9%	--	--	14%	--	--
% of households in which the household head has some schooling	16%	--	--	23%	--	--
Assets	299,262	436,240	164,600	360,325	544,365	184,425
Household Land (ha)	4.5	5.4	3.0	3.6	5.0	2.5
Household Total Expenditure (Nominal FCFA)	120,410	173,875	68,905	143,643	240,363	81290
Value of Weekly Household Food Consumption	12,140	7,940	10,180	13,095	8,711	11708.85
Value of Weekly Household Food Expenditure	9,268	6,512	7,600	9,684	5,670	8915
Net-Income	221,148	210,863	175,200	298,497	322,902	215274
Crop Income	84,253	115,374	51,469	100,614	140,137	78225
Livestock Income	7,362	29,591	0	11,221	34,791	0
Non-Farm Income	68,935	95,846	46,375	86,653	109,664	45000
% Remittances in Total Income 2/	32%	22%	30%	37%	25%	28%
Transfers Other Than Remittances (%Yes)	50%	50%	--	53%	50%	--
Average Role of Transfers other Than Remittances in total Income (%)	7%	12%	0%	8%	17%	1%
Education Expenditures	486	5,085	0	1,380	8,383	0
Percent of households with school age children with some schooling	18%	--	--	23%	--	--
Health Expenditures	1,433	6,661	0	2,435	6,802	0
Households that reduced children's food consumption as a coping mechanism	68%	--	--	71%	--	--
% of Households with Livestock Deaths	35%	--	--	42%	--	--
% of Households faced with Pre- or Post Harvest Crop Losses	72%	--	--	72%	--	--
% of Households with Lost Productive Time due to Illness	55%	--	--	60%	--	--
Household experienced the death of a family member	3%			5%		

1/ Income, assets, expenditures and remittances are reported in nominal FCFA
2/ Remittance receiving households only

Table 3: Migration and Remittance Distribution Across Agricultural Production Systems					
	Village	**# of Migrant Households (% of total)**	**# Households with Remittances (% of Migrant)**	**# of Non-migrant households**	**Total Households**
River-side Irrigation	Ouaki	16	8	36	52
		31%	50%		
	Tomi	3	1	9	12
		25%	33%		
Ponds but no Flood Control	Mangouro	18	12	11	29
		62%	67%		
	Gouaty	5	4	5	10
		50%	0.8		
	Ngoro	30	20	30	60
		50%	67%		
Ponds with Flood Control	Aldianaba	14	13	4	18
		78%	93%		
	Hamakoira	13	6	4	17
		76%	46%		
	Tomba	23	11	16	39
		59%	48%		
Rainfed Agriculture	Goundam	3	2	11	14
		21%	67%		
	Anguira	17	15	7	24
		71%	88%		
Total		142	92	133	275

Table 4: Determinants of Household Out-Migration			
MIGRANTS (Y/N)	**Linear Probability Model 1/**		
	Pooled	**Fixed Effects**	**Dynamic Fixed Effects**
Female Headed Household	0.0419	0.0693*	0.0754**
Village Crop Shock Intensity (%)	-0.0390	-0.0456	-0.0297
Village Illness Intensity (%)	-0.107*	-0.0975	-0.152
Village Livestock Loss Intensity (%)	0.187**	0.225**	0.160
Village Out-Migration Intensity	0.0272***	0.0235***	0.0232***
Land*Rainfall Shock	1.05e-06*	-1.99e-05	2.65e-05
Land*Rainfall Shock (t-1)	-2.69e-06**	3.77e-05	-1.40e-06
Land*Rainfall Shock (t-2)	-1.03e-06*	8.26e-06	4.93e-05
Land*Rainfall Shock (t-3)	-7.76e-07**	-8.47e-06	-1.92e-05
Land*Rainfall Shock (t-4)	-4.04e-08	-2.39e-05	-3.10e-05
Land*Rainfall Shock (t-5)	8.13e-07***	-1.32e-05	-3.40e-05
Village Crop Shock Intensity (t-1)			-0.0876
Village Illness Intensity (t-1)			-0.140
Village Livestock Loss Intensity (t-1)			-0.00228
Village Out-Migration Intensity (t-1)			0.00273*
Constant	0.569***	0.260	0.279
Observations	1,583	1,583	1,304
R-squared	0.659	0.629	0.680
F-test of the joint significance of agro-climatic shocks	5.33***	2.8*	13.32***
Clustered (village) robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			
1/Includes interacted village and period level effects			

Table 5: Determinants of Receiving Remittances									
Remittances (Y/N)	**Linear**			**Fixed Effects**					
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**
Female Headed Household	6.433*	6.250*	1.248	13.98	9.863	14.70	0.0902	0.137	0.0906
Household Land (ha)	0.038**	0.043**	0.026	0.008	0.036**	0.009	0.0004**	0.000269	0.000292
Household Deaths	0.873			-2.314*					
Household Members		0.241	-1.332	0.264	0.0396	0.292	0.00222	0.00289	-0.00202
Household Illnesses	1.564**			1.246**					
Household Death		6.273	3.362		0.443	-2.650	-0.0163	-0.0282	0.0213
Household Illness		4.357*	6.621*		4.001	3.562	0.0305	0.0314	0.0722**
Household Crop Loss		3.140	3.662		4.494	5.392*	0.0279	0.0375	0.00895
Migrant Activity == Agriculture		10.77**	4.429**				0.105***	0.0793**	0.0538**
Migrant Activity == Small Enterprise		18.18**	10.21**				0.146***	0.123***	0.0955**
Migrant Activity == Other		-1.031	-4.994**				0.00187	-0.0150	-0.0180
Lagged Death									0.0706*
Lagged Illness									-0.00780
Lagged Livestock Loss									0.0186
Lagged Crop Loss									-0.0393
Average Livestock Losses	-2.45e-05	-8.77e-06	-1.28e-05				0.105***	0.0793**	
Average Crop Losses	0.00498*	0.00393	0.00603*				0.146***	0.123***	
Average Land	0.00971	-0.0216	-0.00837				0.00187	-0.0150	
Average Household Size	0.977	0.0497	1.951						
lambda 1/			22.72**	***				***	***
Constant	39.08**	-0.0181	29.82**	29.77	29.82**	22.58	0.228***	0.0655	0.170
R-squared	0.151	0.270		0.182	0.135	0.183	0.209	0.225	0.241

Robust standard errors in parentheses

258 Households, and 1485 Observations

*** p<0.01, ** p<0.05, * p<0.1

1/ Test of joint significance of IMR for FE Models

Table 6: Determinants of the Level of Remittances Received (Real FCFA 2000=100)					
Dependent Variable = Total Remittances (Real)	**Pooled OLS**		**Fixed Effects**		
	I	**II**	**III**	**IV**	**V**
Female Headed Household	17,331*	20,548**	24,728*	24,659*	21,480*
	(9,653)	(9,676)	(12,416)	-12223	(10,659)
Household Land (ha)	4.320	10.21	425.4**	798.2***	737.2***
	(48.51)	(48.69)	(165.7)	-245.5	(215.2)
Household Members		-847.6	580.2	-344.4	-555.9
		-2171	(2,089)	-2080	(2,117)
Household Deaths	4,386				
	(6,174)				
Household Illnesses	1,872				
	(2,224)				
Values of Livestock Losses (Real)	0.104				
	(0.0843)				
Value of Crop Losses (Real)	-4.979*				
	(2.842)				
SICK_BAR	-7,380	-4,944			
	(6,079)	(5,767)			
LIVESTOCK_LOSS_BAR	-0.0318	0.0619			
	(0.140)	(0.133)			
CROP_SHOCK_BAR	34.23***	26.48***			
	(8.060)	(7.309)			
LAND_BAR	54.24	26.53			
	(136.0)	(135.9)			
COMP_BAR	3,405**	3,992			
	(1,332)	(2,644)			
Death of Household Member		-1,301	-8,445	6,583	6,892
		(16,463)	(11,903)	(11,668)	(11,000)
Household Experienced Illness		-6,618	-5,693*	1,413	771.1
		(8,165)	(3,011)	(1,682)	(1,736)
Household Experienced Livestock Loss		-1,149	1,526	-0.0345	-0.0223
		(8,697)	(7,066)	(0.0853)	(0.0747)
Household Experienced Crop Loss		118.4	384.6	-1.551	-0.829
		(8,142)	(3,620)	(4.772)	(4.484)
Migrant Activity == Agriculture		1,721			9,871
		(4,471)			(8,326)
Migrant Activity == Small Enterprise		15,930***			31,669**
		(3,634)			(11,892)
Migrant Activity == Other		-4,510			829.0
		(4,709)			(4,462)
Lagged Death				-1,856	-1,757
				(1,221)	(1,578)
Lagged Illness				914.5	337.7
				(2,803)	(2,479)
Lagged Livestock Loss				0.0233	0.0233
				(0.101)	(0.0836)
Lagged Crop Loss				-4.875*	-4.632**
				(2.242)	(2.031)
Lambda 1/	48,910***	52,565***	0.000***	0.0326**	0.0156
	(9,035)	(9,117)			
Constant	56,984**	41,836	13,587	24,643	11,994
	(27,511)	(28,059)	(19,329)	(23,176)	(23,883)
Observations	1,485	1,485	1,442	1,187	1,187
R-squared			0.056	0.076	0.117

1/ for FE specification, the statistic presented is the p-value of test of joint significance of the period specific IMR

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Consumption Smoothing (Total Consumption) by Migration Status						
Dependent Variable = Total Weekly Expenditures (Real FCFA, 2000=100)	**Migrant**				**Non-Migrant**	
	I	**II**	**III**	**IV**	**V**	**VI**
Household Earned Income	0.26**	0.29**	--	--	0.19**	0.26***
	(0.11)	(0.11)			(0.08)	(0.07)
Household Earned Income & Remittances	--	--	0.19**	0.21***	--	--
			(0.06)	(0.06)		
Household Members	180.13	346.04	123.41	280.85	435.94	990.77
	(478.10)	(577.76)	(479.17)	(585.43)	(523.77)	(670.95)
Female Headed Household	-4,870.84**	-4,794.36**	-5,201.76**	-5,249.54**	-4,067.74	-10,310.55**
	(2,065.12)	(1,751.27)	(1,959.25)	(1,694.22)	(3,154.89)	(3,512.75)
Village Period Effects	Yes	--	Yes	--	Yes	--
Constant	-63.62	-734.64	-7,056.49***	-1,014.81	-56,714.73***	-2,377.99*
	(539.03)	(593.13)	(1,559.39)	(624.09)	(3,676.08)	(1,154.50)
Observations	780	780	780	780	511	511
R-squared	0.34	0.14	0.34	0.13	0.40	0.18
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 8: Consumption Smoothing (Natural Log of Total Consumption) by Migration Status						
Dependent Variable =Natural Log of Total Weekly Expenditures (Real FCFA, 2000=100)	**Migrant**				**Non-Migrant**	
	I	**II**	**III**	**IV**	**V**	**VI**
Household Earned Income	0.25***	0.26***	--	--	0.16***	0.19***
	(0.04)	(0.04)			(0.02)	(0.03)
Household Earned Income & Remittances	--	--	0.29***	0.31***	--	--
			(0.05)	(0.05)		
Household Members	0.22***	0.22***	0.22***	0.22***	0.14	0.09
	(0.06)	(0.05)	(0.06)	(0.05)	(0.10)	(0.09)
Female Headed Household	0.21	0.27	0.22	0.26	-0.19	-0.18
	(0.35)	(0.32)	(0.32)	(0.31)	(0.24)	(0.16)
Village Period Effects	Yes	--	Yes	--	Yes	--
Constant	-1.38***	0.01	-1.37***	0.03	-1.82**	-0.23**
	(0.25)	(0.06)	(0.25)	(0.06)	(0.70)	(0.09)
Observations	780	780	780	780	511	511
R-squared	0.37	0.29	0.35	0.26	0.40	0.18
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 9: Effect of Migration on Consumption Smoothing

Dependent Variable = Total Weekly Consumption (Real FCFA, 2000=100)	First-Differenced				First-Differenced and IV			
	I	II	III	IV	V	VI	VII	VIII
Household Earned Income	0.15***	0.18***	--	--	0.12	-0.07		
	(0.05)	(0.04)			(0.48)	(0.18)		
Household Earned Income & Remittances	--	--	0.12***	0.11***			0.02	-0.17
			(0.04)	(0.04)			(0.33)	(0.16)
Migrant (Yes or No)	-1,428.22	-373.07	-1,549.72	-902.32	1,899.78	-5,833.94**	1,329.89	-6,641.84***
	(1,013.63)	(996.36)	(1,008.05)	(985.66)	(3,591.21)	(2,346.24)	(2,802.80)	(2,037.65)
Migrant * Earned Income	0.13**	0.21***	--	--	0.09	0.74***		
	(0.05)	(0.05)			(0.56)	(0.25)		
Migrant * Earned Income and Remittances	--	--	0.12**	0.24***			0.20	0.88***
			(0.06)	(0.06)			(0.45)	(0.25)
Household Members	299.66	502.23**	272.51	481.39**	-483.03	480.18*	-479.23	532.90**
	(234.40)	(242.86)	(234.84)	(243.92)	(544.18)	(257.47)	(545.17)	(265.25)
Household Members with Some Education	164.62	122.61	188.76	137.47	15,956.94*	945.07	16,026.09*	871.04
	(537.80)	(533.06)	(537.94)	(534.77)	(9,139.98)	(1,232.26)	(9,420.39)	(1,243.92)
Female Headed Household	-3,841.73**	-4,700.97**	-4,024.31**	-4,941.09**	-6,457.65**	-4,114.64*	-6,441.46**	-3,864.78*
	(1,912.61)	(2,069.26)	(1,914.91)	(2,076.35)	(2,906.98)	(2,198.24)	(2,923.09)	(2,231.01)
Village Period Effects	Yes	--	Yes	--	Yes		Yes	
Constant	-2,129.80	103.36	-2,143.08	95.97	110.74	193.98	118.90	214.66
	(1,777.41)	(485.22)	(1,778.01)	(486.83)	(2,843.07)	(517.74)	(2,852.59)	(521.94)
Observations	1,291	1,291	1,291	1,291	1,291	1,291	1,291	1,291
R-squared	275	275	275	275	275	275	275	275
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 10: Effect of Migration on Consumption Smoothing

Dependent Variable = Natural Log Total Weekly Consumption (Real FCFA, 2000=100)	First-Differenced				First-Differenced and IV			
	I	**II**	**III**	**IV**	V	VI	VII	VIII
Natural Log Household Earned Income	0.25***	0.31***			0.26	0.33***		
	(0.01)	(0.01)			(0.32)	(0.12)		
Natural Log Household Earned Income & Remittances			0.26***	0.29***			0.36	0.33***
			(0.02)	(0.02)			(0.27)	(0.11)
Migrant (Yes or No)	0.27*	0.16	0.37	-0.21	-2.62	-1.10	-2.35	-2.49*
	(0.15)	(0.14)	(0.25)	(0.26)	(3.08)	(1.37)	(3.69)	(1.44)
Migrant *Natural Log Earned Income and Remittances			-0.02	0.04	0.57	0.21	0.34	0.30*
			(0.02)	(0.02)	(0.50)	(0.21)	(0.44)	(0.16)
Household Members	0.18***	0.11***	0.18***	0.11***	0.06	0.14***	0.00	0.09**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.12)	(0.03)	(0.14)	(0.04)
Household Members with Some Education	0.10	0.14*	0.09	0.14*	2.39	0.32*	3.19	0.62***
	(0.08)	(0.08)	(0.08)	(0.08)	(1.71)	(0.17)	(2.07)	(0.20)
Female Headed Household	-0.01	-0.06	-0.03	-0.07	-0.46	0.19	-0.58	-0.05
	(0.30)	(0.32)	(0.30)	(0.32)	(0.51)	(0.30)	(0.55)	(0.36)
Village Period Effects	Yes		Yes		Yes		Yes	
Constant	0.16	-0.39***	0.15	-0.42***	0.87*	0.15**	0.86	-0.27***
	(0.27)	(0.08)	(0.27)	(0.08)	(0.47)	(0.07)	(0.52)	(0.10)
Observations	1,291	1,291	1,291	1,291	1,291	1,291	1,291	1,291
R-squared	275	275	275	275	275	275	275	275

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Consumption Smoothing (Food Consumption) by Migration Status						
Dependent Variable = Natural Log Total Weekly Food Consumption (Real FCFA, 2000=100)	**Migrant**				**Non-Migrant**	
	I	**II**	**III**	**IV**	**V**	**VI**
Household Earned Income	0.25***	0.28***			0.09***	0.15***
	(0.06)	(0.07)			(0.03)	(0.03)
Household Earned Income & Remittances	--	--	0.24***	0.27***	--	--
			(0.06)	(0.07)		
Household Members	0.13***	0.13**	0.13***	0.13**	0.08	0.02
	(0.03)	(0.05)	(0.03)	(0.05)	(0.10)	(0.10)
Female Headed Household	-0.31**	-0.26*	-0.32**	-0.26*	-0.06	-0.06
	(0.11)	(0.13)	(0.11)	(0.12)	(0.21)	(0.19)
Village Period Effects	Yes	--	Yes	--	Yes	
Constant	0.05	0.19**	0.13	0.16**	-0.03	-0.05
	(0.06)	(0.06)	(0.10)	(0.06)	(0.04)	(0.05)
Observations	762	762	762	762	490	490
R-squared	0.27	0.17	0.26	0.17	0.38	0.11
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 12: Consumption Smoothing (Staple Food Calories) by Migration Status						
Dependent Variable = Total Weekly Cereals Consumption (Calories)	**Migrant**				**Non-Migrant**	
	I	**II**	**III**	**IV**	**V**	**VI**
Household Earned Income			3.81	6.95***	4.73	16.97**
			(2.28)	(1.78)	(6.49)	(6.98)
Household Earned Income & Remittances	1.99	4.52***				
	(1.27)	(1.16)				
Household Members	96,278.86***	117,979.52***	97,051.00***	119,949.20***	47,596.64	135,288.24**
	(14,616.53)	(21,787.46)	(14,954.05)	(21,836.02)	(38,480.65)	(42,164.13)
Female Headed Household	-409,470.19	-350,953.31	-407,931.00	-340,841.41	345,653.51**	272,265.09
	(244,191.41)	(210,438.23)	(245,612.60)	(210,800.42)	(135,194.45)	(187,824.30)
Joint Significance of Village Period Effects	Yes	--	Yes	--	Yes	--
Constant	-419,504.01***	-154,724.89**	-0.46***	-0.09**	826,480.53***	-84,584.58
	(64,158.99)	(51,422.05)	(0.07)	(0.04)	(92,887.41)	(141,574.57)
Observations	687	687	687	687	461	461
R-squared	0.31	0.07	0.28	0.10	0.21	0.06
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Table 13: Effect of Migration on Food Consumption Smoothing (Real 2000=100 FCFA)								
Dependent Variable = Total Weekly Food Consumption (Real FCFA, 2000=100)	**First-Differenced**				**First-Differenced and IV**			
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
Household Earned Income	-0.03	0.04			0.08	0.17		
	(0.04)	(0.04)			(0.46)	(0.16)		
Household Earned Income & Remittances			-0.03	0.03			0.03	0.11
			(0.04)	(0.04)			(0.53)	(0.16)
Migrant (Yes or No)	-1,567.28	-1,357.73	-1,557.45	-1418.05	5,958.66	621.67	5,554.34	-281.93
	(964.21)	(918.91)	(973.75)	-933.67	(4,709.90)	(2,358.41)	(4,525.95)	(2,327.46)
Migrant * Earned Income	0.06*	0.04			-0.35	-0.28		
	-0.03	-0.03			(0.45)	(0.19)		
Migrant * Earned Income and Remittances			-0.03	0.03			-0.31	-0.23
			(0.04)	(0.04)			(0.61)	(0.22)
Village Period Effects	Yes	--	Yes	--	Yes	--	Yes	--
Constant	-279.28	830.33*	-268.12	824.79*	1,437.41	584.64	1,384.93	579.81
	(1,620.79)	(445.19)	(1,620.85)	(445.27)	(2,861.54)	(476.22)	(2,801.17)	(469.93)
Dependent Variable = Natural Log Total Weekly Food Consumption (Real FCFA, 2000=100)	**First-Differenced**				**First-Differenced and IV**			
	IX	**X**	**XI**	**XII**	**XIII**	**XIV**	**XV**	**XVI**
Natural Log Household Earned Income	0.21***	0.23***			0.02	0.24*		
	(0.03)	(0.02)			(0.30)	(0.13)		
Natural Log Household Earned Income & Remittances			0.16***	0.17***			-0.02	0.20**
			(0.02)	(0.02)			(0.25)	(0.10)
Migrant (Yes or No)	0.46*	0.06	0.41	-0.08	-5.14*	-2.30	-6.50**	-1.99
	(0.25)	(0.24)	(0.25)	(0.25)	(2.97)	(1.52)	(3.30)	(1.40)
Migrant * Natural Log of Earned Income	-0.03	-0.01			0.84*	0.33		
	(0.03)	(0.03)			(0.45)	(0.22)		
Migrant *Natural Log Earned Income and Remittances			-0.02	0.00			0.77**	0.20
			(0.02)	(0.02)			(0.37)	(0.15)
Village Period Effects	Yes	--	Yes	--	Yes	--	Yes	--
Constant	0.25	0.11*	0.09	0.23	0.57	0.20**	0.50	0.16**
	(0.25)	(0.07)	(0.07)	(0.25)	(0.43)	(0.08)	(0.47)	(0.08)
Observations	1,252	1,252	1,252	1,252	1,252	1,252	1,252	1,252
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 14: Effect of Migration on Staple Food Consumption Smoothing (Calories from Staple Foods)								
Dependent Variable = Total Weekly Calories from Staple Foods (Real FCFA, 2000=100)	**First-Differenced**				**First-Differenced and IV**			
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
Household Earned Income	4.11	13.54***			22.01	18.93		
	(3.86)	(3.47)			(29.51)	(13.49)		
Household Earned Income & Remittances			2.26	11.78***			-36.15	6.67
			(4.10)	(3.72)			(36.36)	(14.94)
Migrant (Yes or No)	-124,595.99	-2,845.56	-131,491.10	-9,149.55	32,218.08	-132,882.98	-372,372.10	-295,284.72
	(94,759.63)	(87,196.98)	(95,807.85)	(88,931.81)	(307,885.70)	(215,995.79)	(318,314.13)	(221,846.94)
Migrant * Earned Income	-0.46	-2.77			-14.29	1.98		
	(3.21)	(3.15)			(29.11)	(16.40)		
Migrant * Earned Income and Remittances			0.09	-4.97			44.43	13.40
			(4.42)	(4.22)			(41.46)	(19.85)
Village Period Effects	Yes	--	Yes	--	Yes	--	Yes	--
Constant	-301,678.30**	-97,211.69**	-303,668.04**	-99,198.36**	-215,004.17	-98,180.96**	-230,465.65	-98,993.50**
	(151,410.68)	(42,091.03)	(151,455.61)	(42,185.45)	(182,545.42)	(43,185.03)	(185,437.27)	(43,784.72)
Dependent Variable = Natural Log Total Weekly Food Consumption (Real FCFA, 2000=100)	**First-Differenced**				**First-Differenced and IV**			
	IX	**X**	**XI**	**XII**	**XIII**	**XIV**	**XV**	**XVI**
Natural Log Household Earned Income	-0.00	0.03**			0.06	0.16***		
	(0.01)	(0.01)			(0.08)	(0.06)		
			-0.00	0.04***			0.08	0.21***
Natural Log Household Earned Income & Remittances			(0.01)	(0.01)			(0.11)	(0.08)
Migrant (Yes or No)	-0.31**	-0.05	-0.22	-0.04	-0.35	2.60***	-0.36	2.17**
	(0.12)	(0.13)	(0.17)	(0.17)	(1.08)	(0.92)	(1.04)	(0.94)
Migrant * Natural Log of Earned Income	0.01	-0.01			0.01	-0.29***		
	(0.01)	(0.02)			(0.12)	(0.09)		
			-0.02	0.00			0.02	-0.33**
Migrant *Natural Log Earned Income and Remittances			(0.02)	(0.02)			(0.15)	(0.13)
Joint Significance of Village Period Effects	Yes	--	Yes	--	Yes	--	Yes	--
Constant	-0.18	-0.08**	-0.18	-0.06*	-0.09	-0.07	-0.08	-0.06
	-0.11	(0.03)	(0.12)	(0.03)	(0.14)	(0.04)	(0.14)	(0.04)
Observations	1,148	1,148	1,148	1,148	1,148	1,148	1,148	1,148
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 15: Consumption Smoothing by Previous Migration Status						
Dependent Variable: First Difference of Real Household Total Food and Non-Food Consumption (FCFA, 2000=100)	**I**		**II**		**III**	
	Before	**After**	**Before**	**After**	**Before**	**After**
First Differenced Real Household Earned Income (Exogenous)	0.23***	0.16***				
	(0.08)	(0.04)				
First Differenced Real Household Earned Income (Endogenous)			0.23***	0.17***		
			(0.08)	(0.04)		
First Differenced Real Earned Income and Remittances (Endogenous)					0.21***	0.12***
					(0.08)	(0.03)
Constant	-788.49	1,112.11	1,077.58	-945.05	1,008.57	-939.49
	(2,115.71)	(5,140.57)	(5,152.94)	(2,137.12)	(5,155.33)	(2,140.30)
Observations	721	721	193	715	193	715
Robust standard errors in parentheses						
All specifications include village and period level effects						
*** p<0.01, ** p<0.05, * p<0.1						

Table 16: Effect of Past Migration on Consumption Smoothing												
Dependent Variable = Total Weekly Consumption (Real FCFA, 2000=100)	**First-Differenced**						**First-Differenced and IV**					
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**	**XII**
Household Earned Income	0.35***	0.48***	0.35***	0.52***			0.35***	0.48***	0.20***	0.32***		
	(0.06)	(0.06)	(0.06)	(0.06)			(0.06)	(0.06)	(0.03)	(0.03)		
Household Earned Income & Remittances					0.31***	0.40***					0.31***	0.40***
					(0.05)	(0.05)					(0.05)	(0.05)
Past Migration (Yes or No)	976.46 (1,644.46)	-355.77 (1,810.11)			1,036.39 (1,639.16)	-827.09 (1,816.58)	977.83 (1,645.11)	-365.32 (1,809.98)	-181.30 (1,605.44)	-1,606.65 (1,771.53)	1,037.61 (1,639.83)	-835.93 (1,816.30)
Migrant * Earned Income	-0.20***	-0.22***	-0.14***	-0.20***			-0.20***	-0.22***				
	(0.07)	(0.07)	(0.05)	(0.05)			(0.07)	(0.07)				
Migrant * Earned Income and Remittances					-0.18***	-0.19***					-0.18***	-0.19***
					(0.05)	(0.06)					(0.05)	(0.06)
Household Members	483.81**	449.03*	532.62**	456.57*	462.08*	433.69*	479.78**	434.39*	481.41**	408.80	458.20*	417.89
	(239.20)	(257.68)	(245.90)	(263.99)	(238.66)	(259.59)	(239.44)	(258.01)	(240.42)	(258.95)	(238.90)	(259.90)
Household Members with Some Education	19.33	-27.99	-32.83	-45.78	26.00	-19.54	20.50	-27.01	34.23	18.67	27.14	-18.40
	(524.36)	(527.56)	(554.02)	(563.40)	(523.29)	(531.26)	(524.57)	(527.51)	(526.70)	(529.49)	(523.50)	(531.17)
Village and Period Effects	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Constant	-882.82 (1,980.92)	-983.24* (578.17)	-841.58 (1,999.56)	-1,043* (564.63)	-770.63 (1,975.58)	-718.89 (581.01)	-886.37 (1,981.72)	-967.65* (578.30)	-826.93 (1,989.73)	-1,101.98* (579.04)	-774.04 (1,976.40)	-702.69 (581.09)
Observations	1,016	1,016	959	959	1,016	1,016	1,015	1,015	1,015	1,015	1,015	1,015
Robust standard errors in parentheses												
*** p<0.01, ** p<0.05, * p<0.1												

Table 17: Consumption Levels Before and After Migration for Food and Non-Food Items (Real 2000=100 FCFA)				
	All Items		Food	
	Before	After	Before	After
Mean	17755.76	18168.77	14609.28	15162.73
25th Percentile	6747.79	8765.542	6709.5	7526
50th Percentile	14052.4	14830.13	12055.73	12414.94
75th Percentile	25341.62	23012.48	19610.65	19447.47
90th Percentile	37099.17	34407.86	29128.05	26598.38
Observations	334	977	319	958