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Abstract

Over the past two decades, more than half the population in our sample of rural Tanzanians has migrated out of their home-communities. We hypothesize that this powerful current of internal migrants is changing the nature of traditional institutions such as informal risk sharing. Mass internal migration has created geographically disperse networks, on which we collected detailed panel data. By quantifying how shocks and consumption co-vary across linked households we show that, while both migrants and stayers insure negative shocks to stayers, there is no one in the network who insures the migrants' negative shocks. While migrants do share some of their positive shocks, they ultimately end up nearly twice as rich as those at home by 2010, despite practically identical baseline positions in the early nineties prior to migration. Taken together, these findings point to migration as a risky, but profitable endeavour, for which the migrant will bear the risk and also reap most of the benefit. We interpret these results within the existing literature on risk-sharing and on the disincentive effects of redistributive norms.

JEL codes: O12, O15, O17, R23

Keywords: internal migration, risk, insurance, institutions, Africa, tracking data

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1. Introduction

If, in the next decades, Africa catches up with the rest of the world, then that will almost certainly coincide with intergenerational mobility out of rural into urban areas and out of agriculture into non-agricultural activities (Lewis 1954; Harris and Todaro 1970). Historically, in both rich developed countries and fast-growing developing countries, this type of migration has moved in lockstep with development and poverty reduction (Collier and Dercon 2014). Recently, China's urban population officially surpassed its rural one: of China's 1.35 billion people, 51 percent lived in urban areas at the end of 2011, rising from less than 20 percent in 1980 (UN, 2012). Furthermore, UNDP (2009) reports that of the one billion migrants worldwide, three-quarters are internal migrants. With international migration open to only very few Africans, we should expect massive internal migration to form a core part of the development process.

The scale of this demographic process is captured in the data that form the basis of this paper, further motivating our focus on internal migration. These data are part of an exceptional panel data set from the Kagera region in Tanzania, spanning nearly two decades of migration and development. The 2004 and 2010 follow-up surveys attempted to trace all 6,353 individuals listed on the baseline 1991/94 household rosters and re-interview them irrespective of their location. Once we exclude the 1,275 individuals who had died by 2010, we are left with 4,996 baseline individuals whose 2010 locations are known.[1] Of those, 45 percent were found residing in the baseline village, 53 percent had migrated within the country, 2 percent to another East African country (primarily Uganda) and 0.3 percent had moved outside of East Africa. This region – not atypical of remote rural Africa – is clearly on the move, with internal migration dwarfing international migration.

We attempt to understand how this powerful current of internal migration, which is part and parcel of the modernization process, interacts with a traditional institution like informal risk sharing to shape economic mobility and vulnerability. This is a key question because, as Munshi and Rosenzweig (2006, p. 1230) put it

> [...] a complete understanding of the development process must not only take account of the initial conditions and the role of existing institutions in shaping the response to modernization and globalization, but must also consider how these traditional institutions are shaped in turn by the forces of change.

Our analysis departs from a number of other studies in the migration literature by focusing on consumption instead of transfers. This choice of the outcome variable is motivated by the fact that risk sharing and other economic exchange could happen through a multitude of different mechanisms, of which transfers is just one. Other mechanisms could include looking for a job for someone, employing them directly, providing them with tips, advice or a network link, or providing migration opportunities (Munshi 2003). By analysing consumption we focus on the joint and final effect of all such mechanisms.

Work using the 2004 follow-up round has shown that geographical mobility in rural Tanzania is associated with large income gains (Beegle, De Weerdt, and Dercon 2011). We will reiterate that point by showing that despite only minor welfare differences during the 1991-94 baseline survey, those who moved out of the region to other parts of Tanzania have grown roughly twice as rich as those who did not by the time we interviewed them again nearly two

[1] We lack location information on 82 individuals. Because this is after multiple attempts through various sources it is unlikely that these individuals have moved outside of East Africa. Information on such an important, low-occurrence event is unlikely to be hidden.

decades later in 2010. As we are measuring consumption and not income, it is clear that the main beneficiaries of this migration-led growth were the migrants themselves and certainly not their relatives who remained at home.

But did these migrants simply leave and never look back, or did they maintain links with the home community? The empirical contribution of this paper is to investigate this question by exploiting the fact that the 4,282 individuals interviewed in 2010 are grouped in 816 geographically disperse extended family networks. We quantify how household consumption responds to shocks experienced by other households in the extended family network. We find that while everyone suffers from own negative shocks, only the shocks to stayers negatively affect the consumption of other network members. There is no network reaction to migrants' negative shocks, suggesting they are not insured within the network. Those who stay at home do not seem to bear any of the negative shocks of those who move, but neither do they fully share the migrant's growth. Stayers do share some of the migrant's positive shocks and also receive insurance from these migrants against their own negative shocks, but migrants still outgrow stayers by a factor of 3, realising a growth of 120% over the survey period compared to 40% for the stayers. By 2010 migrants have become nearly twice as rich as those at home, whereas they were similar in observable wealth in 1991/94.

Because selection into migration is unlikely to be random, our analysis will remain inconclusive as to whether migration is causing these empirical facts. We cannot make any statements about what would have happened if migrants had stayed home or the stayers had migrated. It is possible that in this parallel universe roles would have switched (migration is causally responsible) or not (it is driven by the unobserved differences between migrants and non-migrants). All indications are, however, that prior to migration the (future) migrants did not assume any different position in the network compared to stayers. The same holds for the position taken up post-migration by return migrants.

We then discuss how we can understand the two important stylized facts that emerge from this paper – migrants grow much richer and become unilaterally responsive to stayers' shocks – within the existing literature. Our results cannot be easily explained within existing models of risk sharing (Altonji, Hayashi, and Kotlikoff 1992; Coate and Ravallion 1993; Townsend 1994; Fafchamps 1999; Attanasio and Ríos-Rull 2000; Ligon, Thomas, and Worrall 2002; Genicot 2006), nor within models of exchange (Lucas and Stark 1985; Hoddinott 1994). The results are more consistent with the existence of obligations of migrants toward those who remain at home. This could be in the form of a debt being paid back state-contingently, or through redistributive norms and altruistic feelings towards the home-community (Platteau 2000; Cox and Fafchamps 2007; Burke and Young 2011). Our analysis speaks further to an emerging literature that worries about the disincentive effects of such redistributive norms. Baland, Guirkinger, and Mali (2011) show how people take out costly loans in order to conceal their income, while Platteau (2014) sees migration as a means to escape the prying eyes and incessant demands of the kinship group. The kinship poverty trap model of Hoff and Sen (2006) predicts possible resistance from the home communities as they feel threatened by productive forces leaving and severing links with home to escape taxing demands for assistance. Anticipating this, the home community may set up subtle exit barriers, which could lead to below-optimal levels of migration.

Sections 2 and 3 describe the data and econometric model, respectively. Section 4 presents the main empirical findings and contains further robustness checks. Section 5 interprets the results within the existing literature and provides a concluding discussion.

2. Data and descriptive analysis

Kagera is a region in the north-western part of Tanzania. A large part of Lake Victoria is contained within this region and it shares a border with Burundi, Rwanda, and Uganda. The region is overwhelmingly rural and agricultural production is the most important source of income, with more than 80 percent of the region's economically active population engaged in it (URT 2012). Bananas, beans, maize, and cassava comprise the main food crops while coffee, tea, and cotton are important cash crops. Recent years have seen a rise in vanilla and horticulture for use as cash crops. According to the 2012 census, the region has a population of roughly 2.5 million people (URT 2013).

The Kagera Health and Development Survey (KHDS) was originally designed and implemented by the World Bank and the Muhimbili University College of Health Sciences. It consisted of 915 households from 51 villages that were interviewed up to four times from autumn 1991 to January 1994.[2] The KHDS-2004 survey aimed to re-interview all individuals that were ever interviewed in the baseline survey and were alive in 2004. This effectively meant that the original household panel survey turned into a panel of individuals. A full household questionnaire was administered in a household where a panel respondent was found residing. Due to household dynamics, the sample size increased to more than 2,700 households.[3] The second KHDS follow-up was administered in 2010 with this time more than 3,300 households interviewed.[4]

Although KHDS is a panel of individuals and the definition of a household loses meaning after 10-19 years, it is common in panel surveys to consider re-contact rates in terms of households. Excluding households for which all previous members were deceased the KHDS 2004 field team managed to re-contact 93 percent of the baseline households. In 2010, 92 percent of the initial households were re-contacted. Taking into account the long, 12 or 18 year periods between surveys, the attrition rates in KHDS-2004 and KHDS-2010 are extremely low by the standards for such panels (Alderman et al. 2001).

This paper exploits the fact that the survey includes all tracked split-offs from the original household and contains particularly rich information on the current links between them. The 2004 sample contains 4,430 individuals originating from 830 initial households. The 2010 sample has 4,282 individuals, originating from 816 initial households. In 2004, the average baseline household had spawned 3.3 households out of which 1.6 were non-migrant and 1.7 were migrant households. In 2010, the average baseline household had 4.1 households out of which 1.8 were non-migrants and 2.3 were migrants. In what follows we will refer to these networks as extended family networks.

In this paper we will define a migrant as anyone who has moved out of the baseline village. [5] By this definition 37 percent of the sample is considered migrant in 2004 and 48 percent in 2010. Details on where they were found in 2010 are given in Figure 1.[6]

[2] See World Bank (2004).

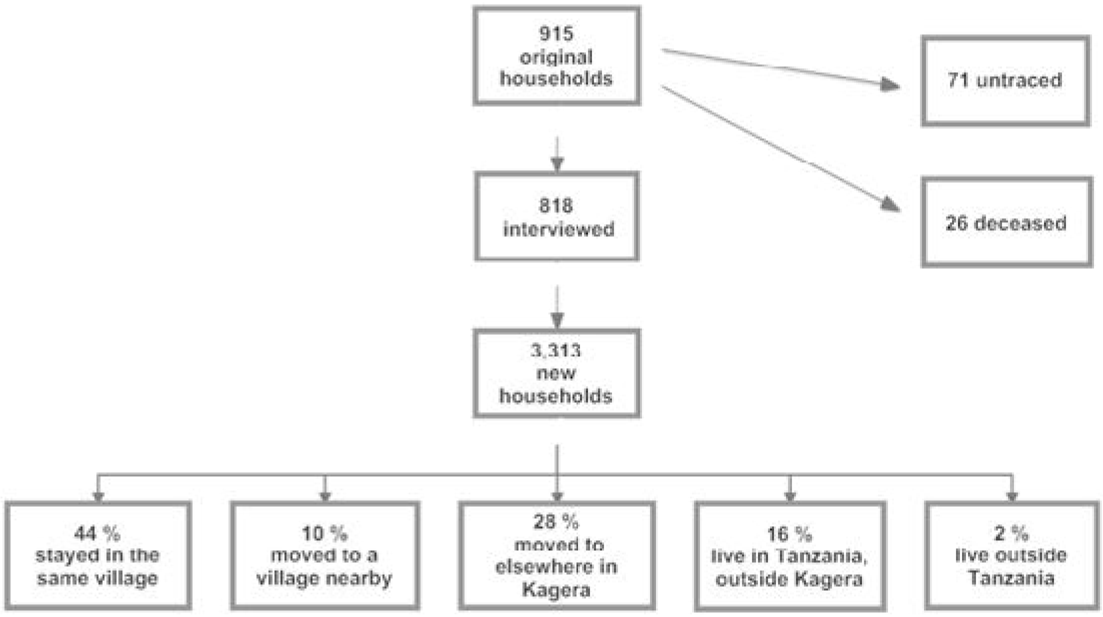
[3] See Beegle, De Weerdt and Dercon (2006).

[4] Whereas the 2004 round was conducted on paper, the 2010 round was conducted on handheld devices (Caeyers, Chalmers, and De Weerdt 2012). De Weerdt et al (2012) provide a full overview of the survey.

[5] Our results are robust to alternative migrant definitions, such as also defining households that moved to a nearby village as non-migrant households.

[6] Similar figure for the 2004 round is presented in Beegle, De Weerdt, and Dercon (2011).

Figure 1: KHDS-2010 – Re-contacting after 16+ years



These internal migration flows described above are associated with structural transformation.[7] Table 1 shows that out of the 1,850 migrant households in 2010, only one-third reported agriculture as their main income generating activity. For the 1,460 non-migrant households this is 65 per cent. More than 25 per cent of the migrant households engage in informal or formal wage employment and 11 per cent are self-employed in the non-agricultural sector. Furthermore, migrants who move farther from the baseline village are less likely to engage in agriculture and more likely to be in wage employment.

[7] This is also documented by Christiaensen, De Weerdt, and Todo (2013) who use the same data to study the role of urbanization and diversification in poverty reduction.

Table 1: Main income generating activity by migrant status in 2010

	non-migrant HHs	migrant HHs			
		all	nearby village	elsewhere in Kagera	outside Kagera
	%	%	%	%	%
agriculture	64.9	33.0	51.3	41.9	8.5
wage employment	6.2	26.8	12.0	20.1	45.8
self-employed	8.8	11.2	10.5	9.5	14.4
trading	11.7	17.2	17.2	15.1	20.7
casual labour	5.5	7.6	6.7	9.5	5.3
fishing	1.8	1.7	0.6	2.6	0.9
transfers & savings	1.2	2.5	1.8	1.4	4.6
number of HHs	**1,460**	**1,850**	**343**	**917**	**590**

Note: Agriculture category includes farming and livestock keeping, trading includes agricultural and non-agricultural trading. Wage employment can be either formal or informal. Transfers include pensions, remittances and rental income. Self-employed category only considers self-employment outside agriculture. The information is missing for 2 non-migrant and 5 migrant households.

Table 2 provides an overview of the reasons for leaving the baseline village. More than one-third of the female respondents but none of the male respondents cited marriage as the reason for migrating, which is what one would expect in a culture with patrilocal marriages. Less than 15 percent of the female respondents reported that they left because of work. In contrast, almost 45 percent of the male migrants reported to have moved because they had found work or went looking for work.[8]

Table 2: Reasons for leaving the baseline village

Reason	males (%)	females (%)
To look for work	29.8	7.5
Own schooling	16.0	10.3
Found work	15.1	6.7
To live in a healthier environment	10.4	11.7
Marriage	0.0	38.9
Other reason	28.8	24.9
Total	**100.0**	**100.0**

The consumption data originate from extensive food and non-food consumption modules in the survey, carefully designed to maintain comparability across survey rounds and to control for seasonality. The aggregates are temporally and spatially deflated using data from a price questionnaire included in the survey. Consumption is expressed in annual per capita terms using 2010 Tanzanian shillings. [9]

Using the 1991-2004 panel Beegle, De Weerdt, and Dercon (2011) document how mi-

[8] Despite these differences in migration motives across the two gender groups, we do not find any statistically significant differences in risk sharing provision between male and female migrants. Results are not reported but available upon request.

[9] Using adult equivalent units as the denominator instead of household size produces almost identical results across all specifications.

grants grow much richer than their family members who did not migrate. Table 3 provides the summary of the consumption and poverty developments of the panel respondents with respect to their 2010 location. On average, consumption levels in the sample almost doubled over 19 years. Individuals who stayed in their community saw their consumption increase by more than 40 percent. Consumption growth for migrants was much higher: those who left Kagera saw their consumption nearly triple over the same two decades. The poverty statistics tell the same story: nearly all respondents who left the region managed to escape poverty, while poverty reduction among non-migrants was more modest. These descriptive statistics, which reinforce the results reported in Beegle, De Weerdt, and Dercon (2011), form the first stylized fact documented in this paper: migrants grow much richer than those who stay. [10]

Table 3: Consumption and poverty movements of the panel respondents in 1991-2010 by 2010 location

	mean 1991	mean 2010	difference in means	N
Consumption per capita (TZS) by 2010 location				
Within community	343,718	492,398	148,680***	2,224
Migrant locations	369,190	805,702	436,511***	2,047
Nearby community	364,099	569,438	205,339***	382
Elsewhere in Kagera	357,930	695,951	338,021***	1,007
Out of Kagera	389,379	1,110,827	721,449***	658
Full Sample	355,926	642,558	286,632***	4,271
Consumption Poverty Head Count (%) by 2010 location				
Within community	31	19	-13***	2,224
Migrant locations	28	13	-16***	2,047
Nearby community	30	20	-10***	382
Elsewhere in Kagera	31	16	-15***	1,007
Out of Kagera	23	3	-21***	658
Full Sample	30	16	-14***	4,271

*Note: All consumption values are in annual per capita terms and expressed in 2010 Tanzanian shillings. Significance of the difference in means using a t-test; *** p<0.01, ** p<0.05, * p<0.1.*

After moving, migrants remain linked to extended family members at home: 90 percent of the migrants in the 2010 round report that they communicated with a non-migrant network member in the 12 months preceding the survey. Migrants who maintained some form of communication experienced an average consumption growth of 110 percent, while those who did not grew by 88 percent. [11] This difference is statistically significant at the 1 percent level. The severing of the most basic links does not seem to be associated with higher consumption growth; if anything, the reverse is true.

We use data from shock modules administered in 2004 and 2010. During both of these rounds, the panel respondents were asked to consider each year between the survey

[10] This finding is not driven by the fact that migrants are the younger generation. The divergence between migrants and stayers observed in Table 3 remains even if we net-out the age-effects. Results available upon request from the authors.

[11] The mean consumption growth among those who maintained contact was 394,679 TZS and among those who severed links 286,991 TZS.

rounds and indicate whether a particular year was, in economic terms, 'Very good', 'Good', 'Normal', 'Bad', 'Very bad'. For each 'Very bad' response, the respondents were asked to provide the main reason for the hardship. We consider each 'Very bad' response as a negative economic shock and each 'Very good' response as a positive economic shock. More than 60 percent of the panel respondents reported experiencing at least one negative shock between 1994 and 2009. The positive shocks were less frequent with 37 percent of the respondents reported experiencing one or more.

Table 4 provides an overview of the shocks experienced. Most frequently reported negative shocks were death of a family member, serious illness and poor harvest due to bad weather. Good harvest and high-income from wage employment and crop prices were the most frequently reported positive shocks.

Table 4: Shocks reported by the panel respondents 1994-2009

Panel A: Negative shocks

Type of negative shock	Freq.	%
Death of family member	797	26%
Poor harvest due to adverse weather	638	21%
Serious illness	577	19%
Loss in wage employment	219	7%
Loss of assets	205	7%
Eviction/resettlement	99	3%
Poor harvest due to pests or crop diseases	98	3%
Low crop prices	85	3%
Loss in off-farm employment	78	3%
Low income due to lower remittances	43	1%
Loss of livestock	6	0.2%
Loss of gifts and support by organizations	4	0.1%
Other reasons	172	6%
Total	**3,021**	**100%**

Panel B: Positive shocks

Type of positive shock	Freq.	%
Good harvest	198	25%
High income from wage-employment	161	20%
High crop prices	153	19%
High income from off-farm employment	71	9%
New assets	54	7%
High income from remittances	23	3%
High income from support by development organisations	16	2%
High returns from assets	17	2%
Extra income from livestock	7	1%
Other reasons	104	13%
Total	**804**	**100%**

The shock data were collected at the individual level – in particular for each person on the 2004 and 2010 roster who also appears on the original 1991/94 rosters. Since our focus is to examine the role of shocks on consumption that is defined at the household level, the data had to be reformatted from the individual to the household level. If at least one individual in the current household reported to have experienced a shock, we interpret it as a household level shock. We should also exclude shocks that occurred before the households split. Fortunately, we know the year in which the respondents out-migrated, allowing us to include only shocks that occurred at least one year after this move.

Furthermore, some of the shock categories are problematic to our network analysis. Mortality shocks may trigger inheritance flows within extended families. A negative shock in one household may then actually be a positive income shock in another household. A similar problem arises with the (positive or negative) remittance shocks, if these capture the loss of transfers from a household within the same extended family. We therefore exclude these two shock categories from our final shock variables.

Another worry is that we are only measuring a subset of relevant shocks. First, if shocks are self-reported then respondents may fail to mention those that were effectively insured. Second, the extended family network in the home community may extend beyond the networks as defined in our data. Fortunately, the survey provides an alternative shock measure, which is community-wide and not self-reported. We have historical rainfall data from the Tanzanian Meteorological Agency for gauges in 212 weather stations in Kagera and at the migration destinations in our sample. The drawback is that this shock measure does not allow us to quantify positive shocks: too much rain is not good for yields, especially when it falls in the wrong season (e.g. when the beans are drying in the field). We therefore treat this exercise as robustness check for the self-reported negative shocks.

In a first step, each household is linked to all rainfall stations within a 100 km radius. Next, a monthly rainfall figure is calculated, for each household, by weighing each monthly rainfall reading with the inverse of the distance of the rainfall station where it was recorded to the household in question. The mean distance to the nearest rainfall station is 17 km (median 9 km) among the 2004 households and 30 km (median 10 km) among the 2010 households. For each household we can calculate average monthly z-score deviations of rainfall during the two rainy seasons, in relation to the 30 year average (1980-2010) for that village. Rainfall shocks are then constructed by truncating the positive yearly average rainfall deviations to zero. We calculate a non-migrant household's own shock as the most negative shock in the five years prior to the interview round.

Table A1 of the Appendix presents the summary statistics for the final sample of 4,782 individuals (resulting in a total of 8,430 observations) by migration status. Migration is not random and Table A1 shows how migrants are more likely to be female, are younger, and have more years of formal education.[12] Section 4 discusses how the endogeneity of migration comes to bear on the interpretation of our results.

[12] These reported differences are statistically significant.

3. Econometric Model

Table 3 illustrates the basic result of Beegle et al. (2011) and is the departure point of this paper: despite small differences at baseline, migrants grow much richer than those who remain at home. The migrant's growth, therefore, does not seem to be shared with family at home. Our contribution is to measure the extent to which own consumption of migrants and stayers is affected by negative shocks to others in the network. In particular, we ask whether stayers and migrants are differentially insured within the network and will find that indeed they are: while both migrants and stayers remain responsive to the shocks of stayers, neither is responsive to the shock of migrants. We will provide further evidence that prior to the move stayers and (future) migrants were responsive to each other's shocks, showing that the special status of the migrant in the relationship coincided with the physical move.

The outcome variable in our econometric analysis is logged per capita consumption in period $t \in \{2004, 2010\}$, for individual i in extended family j ($\ln c_{ijt}$). The vector of own shock variables is s_{ijt}, one for negative and one for positive shocks. The shock variables obtain a value 1 if the individual experienced a shock in the previous five years and zero otherwise. [13] The vector of network shock variables, z_{ijt}, measures the number of households in the network affected by an income shock. As before this vector contains both positive and negative network shock variables. The shocks that occurred in individual's own household are excluded from these variables.

All individuals were living in the same household *j* at baseline. Some also shared a household in 2004 and 2010. We will remain agnostic about how to treat this continued grouping of individuals into households in the follow-up surveys. In the main analysis we will think in terms of a network – and a panel – of individuals. It is, however, important to consider that both our outcome variable and our shock variable are measured at the household level. Therefore, every individual gets assigned the logged consumption value $\ln c_{ijt}$ and own shock value s_{ijt} of the household in which he or she lives. Consequently, the network shock variable, z_{ijt}, is a count of the number of households containing at least one network member, that have received a shock. Our analysis will cluster the standard errors at the network (*j*) level and the robustness section will redo the whole analysis at household level.

The use of consumption as the outcome variable has the advantage that it incorporates all forms of assistance, including more subtle forms of assistance that could hurt one's own position or have an opportunity cost in terms of time (employing a relative, helping with job search, house sharing, and the like). Furthermore, other forms of exchange, the outcomes of which are consumed within the survey period, are captured in a final consumption figure. Consumption is attractive because it is the bottom-line sacrifice someone has made, after all is said and done.

We model logged per capita consumption in period $t \in \{2004, 2010\}$, for individual i in extended family j as:

$$\ln c_{ijt} = s_{ijt}'\beta + z_{ijt}'\delta + x_{ij}'\gamma + h_{ijt}'\nu + w_{jt}'\vartheta + \alpha_j + \varepsilon_{ijt}, \quad (1)$$

where x_{ij} is a vector of individual time-invariant characteristics, such as sex, age and a number of baseline characteristics such as relation to head, marital status and educa-

[13] If t=2004, we consider shocks that took place in 2003-1999. If t=2010 the shock window is 2009-2005. Our results are robust to considering t-1 shocks only; i.e. 2003 if t=2004 and 2009 if t=2010 (see Section 4).

tion relative to age-specific peers (and its quadratic term). [14] These characteristics are likely to influence the current level of consumption but also the role taken by the individual regarding insuring others in the network. To control for the life-cycle effects associated with consumption and risk sharing, age is modelled through age interval dummies (see Table A1 for details on how they are defined). The variable h_{ijt} includes time-variant individual characteristics, such as relation to the individual's current household head, which may correlate with consumption and the level of insurance provision in the network. The variable w'_{it} captures the time-variant network characteristics comprising the number of migrant and non-migrant households in each period. The term α_j represents the network fixed effect and ε_{ijt} is the error term. The standard errors are clustered by network.[15] If shocks matter – and they are not completely smoothed within the network – we expect $\beta < 0$. [16] Finding $\delta < 0$ implies that individual consumption is negatively affected by income shocks to others in the network (some of the individual shock gets absorbed by the extended family).

After running Equation (1) on the pooled sample, we run it separately for migrants and non-migrants to establish whether there is any differential responsiveness to network shocks between these two groups. In the final version of Equation (1), we will also split the network shock variable into shocks to migrants in the network and shocks to stayers in the network to explore heterogeneity in that dimension.

The ability to include network fixed effects (NFE) makes this specification particularly powerful. First, the inclusion of NFE means that we compare the impact of shocks between the individuals originating from the same baseline household. The NFE control for all time-invariant observable and unobservable network characteristics. In particular, through NFE we control for aggregate resources (e.g. income, assets) in the network. Moreover, they also capture the level of inequality within the network. It may well be that the decision to split or to migrate will be related to the level of risk sharing provided in the baseline household. In particular, household division [17] or out-migration could be related to high inequality within the household (Foster 1993; Foster and Rosenzweig 2002), which may then be correlated with the risk sharing arrangement after the baseline household splits – or produces a migrant. Fortunately, the level of inequality within the network is also captured in the NFE.

We remain concerned about unobserved heterogeneity in who within the network decides to migrate. In in Section 2, we discussed how migrants are more likely to be female, are younger and have more years of formal education. This begs the question whether, perhaps, they were already the unilaterally insuring family member, even before they moved.

We can investigate this by restricting the sample to 2,547 individuals who were identified as stayers in either 2004 or 2010. In other words, this new restricted sample of 4,397

[14] A number of individuals in our data had not yet completed schooling in 1991-94. A raw measure of education would consequently be highly correlated with age. To circumvent this problem, we follow Beegle, De Weerdt, and Dercon (2011) in computing the years of schooling relative to peers, and use that variable in our empirical analysis.

[15] The total sample of 8,430 individuals group into 779 networks. Our results hold if we cluster the standard errors at the baseline village level.

[16] We do not attempt to test a full-risk sharing model (e.g. Altonji, Hayashi, and Kotlikoff 1992; Townsend 1994). Recent literature notes that the rejection of the full risk-sharing model in this type of specification may stem from the violation of the assumption that risk preferences are identical within the network (Chiappori et al. 2011; Schulhofer-Wohl 2011; Mazzocco and Saini 2012). In a context of heterogeneous risk preferences, a Pareto-efficient contract allocates more aggregate risk to less risk-averse households. As demonstrated by Schulhofer-Wohl (2011), Chiappori et al. (2011) and Mazzocco and Saini (2012) this would lead to a upward bias (in absolute terms) in β in Equation 1. The standard full risk sharing test is then biased against the null-hypothesis of full risk-sharing.

[17] By household division we refer to an event where a household splits into two or more households. Migration is then one, special, form of household division.

observations drops individuals who were migrants in both 2004 and 2010. Out of these 2,547 individuals, 547 were stayers in 2004 and will move by 2010, while 202 were migrants by 2004, but will have returned by 2010. The essence of our test is to look at whether these individuals had already taken on a different role in the risk-sharing networks at home (i.e. with other stayers) prior to their move (for the 547 future migrants) or whether they continued to do so after their return home (for the 202 return migrants). Interacting the shock variable with future or past migration status (m_{ijt}) allows us to quantify the insurance relation that exists between stayers, differentiated by their future or past mobility. Building on Equation (1), we now estimate:

$$\ln c_{ijt} = m_{ijt} + s_{ijt}'\beta_1 + s_{ijt}'\beta_2 * m_{ijt} + z_{ijt}'\delta_1 + z_{ijt}'\delta_2 * m_{ijt} + x'_{ijt}\gamma + h'_{ijt}\nu + w'_{jt}\vartheta + \alpha_j + \varepsilon_{ijt}\,. \quad (2)$$

We exploit these migration dynamics by studying whether the risk sharing role taken by these mobile individuals differs from that taken on by individuals who never migrated. If the roles are the same, then we expect $\delta_2 = 0$.

4. Results

4.1. Main Results

Table 5 estimates Equation (1) for the pooled sample (Column 1) and separately for the migrant (Column 2) and non-migrant (Column 3) samples. The coefficient on the own negative shock variable appears significant in all columns implying that the shocks we are considering are meaningful for both migrants and non-migrants. The same is true for the own positive shocks with exception of the migrant column where the coefficient is not statistically significant at conventional levels (p=0.149). The individuals in these networks are also responsive to negative shocks occurring to others in the same network implying that some level of risk sharing takes place in these networks. [18] The coefficients on the positive network shock variables appears insignificant in the pooled model.

Columns 2 and 3 show that for both migrants and non-migrants, the negative network shock coefficient is negative whereas the positive network shock coefficient is insignificant. These negative network shocks have a sizeable impact on migrants' consumption: on average, a shock in one household in the network results in a drop of 3.8 percent in migrant's household per capita consumption. This point estimate is significant at the 1 percent level. Also the non-migrants are affected by these shocks with each network shock resulting in a 2.7 percent drop in stayer's household per capita consumption. However, the coefficient is significant only at 10 percent level.

Table 5: The effect of network shocks on consumption

	1 pooled	2 migrants	3 non-migrants
own negative shock	-0.138***	-0.078**	-0.153***
	(0.019)	(0.031)	(0.024)
own positive shock	0.080**	0.083	0.113***
	(0.035)	(0.057)	(0.041)
# of HHs that experienced a negative shock in the network	-0.039***	-0.038***	-0.027*
	(0.011)	(0.015)	(0.015)
# of HHs that experienced a positive shock in the network	0.010	-0.011	0.036
	(0.021)	(0.032)	(0.027)
Number of split-off HHs moved	0.082***	0.060***	0.054***
	(0.010)	(0.014)	(0.013)
Number of split-off HHs stayed	0.016	0.003	0.041**
	(0.014)	(0.017)	(0.019)
Network Fixed Effects?	Yes	Yes	Yes
Other controls?	Yes	Yes	Yes
Number of observations	8,430	3,538	4,892
R^2	0.124	0.125	0.094
Adjusted R^2	0.121	0.120	0.089

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent.*

[18] Note that shocks are only weakly correlated within these extended family networks: the intra-class correlation coefficient for the own negative shock variable equals 0.076 with a standard error of 0.008.

In order to investigate this further, we decompose the network shock variables into shocks in non-migrant and migrant households. The first network-shock variable measures the number of non-migrant households that experienced a shock in the extended family. The second network-shock variable measures the number of migrant households affected by shocks. As before, the individual's own shocks have been excluded from these variables. Table 6 presents the regression results. We see that both migrants and non-migrants are susceptible to negative shocks affecting non-migrant households within their extended family network, while negative shocks in migrant households exert no impact for either group: the coefficient is nearly zero and insignificant in both columns. On average, a negative shock in one non-migrant household in the network leads to a drop of 8.8 percent in migrant household's consumption. This point estimate is significant at the 1 percent level. Similarly, a shock in one non-migrant household in the same network results in a fall of 4.8 percent in non-migrant households' consumption. This coefficient is significant at the 5 percent level.

Table 6: The effect of network shocks by migrant status

	1 **migrants**	**2** **non-migrants**
own negative shock	-0.069**	-0.160***
	(0.031)	(0.025)
own positive shock	0.116*	0.104**
	(0.063)	(0.042)
# of non-migrant HHs that experienced a negative shock in the network	-0.088***	-0.048**
	(0.023)	(0.024)
# of non-migrant HHs that experienced a positive shock in the network	-0.061	-0.007
	(0.056)	(0.035)
# of migrant HHs that experienced a negative shock in the network	0.003	-0.003
	(0.021)	(0.021)
# of migrant HHs that experienced a positive shock in the network	0.058	0.097**
	(0.049)	(0.048)
Number of split-off HHs moved	0.051***	0.050***
	(0.015)	(0.014)
Number of split-off HHs stayed	0.013	0.048***
	(0.017)	(0.019)
Network Fixed Effects?	Yes	Yes
Other controls?	Yes	Yes
Number of observations	3,538	4,892
R^2	0.129	0.097
Adjusted R^2	0.123	0.092

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent.*

Positive network shocks that take in place in non-migrant households do not exert any impact on either groups' consumption. Interestingly, however, positive shocks taking place migrant households appear with a positive and significant sign in the non-migrant column. On average, a positive shock in one migrant household in the network leads to a gain of 9.7 percent in non-migrant household's consumption.

These econometric results comprise the second stylized fact: negative shocks to stayers are insured through their migrant network and their home network, while negative shocks to migrants are uninsured within these networks. Stayers also benefit from positive shocks to migrants, but not vice versa.

We next turn to the question of whether migrants had this peculiar position in the network prior to becoming migrants – or after they returned home. To investigate this we estimate Equation (2), with results reported in Table 7. The results from Table 7 show that these future or past migrants are not more (nor less) responsive to their own and (stayer) network shocks compared to their sedentary network members. Put differently, while living at home these mobile individuals do not take on any special role in the network: they are equally responsive to their own and other stayers shocks as everyone else in the baseline community.

Table 7: Interactions with future or past migration status

	non-migrants
future or past migrant	-0.060
	(0.044)
own negative shock	-0.196***
	(0.025)
--- * (future or past migrant)	0.018
	(0.044)
own positive shock	0.129***
	(0.043)
--- * (future or past migrant)	-0.034
	(0.061)
# of non-migrant HHs that experienced a negative shock in the network	-0.055**
	(0.025)
--- * (future or past migrant)	0.002
	(0.033)
# of non-migrant HHs that experienced a positive shock in the network	-0.006
	(0.035)
--- * (future or past migrant)	0.108
	(0.084)
Number of split-off HHs stayed	0.045**
	(0.018)
Network Fixed Effects?	Yes
Other controls?	Yes
Number of observations	4,397
R^2	0.086
Adjusted R^2	0.081

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent. The sample is restricted to individuals observed as non-migrants in t={2004, 2010}.*

4.2. Robustness

We conducted an array of robustness checks to validate our second stylized fact.

First, similar results hold using the rainfall shock variable. However, as discussed in Section 2, we can only verify our results regarding the negative shocks. The first row in Table A2 shows that rainfall shocks are important in determining consumption growth, with every standard deviation decrease in (negative) rainfall deviation causing consumption growth to decline by 7 percent for migrants and 15 percent for non-migrants.[19]

Knowing that rainfall shocks drive the incomes of both stayer and migrant households, we can use them as an alternative network shock indicator. We replace the network shock variable with the baseline village rainfall shock variable in Equation (1). For migrant households, this rainfall shock is constructed as the most negative rainfall deviation in the baseline village after the migrant left. For stayer households, we take the most negative rainfall deviation among the migrant household locations, after the migrant left. Column 1 reports the results for the migrant households. We see that after the migrants leave their consumption remains responsive to rainfall shocks at the baseline village. Each standard deviation decrease in (negative) rainfall deviation in the baseline village leads, on average, to a 7.5 percent fall in consumption in the migrant households. Column 2 reports the corresponding results for the non-migrant households. Consistent with the results presented earlier, we see that non-migrants are not affected by rainfall shocks that take place in migrant households.

Second, the results are not driven by other important life-events such as changes in marital status. Table A3 of Appendix shows that that the results presented in Table 6 hold if we add dummies for the current marital status to the specification.

Third, the shock variables consider the last 5 years prior t. Using shocks that happened in the previous year (i.e. t-1) does not alter our findings. Table A4 of Appendix shows that considering a shorter shock window yields similar results as in Table 6. The coefficients on the own shock variables turn insignificant in this specification, possibly due to the small cell size in this variable (less than 2 % of the full sample report a positive shock in t-1).

Fourth, the results are not driven by the configuration of the data. We conducted the analysis at the individual level to facilitate better modelling of the within-network relationships and differences in individual level characteristics. Conducting the empirical analysis at household level, however, does not affect our main findings. Table A5 of Appendix re-runs Table 6 using household level data.

Fifth, the demographic composition may systematically differ between the migrant and non-migrant households. Therefore the use of per capita consumption as the dependent variable may not be entirely appropriate. To address this issue we defined household consumption per adult equivalent instead of per household member. Table A6 of Appendix provides the results. The shock coefficients and their standard errors are of similar magnitude. The difference is that the positive migrant network shock coefficient turns insignificant in the non-migrant column.

Finally, Equation (1) exploit panel data but treat repeated individual-level observations as independent. We addressed this concern by replacing the network fixed effects in Table 6 with individual-level fixed effects. However, we cannot use the full sample for this exercise. The within-transformation requires that we have two observations for each individual.

[19] Although only one-third of the migrant households report agriculture as their *main* income generating activity (Table 1), nearly two-thirds cultivate land. This explains why also the migrants are susceptible to rainfall shocks.

Therefore in the sub-sample regressions we can only consider those individuals appear either as migrants or non-migrants in both rounds. Column 1a and 2a in Table A7 of Appendix replicate Table 6 using these reduced sub-samples. The magnitude of stayer network-shock coefficient in the migrant column reduces by a third but remains significant at the 5 percent level. In column 1b and 2b we replace the network fixed effects with individual-level fixed effects. As expected, the use of individual-level fixed effects takes a toll on the efficiency of these estimates but still the stayer-network shock coefficient appears negative and significant at the 10 percent level in the migrant column. Of note is that the coefficient is of similar magnitude as in column 1a suggesting that the individual level heterogeneity is not driving the results in Table 6.

5. Interpretation and concluding discussion

We find that consumption of both migrants and stayers co-moves with own shocks. This empirical result holds after controlling for aggregate network resources, which indicates that these networks are not fully insuring their members, in line with a lot of the literature on this topic. Still some insurance takes place. Interestingly it is only the stayers who have their negative shocks insured: migrants and stayers alike cut back consumption when a stayer in their network is hit by a negative shock. The negative shocks of migrants, however, are not insured: neither migrants, nor stayers cut back their consumption when a migrant is hit by a shock. Migrants share their positive shocks with stayers, but not vice versa. Further analysis reveals that prior to their move (future) migrants did not share risk differently with other stayers in the networks – any differences in how they participate in the insurance network seem to coincide with the physical move the migrant makes. Even though migrants lack such insurance from their network, they are nevertheless much more successful than those at home when it comes to consumption growth. While migrants more than double their consumption from 1991/94 to 2010, those who have remained at the baseline location grow by 40% over the same time period. Taken together these findings point to migration as a risky, but profitable endeavour, for which the migrant will bear the risk, but also reap most of the benefit. This can be interpreted within a number of strands of the literature, which is what we will do next.

With respect to the risk sharing literature, this observed unilateral insurance relationship is difficult to explain within general models of risk sharing (Altonji, Hayashi, and Kotlikoff 1992; Coate and Ravallion 1993; Townsend 1994; Fafchamps 1999; Attanasio and Ríos-Rull 2000; Ligon, Thomas, and Worrall 2002; Genicot 2006). In particular, there should be no subgroups of households – delineated along exogenous or endogenous characteristics – that are completely unresponsive to the shocks of others. It is on this basis that we reject these basic risk sharing models.

Recent work in the risk sharing literature presents a more specialized version of the risk sharing model that explicitly incorporates income inequality across agents. Indeed, with heterogeneous risk preferences, a Pareto-efficient contract allocates more aggregate risk to less risk-averse households (Chiappori et al. 2011; Schulhofer-Wohl 2011; Mazzocco and Saini 2012). Our empirical results could be consistent with an extreme version of this phenomenon, where the poorer, more risk-averse stayer pays an insurance premium to the richer, less risk-averse migrant. In this model, migrants, in effect, sell insurance to the stayers and regressive transfers result (Fafchamps 1999; Genicot 2006).

An alternative explanation to the observed lack of reciprocity could be that migrants insure non-migrants in exchange for other benefits. Some of these benefits may even accrue to the migrant in the more distant future. Lucas and Stark (1985) mention that there could be exchange motives for insurance provision relating to the desire for non-migrants to look after local assets, the intention to return home and the aspiration to inherit. In a context that lacks technology to allow future income to be consumed now, we could confuse unilateral insurance with postponed reciprocity. De Weerdt and Hirvonen (2013) explore these explanations but find no support for any of the three exchange motives mentioned above.

Of particular interest in this context is the issue of return migration. Indeed even if migrants do not have some of the main shocks insured some of them do return home and, as Table 7 suggests, are reinserted in the risk-sharing system. Hirvonen and Lilleør (2015) discuss return migration in more detail and find that return in this context is associated with an unsuccessful migration experience. Returning can then be viewed as a final fall-back option for the migrants when everything else fails. Still, the evidence does not support the notion that migrants engage in strategic remittance behaviour to keep their return options open.

We think that the unilateral insurance provision documented in this paper is more consistent with risk sharing motivated by social norms. Such redistributive values may have been instilled since childhood and carefully nurtured through oral transmission, rituals and ceremonies in which the importance of the kinship group is strongly emphasized (Lévi-Strauss 1969). Remittances and other forms of assistance may buy social prestige, political power or serve to perpetuate subordination (Platteau and Sekeris 2010; Platteau 2014). In the risk sharing literature, social norms have been seen as the glue that keeps the risk sharing contract from breaking apart by alleviating enforcement and information problems (Stark and Lucas 1988; Fafchamps 1999; Foster and Rosenzweig 2001). Theoretically this can be modelled as subjective satisfaction that individuals receive from participation (Fafchamps 1999; Foster and Rosenzweig 2001; De Weerdt and Fafchamps 2011). The satisfaction can stem from the fulfilment of obligations and the avoidance of social sanctions, such as guilt, shame or ridicule, or fear of witchcraft. It can also include altruism, which we do not attempt to distinguish from social norms. Social norms could weaken the constraints to risk sharing to the extent that they never bind and allow for the existence of sustained, unreciprocated transfers, as documented, for example, for Paraguay by Schechter and Yuskavage (2011) and for Tanzania by De Weerdt and Fafchamps (2011). Finally, there may be obligations the migrant has at home, for example related to investments in the migrant's education or the financing of the move. The empirical patterns we describe could occur if migrants are re-paying these loans state-contingently post-migration.

We believe that our results are indicative of redistributive norms and can provide further interpretation with regard to possible disincentive effects that may result. Platteau (2014) discusses how redistributive pr essures can discourage effort, entrepreneurship and risk-taking. Regarding the latter he notes (p. 168-169) that "[...] *these pressures operate in an asymmetrical manner: if the investment project fails, the risk taker will be the only one to bear the burden of the ensuing loss, while, if the project is successful, the risk taker will have to share the benefits with his or her kith and kin. Given a certain degree of risk aversion, a dynamic individual will therefore refuse to embark on a risky project that he (she) would have attempted in the absence of redistributive norms.*" [20] The author continues by outlining three possible strategic reactions for dynamic individuals to undertake. First, they could engage in the strategic hiding of income and assets. An excellent example of this is Baland, Guirkinger, and Mali (2011), who show how people take out costly

[20] These predictions remain to be empirically verified. D'Exelle and Verschoor (2015), for example, find the opposite is true in a lab-in-the-field experiment in Uganda. They find that investments increase when profits can be shared or when losses cannot be shared.

loans in order to conceal their income. Second, religious conversion is one strategy which could serve as a respectable way to distance oneself from some of the traditional obligations and to be, instead, subject to a new set of obligations. The final avenue would be physical separation through migration.

With respect to this latter interpretation it is important to note that migrants are allowed to grow, albeit without any insurance from the home community, but also with relatively little tax on their wealth. Migrants do share their positive shocks with non-migrants, but, after all is said and done, end up almost twice as rich as stayers in 2010, while they had started from similar baseline positons in the early nineties. This would fit well with the idea of migration as an escape from the traditional kin systems. In that respect it is interesting to calculate the cost the migrant incurs for providing the kind of unilateral insurance we have documented above. From Table 6 we observe that for each negative shock in the extended family network at home there is a drop of 8.8 percent in the migrant's consumption. The average migrant has 0.45 negative network shocks of non-migrants, resulting in an implied consumption penalty of 4.0 percent (the 95 percent confidence interval ranges between 1.9 and 6.0 percent). [21] We conclude that migrants share 4 percent of their consumption with home communities through insurance provision. [22]

To many readers this number will seem relatively low and suggestive that migrants' growth is not stifled in any significant way by the kinds of demands from the home communities discussed in this paper. By way of conclusion we note that also that the experimental literature on income hiding has come up with similar single-digit tax rates. Jakiela and Ozier (2012) find that women in a laboratory setting in Kenya purposefully reduced their income in order to keep it hidden. They acted as if they were expecting any observable winnings to be taxed at around 4 to 8 percent. Ambler (2015) reports that El Salvadorian migrants living around Washington DC remit 5 percent more of a windfall income if they are told that the organizers of the experiment will inform potential recipients at home about it. One important difference between these experiments and our observational data is that they look at the short-run reactions to windfall incomes, while we study the long-run consequences of reactions to actual income shocks. Another difference is that they look at how people change remittance behaviour when going from actual belief sets to full information, or how much they would be willing to sacrifice to avoid a full information state of the world. We look at the effect of shocks within real-world belief sets and in the context of migration.

[21] The same calculations based on the rainfall shock regressions in Table A2 of Appendix show that an average migrant sacrifices 4.7 percent out of their consumption to insure their network members back home.

[22] Migrants also share part of gains from their positive income shocks (Table 6). Each positive shock in a migrant household results in a 9.7 percent increase in non-migrant's consumption. Since an average stayer has only 0.09 positive network shocks of migrants, the magnitude of the implied penalty here is very small: 0.09 percent – expressed in terms of stayer household's consumption.

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Appendix

Table A1: Summary statistics

	migrants	non-migrants
Male	0.396	0.529
	(0.489)	(0.499)
Log per capita household consumption	13.16	12.81
	(0.737)	(0.563)
Own negative shock	0.269	0.484
	(0.444)	(0.500)
Own positive shock	0.0571	0.0748
	(0.232)	(0.263)
Number of HHs that experienced a negative shock in the network	0.832	0.789
	(1.072)	(1.011)
Number of HHs that experienced a positive shock in the network	0.179	0.197
	(0.504)	(0.538)
Number of non-migrant HHs that experienced a negative shock in the network	0.448	0.410
	(0.700)	(0.677)
Number of non-migrant HHs that experienced a positive shock in the network	0.0842	0.108
	(0.332)	(0.370)
Number of migrant HHs that experienced a negative shock in the network	0.384	0.380
	(0.721)	(0.709)
Number of migrant HHs that experienced a positive shock in the network	0.0947	0.0895
	(0.327)	(0.330)
Number of split-off HHs moved	3.543	1.997
	(2.031)	(1.839)
Number of split-off HHs stayed	1.688	2.480
	(1.394)	(1.510)
Head of the current HH	0.354	0.431
	(0.478)	(0.495)
Spouse of the current HH head	0.371	0.176
	(0.483)	(0.381)
Child of the current HH head	0.114	0.262
	(0.317)	(0.440)
Baseline characteristics:		
Head or spouse	0.0825	0.299
	(0.275)	(0.458)
Biological child of head	0.488	0.474
	(0.500)	(0.499)
Grandchild of the head	0.191	0.0981
	(0.393)	(0.298)
Unmarried	0.897	0.717
	(0.305)	(0.450)
Unmarried male	0.361	0.409
	(0.480)	(0.492)

	migrants	non-migrants
Baseline age 0-15 (reference category)	0.666	0.506
	(0.472)	(0.500)
Baseline age 16-25	0.239	0.185
	(0.426)	(0.388)
Baseline age 26-35	0.0404	0.0983
	(0.197)	(0.298)
Baseline age 36-45	0.0263	0.0828
	(0.160)	(0.276)
Baseline age 46-55	0.0130	0.0664
	(0.113)	(0.249)
Baseline age 56-65	0.0150	0.0615
	(0.121)	(0.240)
Baseline age 66+	0.00565	0.0166
	(0.0750)	(0.128)
Deviation from median school years of peer group	-0.117	-0.789
	(1.943)	(2.376)
--- squared	3.787	6.265
	(10.09)	(12.31)
Observations:	3,538	4,892

Table A2: Re-calculating insurance provision through rainfall shocks

	Migrants		Non-migrants	
	mean	**1**	**mean**	**2**
max rain shock in own location in the past 5 years [a)]	-0.84	0.072**	-1.07	0.146***
	[0.52]	(0.033)	[0.44]	(0.039)
max rain shock in deviation in baseline village [a)]	-0.62	0.075**		
	[0.58]	(0.035)		
max rain shock in deviation in migrant locations [b)]			-0.94	0.018
			[0.60]	(0.035)
Network Fixed Effects?	n/a	yes	n/a	yes
Other controls?	n/a	yes	n/a	yes
Number of observations	3,538		4,892	
R^2	n/a	0.128	n/a	0.075
Adjusted R^2	n/a	0.123	n/a	0.071

*note: *** p<0.01, ** p<0.05, * p<0.1.*
[a)] For migrants this is after they migrated.
[b)] After the migrant moved to their 2004 or 2010 location.
Standard deviations in brackets. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent.

Table A3: Replicating Table 6 with additional controls

	1 migrants	2 non-migrants
own negative shock	-0.083***	-0.167***
	(0.030)	(0.025)
own positive shock	0.105*	0.106**
	(0.061)	(0.042)
# of non-migrant HHs that experienced a negative shock in the network	-0.082***	-0.048**
	(0.023)	(0.024)
# of non-migrant HHs that experienced a positive shock in the network	-0.060	-0.005
	(0.058)	(0.035)
# of migrant HHs that experienced a negative shock in the network	-0.001	-0.003
	(0.021)	(0.021)
# of migrant HHs that experienced a positive shock in the network	0.053	0.095**
	(0.048)	(0.048)
Number of split-off HHs moved	0.049***	0.051***
	(0.014)	(0.014)
Number of split-off HHs stayed	0.007	0.048***
	(0.017)	(0.018)
Network Fixed Effects?	Yes	Yes
Current marital status dummies?	Yes	Yes
Other controls?	Yes	Yes
Number of observations	3,538	4,892
R^2	0.169	0.107
Adjusted R^2	0.162	0.102

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent.*

Table A4: Replicating Table 6 using a shorter shock window

	1 migrants	2 non-migrants
Own negative shock (t-1)	-0.143***	-0.172***
	(0.032)	(0.025)
Own positive shock (t-1)	0.014	0.027
	(0.098)	(0.061)
Number of non-migrant HHs that experienced a negative shock in the network (t-1)	-0.076***	-0.059**
	(0.024)	(0.027)
Number of non-migrant HHs that experienced a positive shock in the network (t-1)	0.008	-0.062
	(0.076)	(0.047)
Number of migrant HHs that experienced a negative shock in the network (t-1)	0.009	-0.029
	(0.022)	(0.023)
Number of migrant HHs that experienced a positive shock in the network (t-1)	0.051	0.152**
	(0.074)	(0.060)
Number of split-off HHs moved	0.044***	0.040***
	(0.015)	(0.015)
Number of split-off HHs stayed	-0.002	0.035*
	(0.017)	(0.020)
Network Fixed Effects?	Yes	Yes
Other controls?	Yes	Yes
Number of observations	3,538	4,892
R^2	0.129	0.104
Adjusted R^2	0.123	0.099

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent.*

Table A5: Replicating Table 6 using household level data

	1 migrants	2 non-migrants
own negative shock	-0.047	-0.140***
	(0.030)	(0.024)
own positive shock	0.096	0.063
	(0.064)	(0.040)
# of non-migrant HHs that experienced a negative shock in the network	-0.083***	-0.045**
	(0.022)	(0.021)
# of non-migrant HHs that experienced a positive shock in the network	-0.072	-0.010
	(0.049)	(0.039)
# of migrant HHs that experienced a negative shock in the network	0.013	-0.011
	(0.022)	(0.020)
# of migrant HHs that experienced a positive shock in the network	0.058	0.096**
	(0.050)	(0.038)
Number of split-off HHs moved	0.051***	0.050***
	(0.015)	(0.013)
Number of split-off HHs stayed	0.014	0.050***
	(0.018)	(0.016)
Network Fixed Effects?	Yes	Yes
Other controls?	Yes	Yes
Number of observations	3,075	2,651
R^2	0.136	0.083
Adjusted R^2	0.129	0.074

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is household observed in 2004 or 2010.*

Table A6: Replicating Table 6 using (log) consumption per adult equivalent as a dependent variable

	1 migrants	2 non-migrants
own negative shock	-0.082***	-0.181***
	(0.029)	(0.025)
own positive shock	0.105*	0.087**
	(0.058)	(0.042)
# of non-migrant HHs that experienced a negative shock in the network	-0.074***	-0.041*
	(0.022)	(0.024)
# of non-migrant HHs that experienced a positive shock in the network	-0.055	-0.001
	(0.053)	(0.034)
# of migrant HHs that experienced a negative shock in the network	0.008	-0.002
	(0.020)	(0.021)
# of migrant HHs that experienced a positive shock in the network	0.065	0.074
	(0.047)	(0.046)
Number of split-off HHs moved	0.050***	0.052***
	(0.014)	(0.014)
Number of split-off HHs stayed	0.009	0.047**
	(0.017)	(0.019)
Network Fixed Effects?	Yes	Yes
Other controls?	Yes	Yes
Number of observations	3,538	4,892
R^2	0.126	0.133
Adjusted R^2	0.119	0.129

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per adult equivalent consumption. Unit of observation is panel respondent.*

Table A7: Replicating Table 6 using individual level fixed effects

	1a	1b	2a	2b
	migrants		non-migrants	
own negative shock	-0.064*	-0.089***	-0.172***	-0.203***
	(0.033)	(0.031)	(0.026)	(0.028)
own positive shock	0.128**	0.089	0.115***	0.132***
	(0.063)	(0.063)	(0.043)	(0.048)
# of non-migrant HHs that experienced a negative shock in the network	-0.059**	-0.045*	-0.049**	-0.029
	(0.023)	(0.024)	(0.025)	(0.029)
# of non-migrant HHs that experienced a positive shock in the network	-0.051	-0.054	-0.020	-0.040
	(0.058)	(0.061)	(0.033)	(0.034)
# of migrant HHs that experienced a negative shock in the network	0.017	0.037	-0.004	-0.003
	(0.023)	(0.027)	(0.021)	(0.022)
# of migrant HHs that experienced a positive shock in the network	0.055	0.042	0.093*	0.092*
	(0.055)	(0.067)	(0.049)	(0.051)
Number of split-off HHs moved	0.034**	0.029*	0.049***	0.040***
	(0.015)	(0.015)	(0.015)	(0.015)
Number of split-off HHs stayed	-0.004	-0.008	0.046**	0.032
	(0.020)	(0.019)	(0.019)	(0.020)
Network Fixed Effects?	Yes	No	Yes	No
Individual level Fixed Effects?	No	Yes	No	Yes
Other controls?	Yes	Yes	Yes	Yes
Number of observations	2,150	2,150	4,143	4,143
R^2	0.102	0.081	0.106	0.153
Adjusted R^2	0.091	0.076	0.101	0.151

*note: *** p<0.01, ** p<0.05, * p<0.1. Cluster-robust standard errors by network are in parenthesis. Dependent variable is log HH per capita consumption. Unit of observation is panel respondent. Sample in the 'migrants' column is formed of individuals who appear as migrants in 2004 and 2010. Sample in the 'non-migrants' column is formed of individuals who appear as non-migrants in 2004 and 2010.*

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