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# Who Leaves, Who Moves In? The Impact of Positive and Negative Income Shocks on Migration in Senegal

ABLA SAFIR<sup>1</sup>

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JEL Classification: O12, O15, O17, O18

Keywords: Geographic Mobility, Transfers, Risk, Rural-Urban Differences, Senegal

Using a recent household survey conducted in Senegal, I examine the impact of negative and positive income shocks on departures from and entries in the household. I focus on differences in responses to shocks across the urban and rural sectors as well as age and gender groups. Striking differences emerge. Positive shocks increase entries of young girls and adult females in rural areas while they attract adult males in urban areas. Negative shocks decrease the arrivals of boys in urban areas while, in rural areas, they only impact the entries of adult males. Migration only increases after negative shocks, for prime-age adults wherever they reside and for adult children of urban household heads. In addition to migration, I examine private transfers. They show much less contrast between urban and rural areas but a sharp contrast between males and females. Adult males increase the amount of transfers they send after positive shocks and receive more transfers after negative shocks, wherever they reside, pointing towards the use of transfers as insurance. Females send and receive on average more transfers than males. However, negative shocks do not increase the amount of transfers they receive. Negative shocks only reduce transfers given by older rural females. Overall, both in terms of movements and transfers, individuals benefit very differently from their external relations, depending on their place of residence, gender and age. Given the heterogenous responses of migration and private transfers to income shocks, identical public policies may have very different effects for urban and rural areas and across age and gender.

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## Introduction

The impact of income shocks on the lives of households in developing countries has been studied extensively since the seminal work of Townsend (1994). Negative income shocks can cause households to increase their labor supply (Kochar (1999), Rose (2001)), take their children out of school and make them work (Thomas et al. (2004), Jacoby and Skoufias (1997)) ; households may sell productive assets and therefore lose sources of income (Czuckas, Fafchamp and Udry (1998), Kazianga and Udry (2006), Rosenzweig and Wolpin (1993)) or they may reduce consumption so much so as to cause illness (Foster (1995), Jensen (2000)). In addition to private means, households use informal mechanisms to manage risk and cope with shocks collectively, such as credit and informal insurance (Grimard (1997), Ligon et al. (2002), Udry (1994)). The literature has shown that these mechanisms are not fully protective (review in Dercon (2002) and review with research agenda in Dercon (2008) in the case of Africa)). In particular, it is difficult to protect against aggregate income shocks that hit a whole community, since aggregate shocks may change the prices of assets or labor and since collective insurance means are much weaker in the face of aggregate shocks.

Migration has also been studied as a means to smooth consumption. If seen as a family strategy, as in the “New Economics of Labor Migration” (NELM), it is a way to manage risk *ex-ante*. It offers a geographical diversification of the sources of income and, as Rosenzweig and Stark (1989) and Paulson (2000) have shown, migrants go to places in which income shocks are negatively correlated with the income shocks of the places their original households still reside in. Migrant remittances can then be used as insurance, a topic I review later. There is also a literature on migration as an *ex-post* reply to income shocks, although it is more limited. Harrower and Hoddinott (2005) show, in Mali, that households send migrants away in response to negative income shocks. Halliday (2006) finds that migration increases in response to negative idiosyncratic shocks. However, Halliday (2006) and Yang (2008) both find that households affected by earthquakes in El Salvador are less likely to migrate.

In the above-mentioned papers, except in the case of marriage studied by Rosenzweig and Stark (1989), the migrant is viewed as an individual leaving alone to find a job, creating a new household in the place he moves to. The role of networks in facilitating migration, in particular international migration, is deemed as important (Massey (1988), Munshi (2003)). However, networks are viewed mostly as helping migrants find information on employment opportunities and possibly financing the migration. Migration is not viewed as a movement from an existing household to another ex-

isting household while, as mentioned previously there is extensive work on transfers *exchanged* by households that are engaged in dynamic insurance schemes. While the focus has been on households receiving money when times are hard, another possible outcome would be for them to send individuals, not necessarily workers, to households willing to host them. Exchanging money or people are in fact the two most substantial ways through which a household may get help from his network, where network is defined very broadly as anyone exterior to the studied household. This paper examines migration as a movement into households that already exist, looking into the receiving side, while most works focus on the sending side. This contributes to the literature through providing a better understanding of migration *per se* and a better understanding of collective informal insurance, if the *exchange* of people is part of it.

Another contribution of this work is to study positive income shocks. All the works I have mentioned focus on departures from places or households hit, actually or potentially, by negative income shocks. The broader literature on income shocks also focuses on negative income shocks. This is quite understandable as negative shocks may entail serious long-term consequences. However, to understand risk and income volatility, the positive upheavals in income also need to be studied.<sup>2</sup> Therefore, I carry a detailed description of negative *and* positive income shocks faced by Senegalese households. In terms of migration, theoretically, departures can increase in response to both positive and negative as migration may be a coping mechanism, as shown empirically in the works mentioned earlier, as well as an investment (Sjastaad (1962), Stark (1991)). In both cases however, the gains from migration must be superior to its costs. While this is obvious, there is very little knowledge on the cost of migration and the role of positive income shocks in financing it. To better inform policies towards migration, it is important to assess to what extent migration is a coping mechanism or an investment, and examining the response of migration to positive and negative income shocks in a unified framework provides with important information regarding the motivations to migrate. For arrivals in the household, I expect positive shocks to play the role of pull factors and, symmetrically, negative shocks may decrease entries in the household. However, negative income shocks may also induce arrivals, including returns, of family members earning income or, for instance, replacing a person who is sick or deceased. If the receipt of transfers, public or private, induces changes in household composition, it is important to understand these changes and the characteristics of those who leave or, perhaps more importantly for those targeted by the transfer, those who arrive. Edmonds, Mammen and Miller (2004) and Ardington, Case and Hosegood (2009), both in the case of South Africa, show that arrivals in and departures from the household occur in response to increases

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2. An exception may be the study of the impact of conditional cash transfer programs.

in income. A difference with my work though is that they examine the extension of the pension system to Blacks after the end of the Apartheid, a reform which changed both the level of income and its regularity as it increased income to pensioners on a regular and guaranteed basis. In this paper, I compare the impact of unanticipated, mostly transitory shocks, on migration and transfers, as these are the two mechanisms through which shocks affecting a household can impact his network. Akresh (2009) is the work that is closest to this paper as he examines the impact of positive and negative income shocks in sending and receiving household. However, he restricts his study to child fostering.

I study migration in Senegal, using a new survey, “Pauvreté et Structure Familiale” (PSF), which I helped in designing and collecting. Senegal is particularly suitable and rich in terms of migration possibilities and patterns. Situated in the Sahel region but with the Atlantic ocean as a Western border, it offers, for migrants, various location choices which are quite different in terms of geography and occupations. It is also a significant purveyor of international migrants, both within and outside of Africa.<sup>3</sup> Moreover, with an average household size of eight, which is big even by African standards, household structures in Senegal go from small nuclear families to complex households composed of several subgroups who cooperate and pool incomes only partially, if at all. 37% of married women are in a polygamous union while child fostering is a tradition which still prevails today. As both may entail migration, these two examples show that migration in Senegal does not only entail movements of adults creating a new household as they marry or take on a new job. Migration often entails entering a household which already exists and with which ties, more or less strong, have helped the migration. When migration occurs because of marriage or fostering, it is driven by positive pull factors, not only in the classic sense of rich regions which attract migrants, but also in the sense of rich households hosting new members. Migration must then be studied both at the individual level and at the household level to understand the characteristics of individuals moving in comparison with the characteristics of the households they move to or leave from. Examining income shocks must also allow for heterogeneous impacts, across sex and age groups as different groups may be affected differently by negative or positive shocks. For instance, the literature on migration has paid a lot of attention to male migration. If this literature is to be believed, negative income shocks may impact the departure of males looking for work but perhaps not that of females.

I complement the study of migration with a study of private transfers. Usually, when migration

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3. It is difficult to find reliable estimates on the number of Senegalese abroad. Estimates lie between 900,000 and 1,900,000 depending on sources (Marfaing, 2003). Senegalese migrants registered in Senegal’s representations abroad are evenly split between Africa and the rest of the world.

and transfers are viewed together, the literature examines the remittances of a recent migrant to either his household of origin or his close relatives, most generally his parents. The literature focuses on the motivations for a migrant to send transfers. Transfers may be part of a strategic behavior for later inheritance (Lucas and Stark (1985)). They may also be an investment for migrants willing to return to their area of origin (de La Brière et al. (2004) in the case of men, Yang (2008)), an investment in the migrants' children when these are taken care of by the origin household of the migrant (Cox (1987)). Another use of remittances which received a lot of attention, within the NELM framework, may be insurance (de la Brière et al. (2004) in the case of women, Amuedo-Dorantes and Pozo (2006), Yang and Choi (2007)). The insurance may partly be seen as a reimbursement by the migrant to his origin household which helped him finance migration (Rosenzweig (1988)). Lastly, transfers may be the result of an altruistic decision (Agarwal and Horowitz (2002) compare insurance and altruism motives). In this paper, although the focus is on migration, the approach to transfers is closer to the literature on full insurance. For transfers received, I focus on the insurance motive through looking at whether transfers received increase in response to negative income shocks or decrease in response to positive shocks. For transfers sent out, I also have in mind a dynamic insurance mechanism whereby households may have to share their positive shocks with other households. A contribution is to examine urban households together with rural households while most the literature on transfers has focused on rural households (Cox and Jimenez (1998)).

Indeed, since PSF is a national representative survey, I am able to compare the impact of shocks in urban and rural areas. Presumably, given the high degree of imperfections in African agrarian labor markets, the possible change in social norms and constraints when individuals move to urban areas and, more prosaically, the differences in housing conditions, one may expect differences between urban and rural dweller in the way both positive and negative income shocks are shared.

I must stress though that I do not examine particularly the relationship *between* rural and urban households. More specifically, while I will describe migration destinations, comparing movements of urban and rural households, I do not examine the determinants of the choice of migration destination. Contrary to the papers I mentioned previously, I do not study the relationship between a migrant and his original household. I adopt a different point of view which does not only encompass migrants and which comprises all households, my interest lying mainly in whether a given household, not necessarily of recent migrants, sees changes in his household structure in response to positive shocks. I do not take the point of view of particular individuals acting as a link between the rural and urban sectors because they are recent movers from one sector to the other.

The paper is structured as follows: in section 1, I briefly describe the specific aspects of the PSF survey used in this paper; in section 2, I describe positive and negative income shocks declared by the households and the ways they cope with them. In section 3, I turn to the description of migration patterns. I examine in particular whether households mention changes in household structure in response to income shocks. In section 4, I explain the empirical approach to examine the impact of income shocks on migration and transfers. The main point is to make sure that my measures of shocks are exogenous. I study, at the individual and households levels, arrivals and departures of household members during the 2 years preceding the survey. The shocks considered are shocks mentioned by the household. As I know the causes of the shocks, I can remove any shocks that may be regarded as endogenous. For instance, I exclude employment shocks which may be in fact decisions made by the household together with the decision to send a migrant away or to host a new household member. Section 5 presents the results before concluding.

## 1 The Data: the PSF Survey

This study is based upon the survey “Pauvreté et Structure Familiale” that was conducted between November 2006 and May 2007 by the *Agence Nationale de la Statistique et de la Démographie* in Senegal. The survey was designed and prepared by a team of Senegalese and French researchers.<sup>4</sup> The PSF dataset is nationally representative. The target sample was 1800 households and the number of usable questionnaires 1785. The sampling is in two stages: first a stratification in 3 groups: rural, urban excluding Dakar and Dakar that determines the number of enumeration areas (EAs) in each group, 64 in rural areas, 86 in urban areas. Then, in each enumeration areas, 12 households are randomly selected.

PSF is particularly detailed in terms of household structure, expenditures and transfers. It also attempts at understanding the sequence of shocks and movements of household members over the five years preceding the survey. It does so in different sections that ask, separately, about shocks and movements but also in a section that specifically enquires into whether household recompositions occurred after and because of exogenous income shocks. Throughout the descriptive part of this study, I distinguish whether households specifically mentioned movements due to shocks or not.

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4. Matar Gueye and Momar Sylla from the ANSD on the Senegalese side; Philippe De Vreyer (Université Paris IX Dauphine and DIAL), Sylvie Lambert (Paris School of Economics (LEA)) and the author of this study on the French side.



## 2 How Fragile or Volatile Are the Senegalese Households: Frequency of Shocks and the Ability to Cope with Them

Since my interest lies in understanding whether migrations react to income shocks, I must first gain knowledge of the sources of the shocks. Therefore, I start with a description of the causes of income fluctuations that households undergo. In the appendix, I also examine households' responses to shocks. They are not indispensable to understand the impact of income shocks on migration but provide interesting insights into the lives of Senegalese households. As I want to have a comprehensive picture of the income volatility of Senegalese households, I present both positive and negative income shocks. Although negative income shocks may be a priority for policy making to protect households or individuals, positive income shocks also deserve scrutiny as the way households use them may change their impact in the long run. Moreover, those households that experienced positive shocks in the five years before the survey could be similar to those other households who experienced negative shocks, all being in a broad category of households whose incomes are volatile and who, therefore, may undertake *ex-ante* actions to smooth their income. It is important to identify all these households as the impact of shocks on consumption may be pulled downward for them. What's more, the coping mechanisms they use may differ from other households whose income volatility is lower and who may be hit more hardily by a single shock as they may not be prepared to cope with it.

Throughout the descriptive part of this study, i.e. in this section and the next one, the shocks presented are declared by households, not measured through estimates. Positive and negative shocks were recorded following a similar method. I detail here how negative shocks were recorded. First, a household was asked whether he experienced years particularly bad in terms of income in the five years before the survey, i.e. between 2002 and 2006, allowing for a maximum of 3 particularly bad years. Then, for each year considered particularly bad by the household, he was asked about the causes. If the household stated a bad harvest, only a limited set of reasons, mostly linked to weather and other natural conditions, were allowed. While I allowed households to respond *other*, survey enumerators were asked to record reasons linked to a loss of income not due to a change in household behavior but to reasons beyond the household's control. An overarching goal, in data collection, was to capture exogenous shocks, except for some specific responses, such as taking on a new employment. The latter can hardly be regarded as exogenous or unanticipated and, together with divorce and house eviction in the case of negative shocks, I will exclude it when I estimate the impact of shocks on movements. I allowed it among positive shocks in order not to miss, in describing Senegalese households, an important change in economic conditions.

One may notice that shocks first hitting a specific household member, such as a job loss, are a possible response. However, the fact that they are mentioned by the household as a cause for a difficult year, means that the shock in fact affected the whole household. The questionnaire's section on shocks was preferably administrated to the head of the household or to another adult household member, but all household members were encouraged to take part in answering.

The magnitude of shocks is not quantified. Typically, whether a household lost 20% of its income or 60% is unknown to us. If both losses are due to the same reason, they will represent exactly the same thing to us, be it in the descriptive statistics or in estimates. The survey did not quantify shocks partly because it was heavily detailed in many sections and very different from other surveys and so I did not want to put even more burden on enumerators or households. However, while quantifying shocks likely brings additional information to a mere dummy measure, what matters is households' perception of whether they underwent a difficult year, so long as I restrict their perception to economic hardships. In order to make sure that shocks as I measure them do capture economic phenomena, I estimated the impact of shocks on consumption and found strong coefficients both for positive and negative shocks, with the expected sign in each case.

Lastly, I do not include a distinction along household structure, although household structure is a focus of the PSF survey. In a basic typology of household structure based on the cohabitation of wives of the household head, the proportion of urban households with co-habitation is somewhat low, at 6%. Therefore, separating them would make a small sample. In contrast, cohabitation is prevalent among 23% of rural households and so differences in household structure along this criterion seem to overlap with the basic rural/urban distinction. When it does not, neither the pattern of shocks nor the way to cope with them seem to vary along household structure.

## 2.1 Negative Income Shocks

Figure 1 plots the percentage of households that experienced a shock listed underneath at least once in the five years preceding the survey. The results are presented separately for urban and rural households.<sup>5</sup> Over the whole period, 69% of rural households experienced a shock while only 46% of urban households did and this is mostly explained by the incidence of crop loss and animal disease or loss, which are obviously much less likely to affect urban households. The incidence of these shocks is particularly low in Dakar, where crop loss only affected 4% of households while animal

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5. In Senegal, a commune is defined as being urban if the number of its inhabitants is greater than 10,000.

loss occurrence is as low as 1%. In urban areas outside of Dakar, animal loss affected 5% of the households which is a relatively high third of the 15% proportion in rural areas and shows the links that households in small urban areas can maintain with rural areas.<sup>6</sup> Crop loss is only mentioned by 11% of those households, which is double the Dakar proportion but only one fifth of the proportion in rural areas. It may be that some urban households outside of Dakar have enough space available to raise some animals that they sell.<sup>7</sup>

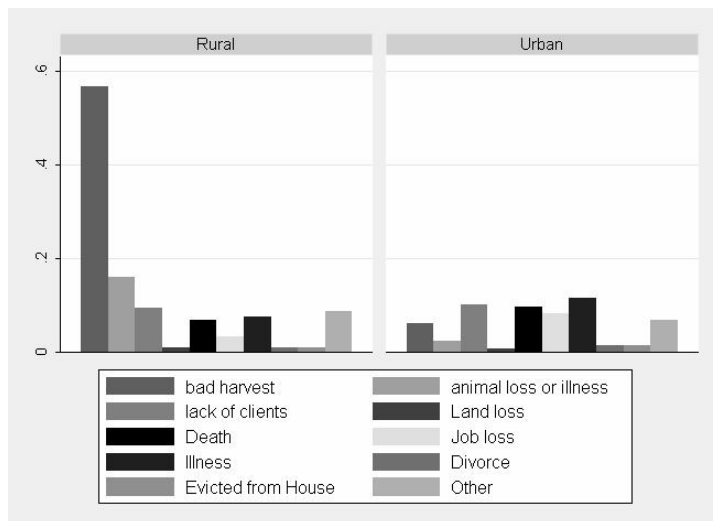


Figure 1: Negative income shocks experienced by households, % in rural and urban areas

On the other hand, as one may expect, individuals in urban areas are more likely to lose their jobs than in rural areas, with a proportion of 8% of households declaring a job loss in the five years before the survey, in contrast with 3% in rural areas. Similarly, income shocks due to illness are also mentioned more often in urban areas. This is especially true of Dakar where 13% of households declared the illness of a household member while the proportion is 9% in other urban areas and 8% in rural areas. Unlike job loss, this higher declaration of health shocks in Dakar is probably due to different perceptions of health rather than to actually worse health conditions in Dakar. Indeed, this pattern is similar to a pattern observed elsewhere in which richer households are more likely to declare illnesses or declare their health status as being bad. Of course, Dakar is by no means

6. The proportion of households who own cattle, sheep or goats is 13% in Dakar, 26% in urban areas outside of Dakar and 66% in rural areas.

7. Dakar is a very special urban area. It comprises 4 million inhabitants, a third of the Senegalese population. The biggest city after Dakar, Thiès, only encompasses 252,000 inhabitants (Direction de la Prévision et de la Statistique (2004)). Therefore, economic opportunities are likely to be much higher in Dakar than elsewhere. Because they are small and immediately surrounded by rural areas, urban areas outside of Dakar may also maintain stronger links with rural areas. This may have consequences on their sources of income as well as on the size of their network.

uniformly richer than the rest of Senegal, however, even poorer households there may nurture higher expectations on health than households in other areas.

In addition to being more likely to be hit at least once by a given shock, rural households are also more likely to experience a negative shock more than a sole year. While, in Dakar, 70% of the households who experienced a negative shock did so only once over the five year period, the proportion goes down to 45% in rural areas. Mirroring this is the fact that 29% of rural households had three bad years out of 5 while only 11% of urban households went through such a series of bad years. Given the differences uncovered between urban and rural areas, I will continue to examine them separately throughout most of the paper.

## 2.2 Positive Income Shocks

Positive shocks are much less frequent than negative ones. They also differ from the latter in that their incidence is very similar in urban and rural areas: the frequency is 34% for the whole sample, 31% for urban households and 38% for rural households. Albeit significant, the difference is rather small. Thus, while the likelihood of a positive income shock is half that of a negative income shock in rural households, it is 2/3 that of a negative income shock in urban areas. I must bear in mind that the period going from 2002 to 2007 was quite difficult for rural areas, both because of drought and because of grass-hoppers. Attacks of grass-hoppers occur casually in Senegal but they hit the country particularly hard in 2004.

The sources of positive income shocks strongly mirror those of negative income shocks, as can be seen in chart 2. Good harvests and high agricultural prices<sup>8</sup> are almost exclusive to rural households while, with a probability of 10%, finding a new job is three times as likely in urban than in rural areas. 10% of urban households cited a shock that had not been listed in the survey questionnaire and, as consequence, fell in the “other” category, while they are only 4% in this case in the rural sector. This may be an indication that I have more difficulty capturing the sources of shocks in urban areas. The only exception to the symmetry between negative and positive shocks is for good sales, which are cited by more rural than urban households while bad sales were cited equally often by urban and rural households.

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8. Given that most Senegalese agricultural production is either for own-consumption or for exports (cotton, peanuts), high agricultural prices can be beneficial to rural households without harming urban households.

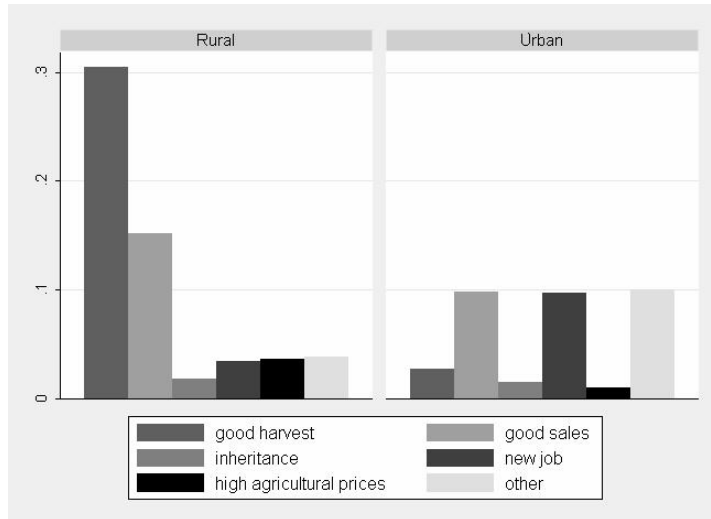


Figure 2: Positive income shocks experiences by households, % in rural and urban areas

### 3 Migration in Response to Shocks: Descriptive Statistics

#### 3.1 Do Households Declare Changes in Household Structure Because of Shocks?

This subsection follows the same scheme as the previous one, examining first responses to negative and then positive income shocks in terms of changes in household structure. The latter encompass migration but also moves within the same community. Although I restrict estimates to movements with changes in community, it is of interest to have a more general picture of household changes.

##### 3.1.1 Negative income shocks

On average, among households that experienced a negative shock, 16% declared modifying their structure in response to the shock. What drives up this figure of 16% is mainly temporary migration emanating from rural households: 14% of rural households facing a negative shock declare that a household member undertook temporary migration. The figure is a mere 3% for urban households. No definition of temporary movements was provided to households. However, given that they had other possible responses of permanent departure of household members and other possible responses related to taking on a new employment, the item of temporary migration should be clearly understood by them, especially as it in fact covers two items, temporary migration for work and temporary

migration for another purpose. The higher prevalence of temporary migration in rural households has to be compared with the fact that they are less likely than urban households to declare that inactive household members took on a job after a negative shock: the figure is 4% in their case as against 8% for urban households. So, in the end, rural dwellers do seek income generation schemes in addition to their usual sources of income, and they actually do so more than urban households, but they have to send individuals away from the village to find these income generation schemes. Individuals living in urban areas are less in need to move away since they have more opportunities at home. Anecdotal evidence in Dakar and its suburbs shows that urban dwellers accept to spend long hours in public transport, with frequent commuting times of more than four hours per day.

Although at a low rate of 3%, temporary migration is the household change in structure most often cited by urban households which faced negative shocks. Temporary migration for a purpose other than work is declared by 2% of them while all other re-compositions, which include the departure for good of former household members, the arrival of new household members or, lastly, the fostering out of children, are cited by fewer than 2% of urban households facing shocks. The latter two are also mentioned by no more than 2% of rural households. I will probe more into this when looking at the reasons put forward by parents who fostered their children out or by children fostered within the households of the PSF sample but it seems that child fostering often responds either to traditions that may not be particularly linked to shocks or to the need to put a child in school. If these two reasons dominate, one would expect fostering to be responsive to positive and not to negative income shocks, if anything. Similarly, although households could try to diminish their dependence ratio by sending out inactive members, typically the elderly, in hard times, migration actually often entails costs that credit or liquidity constrained households cannot meet up. As for other recompositions in rural households, they are slightly higher than in urban households albeit significant in a single case which is a complement to the temporary migration case: permanent departure of household members looking for work, which is mentioned by 4% of rural households.<sup>9</sup>

In the end, although the proportion of households declaring a specific recomposition is small, once I add all the alternatives but exclude temporary migration for work, 6% of urban households undertook an important change in their structure in response to negative shocks and 9% of rural households did, which is far from being negligible and as high as the proportion of households receiving transfers from the family, while these recompositions are more *radical* answers to shocks and

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9. The exact phrase is “permanent departure of household members to work”. Although the word “migration” was not displayed in this response item, it is highly likely that most these changes of household were also changes of community.

may have very important consequences in terms of the changes of relationships between household members, former and new.

### 3.1.2 Positive Income Shocks

I now turn to the comparison of urban and rural areas changes in household structure in response to positive shocks. As for negative shocks, each *permanent* re-composition taken separately seems equally frequent in urban and rural areas. Most responses are not significantly different between the two sectors, except for marriage. The marriage of household members after positive shocks stands at 11% in both regions. However, in urban areas, the household head is slightly more likely than other household members to marry after a positive shock while, in rural areas, it is mainly household members other than the household head who marry after a positive shock, as can be seen in figure 3. This reflects the differences in marital status and in household size between the two regions. Rural households comprise on average 1.6 individuals more than urban households and, while 9 out of 10 rural household heads is married, this is true of only 3 in 4 household heads in urban areas. This difference may explain why, in rural areas, the extra money spent for a marriage is mostly used by someone else than the household head.

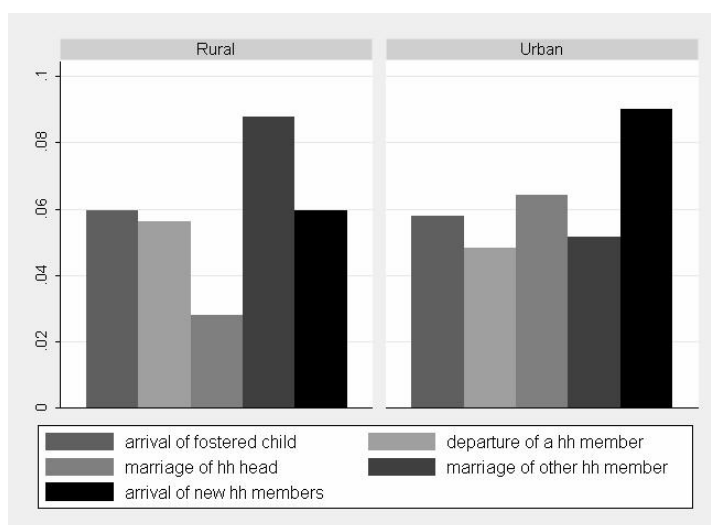


Figure 3: Household re-compositions after positive income shocks, % in rural and urban areas

All other responses are similar in incidence. Child fostering after a positive shock is mentioned by the same proportion of households in urban and rural areas, which is an additional proof that this tradition is not waning in urban areas which might be expected to be more *modern*. Contrary to

fostering and to the entry of new household members, while the departure of household members was declared by relatively more rural than urban households, its incidence, in response to positive shocks, is the same in the two areas. The close proportions in the case of positive shocks are probably due to the fact that these departures necessitate financing and are then cases in which the extra money generated by a positive shock is used to cater for the costs of a movement in its initial months. There is no reason, *a priori*, why movements which are indeed investments, such as education or looking for better employment opportunities, should differ in the two regions. I actually expect rural dwellers to move more for such reasons as they have fewer opportunities and services available than their urban counterparts. However, in the context of Senegal, urban youth in particular may contemplate international migration, which is very costly, more than rural inhabitants. This is confirmed by the data, as the proportion of individuals who migrated out of Senegal is threefold in urban areas relative to rural areas. I come back to this when I turn to the general description of migrations.

### **3.1.3 Differences in Household Structure Changes in Response to Positive and Negative Income Shocks**

Re-compositions after positive income shocks are much more likely than after negative income shocks. 23% of the households that experienced a positive income shock changed something in their structure permanently. In the case of negative shocks, the proportion is 9% for rural households and 6% for urban households, where, again to capture permanent changes, I excluded temporary migration. Figure 4 displays the differences between the two types of shocks. It shows, side by side, the incidence of each response for each group, the one that faced a negative shock at least once and the one that faced a positive shock at least once. If I restrict the sample to households who faced both negative and positive income shocks, the differences are statistically significant for fostering and entries, and almost significant for departures of former household members. All mentioned movements are more frequent in response to positive shocks. While I do expect arrivals in the case of negative shocks to be low, I would expect, if migration was a coping mechanism, departures to be more responsive to negative shocks than is displayed in figure 4. This seems to be more true in rural areas where departures after negative shocks stand at 4% among rural households, which is significantly higher than the 2% proportion among urban households.



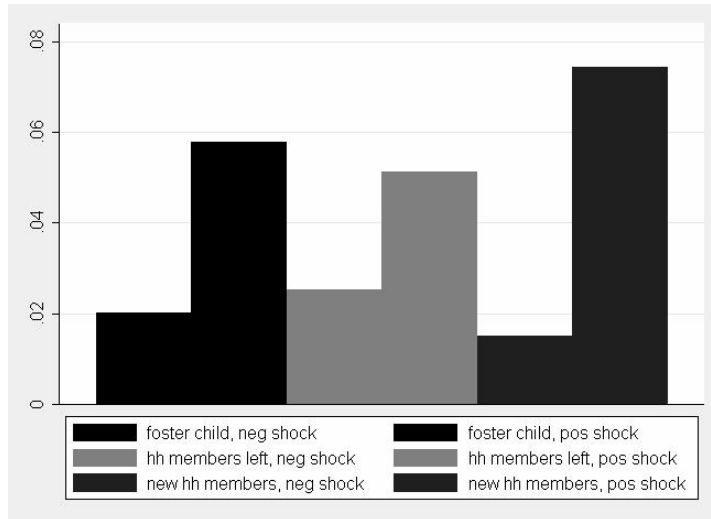


Figure 4: Household re-composition after negative and positive income shocks

### 3.2 The Incidence of Migration

From now onto the end of the paper, the move I consider is a change of community, i.e. village in rural areas and city in urban areas, unless indicated otherwise.<sup>10</sup> This part is more restrictive than the previous sections in which, except when the explicit term of migration was used for the departure of former household members, the changes in household structure, for instance through fostering or marriage, entailed all entries into and departures from the household, not necessarily from the community.

The total number of individuals who have changed community over the past five years is 2181, which amounts to 13% of the 16581 individuals on whom I have information in the sample. These include current household members who are part of my sample and who entered in the household during the five years before the survey but also former household members on whom information

10. Dakar, despite its significant size, is a single community. When collecting the data, I allowed the registration of a change in community when individuals came from parts of Dakar that are very far apart but, examining their characteristics, in particular the occupation of the household head in their former household and their former occupation, I do not find differences. In particular they do not seem to conduct more agrarian activities, which is what I would expect if they were living in the outskirts of Dakar. In addition, there is likely to be heterogeneity in responses, with individuals moving similarly between two communes of Dakar giving different responses depending on how they perceive their move. So, in order to have a clear cut sample of movers, all individuals moving within Dakar are not defined as migrants. All the results presented in the paper, both descriptive statistics and estimates, are quantitatively very close and qualitatively the same when I allow movements within Dakar to be defined as migration.

was collected. I cannot describe their movements together though and the description of mobility has to split migrants between individuals who entered the sampled households and individuals who left them. Firstly for the sake of clarity but also because the number of movers out of the households is underestimated in the survey and cannot be compared to the number of members arriving in the household. Therefore, before turning to a detailed description of migration, the next subsection assesses the extent to which some movers are missing.

### 3.2.1 Underestimation of Departures

There are 1414 individuals who have entered in the surveyed household in the five years before the survey, coming from a different community. The number of individuals who left the households in the same period and who changed community is 708.<sup>11</sup> Since the sample is representative of Senegal, the numbers of individuals leaving the households and entering them should be much closer than this and I rather expect the number of individuals leaving to be higher, since they include migrants outside of Senegal. This section aims at decomposing the gap to identify the groups for whom the discrepancies are smaller.

The first part of the gap between those two groups is due to a lack in the survey: households were not surveyed about former household members under 25 who are not children of current household members. Indeed, the number of *new* household members, *i.e.* individuals who entered in the sampled households during the five years before the survey and coming from a different community, who are under 25 and with no parent in the household they came from is 223, which is 32% of the gap between arrivals and departures.

The rest of the gap, 478 individuals, is due to deficiencies in household recall of former members. Among adults 25 or older, 540 arrived in the household while households mentioned only 250 former adult members, which is another 41% of the total gap. Among children under 24 who left leaving at least one parent in the household, their counterparts in arrivals being children under 25 with at least one parent alive outside of the surveyed household, the gap is of 125 (651 arrival and 526 departures), which is 18% of the total gap. The fact that the recall bias is much higher for adults above 25 than for children under 24 of household members is not surprising. I do expect individuals to remember their children better than more distant relatives.

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11. in addition, there are 52 former household members for whom the answer on the current place of residence is missing.

Adding up the three subgroups with discrepancies between the numbers of arrivals and departures, I reach a 91% *explanation* of the gap. Of course, I do not expect the total number of arrivals and departures to be exactly equal and, as a consequence, the 91% figure seems satisfying.

It is not possible to estimate the extent of the recall bias for each household. While, since the sample is representative of Senegal, I expect the aggregate figures of departures and arrivals to be close, there is no reason why a specific household should witness the same number of departures and arrivals. Indeed, the whole point of this study is, in a way, to see what sorts of households tend to host or send away individuals, in particular in terms of the shocks they face.

So, I cannot explain specifically why a specific household has a high recall bias or why a given individual is *forgotten*, unlike in the classic case of an attrition bias in a panel data where I could run estimates coding to 1 individuals missing in a round of the panel and examine their characteristics. However, just as I saw, by comparing their aggregate numbers in arrivals and departures, that children of household members were forgotten less than other former household members, I can compare the aggregate movements of some categories and see those for whom the gap is wider. I do not want to give the detailed figures but only to give a better idea of the recall bias. First, urban areas are the ones where the recall bias is the highest. Moreover, individuals who move to rural areas, whether they come from urban or rural areas, are also more likely to be forgotten. In terms of the reasons for moving, individuals moving for marriage are under-represented in departures while individuals who moved because they found a job are over-represented. Lastly, in rural areas and urban areas outside of Dakar, women are under-represented in departures. Crossing the previous aspects a group comes up as under-represented: women marrying out in rural areas. And indeed, the number of such women who moved in is 141 while the number who moved out is only 38. The gap is very high even for children of household members, as only 23 of them are declared as leaving while, out of the 141 who moved in, 92 women under 24 with at least one parent outside of the household, joined a rural household because of marriage.

It is difficult to know whether the movements which are under-represented are more or less linked to shocks. For now, I can only speculate, but if movers to rural areas increase after negative income shocks in the sending household and if those movers are forgotten by their sending households, then I may greatly underestimate the impact of negative shocks on departures. As a matter of fact, we will show the impact of shocks on departures for the whole selected sample of movers but also for sub-samples for which the recall bias is low, for example the children of current household members.

### 3.2.2 The Incidence of Migration

Given the underestimation I explained in the previous section and, more particularly, the fact that it is higher for women and in urban areas, I focus on arrivals during the 5 years before the survey to describe the basic characteristics of movers and the households that host them. I restrict the sample to households created before 2003 as I do not want to add reasons specific to the creation of a new household.

The aim of this section is to quantify migration across gender, age and sector of residence and to understand the motivations mentioned by movers. I pay particular attention to whether movers declared moving because of difficulties in their household of origin and examine the relative frequency of movements which may be considered as investments for the individual, such as education, with movements that may less be regarded as investments, for instance divorce. This section is complementary to the previous sections where I focused, at the household level, on movements explicitly viewed as responses to shocks. In addition, it provides us with individuals' stated motivations to move, which I will then compare with the results of estimates.

Among those households, 8.0% of current members changed community in the five years before the survey. The number is exactly the same for urban and rural areas, while, within urban areas, Dakar in fact attracts fewer newcomers than other cities, with proportions of 7.5% and 8.8%.

The age profile of movers is also as expected, with the proportion of new entrants having an inverted U-shape profile, increasing from 6.4% to 13.6% between children between 0 and 14 and the group who is most likely to move for all the expected reasons (education, work and marriage), the 15-24 year-olds. The individuals between 25 and 54 also bear a proportion of newcomers which is higher than the sample average, at 9.9% while those above 55 are the least likely to move, with a proportion of 4% recent movers, which amounts to only 52 individuals.

The main motivations for movements are displayed in table 1. Movers are split in 3 age-groups and, for each group, between males and females as the motivations for migration are highly heterogeneous.

Facing a "Difficult situation in origin household" ranks third in explaining children movements and, at 11.7%, accounts only for a low proportion of movements when compared with the fact that more than a quarter of children move because they follow their relatives while another quarter move due to fostering. However, among those fostered, 22.7% mention that they were fostered

because of a difficulty faced by their parents or their original household. If I add these to those non-fostered children who entered the household in the five years before the survey, I find that 20.5% of the children who came in the household did so because of some difficulty.<sup>12</sup> So, in the end, despite not being mentioned by households to explain departures of their former members, children arriving in the surveyed households do mention leaving their original household because of a difficult situation. On the other hand, the typical movement which is due to an investment, education, is mentioned less often for this age-group of 0-14. If I add-up the children who mention fostering because of education to non fostered children who entered the household also because of education, the proportion is 13.5%. This latter motivation is mentioned as often for boys as for girls, as are most other motivations, except for the difficult situation in origin household which is twice as likely to be mentioned by boys as by girls.

The comparison of male and female prime age adults brings a different picture to the comparison among children. While movements due to difficult situations are very low, both among men and women, there is much more heterogeneity when it comes to other migration motives. Males move because of fostering or education almost three times as often as girls. This mirrors the fact that female school enrollment decreases sharply in the transition to secondary education.<sup>13</sup> In line with this, I see that boys moving for education are also more likely to come from a rural area than boys moving for other reasons.

In fact, for women between 15 and 54, the main motivation to migration is marriage, accounting for more than 50% of their movements, while the figure is a tiny 1.5% for men.<sup>14</sup> Symmetrically to marriage, as divorced women generally return to their parents' households, I see that 6.02% of women between 25 and 54 moved because of a divorce while the proportion is a tiny 0.54% for men. In fact, while 71.6% of female newcomers are married, only 44.3% of male newcomers are. In contrast, men move much more because of employment. A total of 24.19% of men between 15 and 24 entered a household because they were looking for a job or had found one. These two

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12. Difficulties group illness, difficult economic situation in the household of origin, illness or death of a parent or divorce or separation of the parents.

13. In my sample, while the proportions following formal educations are the same for 6 to 14 year-old boys and girls, the proportion of boys between 15 and 20 who are still in school stands at 44.1%, which is almost 50% higher than girls' 30.4% proportion still in school. Thus, the inequality in education between boys and girls translates into more movements for education in the case of boys than girls, to allow this further education to take place.

14. Moving for marriage splits into two reasons. While the women who mention "marriage" as the reason for entering the household moved in with their husband immediately after the wedding, the women who mention that they "joined their husband's household" did not reside with their husband in the aftermath of marriage and joined his household only after a while.

reasons are mentioned by 43.78% of men between 25 and 54 while only 3.61% of the women in this age category moved because of work. The proportion among younger women is much higher, at 11.06% but, without examining the employment history of older women, I cannot tell whether this higher proportion bears evidence of higher employment participation in the younger generations of Senegalese or whether the difference is due to life-cycle work decisions.

The heterogeneity in the motivations for arrivals between the urban and rural sectors is significant mainly for the group of individuals aged between 15 and 24, for which I also display the differences in motivations in table 1. For children, the only difference is in education, which stands at 14.06% in urban areas, almost three times the 5.20% proportion in rural areas. Somewhat mirroring this is also a difference, for adults between 25 and 54, in the motives linked to employment. While 33% of movers to urban areas do so for employment reason, the figure is only 14% among movers to rural areas. For prime-age adults, the contrast in the education motive is even stronger, as chances for moving for education purposes is almost fourfold for those moving to urban areas. Urban households are also much more likely to host individuals looking for a job (3 times as much as rural households), moving because of a difficult situation in their original household or fostered young adults (more than twice as much as rural households in the two latter cases). Excluding individuals returning to their original household, which is a motivation difficult to interpret, the main motivation for movement to rural areas, is marriage, mentioned more than three times more often than in urban areas. The proportion of individuals aged between 15 and 24 and who are married is indeed much higher in rural than in urban areas: 30% versus 12%.

	Age 0 to 14		Age 15 to 24				Age 25 to 54	
	Male	Female	Male	Female	Rural	Urban	Male	Female
Move with a relation	24.64	25.77	0.00	1.70	1.27	1.00	1.08	1.20
Fostering	23.91	28.83	12.10	3.83	3.80	8.96	1.08	0.60
Education	8.70	9.20	29.84	10.64	6.96	25.37	2.70	3.01
Difficult situation in origin household	15.22	7.36	5.65	2.98	1.90	5.47	3.24	10.24
Marriage	0.00	0.61	0.00	17.02	16.46	6.97	1.62	19.88
Join Spouse's households	2.17	1.23	0.00	33.19	37.97	8.96	0.54	29.52
Divorce	0.72	0.00	0.81	1.28	1.27	1.00	0.54	6.02
Job search	2.17	0.00	16.13	6.38	4.43	13.93	21.62	3.01
Job found	0.72	0.61	8.06	4.68	3.16	7.96	22.16	0.60
Back in origin household	10.87	9.20	15.32	8.09	12.66	8.96	20.54	7.83
Creation of the household	1.45	1.84	1.61	0.85	0.63	1.49	7.57	3.01
N Obs	138	163	124	235	158	201	185	166

NOTES - 911 new household members who migrated over the 5 years before the survey, out of 14039 current members of households created before 2003. Separate figures for the urban and rural sector are displayed only for the 15-24 year-olds because they are close for children, except for education motives, and similar for the 25-54 year-olds.

Table 1: Motivations for Movements of New Household Members, %

**Location of Migrants** Bearing in mind the recall bias already discussed, I must now turn to departures from the interviewed households to examine migration destinations and, in particular, international migration. In table 2, I show the results both for the whole sample of movers and for the sub-sample of movers for whom I expect the recall bias to be low, namely the children of household members who are under 24 and the children of the household head, regardless of their age. In fact, the size of the sub-sample that I expect to be under-represented is rather small, with 96 individuals only. But the differences in their places of migration are quite striking when compared to the sub-sample for which the recall bias is low. 31.2% of the sub-sample with *biased recall* moved abroad while only 12.8% of the *unbiased* sub-sample left Senegal. It may be that individuals with at least one parent alive in Senegal are more reluctant to leave their country or they may just be younger on average with international migration coming later in life. However, it also seems quite plausible that individuals who go to a foreign place are less forgotten because they may play an important economic role in their original household. In any case, I cannot say very much about this category as they are only 96, the 31.2% proportions representing merely 30 individuals.

When I split the *unbiased* sample between urban and rural households, I see that rural households are three times less likely to have a former member abroad than their urban counterparts. Regarding migrations within Africa, the proportion is *only* halved between urban and rural households. Since Senegal has borders with five countries and since the areas close to most frontiers are densely populated, this is not surprising. Overall, rural migrants' movements are 10 percentage points lower than urban movements, in terms of international migration as well as internal migration to cities; they are, on the other hand, almost twice as likely to migrate to another rural area, than are urban individuals likely to move to a rural area. More surprising is the fact that the proportions of men and women, respectively, migrating abroad, are very close, with 12.6% for men and 12.9% for women. The proportions between men and women are also very close if I distinguish migrations within and outside of Africa.

	All movers	Movers' sample with better recall	Movers' sample with better recall	
			Origin HH urban	Origin HH rural
Dakar	23.45	24.51	27.52	22.32
Other city	28.67	29.01	30.23	28.24
Other village	31.21	33.50	22.09	41.81
Other African country	6.92	5.56	7.75	3.95
Other non African country	8.33	7.19	12.40	3.39
Unknown	1.41	0.16	0.00	0.28
N Obs	708	612	354	258

Table 2: Migration Destinations of Former Household Members, %

Overall, if I separate the motivations to move into three main reasons: those simply due to the life-cycle, such as marriage, those due to education or work, and those due to difficulties, the major observations are as follows. The main reasons for the movements of prime-age and adult women are linked to marriage or divorce while the major reasons for the movements of men in the same age-groups are linked to employment or education. As a bride-price and patrilocality are prevalent in Senegal, both hosting a bride and a member looking for work may be driven by positive income shocks in the hosting household. So, albeit marriage may entail a higher upfront cost than hosting a new member for another reason, there may not be strong differences in responsiveness to positive income shocks between prime-age or adult men and women. In terms of responsiveness to negative shocks though, for 25-54 year-olds, movements due to difficulties in the previous households are twice



as likely for women as they are for men. The reverse is true for children, for whom boys' movements due to difficulties in the household of origin are twice as likely as girls'. Prime-age adult males also display higher movements due to negative shocks than females in the same age-group, although this difference is not significant at 10%.

## 4 Migration and Transfers in Response to Shocks: Empirical Approach

### 4.1 Migration

The descriptive statistics I have conducted bear evidence of a rather weak link between negative income shocks and mobility. Hosting new members after experiencing a positive shock seems more likely. In addition, while there are important differences between the urban and rural sectors in terms of the motivations to move, differences between the two sectors in terms of recomposition after income shocks seem rather limited. Descriptive statistics only allow to draw limited conclusions, though. First for a technical reason, since they only allow for univariate analysis. But more importantly, the descriptive statistics I have shown above were on the movements viewed by the household as being responses to income shocks. In this section, by conducting estimates of the impact of shocks on the probability of moving, I am able to estimate the impact of positive and negative income shocks on actual individual movements holding constant other characteristics that may also be correlated with movements. I do not have income data covering the five years before the survey but I have the employment history of household members. Thus, using retrospective answers, I attempt at capturing the household's economic situation at the time of the move by controlling for the household head's occupation in the year before movements took place. I estimate the impact of shocks experienced by a household in the years 2004 and 2005, on migration in 2005 and 2006.

The estimations are conducted both at the individual level and the household level. Although I expect close, or at least not contradictory, results between the two sets of estimates, each of them uncovers a different aspect of migration. For individuals, the question is whether they are more likely to go to or leave households where shocks happened. Moreover, besides shocks, I am interested in examining which individual characteristics are correlated with mobility in particular sex, economic status and ties with the households. It is unclear how I would aggregate this information at the household level. For households, the question is whether they are more likely to host a new member

after a shock or to send a member away after a negative shock. If migration decisions are taken in a different way by an individual and a household, the impact of shocks may differ depending on the unit of observation.

For arrivals, I estimate the probability that current household members joined the household in the years 2005 or 2006 and, in the case of households, that they hosted at least a new member in 2005 or 2006, after a shock in 2004 or 2005. For departures, I estimate the probability that individuals who were household members in 2003 left the household in 2005 or 2006. Similarly, for households, I examine whether they sent at least one member away after a shock. I restrict the sample of individuals to those who were born before 2003 as I do not want to mix decisions on childbearing with movement decisions. Besides, we restrict the sample to households that were created before 2004 because I mainly want to examine how households already formed react to shocks. I do not want to mix the study with the motives for creation or dissolution of households. An additional and more practical reason for this restriction to households created before 2004 is that the meaning of shocks occurring in 2004 would be unclear for them. In particular, they may be shocks affecting one of the household members in his former household, if the survey question was not understood correctly.<sup>15</sup> I consider shocks in 2004 and 2005 because, in the next section, I examine the impact of shocks on the other mechanism through which a household's network may be impacted by the household's events: transfers. As PSF collected information on transfers over the 12 months preceding the survey, *i.e.* essentially in 2006, I also focus on arrivals in a close period but add arrivals in 2005 to increase the power of my estimates.

I estimate separately arrivals and departures. But, for both, I focus on the characteristics of the sampled households. This means that, for arrivals, I focus on the characteristics of the households in which new members enter while, for departures, I focus on the characteristics of households that send away members.<sup>16</sup>

I consider that an individual  $i$  has a latent propensity to move, which depends on income shocks in the household  $h$  that he enters in or leaves, the individual's own characteristics  $X_i$  and household

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15. The proportion of those declaring a positive shock in 2004 or 2005 is similar for households created before and after 2004. The same is true of negative shocks.

16. While the PSF survey collected some information on households that individuals came from or went to but no information on household income shocks. Such information would have been costly to collect in a reliable way.

characteristics  $X_h$ :

$$Move^{k,05/06*}_i = \beta^{k}_{i1}PositiveShock^{04/05}_h + \beta^{k}_{i2}NegativeShock^{04/05}_h + \beta^{k}_{i3}X_i + \beta^{k}_{i4}X_h + \epsilon_i \quad (1)$$

where  $k$  denotes either an arrival or a departure.

I adopt a probit model: the  $\epsilon_i$  are assumed to be identically and normally distributed, independent between households but not necessarily within households: the standard errors allow for intra-household correlation. I do not observe the latent propensity  $Move^{05/06*}_i$ . Instead, I only observe whether individuals actually moved.

$$Move^{k,05/06}_i = 1 \text{ if } Move^{k,05/06*}_i \geq 0$$

$$Move^{k,05/06}_i = 0 \text{ if } Move^{k,05/06*}_i < 0$$

Similarly, households change their structure, either through departures of old household members or arrivals of new members:

$$ChangeMembers^{k,05/06*}_h = \beta^{k}_{h1}PositiveShock^{04/05}_h + \beta^{k}_{h2}NegativeShock^{04/05}_h + \beta^{k}_{h3}X_h + \epsilon_h \quad (2)$$

where  $k$  denotes either that the change was the arrival of new household members or departure of former household members. I also only observe the actual change  $ChangeMembers^{k,05/06}_h$  which is equal to 1 if  $ChangeMembers^{05/06*}_h \geq 0$  and 0 otherwise.

The measure of negative shocks I use is a dummy variable equal to one if the household underwent at least one negative shock in 2004 or 2005. A negative shock is one of the shocks presented in the descriptive section, with the exception of divorce and eviction, since they may be both anticipated and due to household behavior. Thus, negative shocks included are bad harvest, animal loss or illness, lack of clients, land loss, death, job loss, illness and “other” reasons that the PSF survey had not pre-coded. I come back to this after mentioning positive shocks. A parallel measure of positive shocks is used from which I removed the positive shock on employment as it is not an unanticipated shock and may in fact be a voluntary decision by a household member to bring new members in.

sources of positive income shocks allowed in the estimation are therefore good harvests, good sales, inheritance, high agricultural prices and “other” reasons not pre-coded in PSF. Including shocks for reasons not pre-coded is not very satisfactory since one may worry that some of these reasons may not be exogenous. However, in urban households, positive shocks due to “other” reasons are equally important as “good sales” and “new job” and excluding them would make the occurrence of shocks too low. I explain below robustness checks I conduct partly to make sure that the “other” response does not capture an unobserved variable linked to household optimism and hospitality.

Thus, since I remove positive employment shocks, the shocks I measure should neither be anticipated by the household nor be due to a household effort to generate income in order to host new members or send members away.

However, some shocks may only happen if households conduct certain activities and larger households are more likely to be hit by shocks when the shocks I measure are originally individual level shocks. Since I want to make sure that our measures of the shocks do not capture unobserved household characteristics (typically, I have seen that negative shocks are much more likely in rural than in urban households), I control for two broad sets of household characteristics. First, I control for household demographic composition, i.e. the number of individuals in the household before the shock, in age-groups 0-5, 6-14, 15-24, 25-54 and older than 55, typically to make sure that shocks such as illness or death are not simply due to differences in the presence of older individuals in the households. Besides, I control for the occupation of the household head in 2003 and for land possessed to make sure that shocks on agriculture or sales do not capture the fact of conducting these activities. The household head’s occupation, amount of land possessed and, an additional control – the education of the household head – are also proxies for household long-term income. I do not control for income directly as I only have it in the year of the survey and not before new household members joined. In particular for farming households, it would be very difficult to disentangle the contribution of new household members to income. More crucially, given household decision leeway in occupational choice and work intensity, income is likely to be determined together with household willingness to host new members. Ideally, we would like to instrument income using income shocks and then examine the impact of instrumented income on changes in household composition. This will be possible if the PSF survey is carried out again to form a panel of individuals.

Moreover, given that I allowed for the reason “other” in positive shocks which is the item mentioned most often by urban households together with “new job” and “good sales”, I want to make sure that I am not only capturing *optimistic* households that would also be more welcoming to new

members. As a consequence, I conduct robustness checks through including the whole set of shocks between 2002 and 2006 to make sure that what matters is indeed the sequence or, more precisely, that arrivals in 2005 and 2006 are more likely in households that experienced shocks in 2004 or 2005 and not in households that mentioned a shock at any point in time.

In addition to the controls necessary to make sure that the shocks are not correlated to unobserved household characteristics, another set of control variables measures the strength of the links between individuals and their households and help us understand which factors favor departure from or arrival in the household. I control for whether individuals have a parent in the household and for whether they are married to someone in the household. I interact some of these controls with the sex of the individuals because I expect women to move more because of marriage. I also check whether the fact of having a parent in the household has a specific impact for children. The other individual level variables I include are the work status and the education of individuals, along with sex and age dummies. I pay particular attention to the latter two as I interact them with income shocks and urban status to understand fully which groups are sensitive to shocks.

A last set of controls is region fixed effects. In robustness checks on the results, I control for regional differences potentially affecting both shocks and arrivals. For instance, regions with cash crop cultivation may both pull people in general as they may offer agricultural work and also face more shocks as cash crops such as cotton are water intensive and more sensitive to drought. If household level shocks and arrivals are both due to regional factors, then we must control for them as I want to capture household-level shocks.<sup>17</sup> That said, given the possible small variation in movements within a region and the fact that my sample is not very big, I must be weary of outliers and, thus, must not consider the specifications with regional fixed effects as the best necessarily, but regard them as additional sensitivity analysis.

**Sample Size.** Table 13 in the appendix presents summary statistics for all the variables used in the estimation for the sample examined. For arrivals, given that I examine households created earlier than 2004 and individuals born before 2004, the number of observations for individual-level estimates should be 12206 current household members.<sup>18</sup> However, missing observations reduce the sample to 9628 individuals. The number of missing values is particularly high because I use retrospective

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17. The name of the regions in French is *département*. There are 29 regional clusters in rural areas and 20 in urban areas.

18. a less conservative number would be 12348 if I do not cross check with restricting the sample to households with at least one member in 2003.

information to capture the household and individual situation in 2003, before the shocks occurred. The year of entrance into the household is missing for 145 individuals. When this information is not available, I am unable to compute household composition before shocks occurred, i.e. in 2003. As most of the 145 individuals are in different households, I lose information on the 1774 individuals who live in the same households as them. In addition to this, information on work status in 2003 is missing for 390 individuals and information on the presence of parents or spouses is also missing for 599 individuals. In the estimates, I will conduct robustness checks examining samples with fewer explanatory variables to make sure that the results are not driven by the sample for which no information is missing.

In the end, since the sampled households are representative of Senegal, comparing the impact of household and individual characteristics on departures and on arrivals will give us a better understanding of *pull* and *push* factors in explaining migration. In fact, despite the caveat on recall bias discussed earlier, my understanding of push factors will be more comprehensive than of pull factors, in the case of individuals. To truly assess pull factors, I would need to observe all *potential* migration destinations of a given individual and compare the one he finally chose to the other destinations. Although I do not have this information and cannot compare the relative importance of pull factors between all possible destinations, I will see whether individuals are more likely to move to households that experienced shocks. At the household level, the interpretation of *pull* factors is more straightforward as I compare households that host new members to households that do not and I will be able to tell whether certain characteristics, and in particular shocks, drive households to bring in new members.

## 4.2 The Impact of Shocks on Transfers

Theoretically, a household has two ways to grasp part of a positive shock on another household: either receive transfers from it or send it individuals. Symmetrically, a household can obtain help from another household mainly through receiving remittances or sending him dependents. Along with my study of movements, I examine whether income shocks also impact transfers sent and received by individuals and households.

I carry a large study that covers all individuals, regardless of whether they can be considered as migrants, *i.e.*, I also include individuals that never changed residence, and I see whether the amounts of transfers they send or receive are influenced by their experiencing shocks. Just as I did

not restrict the individuals entering or leaving a given household to be close relatives of household members, I do not restrict transfers to transfers sent to or received from individuals who are more likely to be in the origin household, e.g. the parents.

As transfers have already been studied widely, I examine them only to complete the picture of household economic events in relationship with his external private network, where a network is defined very broadly and loosely as all the individuals who are not household members and who know a household member. I view shocks and movements in two separate parts: transfers sent by the household and arrivals in the household, in particular after positive shocks, on the one hand; movements out of the household and transfers received by the household on the other hand. I have already explained why I want to compare the impact of shocks on arrivals and transfers sent out, since these are the two means through which a household's network may benefit from the household's positive shocks. Symmetrically, for a given household, receiving transfers and sending individuals are the two ways through which he can benefit from external resources.

The PSF survey did not collect net transfers but collected, for each household member, the transfers he sent separately from the transfers he received. I estimate them separately also because the networks helping and being helped may be different. In a classic informal insurance framework, one would expect these two networks to overlap for the insurance to be viable and for enforcement to take place. Network members would have to help in a given period in order to get help in a later period. However, with income and occupational mobility, individuals changing location or job may join new networks that help them in hard times while at the same time keeping strong links with their network *of origin*. Individuals may still send transfers to their network of origin for aims other than insurance, ranging from pure altruism to strategic behavior with view of inheritance.

Accordingly, I estimate:

$$TransferSent^{06}_i = \max\{0, \gamma_1 PositiveShock^{04/05}_h + \gamma_2 NegativeShock^{04/05}_h + \gamma_3 X_i + \gamma_4 X_h + u_i\} \quad (3)$$

$$TransferReceived^{06}_i = \max\{0, \delta_1 PositiveShock^{04/05}_h + \delta_2 NegativeShock^{04/05}_h + \delta_3 X_i + \delta_4 X_h + v_i\} \quad (4)$$

I estimate an equivalent model for households. As many households and individuals do not receive

transfers (42% and 88% respectively), I want to correct for the fact that the distribution of transfers has a large mass at 0. Moreover, individuals or households sending transfers may in fact want to send negative transfers. For these two reasons, I allow estimation with a censored tobit model. For transfers received, it is less obvious why I would allow censoring on economic grounds, unless transfers received create obligations for households to send transfers in a later period. However, given also a large mass at 0, I estimate them with a censored model. Lastly, I allow for intra-household correlation of the  $u_i$  and  $v_i$ .

In terms of specification, some explanatory variables differ from the specifications for movements: because transfers are measured in the twelve months before the survey, i.e. in a period starting between December 2005 and March 2006, depending on the month of interview, I control for household characteristics in 2006 and not in 2003. However, to follow a similar methodology as for departures, I restrict observations to individuals who were household members in 2004, *i.e.* before the shocks occurred. Doing so allows not to mix the impact of shocks on arrivals and the possibly different behavior of new members with respect to transfers sent.

## 5 Results

### 5.1 Migration

#### 5.1.1 Household-Level Results: Arrivals and Departures

The results for arrivals and departures at the household level are in table 3. For departures, I must be cautious since I cannot restrict the estimates to samples for which recall bias may be small. I only show the results for departures in order to compare with individual level estimates and to have a reference when I examine transfers received by the household in response to shocks, in the next section. I find no impact of income shocks with these household-level estimates, in either area. In addition, mainly household demographic characteristics seem to affect movements. I will come back to this and compare the variables impacting movements with the variables impacting transfers at the household level. At this stage, it seems that movements may necessitate a more disaggregated examination, to which I turn in the next sections.



### 5.1.2 Individual-Level Results: Arrivals

#### *Average Impact, Fostering and Marriage*

Positive and negative income shocks impact arrivals but in a heterogeneous way, across age, sex and residential sector. On average, they do not seem to have an impact, as can be seen in column (1) of table 6, as well as in the more parsimonious specification of column (2). It is important to notice that the point estimate in column (2), for positive shocks, is less than a third that in column (1), so I will have to be careful in checking the robustness of the results.

In columns (3) and (4) of table 6, I focus on groups for whom I expect shocks to have a specific impact. First, I expect children whose parents are outside the household to be more likely to enter the household after positive shocks. Column (3) shows that children without parents in the household are more likely to enter the household than children with their parents in, and in particular children of the household head. However, they are not more likely to enter after positive shocks. In fact, positive shocks seem to attract exclusively children of household members.<sup>19</sup> I return to examining the arrivals of children later.

Given two other traditions, patrilocality and *bride price*, I also expect a woman whose husband lives in the household to be more likely to move in after positive income shocks. As seen with descriptive statistics, movers may be recent brides or women married for a while but who had been staying away from their husband, which I expect to be due to financial constraints, including housing problems. First, even without shocks, women with husbands in the households should be more likely to move in. In fact, the fact of having a husband in the household does not come up as significant.<sup>20</sup> In addition, in column (4), women married in the household do not seem to be more likely to arrive after positive shocks. Neither do they seem less likely to enter after negative shocks. So it does not seem that positive shocks are used to pay the bride price or to bring the bride in the household. In fact, only females not married with someone in the household seem more likely to enter the

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19. The coefficient on the interaction of positive shocks with the fact of being a child is positive and significant. Its sum with the coefficient on positive shocks is significantly different from 0, indicating more entries for children of household members after positive shocks. The coefficient on the interaction with having no parents in the household is of the same magnitude but opposite sign and the total effect of positive shocks for children with no parent in the household is 0

20. In addition, while 93% of the women who are married with a household member have no parent in the household and so, for most of them, calculating their likelihood of moving in necessitates taking into account the high 0.179 coefficient that applies to individuals without parents in the household, the sum with the dummy equal to one for women is not significantly different from 0.

household after positive income shocks.<sup>21</sup> I will come back to this later. As for individuals married in the household, the only significant impact of shocks is that negative shocks decrease the entry of males with a wife in the household. This effect seems mainly to capture the return or entry of close relations to the household. 98% of the males married in the household are direct relations to the head. In addition, 20% of men married in the household and who did not live in the household continuously since birth mention that the household is their “usual place of residence” or that they returned to their original household. So, negative shocks seem to delay the entry or return of close relations. It is worth noting though that the results hold when the head of the household and his children are excluded from estimates.

Looking at the other explanatory variables at the household level, the only significant ones are linked to household composition. In particular, whether the household head went to school or whether he was working in 2003 do not seem to matter. Nor did his occupation matter in specifications not shown here. Likewise, individuals more educated or working do not seem more likely to enter the household. I also interacted the fact of working in 2003 with age and sex dummies and none of the interactions were significant. However, current enrollment matters. Being enrolled in school is negatively correlated with entering the household in 2005 and 2006. Of course, this is not a causal relationship since obviously current enrollment and movements are likely to be jointly determined but this correlation would go in the sense of Akresh (2008) who finds that fostered children are less likely to be enrolled in school than other children in the households that host them.

### *The Heterogenous Impact of Shocks*

In table 5, I disaggregate the impact of income shocks across sex, age and sector of residence to see whether the relatively limited impact of shocks I found is due to heterogeneity across groups. So far, negative shocks decrease the arrival of men only, married in the household, and positive shocks seem to have an impact only on females not married with someone in the household.

In the descriptive section, shocks seemed to have a more pervasive impact. 14% of the households that underwent positive income shocks declared welcoming, as a consequence, either a fostered child, a new spouse or an individual other than a spouse. Given that 30% of individuals who enter households do so without changing community, the changes due to shocks mentioned by households may be those not linked to migration. However, when I conduct estimates coding to 1 all recent entries, even when they did not imply migration, the results are unchanged. Another possible

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21. The test of the joint significance of the coefficients on positive shocks for women married in the household is not significant.

explanation for the limited impact of shocks in the estimates, compared to households' replies, could be the inclusion of explanatory variables. However, only a few of them are significant and I have seen that removing the controls seems to make the impact of positive shocks weaker. The fact that work and education outside of enrollment bear non significant coefficients also seems to contradict the results of the descriptive statistics where many movements, in particular of prime-age adults and adults, were linked to work and education.<sup>22</sup> However, for the 15-24 year-olds, I have also seen that the motivations to migrate differ strongly between movers to urban and to rural areas. I explore the heterogeneity of the impact of income shocks and of some other key variables in the next two tables where I examine urban-rural differences across age and gender. So far, estimations for the urban dummy are in line with descriptive statistics: urban areas do not seem to draw higher migration than rural areas.

Column (1) of table 5 examines differences in the impact of shocks along sector of residence, while columns (2) and (3) add interactions of urban status with age dummies, for males and females respectively. They both exclude individuals above 54 because, as they are only a few and mostly do not move, studying the responsiveness of their movements to shocks would make little sense. The sub-group affected by shocks would be too small to examine seriously any reaction to them through migration.<sup>23</sup> I display results separately for males and females to allow for an easy reading of the table, all the more as some explanatory variables other than shocks have different impacts for each gender. This table has slightly more parsimonious specification than table 6.<sup>24</sup> Columns (4) to (9) display robustness checks of the results of columns (2) and (3), with even more parsimonious specifications and region fixed effects.

The estimates display tremendous heterogeneity. In urban areas, only male movements are responsive to shocks while shocks seem to mostly impact female movements in rural areas. Urban households which faced negative income shocks are less likely to host males of age 0-14 while this is not true of rural households. The decrease in entry seems more likely to affect the 0-14 year-olds who are the children of the household head. When the household did not undergo negative income

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22. This does not seem to be due to lack of variability in the explanatory variables as, for instance, for men, only 50% of those aged between 15 and 24 work. The figures are 71% in rural areas and 38% in urban areas

23. The biggest subgroup in this age category is the one of 241 rural older females who is also the group moving most, with a rate of 2.4% and a non significant difference between households facing positive or negative shocks or no shocks. I must stress that, in this group, there are only 54 individuals with positive shocks

24. I have grouped the 3 variables of household head, spouse and child of the household head as they had very close coefficients in the estimates of table 6 and I have dropped the variables on the presence of a spouse in the household as I return to it in table 6. As this variable is missing for 144 observations, removing it increases the number of observations from 9628 in table 6 to 9772 in table 5.

shocks, the 0-14 year-olds entering in 2005 or 2006 are, at 20%, children of the household head while there are 0 such children when the household underwent negative shocks. However, the sample is small, with 46 and 10 observations respectively. To increase the sample size, I compare individuals moving in households which underwent a negative shock at any time between 2002 and 2006 with individuals moving in households that did not. Those households that witnessed shocks have fewer children of the head coming after negative shocks. However, they also have a higher number of grand-children entering.

Adult males, between 25 and 54, are more likely to enter urban households which experienced positive income shocks.<sup>25</sup> In terms of relationship to the household head, men moving in the 5 years before the survey to urban households do not differ depending on whether the household experienced a positive shock (there are 36 and 99 observations respectively). There is one difference in the motivation to move however: movements into households that experienced positive income shocks seem more likely to be related to employment, 40% vs. 30% respectively. I also find that they were more likely to be working before entering the households, compared to those not arriving after positive shocks as well as compared to those not moving. The respective figures are 84, 67 and 60%. On average however, whether someone is working in 2003 does not seem to increase entries, be it for individuals in urban or in rural households. At the time of the survey, the proportion working is almost the same for all three groups, still at 84% for movers after positive shocks, as in 2003, at 80% for movers not after positive shocks and non movers. An additional important information is that those arriving after positive shocks are not more likely to come from rural areas.

In rural households, arrivals are strongly responsive to positive shocks in the case of girls and adult women. I cannot detect any difference between adult females entering rural households depending on whether they did so after positive shocks or not, in terms of relationship to the household head, the fact of having their husband living in the household or having their children with them. I will return to female children in table 6.

Be it in urban or rural areas, for males or for females, adults of age 15-24 are not responsive to pull shocks when moving. And yet, they are the group for whom movements are likely to be investments, in education or to find work. I will examine in the next section whether they are more responsive to push factors, positive or negative. An interesting result however is that females in this

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25. Although the specific interaction of positive shocks with being aged between 25 and 54 and living in an urban area is not significant, the sum of the coefficients on positive income shocks for urban males in this age group, i.e. the sum of the coefficients on positive shocks, positive shocks in urban areas and both the latter interacted with the 25-54 age dummy, is significantly different from 0 and robust to all specifications.

age group are more likely to move to urban households than to rural households.

I ran all the regressions of table 5 examining the impact of shocks only for recent movers, i.e. individuals who entered the households within the past 10 years. The results of table 5 are confirmed.

Explanatory variables other than shocks also bear heterogeneous impacts. Being enrolled in school is negatively correlated with arrivals in rural areas both for males and females. The correlation looks much stronger for males but, for them, it is nil in urban areas, hinting towards their fostering to urban areas precisely for education, as seen in the descriptive statistics. In results not shown here, I obtain a complementary result when examining work at the time of the survey: prime-age adult males working are more likely to enter rural households while this correlation is zero in urban households, also hinting towards possible movements specifically for schooling. Movers to urban areas are also less likely to work in 2003. However, contrary to current work where the correlation was only true of males, this correlation is only true for girls and prime-age adult females.

### *Marriage and Fostering In Urban and Rural Areas*

Since I find that girls and adult women are more likely to move to rural households after positive income shocks while, in urban areas, boys are less likely to enter after negative income shocks and adult males more likely to enter after positive income shocks, I return to the estimates for fostering and marriage, presented in table 6, and run them again separating the urban and rural sectors. Table 6 displays the results, for the sample restricted to individuals older than 54. Columns (1) and (2) are equivalent to column (4) of table 6, with column (1) displaying the results for entries in rural households and column (2) displaying the results in urban households. Starting from column (4), I focus on fostering. Columns (3) and (4) are equivalent to column (3) of table 6, for the rural and urban sectors respectively and columns (5) to (7) present additional results on children.

For fostered children and married women, shocks play no role whatsoever in urban areas. The negative impact of negative shocks on the entry of boys in urban households that I saw in table 5 seems to be diluted once I add interactions of shocks with the presence of the parents.

The results of table 6 seem to hold for the rural sector. The lesser entry of adult males in households hit by negative shocks is confirmed. In rural areas, the proportion of men entering the household in 2005 or 2006 and mentioning that they returned to their original household is very high, at almost 50% and so this may explain why they are more sensitive to negative shocks than males in urban households.

As for children, I find, as in table 6 that those more likely to enter a rural household after a positive income shock are children with a parent in the household, as can be seen in column (3). In results not shown here, it seems that the correlations are stronger for children entering with other individuals in the household (although I do get into small samples with these estimates). However, columns (5) to (7) show that the impact of positive shocks holds mostly for girls, confirming previous results.<sup>26</sup> And, in fact, for them the impact of positive shocks is the same in magnitude whether they have a parent residing in the household or not. The only difference is the precision of the estimated impact.<sup>27</sup> The results are unchanged if I remove controls for household size.

Lastly, the mothers moving in without positive income shocks are more likely to be the wives of the household head while, after positive income shocks, they are more likely to be his daughters or daughters-in-law. This leads to an over-representation of grand-children among girls entering the household after positive income shocks, with figures of 37% and 16%. I confirm this in column (8) where I include an interaction between positive shocks and dummies for female grand-children. The impact of positive shocks only holds for female grandchildren.<sup>28</sup>

Besides grand-daughters, the proportion of girls who are “other relations” or have no family ties to the household head doubles in households which experienced positive income shocks. It is 31% for them versus 14% in households with no positive income shocks. This may be a hint towards girls coming in perhaps to help with domestic work and free adults to work in the fields or work themselves on the field in case of a positive shock on land (either land available for cultivation through inheritance or productivity shocks due to rainfall). However, in estimations not shown here, I did not find a specific impact for cultivator households and so it is difficult to draw a conclusion on the activities of these girls. An interesting finding, looking at descriptive statistics, is that, among the 0-14 year-olds, the proportion of girls is the same in households which experienced positive shocks and in households which did not. So, positive shocks seem to be used to equilibrate the numbers of boys and girls, and the movements of girls may be more sensitive to liquidity constraints than those of boys.

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26. In column (5) the  $\chi^2$  test on the joint significance of positive shocks for girls between 0 and 14 is significant at 1%.

27. When no parent lives in the household, the test on the joint significance of the coefficients is only significant at 12% but the magnitude of the sum of the partial effects (not show here) is very close to the partial effects for girls with their parents in.

28. The test of joint significance of positive income shocks for female grand-children is significant at 1% and the sum of the partial effects is 0.11 while, for male grand-children, the sum of the coefficients is not significantly different from 0.

### *Summary of Results on Arrivals*

Overall, I find significant differences between the urban and rural sectors. Urban areas do not attract, on average, more individuals than rural areas. However, the composition of the flows is very different in the two sectors and it also differs sizably along income shocks. Urban households with positive income shocks attract mainly adult males, moving for employment reasons. It is important to mention, in addition, that these males are not more likely to come from rural areas. On the other hand, in rural areas, I mainly see females, adults and children, moving in after positive shocks. They are partly adult females moving with their daughters and partly girls moving alone. Negative shocks decrease entries of boys in urban households and of adult males married with a household member in rural areas. The adult males are close relations to the household head. Among the boys less likely join urban households after negative shocks, the children of the household head seem over-represented, although the evidence is inconclusive given that I have small samples. So, negative shocks do seem to decrease relatively more arrivals of individuals close to the household while one may have expected the contrary. Households somewhat seem to have little control really on whom enters in them, except for close relations. Contrary to what I was expecting, urban households are not less connected to non close relations than rural households.

#### **5.1.3 Individual Level Results: Departures**

Now that I have looked at the impact of shocks on individual arrivals thoroughly, I turn to their impact on departures from the household. The PSF survey did not interview the households on former household members under 25 who are not children of a household member. In addition, given that households tend to *forget*, when interviewed, some former household members, I conduct the estimates of departures using mainly the sub-samples for which the recall bias is the lowest. As the sub-samples are smaller and by definition restricted to some categories, I am not able to test as many specifications for departures as for arrivals. As women are forgotten more than males, it is difficult to estimate their departures. One thing I am unable to do because of the recall bias, is to see whether, in a symmetry with positive shocks, young girls leave rural households in response to negative shocks, as they are typically forgotten by their households. Similarly, adult female children of the household head seem to be forgotten too. In rural areas, they are only a few and problems of recall seem acute for them: there are only 86 of them who have left a rural household in 2005 or 2006 while there are 150 females who are the children of their origin household head, coming from rural households and entering rural households. Second, in urban areas, the proportion of them leaving

is less than 2%.

Columns (1) and (2) of table 7 display the results respectively for arrivals and departures for the whole sample, while columns (3) to (9) focus on adult children of the household head on whom information was collected and for whom recall bias is lower. Table 8 focuses on children under 24 of household members. The specification is slightly different from that for arrivals as I do not have labor history for former household members and so do not control for work status in 2003.

### *Average Impact and Adult Children of the Household Head*

The first notable result in table 7 is that, while the coefficient on the female dummy is significant and negative in the whole sample estimates of column (2), it is no longer significant in other columns for departures (columns (4) to (6)) and is not significant either in table 8. What I have already discussed on recall bias is confirmed in estimates: while, looking at the whole sample, one may have the impression that females move less than males, I see, looking at the sub-samples where recall bias is lower, that, in fact, they are as likely to move as males. Women seem to be *forgotten* more than males by their former households.

The results in table 7 point towards a responsiveness of departures to negative income shocks. This result is weak on average, partly because standard errors are large, but seems to hold for urban males. For the whole sample, the positive impact of negative shocks on departures is not robust to the specification of column (5). In column (6), the interactions with urban status are not significant either. Starting from column (7), I focus on males, who are less likely to be forgotten, and find consistently that urban males are more likely to move after a negative shock.<sup>29</sup> The magnitudes of the partial effects vary considerably though, at 5.8 in column (7), 14.5 in column (8) and a huge 23.4 in column (9) which controls for region fixed effects, so I must be careful with the quantitative result.

In terms of other explanatory variables, the first result one may notice is the strong and negative coefficient on the urban dummy. However, given that the coefficient on the fact of not conducting agrarian activities is of opposite sign and close magnitude, out-migration is not lower in urban areas than in rural areas.<sup>30</sup> If I restrict the sample to rural areas, the negative coefficient on not

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29. Although the specific interaction of negative shocks with urban status is not significant in column (7), the total impact of negative shocks, i.e. adding the dummy on negative shocks is significant at 1%.

30. Despite not being systematically significant, the coefficient on the fact of not conducting agrarian activities always sums to 0 with the urban dummy



conducting agrarian activities is significant.<sup>31</sup> At the same time, male children of the household head seem to be more likely to leave households that comprise prime-age adults and adults. Putting together the latter results with results on non agrarian households may hint to surplus labor.

For the sample of arrivals mirroring that of departures, I examine individuals who have at least one parent outside of the household, with the additional restriction of being the child of the head of their original household, for those who arrived in the 5 years before the survey. Positive shocks increase arrivals for them. However, there is no specific impact for males in urban areas (we replicated column (9) for arrivals and did not find any significant impact). So it seems that adult males entering urban households after positive shocks are not predominantly children of the head of their original household.

### *Children Under 25 of All Household Members*

The sample of table 8 is restricted, in estimating departures, to children under 25 of current household members. The mirror sample for arrivals, in columns (1) and (3), is the group of individuals who have at least one parent alive outside of the household.<sup>32</sup> While I do not find any impact of shocks on arrivals, shocks do impact departures, with prime-age adults more likely to change community after a negative shock.<sup>33</sup> This result holds when controls for household composition are excluded, as in column (7). Columns (5) and (6) examine whether there are specific impacts of shocks for urban households or females and no such things emerge, except for a possible positive impact of positive shocks on the departures of prime-age rural males. However, this impact seems limited, as can be seen in columns (8) and (9).

In contrast to adult males of the household head, children of household members are less likely to leave households which do not conduct agrarian activities.<sup>34</sup> This result holds if I (quite imperfectly)

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31. I must bear in mind though, that, in this sample, there are only 53 individuals residing or coming from rural households not conducting agrarian activities.

32. The exact sample mirroring the sample on departures would be the sample of children who come from a household where at least one of their parents was residing. However, defining the sample in this way would restrict it to actual movers. Moreover, this information was only collected from individuals who entered the households in the five years before the survey and, even for them, it is missing in 25% of the cases.

33. Prime-age adults in this case are aged 15 to 21 in 2003, since the information I have is on children being under 24 at the time of the survey, in 2006.

34. This result seems driven by prime-age adult children who are not children of the household head. If I restrict the sample to children of the household head, the point estimate is still negative but much smaller and not significant. So, it seems that children of household members other than the household head are more likely to leave household which conduct agrarian activities.

attempt to control household income through including non food expenditures in the year of the survey. Therefore, agrarian activities do not seem to be capturing income. I cannot think of a particular interpretation for this result for which I must be careful anyway, given that only 58 rural households for this sample of prime-age adult rural children do not conduct agrarian activity. Another contrast with adult children of the household head is that the young children of household members are more likely to leave households where there are fewer prime-age adults.

### ***Summary of Results on Departures***

To sum up, contrary to arrivals in the household, which are both responsive to positive and negative income shocks, departures seem to be only responsive to negative shocks. Also in contrast with arrivals, children out-migration is not sensitive to shocks. I have examined the movements of adults who are close to the household: the children of the household head and the children of household members. I examined, in a regression not shown here, whether the 25-54 adult males not children of the household head are more likely to leave urban households after negative shocks. I cannot examine them seriously because they are typically in the category of the *forgotten*, all the more as urban households tend to forget household members more than rural households. But I expected them to be possibly pushed away by the household in hard times. I do not find any impact of negative shocks for them. In fact, I find that they are likely to leave rural households after negative shocks but not urban households. I do not find that they leave after positive shocks either. It is difficult to infer whether moving away after negative shocks is a protection or not. The fact that young children do not leave after negative shocks may hint towards the fact that staying is a protection but I cannot be sure of this given that preferences unrelated to risk management may be at play in this decision too. Lastly, while I have seen that prime-age children of household members may move after positive shocks, I have been unable to capture this result more precisely. While I would like to verify this through examining international migration, which is more costly and thus possibly more responsive to positive income shocks, the proportion and absolute numbers of people moving abroad over the sole years of 2005 and 2006 are too small to allow for any worthy investigation.

#### **5.1.4 Additional Robustness Checks**

As discussed previously, shocks as I measure them are designed to capture unanticipated changes in income. However, if more optimistic or welcoming households are more likely to declare positive

shocks and receive new household members, shocks would be capturing the effect of an unobserved variable of optimism and hospitality. To make sure that shocks do not capture unobserved characteristics, I control declarations of shocks by the household in additional years and I verify that arrivals in the years I measure are impacted by the shocks in the years that precede them. I repeat the estimates in columns (2) and (3) of table 5 adding, to the set of explanatory variables, shocks in 2002, 2003 and 2006. I group shocks in 2002 and 2003 as I do for shocks in 2004 and 2005. The results are displayed in table 9. They are similar to those of table 5. While the coefficient on the interaction of the 25-54 males and negative income shocks is significant, contrary to table 5, the impact of negative shocks for this group of adult rural males is in fact also not significant.

### *Summary of Results on Migration*

In the end, I do find the expected impact of negative shocks on departures. Children of household members between 15 and 24 leave their households after negative income shocks, both in urban and rural areas. On the other hand, male adult children of the household head only leave urban areas after negative shocks. The contribution of this paper is to examine the impact of positive shocks. I find sizable impacts and very different results in urban and rural households. While rural households host females, children and adults after positive shocks, urban households only host adult males after positive shocks. In an exact opposite picture, negative shocks decrease entries of boys in urban households while they decrease entries of adult married males in rural households.

## **5.2 Transfers**

### **5.2.1 Household-Level Results**

Table 10 shows the estimates at the household level for transfers sent (columns (1) to (5)) and received (columns (6) to (9)). For transfers sent, the impact of positive shocks shows up quite clearly, both in terms of total household transfers and in terms of transfers given per household member above 15. Moreover, the positive impact of positive shocks is true of urban and rural households. Negative shocks seem to decrease transfers given but the impact is only significant for total household transfers, in column (1). As for transfers received, no coefficient on shocks is significant.

Comparing the characteristics displayed in tables 10 and 3, very few variables seem to impact both transfers and movements. As already found at the individual level, it is mostly demographic

characteristics of the household which are correlated with movements, with more movements in households with 15-24 year-olds and more departures in households with children and adults. For transfers, a different group plays a role: comprising household members older than 55 increases transfers received and decreases transfers given. Besides demographic variables, the fact of conducting agrarian activities is the only variable significant for movements, only for departures in fact as households conducting agrarian activities are more likely to see departures. Households conducting agrarian activities are both less likely to send and receive transfers and this holds true if I restrict the sample to rural households. Most other explanatory variables seem to matter only in the case of transfers. Households whose head has some education are more likely to receive transfers, although this is offset when the head of the household works. The latter variable has a positive impact on transfers given in urban areas. Lastly, as can be expected, households headed by females receive more transfers and send fewer transfers.

### 5.2.2 Individual-Level Results

The results on the impact of shocks on transfers sent by household members are in table 11. In column (1), estimates are conducted on the whole sample while the rest of the table restricts estimates to household members older than 15. Only 2.73% of household members under 15 send out transfers and the estimates of columns (1) and (2) are quite close.

On average, income shocks do not seem to impact transfers sent. Similarly to movements, the impact of income shocks on transfers sent seems to be heterogeneous. However, the impact varies more across gender than along sector of residence. In column (2), the coefficients on the interactions with urban status are not significant. In terms of gender differences, a first important result is that women send larger transfers than men. In addition, column (3) shows that positive shocks only increase transfers given by males while negative shocks only decrease transfers given by females. The coefficient on the interaction between the female dummy and positive shocks is equal, in absolute value, to half the coefficient on the female dummy. These results are robust to excluding controls for household size and to including region fixed effects, in regressions not displayed here.

For males, the impact of positive shocks seems homogenous across age and sector of residence and is only weaker when interactions with age dummies or sector of residence are included, in column (4). Besides, I find that negative income shocks decrease transfers given by older urban males. In the case of females, the negative impact of negative shocks seems particularly strong for the 25-54

age group. More surprisingly, rural females in this age group also decrease transfers given after positive income shocks. I examined whether this result depended on whether the household hosted new members in 2005 and 2006, thinking of a possible substitution between transfers and arrivals, and in fact found that the decrease in transfers given is only true of households who did not receive new members. On the other hand, I also find that positive shocks increase transfers sent by older rural females, above 55, as can be seen in column (5), and this holds whether the household hosted new members or not. One possible explanation would be that older females in rural households are in charge of distributing the benefits of positive income shocks to the outside world. Positive shocks would then only be distributed outside by them, causing adult females to give smaller amounts. In fact, the negative impact of positive shocks for adult females only holds when they do not reside with older individuals and so my hypothesis does not seem true. The estimates also hold in the robustness checks of (6) to (9).

Lastly, in column (10), I restrict estimates to males and interact positive shocks with the fact of having at least a spouse in the household. The coefficient on this interaction is negative and its sum with the coefficient on positive shocks is not significantly different from zero. In another specification, I restricted the sample to married men and the results held too. Furthermore, if I do a similar regression but interact positive shocks with the fact of being married, the results are qualitatively the same but quantitatively slightly weaker. It so seems that single males are more likely to send transfers after positive shocks and that, among married men, those whose wives do not live in the same household, are also more likely to send transfers after positive shocks.

Turning to transfers received, in table 12, the impact of income shocks seems weak. Columns (3), (4) and (5) may point towards a positive impact of negative income shocks on transfers received by males. However, the standard errors are large and estimates imprecise. I have excluded prime age adult males together with children because they receive very few transfers, in particular in rural areas. For females, the impact of negative shocks is overall indistinct, except for older rural females for whom transfers received decrease after negative income shocks. Albeit with a somewhat large standard error, making it significant only at 10%, this surprising effect is robust to the specifications of columns (9) and (10). Positive shocks do not have any impact on transfers received. In particular, they do not decrease them.

As a summary, shocks impact mainly males in the expected way: positive shocks increase transfers sent out by males, and particularly males who are single or whose wife does not reside in their household. Negative shocks increase transfers males receive although this impact is weak. For

females, negative shocks decrease transfers sent and positive shocks increase transfers given by rural females. In addition, I find two unexpected impacts. Adult rural females aged between 25 and 54 decrease the amounts of transfers they give when they undergo positive shocks and older rural females receive fewer transfers after negative income shocks. These results are only true for women and hold with regional dummies that capture aggregate shocks. Thus, they do not seem to be driven by highly correlated shocks in rural areas, whereby adult females would decrease the transfers they give after positive shocks because the whole village may face a positive shock. In fact, these results almost hold even when I include village fixed-effects. At the household level, only positive shocks seem to have a robust impact, increasing transfers sent after positive shocks. So, overall, transfers received do not seem to increase with negative income shocks, except perhaps in the case of adult males. Households do not seem to receive much help in a pecuniary way. Negative shocks only allow older rural females to decrease the amount of transfers they give.

## Conclusion

In this paper, I have studied the impact of income shocks on migration and transfers. I have examined arrivals in households and departures from them as well transfers sent and received. In contrast, most previous studies focus on migration as a departure from a household of origin and potential subsequent remittances sent by the migrant. Alternatively, former studies have focused on particular groups, for instance fostered children or the movements of women at the time of marriage. I have adopted a broad approach, allowing for heterogeneous impact of shocks along age, sex and sector of residence. my approach is partly motivated by anecdotal evidence on households hosting new members regularly, including adult members, and changing structure. I have completed my analysis of movements with an examination of the impact of income shocks on transfers to have a comprehensive view of a household's relationships with other households, given that migration and transfers are the two main ways through which a household can receive help or provide support to other households.

In my analysis, I have paid particular attention to differences between the urban and rural sectors as labor markets function very differently in the two sectors, with predominant independent farms and absent labor markets in rural areas. In addition, urban areas offer infrastructures, such as schools, which may make them more attractive to some groups.

I find that shocks have multiple impacts, both in terms of movements and in terms of transfers.

The impacts are very heterogenous. In terms of arrivals in the household, there is a clear contrast between urban and rural areas, with adult males moving to urban households which faced positive shocks while positive shocks in rural areas bring in adult females and young girls. Contrary to what one might expect, urban households do not necessarily seem more detached from their networks than rural households. In terms of relationship to the household head, the adult males hosted after positive income shocks are not different from those not hosted after positive income shocks. They seem to be young active males looking for a job. Positive shocks may allow to finance their movements, which may also be an investment to take advantage of economies of scale in housing consumption. Another interpretation would be that households have more difficulty keeping relations away after positive shocks. In rural households, the females entering are a mix of close relations to the household head and less close relations. Adult females entering rural households after positive shocks are less likely to be the wife of the household head than adult females joining households that did not experience positive shocks. Yet, they are close relations to the household head, most likely his daughter or daughter-in-law. The girls, under 14 are split between close relations to the household head, for instance his grand-daughters, or girls with less close relations or no family relation.

Therefore, rural households do seem to use a good part of positive income shocks to bring in close relations. Somewhat symmetrically to this, rural households also seem less likely to see former male members return when they face negative income shocks. In urban areas, negative shocks only decrease entries of boys. It is interesting to see that positive shocks do not bring in adult males in rural households. This result deserves further investigation, related to the role of women in agriculture in Africa (Jacoby (1995)). As for departures, the expected role of negative shocks in spurring them is confirmed for prime-age adults both in urban and rural households and for adult children of the household head, in urban households. Positive shocks do not impact departures.

While one might consider the 15-24 year-olds as the group for whom movements may be investments (for work or for education), they are a little responsive to shocks. They receive very few transfers and their only movement is that of departure after negative shocks. Movements that are investments may imply a cost that is too high to be impacted by short-term shocks. Long-term factors may play a more important role in the movements of this age group. In particular, males currently enrolled in school are less likely to join rural households while this is not the case in urban households. For females, current enrollment, if anything, decreases the likelihood to enter the household in both areas.

If public transfers and positive income shocks induce changes in household composition that

are similar, the results of this paper bear important consequences for the design of public policies. Identical policies for urban and rural areas, for instance targeting young girls, may entail very different consequences. One may expect the arrival of adult males (in the case of urban areas) and of adult females and girls (in the case of rural areas) to have different consequences in terms of competition for and reallocation of resources. An extension of this work, going into more detailed examination of intra-household outcomes, would be to link movements with shocks affecting specific sub-groups in the household. In addition, if a second wave of the PSF survey is carried out, I will be able to examine the welfare impacts of these changes in household structure on the household and its sub-groups.

Transfers show much less contrast between urban and rural areas but a great contrast between males and females. Adult males increase transfers sent after positive income shocks and receive more transfers after negative income shocks, whether they reside in urban or rural areas. For females, insurance is only manifest through the decrease in transfers given by older rural females after negative income shocks. They do not seem to receive direct help after negative shocks, and this is despite the fact that they both receive and send more transfers than males. This may deserve more scrutiny possibly using the insights of the anthropological literature on norms for expenditures, which may also have implications in terms of transfers. In another paper (De Vreyer et al. (2009)), I examine who benefits from transfers received by a household member: whether it is only the household member and his closest relations in the household or whether the whole household may benefit. Symmetrically, it would be of interest to investigate the interactions between transfers given by household members.



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# Tables

	Arrivals		Departures	
	(1)	(2)	(3)	(4)
<i>PosShock</i> <sub>04/05</sub>	0.032 (0.105)	0.026 (0.14)	-.051 (0.113)	0.04 (0.145)
<i>NegShock</i> <sub>04/05</sub>	-.025 (0.088)	-.014 (0.118)	0.125 (0.092)	0.123 (0.123)
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>		0.017 (0.212)		-.237 (0.235)
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>		-.025 (0.176)		0.016 (0.185)
<i>HHHeadFemale</i>	0.132 (0.098)	0.134 (0.098)	0.137 (0.108)	0.129 (0.108)
<i>HHHeadSchool</i>	0.055 (0.089)	0.055 (0.089)	0.111 (0.096)	0.106 (0.096)
<i>HHHeadWorking</i> <sub>03</sub>	-.130 (0.151)	-.129 (0.151)	-.006 (0.161)	-.011 (0.162)
<i>HHHeadWorking</i> <sub>03</sub> * <i>Urban</i>	-.023 (0.186)	-.024 (0.186)	0.094 (0.203)	0.102 (0.204)
<i>Urban</i>	0.127 (0.186)	0.132 (0.196)	0.007 (0.209)	0.035 (0.219)
<i>NotAgrarianHH</i>	-.106 (0.124)	-.105 (0.124)	-.298 (0.134)**	-.300 (0.135)**
<i>HHNumber</i> <sub>0503</sub>	0.067 (0.028)**	0.068 (0.028)**	-.010 (0.029)	-.014 (0.03)
<i>HHNumber</i> <sub>61403</sub>	0.02 (0.022)	0.02 (0.022)	0.08 (0.023)***	0.079 (0.023)***
<i>HHNumber</i> <sub>152403</sub>	0.181 (0.024)***	0.181 (0.024)***	0.057 (0.025)**	0.059 (0.025)**
<i>HHNumber</i> <sub>255403</sub>	-.019 (0.031)	-.019 (0.031)	0.08 (0.032)**	0.082 (0.032)**
<i>HHNumber</i> <sub>5503</sub>	0.058 (0.054)	0.058 (0.054)	-.038 (0.059)	-.039 (0.059)
<i>Cons</i>	-1.010 (0.236)***	-1.015 (0.242)***	-1.119 (0.249)***	-1.131 (0.255)***
N. Obs.	1466	1466	1466	1466
$\chi^2$ -stat.	124.538	124.565	64.72	65.766
Pseudo-R <sup>2</sup>	0.084	0.084	0.054	0.054

Table 3: Impact of Income Shocks on Arrivals and Departures - Household Level Estimates

	(1)	(2)	(3)	(4)
<i>PosShock</i> <sub>04/05</sub>	0.125 (0.098)	0.042 (0.085)	-0.116 (0.159)	-0.049 (0.142)
<i>NegShock</i> <sub>04/05</sub>	-0.096 (0.083)	-0.096 (0.068)	-0.094 (0.082)	-0.0009 (0.115)
<i>PosShock</i> <sub>04/05</sub> * <i>NoParentInHH</i>			0.225 (0.187)	
<i>PosShock</i> <sub>04/05</sub> * <i>NoParentInHH</i> * <i>Age</i> <sub>014<sub>03</sub></sub>			-0.712 (0.283)**	
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> <sub>014<sub>03</sub></sub>			0.527 (0.175)***	
<i>PosShock</i> <sub>04/05</sub> * <i>SpouseinHH</i>				0.021 (0.216)
<i>PosShock</i> <sub>04/05</sub> * <i>SpouseinHH</i> * <i>F</i>				-0.206 (0.288)
<i>NegShock</i> <sub>04/05</sub> * <i>SpouseinHH</i>				-0.657 (0.246)***
<i>NegShock</i> <sub>04/05</sub> * <i>SpouseinHH</i> * <i>F</i>				0.551 (0.284)*
<i>PosShock</i> <sub>04/05</sub> * <i>F</i>				0.379 (0.169)**
<i>NegShock</i> <sub>04/05</sub> * <i>F</i>				-0.033 (0.145)
<i>HHHeadSpouse</i>	-0.644 (0.136)***	-0.667 (0.09)***	-0.651 (0.137)***	-0.652 (0.136)***
<i>HHHeadChild</i>	-0.620 (0.1)***	-0.816 (0.063)***	-0.618 (0.1)***	-0.618 (0.1)***
<i>SpouseinHH</i>	0.056 (0.123)		0.066 (0.124)	0.23 (0.14)*
<i>SpouseinHH</i> * <i>Female</i>	-0.102 (0.153)		-0.101 (0.152)	-0.204 (0.179)
<i>NoParentInHH</i>	0.179 (0.1)*		0.14 (0.104)	0.187 (0.1)*
<i>NoParentInHH</i> * <i>Age</i> <sub>014<sub>03</sub></sub>	0.559 (0.127)***		0.724 (0.139)***	0.562 (0.127)***
<i>Female</i>	-0.063 (0.069)	-0.025 (0.052)	-0.067 (0.069)	-0.131 (0.091)
<i>School</i>	0.005 (0.077)		0.005 (0.077)	0.004 (0.078)
<i>SchoolEnrolled</i>	-0.182 (0.089)**		-0.189 (0.09)**	-0.177 (0.089)**
<i>Working</i> <sub>03</sub>	-0.096 (0.065)		-0.089 (0.065)	-0.096 (0.065)
<i>HHHeadSchool</i>	-0.036 (0.077)	0.037 (0.067)	-0.034 (0.076)	-0.041 (0.076)
<i>HHHeadWorking</i> <sub>03</sub>	0.005 (0.081)		0.002 (0.081)	0.006 (0.082)
<i>Urban</i>	0.052 (0.098)	-0.002 (0.068)	0.052 (0.099)	0.048 (0.098)
<i>NotAgrarianHH</i>	-0.017 (0.108)		-0.018 (0.108)	-0.005 (0.108)
<i>HHNumber</i> <sub>05<sub>03</sub></sub>	0.033 (0.018)*		0.031 (0.018)*	0.033 (0.018)*
<i>HHNumber</i> <sub>614<sub>03</sub></sub>	-0.017 (0.019)		-0.016 (0.019)	-0.015 (0.019)
<i>HHNumber</i> <sub>1524<sub>03</sub></sub>	0.036 (0.021)*		0.036 (0.02)*	0.037 (0.021)*
<i>HHNumber</i> <sub>2554<sub>03</sub></sub>	-0.058 (0.023)**		-0.057 (0.023)**	-0.058 (0.023)**
<i>HHNumber</i> <sub>55<sub>03</sub></sub>	-0.011 (0.049)		-0.014 (0.049)	-0.015 (0.049)
<i>Cons</i>	-1.731 (0.267)***	-1.214 (0.089)***	-1.680 (0.267)***	-1.749 (0.271)***
$\chi^2$ -stat.	341.433	233.625	328.18	362.66
Pseudo-R <sup>2</sup>	0.141	0.091	0.144	0.146
N. Obs.	9628	11978	9628	9628

NOTES - Additional controls: Age dummies for the 0-14, 15-24 and 2554 year-olds.

Table 4: Impact of income shocks on individual entries in the household in 2005 and 2006

	All	Males	Females	Males	Females	Males	Females	Males	Females
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>PosShock</i> <sub>04/05</sub>	0.171 (0.121)	0.052 (0.234)	0.663 (0.168)***	0.189 (0.223)	0.711 (0.174)***	0.065 (0.214)	0.568 (0.165)***	0.162 (0.205)	0.644 (0.169)***
<i>NegShock</i> <sub>04/05</sub>	-0.098 (0.105)	0.105 (0.185)	-0.162 (0.17)	0.155 (0.19)	-0.229 (0.162)	0.086 (0.173)	-0.145 (0.162)	0.168 (0.182)	-0.175 (0.152)
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>	-0.113 (0.17)	0.137 (0.368)	-0.930 (0.341)***	0.005 (0.385)	-0.912 (0.362)**	0.283 (0.344)	-0.982 (0.328)***	0.176 (0.356)	-0.963 (0.331)***
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>	-0.037 (0.146)	-0.515 (0.276)*	0.133 (0.29)	-0.573 (0.277)**	0.132 (0.292)	-0.429 (0.258)*	0.082 (0.27)	-0.539 (0.262)**	0.052 (0.268)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>		-0.243 (0.368)	-0.892 (0.231)***	-0.376 (0.389)	-0.881 (0.235)***	-0.360 (0.356)	-0.828 (0.233)***	-0.499 (0.367)	-0.830 (0.236)***
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>		-0.513 (0.316)	0.139 (0.24)	-0.699 (0.335)**	0.14 (0.24)	-0.398 (0.297)	0.128 (0.229)	-0.566 (0.31)*	0.117 (0.231)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>		-0.475 (0.564)	1.149 (0.42)***	-0.381 (0.581)	1.111 (0.448)**	-0.530 (0.548)	1.118 (0.399)***	-0.401 (0.566)	1.062 (0.41)***
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>		0.908 (0.445)**	-0.042 (0.402)	1.047 (0.461)**	-0.028 (0.409)	0.741 (0.423)*	-0.043 (0.367)	0.912 (0.433)**	-0.011 (0.375)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>		-0.184 (0.262)	-0.287 (0.226)	-0.281 (0.281)	-0.254 (0.244)	-0.177 (0.251)	-0.156 (0.211)	-0.247 (0.272)	-0.129 (0.228)
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>		-0.215 (0.244)	0.043 (0.231)	-0.349 (0.274)	0.039 (0.233)	-0.229 (0.236)	0.028 (0.221)	-0.370 (0.27)	-0.015 (0.217)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>		0.632 (0.437)	0.603 (0.563)	0.796 (0.467)*	0.699 (0.587)	0.407 (0.422)	0.452 (0.543)	0.527 (0.45)	0.481 (0.564)
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>		0.406 (0.454)	0.042 (0.403)	0.435 (0.48)	0.119 (0.404)	0.376 (0.416)	-0.068 (0.377)	0.445 (0.444)	0.03 (0.376)
<i>Age</i> 014 <sub>03</sub>	0.679 (0.143)***	-0.546 (0.323)*	-0.401 (0.25)	-0.679 (0.359)*	-0.464 (0.278)*	-0.616 (0.32)*	-0.355 (0.231)	-0.751 (0.35)**	-0.485 (0.254)*
<i>Age</i> 1524 <sub>03</sub>	0.827 (0.145)***	0.413 (0.36)	-0.171 (0.235)	0.607 (0.378)	-0.157 (0.242)	0.497 (0.337)	-0.101 (0.225)	0.647 (0.341)*	-0.111 (0.231)
<i>Age</i> 014 <sub>03</sub> * <i>Urban</i>		0.442 (0.427)	0.802 (0.37)**	0.602 (0.457)	0.854 (0.39)**	0.502 (0.412)	0.834 (0.325)**	0.622 (0.436)	0.963 (0.344)***
<i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>		-0.064 (0.443)	0.883 (0.317)***	-0.224 (0.457)	0.895 (0.325)***	-0.156 (0.407)	0.94 (0.292)***	-0.277 (0.41)	0.972 (0.302)***
<i>School</i>	0.062 (0.078)	-0.052 (0.118)	0.136 (0.098)	-0.107 (0.12)	0.093 (0.101)	-0.136 (0.115)	0.098 (0.094)	-0.212 (0.114)*	0.048 (0.096)
<i>SchoolEnrolled</i>	-0.396 (0.143)***	-0.649 (0.208)***	-0.258 (0.166)	-0.719 (0.205)***	-0.329 (0.162)**	-0.675 (0.207)***	-0.294 (0.163)*	-0.741 (0.199)***	-0.351 (0.165)**
<i>SchoolEnrolled</i> * <i>Urban</i>	0.29 (0.152)*	0.64 (0.241)***	-0.023 (0.217)	0.685 (0.238)***	0.066 (0.214)	0.609 (0.234)***	-0.008 (0.205)	0.666 (0.227)***	0.059 (0.209)
<i>Urban</i>	0.129 (0.156)	-0.360 (0.391)	-0.531 (0.354)	-0.505 (0.42)	-0.718 (0.394)*	-0.440 (0.377)	-0.688 (0.318)**	-0.442 (0.395)	-0.888 (0.354)**
<i>Working</i> <sub>03</sub>	0.046 (0.084)	-0.071 (0.231)	0.038 (0.179)	-0.067 (0.224)	-0.018 (0.197)	-0.138 (0.229)	0.027 (0.165)	-0.119 (0.22)	-0.089 (0.177)
<i>Working</i> <sub>03</sub> * <i>Urban</i>	-0.304 (0.119)**	-0.715 (0.563)	-0.905 (0.529)*	-0.537 (0.554)	-0.851 (0.55)	-0.371 (0.452)	-0.920 (0.512)*	-0.374 (0.426)	-0.800 (0.53)
<i>Working</i> <sub>03</sub> * <i>Age</i> 1524 <sub>03</sub>		-0.011 (0.327)	0.437 (0.277)	-0.259 (0.346)	0.404 (0.296)	-0.150 (0.315)	0.483 (0.256)*	-0.346 (0.328)	0.46 (0.276)*
<i>Working</i> <sub>03</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>		0.456 (0.632)	0.032 (0.61)	0.498 (0.643)	0.052 (0.638)	0.222 (0.538)	0.0001 (0.575)	0.383 (0.528)	0.007 (0.597)
<i>Working</i> <sub>03</sub> * <i>Age</i> 2554 <sub>03</sub>		-0.033 (0.339)	-0.413 (0.27)	-0.170 (0.351)	-0.562 (0.287)*	-0.076 (0.327)	-0.363 (0.252)	-0.225 (0.33)	-0.487 (0.265)*
<i>Working</i> <sub>03</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>		0.856 (0.66)	1.214 (0.612)**	0.805 (0.66)	1.280 (0.63)**	0.594 (0.554)	1.449 (0.591)**	0.722 (0.538)	1.518 (0.608)**
<i>NotAgrarianHH</i>	-0.013 (0.108)	-0.087 (0.132)	0.115 (0.146)	0.061 (0.161)	0.107 (0.172)	-0.096 (0.123)	0.081 (0.129)	0.079 (0.148)	0.088 (0.149)
Regions FE	NO	NO	NO	YES	YES	NO	NO	YES	YES
Controls for HH size	YES	YES	YES	YES	YES	NO	NO	NO	NO
$\chi^2$ -stat.	337.753	215.021	297.142	323.905	462.771	225.424	328.183	343.845	462.178
Pseudo-R <sup>2</sup>	0.138	0.167	0.177	0.216	0.212	0.172	0.165	0.221	0.203
N. Obs.	9772	4190	4685	3867	4426	4788	5338	4548	5222

NOTES - Additional controls: Age Dummies for the 2554 year-olds, female (in column(1)), Presence of the parents in the HH and its interaction with Age 0-14 and urban status, HH head or spouse or child, Female HH head, HH head working in 2003 and educated.

Table 5: Heterogeneity in the impact of income shocks on individuals entering the household in 2005 or 2006

	Rural	Urban	Rural	Urban	All	Males	Females	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>PosShock</i> <sub>04/05</sub>	-0.146 (0.201)	0.235 (0.175)	-0.201 (0.212)	-0.016 (0.275)	-0.233 (0.265)	-0.204 (0.263)	-0.115 (0.375)	-0.259 (0.164)
<i>NegShock</i> <sub>04/05</sub>	0.062 (0.163)	-0.144 (0.151)	-0.124 (0.17)	0.177 (0.207)	-0.110 (0.114)	-0.164 (0.138)	-0.074 (0.141)	-0.100 (0.11)
<i>PosShock</i> <sub>04/05</sub> * <i>SpouseinHH</i>	0.024 (0.294)	0.004 (0.316)						
<i>PosShock</i> <sub>04/05</sub> * <i>SpouseinHH</i> * <i>Female</i>	-0.310 (0.379)	0.116 (0.508)						
<i>NegShock</i> <sub>04/05</sub> * <i>SpouseinHH</i>	-0.818 (0.303)***	-0.125 (0.422)						
<i>NegShock</i> <sub>04/05</sub> * <i>SpouseinHH</i> * <i>Female</i>	0.71 (0.376)*	-0.022 (0.37)						
<i>PosShock</i> <sub>04/05</sub> * <i>NoParentInHH</i>			0.239 (0.255)	0.271 (0.321)	0.122 (0.402)	0.013 (0.371)	0.259 (0.404)	
<i>PosShock</i> <sub>04/05</sub> * <i>NoParentInHH</i> * <i>Age014</i> <sub>03</sub>			-0.736 (0.376)*	-0.301 (0.48)	-0.715 (0.538)	-0.580 (0.525)	-0.727 (0.523)	
<i>PosShock</i> <sub>04/05</sub> * <i>Age014</i> <sub>03</sub>			0.747 (0.218)***	0.127 (0.387)	0.363 (0.288)	0.379 (0.285)	0.988 (0.373)***	
<i>NegShock</i> <sub>04/05</sub> * <i>NoParentInHH</i>			-0.012 (0.212)	-0.228 (0.251)				
<i>NegShock</i> <sub>04/05</sub> * <i>NoParentInHH</i> * <i>Age014</i> <sub>03</sub>			0.355 (0.342)	-0.166 (0.386)				
<i>NegShock</i> <sub>04/05</sub> * <i>Age014</i> <sub>03</sub>			-0.076 (0.235)	-0.175 (0.291)				
<i>PosShock</i> <sub>04/05</sub> * <i>NoParentInHH</i> * <i>F</i>					0.075 (0.601)			
<i>PosShock</i> <sub>04/05</sub> * <i>NoParentInHH</i> * <i>Age014</i> <sub>03</sub> * <i>F</i>					-0.022 (0.73)			
<i>PosShock</i> <sub>04/05</sub> * <i>Age014</i> <sub>03</sub> * <i>F</i>					0.551 (0.463)			
<i>PosShock</i> <sub>04/05</sub> * <i>Female</i>	0.631 (0.224)***	-0.378 (0.321)			0.158 (0.475)			0.512 (0.194)***
<i>NegShock</i> <sub>04/05</sub> * <i>Female</i>	-0.123 (0.21)	0.236 (0.199)						
<i>PosShock</i> <sub>04/05</sub> * <i>HHHeadGdChild</i> * <i>Female</i>								0.182 (0.459)
<i>PosShock</i> <sub>04/05</sub> * <i>HHHeadGdChild</i>								0.757 (0.444)*
<i>HHHeadGdChild</i> * <i>Female</i>								0.399 (0.365)
<i>HHHeadGdChild</i>								-0.624 (0.283)**
<i>SpouseinHH</i>	0.144 (0.177)	0.344 (0.205)*	-0.116 (0.15)	0.287 (0.172)*	-0.336 (0.17)**	-0.352 (0.188)*	0.073 (0.155)	-0.160 (0.15)
<i>SpouseinHH</i> * <i>Female</i>	-0.157 (0.22)	-0.158 (0.198)	-0.010 (0.167)	-0.177 (0.161)	0.337 (0.23)			0.084 (0.172)
<i>NoParentInHH</i>	0.17 (0.132)	0.129 (0.14)	0.103 (0.179)	0.053 (0.138)	0.296 (0.213)	0.295 (0.215)	-0.028 (0.218)	0.167 (0.13)
<i>Female</i>	-0.203 (0.167)	-0.024 (0.095)	-0.082 (0.107)	0.034 (0.083)	-0.342 (0.225)			-0.324 (0.124)***
<i>Age014</i> <sub>03</sub>	-0.229 (0.151)	0.003 (0.173)	-0.426 (0.205)**	-0.032 (0.167)	-0.593 (0.219)***	-0.295 (0.393)	0.123 (0.343)	0.272 (0.234)
<i>NoParentInHH</i> * <i>Age014</i> <sub>03</sub>	0.496 (0.183)***	0.689 (0.182)***	0.581 (0.28)**	0.866 (0.203)***	0.558 (0.28)**	0.62 (0.281)**	0.748 (0.318)**	0.525 (0.18)***
<i>NoParentInHH</i> * <i>Age014</i> <sub>03</sub> * <i>Female</i>					0.212 (0.421)			
<i>Age014</i> <sub>03</sub> * <i>Female</i>					0.229 (0.303)			
<i>Cons</i>	-1.457 (0.356)***	-0.891 (0.338)***	-1.317 (0.344)***	-0.476 (0.343)	-1.206 (0.347)***	-1.179 (0.565)**	-2.305 (0.451)***	-1.789 (0.391)***
N. Obs.	4369	4506	4369	5327	4369	2226	2554	4780
$\chi^2$ -stat.	245.797	212.196	191.853	271.262	278.493	121.343	210.968	231.43
Pseudo-R <sup>2</sup>	0.155	0.176	0.151	0.208	0.163	0.189	0.182	0.162

NOTES - Additional controls: Dummies for work status in 2003, current school enrollment and the household not conducting agrarian activities.

Table 6: Who Enters in Rural Households After Positive Income Shocks?



	All		Children Older than 25 of HH Head						
	Arrivals	Departures	Arrivals	Males			Males	Males	
				Departures					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
<i>PosShock</i> <sub>04/05</sub>	0.116 (0.089)	-0.030 (0.097)	0.318 (0.184)*	0.255 (0.289)	0.005 (0.242)	0.277 (0.385)	0.475 (0.415)	-0.095 (0.369)	0.104 (0.44)
<i>NegShock</i> <sub>04/05</sub>	-0.076 (0.076)	0.083 (0.08)	-0.112 (0.172)	0.511 (0.284)*	0.326 (0.236)	0.418 (0.368)	0.444 (0.437)	-0.114 (0.386)	-0.598 (0.407)
<i>PosShock</i> <sub>04/05 * Urban</sub>						-0.036 (0.49)	-0.199 (0.656)	-0.028 (0.576)	-0.122 (0.816)
<i>NegShock</i> <sub>04/05 * Urban</sub>						0.276 (0.439)	0.814 (0.545)	0.947 (0.458)**	1.254 (0.507)**
<i>Female</i>	-0.12 (0.053)	-0.175 (0.06)***	-0.493 (0.156)***	-0.049 (0.195)	-0.240 (0.193)	-0.049 (0.194)			
<i>School</i>	-0.161 (0.066)**	0.084 (0.085)	-0.179 (0.216)	-0.003 (0.242)	-0.082 (0.203)	-0.030 (0.242)	0.311 (0.324)	0.031 (0.244)	0.225 (0.302)
<i>HHHeadFemale</i>	0.18 (0.084)**	0.165 (0.093)*	0.173 (0.193)	-0.067 (0.287)	-0.164 (0.232)	-0.086 (0.287)	-0.377 (0.417)	-0.321 (0.294)	-0.557 (0.32)*
<i>HHHeadSchool</i>	0.033 (0.071)	-0.038 (0.088)	0.15 (0.195)	0.411 (0.247)*	0.284 (0.231)	0.408 (0.246)*	0.009 (0.314)	-0.017 (0.276)	0.345 (0.363)
<i>HHHeadWorking</i> <sub>03</sub>	0.052 (0.11)	-0.008 (0.128)	0.579 (0.31)*	-0.075 (0.338)	-0.155 (0.319)	-0.084 (0.34)	-0.405 (0.399)	-0.287 (0.363)	0.149 (0.412)
<i>HHHeadWorking</i> <sub>03 * Urban</sub>	-0.068 (0.135)	0.048 (0.165)	-0.680 (0.378)*	-0.445 (0.469)	-0.264 (0.429)	-0.493 (0.452)	-0.154 (0.554)	-0.087 (0.488)	-0.914 (0.539)*
<i>Urban</i>	0.093 (0.131)	-0.039 (0.161)	0.564 (0.346)	-0.877 (0.373)**	-0.498 (0.359)	-0.995 (0.373)***	-1.553 (0.455)***	-0.789 (0.421)*	-0.573 (0.644)
<i>NotAgrarianHH</i>	0.036 (0.098)	-0.152 (0.125)	-0.009 (0.201)	0.706 (0.388)*	0.303 (0.351)	0.699 (0.396)*	1.049 (0.464)**	0.383 (0.393)	0.99 (0.46)**
<i>HHNumber</i> <sub>0503</sub>	0.023 (0.017)	-0.038 (0.024)	0.026 (0.049)	-0.161 (0.112)		-0.165 (0.114)	-0.422 (0.127)***		
<i>HHNumber</i> <sub>61403</sub>	-0.024 (0.017)	0.019 (0.017)	0.013 (0.035)	0.017 (0.052)		0.02 (0.054)	0.058 (0.053)		
<i>HHNumber</i> <sub>152403</sub>	0.044 (0.021)**	-0.045 (0.02)**	0.076 (0.044)*	0.061 (0.05)		0.061 (0.049)	0.112 (0.063)*		
<i>HHNumber</i> <sub>255403</sub>	-0.036 (0.02)*	0.041 (0.024)*	-0.018 (0.049)	0.036 (0.057)		0.037 (0.058)	0.178 (0.066)***		
<i>HHNumber</i> <sub>5503</sub>	0.045 (0.047)	-0.004 (0.046)	-0.010 (0.116)	0.002 (0.131)		-0.002 (0.129)	-0.115 (0.17)		
<i>Cons</i>	-2.219 (0.238)***	-2.492 (0.315)***	-1.341 (0.622)**	-2.202 (0.911)**	-1.408 (0.727)*	-2.129 (1.016)**	-2.848 (1.019)***	-1.178 (0.897)	-3.549 (1.293)***
Regions FE	NO	NO	NO	NO	NO	NO	NO	NO	YES
Controls for HH Size	YES	YES	YES	YES	NO	YES	NO	YES	
N. Obs.	10043	10023	1665	720	853	720	445	522	309
$\chi^2$ -stat.	86.763	81.409	32.562	33.217	23.576	32.441	56.706	23.25	38.712
Pseudo-R <sup>2</sup>	0.04	0.04	0.112	0.133	0.073	0.132	0.2	0.07	0.239

NOTES - Additional controls: Age Dummies in columns (1) and (2). Age in the rest of the table.

Table 7: Impact of shocks in 2004 or 2005 on Departures of Household Members in 2005 or 2006 - Adult Children of the Household Head

	Arrivals	Departures	Arrivals	Departures	Departures				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Males (9)
<i>PosShock</i> <sub>04/05</sub>	0.134 (0.129)	-.022 (0.122)	-.058 (0.164)	0.151 (0.19)	0.256 (0.239)	0.327 (0.228)	0.09 (0.179)	0.485 (0.304)	0.378 (0.277)
<i>NegShock</i> <sub>04/05</sub>	-.023 (0.094)	0.053 (0.098)	-.029 (0.145)	0.375 (0.153)**	0.281 (0.203)	0.346 (0.199)*	0.279 (0.147)*	0.391 (0.268)	0.228 (0.245)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> <sub>01403</sub>			0.199 (0.216)	-.229 (0.217)	-.288 (0.259)	-.479 (0.286)*	-.127 (0.202)	-.599 (0.352)*	-.502 (0.323)
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> <sub>01403</sub>			0.017 (0.185)	-.433 (0.164)***	-.367 (0.216)*	-.412 (0.22)*	-.360 (0.156)**	-.563 (0.296)*	-.373 (0.269)
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>					-.512 (0.395)			-.419 (0.461)	-.368 (0.433)
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>					0.221 (0.3)			-.037 (0.39)	0.04 (0.357)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> <sub>01403</sub> * <i>Urban</i>					0.295 (0.514)			0.289 (0.636)	0.549 (0.542)
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> <sub>01403</sub> * <i>Urban</i>					-.080 (0.341)			0.42 (0.436)	0.238 (0.399)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> <sub>01403</sub> * <i>Female</i>						0.593 (0.381)			
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> <sub>01403</sub> * <i>Female</i>						-.037 (0.328)			
<i>PosShock</i> <sub>04/05</sub> * <i>Female</i>						-.453 (0.342)			
<i>NegShock</i> <sub>04/05</sub> * <i>Female</i>						0.053 (0.28)			
<i>Female</i>	0.104 (0.084)	-.022 (0.071)	0.079 (0.087)	-.015 (0.072)	-.014 (0.072)	0.064 (0.195)	-.028 (0.067)		
<i>School</i>	-.170 (0.096)*	0.055 (0.102)	-.199 (0.1)*	0.052 (0.102)	0.055 (0.101)	0.053 (0.102)	0.024 (0.096)	0.025 (0.129)	-.032 (0.12)
<i>HHHeadFemale</i>	-.383 (0.103)***	0.177 (0.124)	-.387 (0.103)***	0.185 (0.123)	0.169 (0.122)	0.184 (0.123)	0.166 (0.112)	0.293 (0.158)*	0.275 (0.145)*
<i>HHHeadSchool</i>	0.036 (0.099)	-.094 (0.112)	0.078 (0.101)	-.091 (0.112)	-.099 (0.112)	-.092 (0.112)	-.036 (0.105)	-.089 (0.148)	0.021 (0.136)
<i>HHHeadWorking</i> <sub>03</sub>	0.109 (0.151)	0.006 (0.159)	0.157 (0.164)	-.006 (0.159)	-.016 (0.159)	-.005 (0.158)	-.029 (0.144)	-.070 (0.179)	-.060 (0.171)
<i>HHHeadWorking</i> <sub>03</sub> * <i>Urban</i>	-.361 (0.189)*	0.157 (0.223)	-.388 (0.201)*	0.165 (0.222)	0.175 (0.22)	0.16 (0.221)	0.262 (0.2)	0.107 (0.252)	0.271 (0.233)
<i>Urban</i>	0.44 (0.193)**	-.014 (0.212)	0.461 (0.204)**	-.022 (0.211)	-.165 (0.278)	-.019 (0.211)	-.130 (0.187)	0.076 (0.375)	-.154 (0.314)
<i>NotAgrarianHH</i>	0.062 (0.145)	-.285 (0.145)**	0.107 (0.143)	-.288 (0.145)**	-.299 (0.145)**	-.293 (0.146)**	-.278 (0.134)**	-.379 (0.19)**	-.281 (0.17)*
<i>HHNumber</i> <sub>0503</sub>	0.014 (0.025)	-.003 (0.028)	0.011 (0.026)	-.005 (0.028)	-.009 (0.028)	-.006 (0.028)		-.018 (0.035)	
<i>HHNumber</i> <sub>61403</sub>	-.018 (0.025)	0.033 (0.021)	-.015 (0.026)	0.032 (0.021)	0.032 (0.021)	0.033 (0.021)		0.025 (0.028)	
<i>HHNumber</i> <sub>152403</sub>	0.061 (0.021)***	-.061 (0.025)**	0.075 (0.022)***	-.060 (0.025)**	-.058 (0.025)**	-.060 (0.025)**		-.056 (0.032)*	
<i>HHNumber</i> <sub>255403</sub>	-.086 (0.031)***	-.001 (0.033)	-.084 (0.033)***	0.0005 (0.033)	0.003 (0.033)	0.0006 (0.033)		0.012 (0.04)	
<i>HHNumber</i> <sub>5503</sub>	-.010 (0.056)	-.009 (0.06)	0.009 (0.059)	-.010 (0.061)	-.012 (0.062)	-.011 (0.061)		-.008 (0.075)	
<i>Cons</i>	-1.218 (0.274)***	-1.076 (0.281)***	-1.368 (0.284)***	-1.233 (0.287)***	-1.133 (0.31)***	-1.260 (0.3)***	-1.237 (0.254)***	-1.144 (0.373)***	-1.232 (0.325)***
Regions FE	NO	NO	NO	NO	NO	NO	NO	NO	YES
N. Obs.	2009	4660	2009	4660	4660	4660	5301	2390	2730
$\chi^2$ -stat.	64.289	33.683	62.295	44.289	51.251	47.373	33.348	34.323	25.7
Pseudo-R <sup>2</sup>	0.045	0.027	0.047	0.032	0.035	0.033	0.024	0.041	0.03

NOTES - Additional controls: Age Dummy for the 0-14 year-olds and its interaction with female dummy.

Table 8: Impact of shocks in 2004 or 2005 on Departures of Household Members in 2005 or 2006 - Children 0 to 24 of Household Members

	Males	Females	Males	Females
	(1)	(2)	(3)	(4)
<i>PosShock</i> <sub>04/05</sub>	0.023 (0.228)	0.659 (0.167)***	0.149 (0.212)	0.633 (0.167)***
<i>NegShock</i> <sub>04/05</sub>	0.168 (0.19)	-0.194 (0.178)	0.265 (0.193)	-0.189 (0.155)
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>	0.149 (0.373)	-0.950 (0.337)***	0.195 (0.367)	-0.946 (0.337)***
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>	-0.513 (0.274)*	0.18 (0.295)	-0.587 (0.269)**	0.094 (0.27)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>	-0.227 (0.367)	-0.890 (0.235)***	-0.472 (0.366)	-0.832 (0.233)***
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>	-0.504 (0.311)	0.347 (0.244)	-0.593 (0.319)*	0.289 (0.236)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>	-0.470 (0.567)	1.162 (0.415)***	-0.425 (0.57)	1.124 (0.409)***
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>	0.867 (0.444)*	-0.217 (0.399)	0.892 (0.445)**	-0.144 (0.376)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>	-0.116 (0.267)	-0.332 (0.235)	-0.172 (0.279)	-0.174 (0.235)
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>	-0.287 (0.252)	0.042 (0.236)	-0.492 (0.279)*	-0.010 (0.222)
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>	0.587 (0.439)	0.654 (0.574)	0.491 (0.458)	0.535 (0.574)
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>	0.429 (0.454)	0.048 (0.406)	0.546 (0.443)	-0.001 (0.379)
<i>PosShock</i> <sub>06</sub>	0.047 (0.192)	-0.008 (0.199)	-0.098 (0.172)	-0.121 (0.172)
<i>NegShock</i> <sub>06</sub>	-0.047 (0.122)	-0.164 (0.104)	-0.019 (0.116)	-0.229 (0.101)**
<i>PosShock</i> <sub>02/03</sub>	-0.045 (0.138)	0.156 (0.128)	-0.054 (0.131)	0.123 (0.119)
<i>NegShock</i> <sub>02/03</sub>	-0.290 (0.137)**	-0.102 (0.127)	-0.443 (0.121)***	-0.192 (0.116)*
<i>Cons</i>	-0.897 (0.334)***	-1.460 (0.352)***	-0.992 (0.358)***	-1.185 (0.378)***
Regions FE	NO	NO	YES	YES
N. Obs.	4143	4654	4502	5192
$\chi^2$ -stat.	222.099	299.118	346.771	456.957
Pseudo-R <sup>2</sup>	0.171	0.172	0.23	0.198

NOTES - Additional Controls include all those of table 5.

Table 9: Robustness Checks On Arrivals Adding Shocks in 2002, 2003 and 2006

	Transfers Sent				Transfers Received				
	HH Members in 2003 Older than 15				HH Members in 2003				
	Total	Total	Per Capita	Per Capita	Total	Total	Per Capita	Per Capita	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
<i>PosShock<sub>04/05</sub></i>	0.925 (0.602)	1.178 (0.806)	1.099 (0.561)*	1.436 (0.735)*	1.814 (0.727)**	0.207 (0.616)	0.139 (0.818)	-1.102 (0.666)	-0.002 (0.875)
<i>NegShock<sub>04/05</sub></i>	-1.062 (0.516)**	-0.690 (0.709)	-0.660 (0.471)	-0.359 (0.646)	-0.246 (0.635)	0.214 (0.504)	0.433 (0.681)	0.257 (0.534)	0.589 (0.723)
<i>PosShock<sub>04/05</sub> * Urban</i>		-0.610 (1.143)		-0.912 (1.074)	-1.037 (1.027)		0.267 (1.196)		-1.188 (1.314)
<i>NegShock<sub>04/05</sub> * Urban</i>		-0.933 (1.001)		-0.732 (0.915)	-0.837 (0.861)		-0.600 (0.998)		-0.865 (1.056)
<i>HHHeadFemale</i>	-1.583 (0.561)**	-1.573 (0.564)**	-1.941 (0.537)**	-1.942 (0.54)**	-1.815 (0.505)**	4.360 (0.522)**	4.380 (0.523)**	4.080 (0.573)**	4.098 (0.575)**
<i>HHHeadSchool</i>	0.746 (0.512)	0.718 (0.511)	0.781 (0.475)	0.749 (0.475)	0.325 (0.449)	1.968 (0.513)**	1.958 (0.513)**	1.870 (0.547)**	1.860 (0.547)**
<i>HHHeadWorking</i>	-0.531 (0.764)	-0.503 (0.763)	-0.762 (0.697)	-0.739 (0.696)	-1.166 (0.685)	-1.093 (0.747)	-1.078 (0.748)	-1.103 (0.798)	-1.091 (0.799)
<i>HHHeadWorking * Urban</i>	2.482 (1.021)**	2.497 (1.019)**	2.478 (0.941)**	2.505 (0.939)**	1.996 (0.887)**	-0.868 (0.987)	-0.880 (0.988)	-0.825 (1.054)	-0.811 (1.056)
<i>Urban</i>	-0.044 (1.011)	0.289 (1.060)	-0.017 (0.935)	0.301 (0.983)	-0.886 (1.075)	0.342 (0.961)	0.479 (1.024)	0.855 (1.037)	1.093 (1.105)
<i>NotAgrarianHH</i>	2.608 (0.665)**	2.649 (0.67)**	2.199 (0.626)**	2.232 (0.63)**	1.005 (0.706)	1.370 (0.699)**	1.386 (0.7)**	0.914 (0.747)	0.963 (0.75)
<i>HHNumber0506</i>	0.225 (0.152)	0.225 (0.152)	0.18 (0.139)	0.178 (0.139)	0.132 (0.131)	-0.295 (0.159)*	-0.294 (0.159)*	-0.367 (0.169)**	-0.365 (0.169)**
<i>HHNumber61406</i>	-1.174 (0.132)	-1.175 (0.132)	-0.167 (0.12)	-0.171 (0.12)	-0.081 (0.11)	0.12 (0.135)	0.125 (0.135)	0.163 (0.142)	0.163 (0.143)
<i>HHNumber152406</i>	0.216 (0.125)*	0.214 (0.125)*	0.133 (0.114)	0.134 (0.114)	0.041 (0.108)	0.109 (0.123)	0.103 (0.123)	0.152 (0.13)	0.146 (0.13)
<i>HHNumber255406</i>	0.419 (0.155)**	0.422 (0.155)**	0.272 (0.139)**	0.276 (0.138)**	0.249 (0.131)*	0.31 (0.153)**	0.309 (0.153)**	0.26 (0.162)	0.261 (0.162)
<i>HHNumber5506</i>	-0.478 (0.294)	-0.478 (0.294)	-0.749 (0.27)**	-0.748 (0.27)**	-0.663 (0.255)**	1.297 (0.295)**	1.297 (0.296)**	1.484 (0.311)**	1.494 (0.311)**
<i>Cons</i>	0.692 (1.293)	0.418 (1.346)	1.003 (1.197)	0.754 (1.244)	7.790 (1.403)**	-0.431 (1.274)	-0.538 (1.306)	-3497.353 (989.374)**	-703 (1.382)
REGION FE	NO	NO	NO	NO	YES	NO	NO	NO	NO
N. Obs.	1498	1498	1474	1474	1474	1493	1493	1489	1489
F-Stat.	11.441	10.28	11.497	10.255	9.871	11.183	9.982	9.719	8.675
Pseudo-R <sup>2</sup>	0.022	0.023	0.023	0.023	0.055	0.023	0.023	0.022	0.022

Table 10: Transfers Sent and Received - Household Level

	(1)	(2)	(3)	(4)	Females	Males	(5)	(6)	Females	Males	(7)	(8)	Females	Males	(9)	(10)
<i>PosShock</i> <sub>04/05</sub>	0.587 (0.744)	0.357 (0.971)	1.762 (0.842)**	-0.966 (2.513)	7.247 (2.599)**	-0.717 (2.434)	6.993 (2.497)**	-0.255 (2.414)	7.989 (2.296)**	2.689 (1.448)*						
<i>NegShock</i> <sub>04/05</sub>	-0.611 (0.612)	-0.515 (0.818)	0.414 (0.713)	2.573 (1.949)	0.048 (2.632)	1.530 (1.898)	-0.849 (2.568)	0.744 (1.890)	0.626 (2.341)	0.26 (0.715)						
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>		0.304 (1.446)		0.916 (3.741)	-6.070 (4.187)	2.220 (3.574)	-2.761 (3.866)	2.957 (3.504)	-5.703 (3.594)							
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>		-0.787 (1.196)		-7.019 (3.097)**	-1.140 (3.651)	-5.554 (3.021)*	-4.418 (3.467)	-4.205 (2.922)	-1.494 (3.101)							
<i>PosShock</i> <sub>04/05</sub> * <i>Female</i>			-2.441 (1.130)**													
<i>NegShock</i> <sub>04/05</sub> * <i>Female</i>			-2.281 (0.897)**													
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>				3.500 (3.895)	-6.110 (3.319)*	2.466 (3.915)	-6.655 (3.129)**	0.917 (3.758)	-5.482 (2.965)*							
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>				-1.173 (3.355)	-1.551 (3.163)	0.259 (3.354)	-1.472 (3.080)	0.569 (3.218)	-0.582 (2.909)							
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>				0.041 (5.420)	4.750 (5.376)	-1.356 (5.465)	1.921 (5.091)	-0.430 (5.160)	2.798 (4.814)							
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>				4.354 (4.493)	0.437 (4.397)	2.329 (4.475)	1.046 (4.122)	1.153 (4.364)	-0.105 (3.819)							
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>				2.956 (3.053)	-10.858 (2.989)**	2.350 (2.978)	-10.987 (2.850)**	1.838 (2.886)	-11.745 (2.514)**							
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>				-1.970 (2.326)	-2.794 (2.801)	-1.314 (2.274)	-2.556 (2.727)	-0.863 (2.539)	-2.324 (2.539)							
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>				-1.599 (4.230)	8.309 (4.680)*	-2.112 (4.094)	5.489 (4.309)	-2.707 (4.000)	8.886 (3.876)**							
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>				5.695 (3.595)	2.566 (3.834)	4.678 (3.490)	3.060 (3.618)	2.944 (3.348)	2.047 (3.278)							
<i>PosShock</i> <sub>04/05</sub> * <i>SpouseInHH</i>										-1.390 (1.716)						
<i>Female</i>	3.470 (0.514)**	3.787 (0.618)**	4.831 (0.661)**	6.992 (1.116)**	3.658 (1.044)**	7.723 (1.032)**	4.246 (0.985)**	7.451 (1.003)**	4.186 (0.941)**	7.183 (1.129)**						
<i>HHHead</i>	7.505 (0.614)**	7.161 (0.658)**	7.095 (0.653)**	12.005 (3.574)**	2.057 (0.98)**	12.695 (3.804)**	2.501 (0.886)**	9.872 (3.334)**	2.287 (0.771)**	13.601 (3.858)**						
<i>HHHeadSpouse</i>	0.635 (0.748)	0.692 (0.786)	0.843 (0.785)	0.852 (2.008)	3.222 (1.028)**	0.782 (2.009)	3.469 (0.998)**	1.202 (1.911)	4.039 (1.017)**	1.501 (1.951)						
<i>Working</i>	2.543 (0.827)**	2.716 (0.861)**	2.804 (0.853)**	2.381 (2.343)	5.546 (2.514)**	1.105 (2.239)	4.713 (2.338)**	-1.110 (2.230)	7.132 (2.403)**	0.334 (1.707)						
<i>Urban</i>	0.266 (1.186)	0.736 (1.285)	0.821 (1.233)	-17.112 (3.020)**	-17.404 (3.061)**	-19.035 (2.460)**	-19.720 (2.649)**	-12.252 (2.696)**	-12.270 (2.786)**	-16.518 (2.668)**						
<i>Cons</i>	-20.345 (1.751)**	-16.962 (1.928)**	-17.189 (1.895)**	YES	YES	NO	NO	YES	YES	YES						
Controls for HH Size	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO						
REGION FE	NO	NO	NO	2393	2818	2616	3081	2616	3081	2393						
N. Obs.	10229	5211	5231	20.302	10.726	23.906	12.4	18.088	13.316	27.693						
F-Stat.	81.184	30.33	30.988	0.081	0.044	0.08	0.042	0.105	0.087	0.08						
Pseudo-R <sup>2</sup>	0.14	0.054	0.055													

NOTES - Additional controls: Age Dummies and their interactions with urban status, presence of the parents in the household as well as education, work status of the HH head and the household not conducting agrarian activities. And HH Composition.

Table 11: Transfers Sent - Individual Level

	Older than 15			Older than 25			Older than 15			Older than 25			Older than 15			Older than 25		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	
<i>PosShock</i> <sub>04/05</sub>	-0.357 (0.948)	-0.544 (1.210)	-0.962 (1.205)	-0.915 (1.157)	0.283 (1.188)	-2.196 (1.578)	-0.460 (2.752)	3.906 (2.884)	2.591 (2.685)	3.507 (2.609)								
<i>NegShock</i> <sub>04/05</sub>	0.33 (0.759)	0.11 (0.987)	1.515 (0.975)	1.299 (0.944)	1.431 (0.954)	1.258 (1.272)	-1.009 (2.159)	-4.780 (2.708)*	-5.094 (2.571)**	-4.057 (2.419)*								
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>		-0.362 (1.790)				3.562 (2.301)	2.744 (4.066)	-1.578 (4.900)	1.307 (4.170)	-1.048 (3.791)								
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>		-0.345 (1.503)				1.634 (2.004)	2.609 (3.282)	3.851 (3.820)	3.844 (3.532)	3.420 (3.382)								
<i>PosShock</i> <sub>04/05</sub> * <i>Female</i>			0.499 (1.714)	0.587 (1.591)	-0.398 (1.562)	2.504 (2.223)												
<i>NegShock</i> <sub>04/05</sub> * <i>Female</i>			-2.829 (1.203)**	-2.596 (1.145)**	-2.649 (1.137)**	-1.323 (1.690)												
<i>PosShock</i> <sub>04/05</sub> * <i>Female</i> * <i>Urban</i>						-4.170 (3.132)												
<i>NegShock</i> <sub>04/05</sub> * <i>Female</i> * <i>Urban</i>						-3.113 (2.545)												
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>																		
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>																		
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>																		
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>																		
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>																		
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>																		
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>																		
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>																		
<i>Female</i>	8.942 (0.877)***	8.286 (1.109)***	9.074 (1.198)***	9.422 (1.072)***	9.421 (1.003)***	7.584 (1.487)***												
<i>HHHead</i>	13.969 (0.928)***	13.320 (1.057)***	13.262 (1.056)***	12.629 (0.915)***	12.605 (0.874)***	13.865 (0.972)***	13.809 (1.892)***	9.469 (1.385)***	8.140 (1.278)***	8.432 (1.208)***								
<i>Working</i>	2.718 (0.991)***	2.940 (1.116)***	3.019 (1.109)***	2.616 (1.067)**	2.656 (1.034)**	2.112 (1.139)*	-3.258 (2.386)	3.640 (1.246)***	3.161 (1.198)***	3.798 (1.231)***								
<i>Urban</i>	1.718 (1.485)	2.354 (1.501)	2.199 (1.443)	1.972 (1.352)	1.937 (1.494)	-0.20 (1.979)	-8.52 (2.768)	4.911 (2.496)**	3.230 (2.325)	5.553 (2.408)**								
<i>C'ons</i>	-19.526 (2.506)***	-18.877 (2.692)***	-19.146 (2.684)***	-17.233 (2.159)***	-11.751 (2.464)***	-18.155 (2.719)***	-18.690 (4.180)***	-12.050 (3.478)***	-12.298 (2.940)***	-7.254 (3.193)**								
Controls for HH Size	YES	YES	YES	NO	NO	NO	NO	YES	YES	YES								
REGION FE	NO	NO	NO	NO	YES	NO	NO	YES	YES	NO								
N. Obs.	5244	3450	3450	3747	3747	5017	1590	2816	3079	3079								
F-Stat.	39.841	18.842	19.398	27.062	19.864	27.836	10.145	14.864	18.759	.								
Pseudo-R <sup>2</sup>	0.066	0.047	0.047	0.047	0.07	0.068	0.058	0.052	0.052	0.088								

NOTES - Sample of HH Members in 2003 at least more than 15 years-old. Males under 25 excluded as they receive very few transfers. Additional controls: Similar to table 11.

Table 12: Transfers Received - Individual Level

# Appendices

## A Coping Mechanisms and Use of Positive Income Shocks

In this appendix, I describe the means mentioned by households as coping mechanisms as well as their use of positive income shocks.

### A.1 Coping Mechanisms Declared by Households

Similarly to section 2.1, the coping mechanisms shown in figure 5 are declared by the household. Here, I restrict the sample to households that indeed faced a negative shock at least once, *i.e.* 525 households, out of 767, in rural areas and 464 households, out of 1018, in urban areas. I have excluded the coping mechanisms that entail movements of household members as I describe them separately in section 3.1.

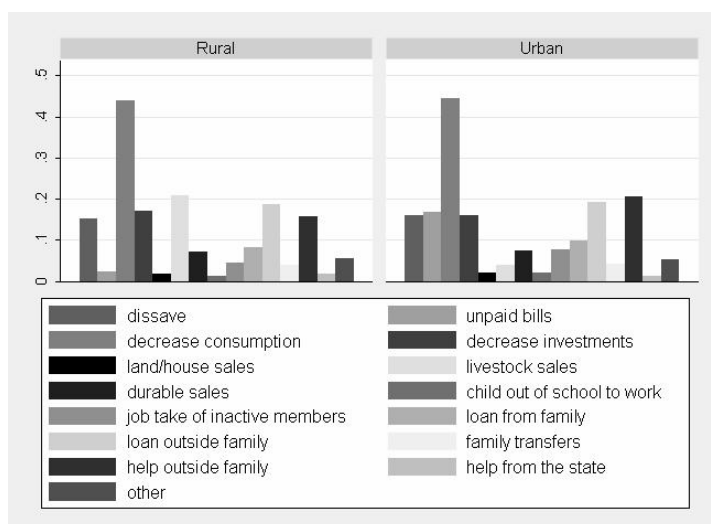


Figure 5: Coping mechanisms used by households after negative shocks, % in rural and urban areas

In order to keep with the graphic presentation of the section 2.1, I have separated urban from rural areas. Nevertheless, in figure 5, many responses to negative shocks are similar in the two sectors. In particular, the proportions of households that dissave, decrease their consumption, decrease investments, sell property or land, sell durable goods, take up a loan within or outside of the family, receive help from the family or, lastly, from the government are not significantly different.

As for the few other alternatives to negative shocks that differ between urban and rural areas, they stem mechanically from differences in asset holdings and economic opportunities between urban and rural areas. In particular, it seems quite natural that the sales of livestock are used by rural households and not by urban households. Just like livestock shocks, the use of this coping mechanism, when compared to rural areas, is actually only three times lower in urban areas outside of Dakar while it is seven times lower in Dakar. Similarly, leaving bills unpaid is quite specific to urban households since rural households own their house in general and make a much more limited use of electricity or publicly traded water.

Two other coping mechanisms that are significantly different between the two areas and they are linked to labor markets. In urban areas, 8% of the households declare that a previously inactive or unemployed household member took a job as a consequence of the income shock while only 4% of rural households declare such a solution. At the same time, Dakar households are more likely to take their children out of school and put them to work, although the proportion, at 2.7% is not very high. Thus, urban households, and Dakar households more particularly, not surprisingly, have more opportunities and leeway to generate more income in hard times.

In addition to general economic opportunities, a possible explanation of the fewer income generation schemes available to rural households could be linked to the difference in the idiosyncrasy of shocks between the two sectors. Bad harvests may affect a whole region, which makes it difficult to find a job on a neighboring farm as it is very likely to be affected as well. In fact, the correlations between the fact that a household faces a negative shock and the fact that his community<sup>35</sup> faces a negative shock are almost twice as high in rural than in urban areas: the figures are 44% and 23%, respectively. This is reflected by the last coping mechanism which is used more frequently by urban than by rural households: help outside of the family. The proportions are respectively of 21% and 16% and are significantly different at 9%. So it may be easier for urban households to ask neighbors for help because they are less likely to be affected by the same shock.

This hypothesis is confirmed if I go into more detail and look at the help that rural households receive in the specific case of bad harvests: 14% of the rural households whose harvest was particularly bad at least once receive help from outside the family while this proportion stands at a significantly higher 21% for their rural counterparts who faced a negative shock other than bad harvests. This may be evidence of the fact that a bad harvest declared by a household also hit his neighboring households which makes them unable to help each other in case of a collective decrease in income.

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35. where communities are defined as the survey's enumeration areas



However, as I do not measure the size of the income shortfall caused by each type of shock, this difference may be stemming from differences in the extent to which income decreases after a bad harvest and after another shock. The difference may go in either direction: bad harvests may be less serious than other shocks on average, making households less likely to revert to external help ; or bad harvest could be more serious than other income shocks and households may find that help from outside will not be sufficient and therefore skip it completely.

Distinguishing coping mechanism along whether they entail medium to long run adverse effects, it is somewhat reassuring that very few households take children out of school to put them to work, as this decision could have serious consequences for a child and even make him abandon school.<sup>36</sup> However, households do make some decisions that can be negative in the medium run, the most salient being the sales of livestock, which are a classic means of insurance in rural households, as shown by Rosenzweig and Binswanger (1993) and by Kazianga and Udry (2006). What is more difficult to assess is whether the decrease in consumption is dramatic or not and whether it entails medium to long run consequences in terms of nutrition or health. This is something that I can examine using measures of child health but would go beyond the scope of this study.

What I can do here, though, is examine whether households which faced three bad years use the same coping mechanisms in their last as in their first bad year. If households value education a lot, I would expect them to take their children out of school only once they are left with no other option, typically after a long strike of bad luck. If I restrict the study to households that experienced three bad years, the sample size shrinks to 68 households in urban areas and 146 households in rural areas. While I can hardly see any difference for rural households: they use the same coping mechanisms during the first as during the third bad year. Although the same is true of most coping mechanisms used by urban households, a striking difference is that, while they decrease consumption significantly more during their first bad year than during the last one (48% as against 39%), they delay decreases in investments as much as possible: the proportion of households who decrease investments more than doubles between the first and the last shock, going from 11% to 25%. To maintain their levels of investment, households borrow from the family more often during the first shock (15% as against 9%) and are more likely to find new occupations for inactive members (12% as against 8%). Another interpretation not linked to the willingness to maintain investments is that the two latter sources of relief simply dry-up with the number of shocks: it is less easy to find lenders or to put new inactive members to work at the third than at the first shock.

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36. As we already discussed, it is possible that some households have actually taken their children out of school as a consequence of bad years without stating it in the specific part of the survey that covers shocks.

## A.2 The Use of Positive Income Shocks

Contrary to the shocks *per se*, the reactions to them from urban and rural households differ in a sizeable way when I compare positive and negative shocks. A first important difference is in savings. While the proportion of households who declare using their savings to smooth income losses is almost the same in the two areas, the proportion of households who save out of income gains increases by 2/3 when going from rural to urban households. In terms of consumption, while the proportions of households who sell durable goods are very close in hard times, urban households, in good times, seem more eager to consume, as 20% purchase durable goods while this is true of only 13% of rural households. In a similar fashion, 15% of urban households spend on housing after an income gain, almost double the proportion of rural households. There is only one major case in which rural households seem more responsive to positive shocks: food expenditures. 49% of rural households who gained income unexpectedly increased their food expenditure, while only 32% of urban households did. In fact, given the agrarian activities of rural households, the increase may be not in *expenditures* but in consumption of own production. To probe into this, I examine the responses of rural households who enjoyed positive shocks other than good harvests, and the percentage mentioning an increase in consumption is exactly the same as that of urban households.<sup>37</sup> However, looking at the survey module on auto-consumption, I see that among households who experienced positive shocks, the proportion of rural households who consume at least a part of their production is the same in the group who declares an increase in consumption as a consequence of the shock and in the group who doesn't. It is difficult from this to conclude whether enumerators or households restricted the answers to expenditures or not as I have two contradicting elements, all the more so as it is the proportion of own consumption that may matter in my analysis and not just whether households conduct auto-consumption.<sup>38</sup> In any case, once I add food, rural households seem to consume as much as urban households, in response to positive income shocks.

The other uses of positive income gains have a more similar trend to coping mechanisms. Similarly to decreased investment previously, investment increases in similar proportions among urban and rural households. Of particular interest to us is the difference in terms of transfers sent out by urban and rural households. This difference is similar to the difference in help received by households in bad years, although the gap is much higher here, with transfers to households facing hardships sent

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37. There are 56 such households.

38. The same is true of negative shocks and the decrease in consumption. While the proportion of households consuming their own production is similar between those who declare a decrease in consumption as a consequence of a negative shock and those who don't, the proportions of rural households decreasing consumption in response to negative shocks is at 46% for those who experienced a bad harvest and 35% for those who didn't.

out by 15% in urban households, as against 8% of rural households. The same halving prevails for “other transfers”: from 14% to 7% when comparing urban and rural households. So, the use of transfers seems much more prevalent among urban households, both as receivers in bad times and as senders in good times, the difference with rural households being particularly sharp in the latter case.

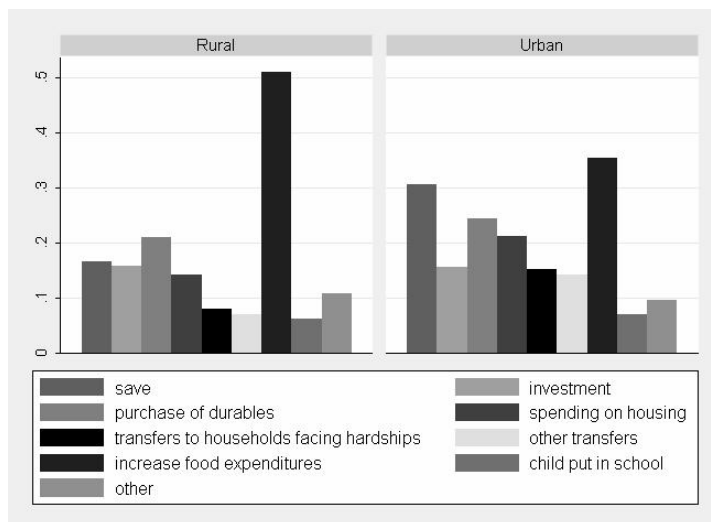


Figure 6: Use of positive income shocks, % in rural and urban areas

To better understand whether spending out of positive income shocks is different from spending with regular (or permanent) income, I compare the use of positive shocks with the PSF survey’s information on expenditures.<sup>39</sup> In figure 7, most of the *ranking* of figure 6 is maintained, except for durable goods which are mentioned more often than spending on housing in response to income shocks when compared with actual household expenditures. Other than this, even the magnitudes of the proportions are not too far from the figures in graphic 6 except for food expenditures, which are of course higher, and education expenditures which are much lower. This is what one would expect: a higher average share of food expenditures in *permanent* income when compared to shocks and, in contrast, a higher share for investments, in this case in education, from transitory income.

Senegalese households’ fragility is borne out by the fact that they have a 50% higher chance of

39. Excluding the “other” category, there are two categories displayed in figure 7 for which I cannot draw a comparison. The first one is savings. Although I do have data on household savings at the time of the survey, I do not have data on savings accumulated during the 12 months before the survey while the data I have on expenditures and incomes cover those 12 months. I tried to calculate savings through simply taking expenditures out of income (excluding transfers received) but my data shows more than 75% of households with negative savings! This may be due to very noisy income data but, in any case, I cannot tell more about savings at this stage. I do not have much precise information on investment, in particular in land implements, and so I also leave this category out for the comparison. Lastly, the two categories on transfers are aggregated.

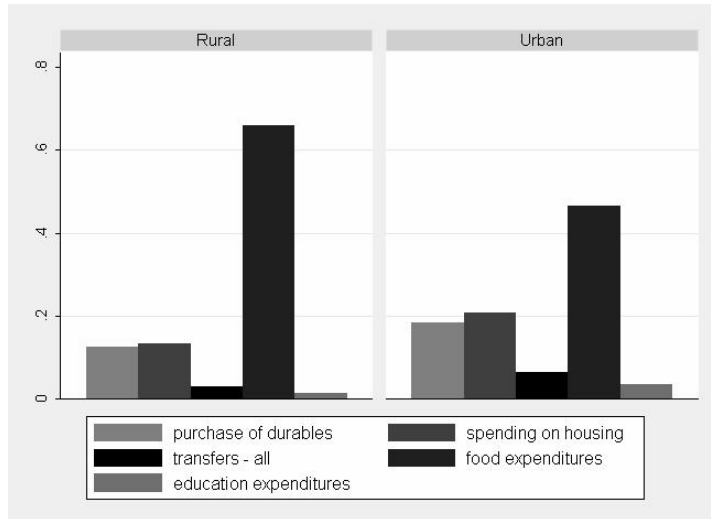


Figure 7: Share of household expenditures in each category, % of total expenditures in rural and urban areas

going through a difficult year than through a good year. Overall, 34% of the households in the sample did not experience a shock, be it positive or negative, over the period. I have also explored the means households use to smooth their incomes and how they use the extra money gained in good years. Urban and rural households differ in all these dimensions. In particular, urban households are twice as likely to send transfers after positive income shocks than rural households. There are different ways to cope with shocks that I haven't studied in which households rely on their own structure, networks and flexibility. This is what I examine in section 3 which investigates household recomposition and individual movements, including the declarations of households regarding movements in response to shocks.

## B Summary Statistics of Variables Used in Estimates

Variable	N. Obs.	Mean	Std. Dev.	Min	Max
<i>Arrive</i> <sub>05/06</sub>	12016	.043	.204	0	1
<i>PosShock</i> <sub>04/05</sub>	12206	.179	.383	0	1
<i>NegShock</i> <sub>04/05</sub>	12206	.316	.464	0	1
<i>PosShock</i> <sub>04/05</sub> * <i>Urban</i>	12206	.068	.251	0	1
<i>NegShock</i> <sub>04/05</sub> * <i>Urban</i>	12206	.112	.316	0	1
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>	12141	.034	.182	0	1
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub>	12141	.057	.233	0	1
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>	12141	.016	.128	0	1
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 1524 <sub>03</sub> * <i>Urban</i>	12141	.024	.154	0	1
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>	12141	.050	.218	0	1
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub>	12141	.086	.281	0	1
<i>PosShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>	12141	.022	.148	0	1
<i>NegShock</i> <sub>04/05</sub> * <i>Age</i> 2554 <sub>03</sub> * <i>Urban</i>	12141	.033	.179	0	1
<i>HHHead</i>	12206	.135	.342	0	1
<i>HHHeadSpouse</i>	12206	.114	.318	0	1
<i>HHHeadChild</i>	12206	.406	.491	0	1
<i>SpouseInHH</i>	11987	.274	.446	0	1
<i>SpouseInHH</i> * <i>Female</i>	11987	.149	.356	0	1
<i>NoParentInHH</i>	11838	.431	.495	0	1
<i>NoParentInHH</i> * <i>Age</i> 014 <sub>03</sub>	11803	.068	.252	0	1
<i>Female</i>	12206	.526	.499	0	1
<i>Age</i> 014 <sub>03</sub>	12141	.433	.495	0	1
<i>Age</i> 1524 <sub>03</sub>	12141	.205	.404	0	1
<i>Age</i> 2554 <sub>03</sub>	12141	.285	.451	0	1
<i>School</i>	11761	.509	.499	0	1
<i>SchoolEnrolled</i>	11676	.245	.430	0	1
<i>SchoolEnrolled</i> * <i>Urban</i>	11676	.154	.361	0	1
<i>Working</i> <sub>03</sub>	12206	.335	.472	0	1
<i>Working</i> <sub>03</sub> * <i>Urban</i>	12206	.141	.348	0	1
<i>HHHeadFemale</i>	12206	.195	.396	0	1
<i>HHHeadSchool</i>	12206	.340	.473	0	1
<i>HHHeadWorking</i> <sub>03</sub>	12198	.723	.447	0	1
<i>Urban</i>	12206	.526	.499	0	1
<i>NotAgrararianHH</i>	12097	1.545	.497	1	2
<i>HHNumber</i> 05 <sub>03</sub>	10507	2.179	1.952	0	12
<i>HHNumber</i> 614 <sub>03</sub>	10507	2.852	2.238	0	13
<i>HHNumber</i> 1524 <sub>03</sub>	10507	2.466	2.091	0	11
<i>HHNumber</i> 2554 <sub>03</sub>	10507	2.798	1.736	0	10
<i>HHNumber</i> 55 <sub>03</sub>	10507	.781	.846	0	4
<i>HHHeadWorking</i>	12128	.701	.457	0	1
<i>HHHeadWorking</i> * <i>Urban</i>	12128	.342	.474	0	1
<i>HHNumber</i> 05 <sub>06</sub>	11046	2.188	2.006	0	12
<i>HHNumber</i> 614 <sub>06</sub>	11046	2.994	2.355	0	13
<i>HHNumber</i> 1524 <sub>06</sub>	11046	2.948	2.328	0	14
<i>HHNumber</i> 2554 <sub>06</sub>	11046	3.286	2.155	0	14
<i>HHNumber</i> 55 <sub>06</sub>	11046	.918	.918	0	5

Table 13: Summary Statistics