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Migrant Remittances and Economic Development in Africa: A Review of Evidence

by

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Abstract: This paper reviews some of the evidence on the role of migration and remittances in African development. After a brief survey of the literature, it draws some lessons from two surveys performed among people from the Senegal River valley, in Mali and in Senegal. The paper makes two main points: (i) migration cannot be understood as an individual decision, and must instead be regarded as a collective decision made by the extended family or the village. It involves the strategic choice of sending its best offspring away with a view to diversify its risks, and to build a social network. Then, remittances are to a large extent a contingent flow, aimed at buttressing the family's consumption in case of adverse shock. However, (ii) this insurance system involves some moral hazard, as those remaining behind tend to exert less effort to take care of themselves, knowing that the migrants will compensate any consumption shortfall, with a high probability. These results undermine a very popular view about migration based on relative deprivation, and solve a puzzle that bugged this literature for nearly three decades: the rich families are more likely to send some migrant away, and thus get more remittances, while they earn less income in the village, because of moral hazard. Wealth makes them lazy, while low income does not make them poor!

Keywords: Migration - risk-coping strategy - moral hazard - technical inefficiency

JEL codes: C23 - D24 - D82 - Q12.

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1. Introduction

People usually have strong views about migration, and sometimes use fairly strong words to talk about it. While economists are generally in favour of the wider possible integration of markets, supposed to be a pre-requisite for the optimal allocation of resources, many resent the free movement of labour and human capital. Globalisation is accused of blurring cultural differences and to lead humankind towards a homogenised and tasteless western commercialised culture. International migrations are accused of uprooting the best offspring from poor countries and of merging them in that globalised magma. In Africa, there is often an implicit condemnation of those who leave, as if they inflicted some harm on those remaining behind. This is not just an elegant way to tell them how much they are missed. This is especially true when skilled labour is involved, and the "brain drain", or "human capital exodus", are often regarded with moral reprobation by those remaining behind, as if the leavers were committing some theft of national resources. However, in most cases, the decision to migrate is a collective decision made by the extended family, or even more broadly by the village, with a strategic view. These people invest a sizable amount of resources for sending their most promising offspring to the city, or even abroad. The largest cost that they bear is probably the opportunity cost of the departing young labour, at the height of its energy and productive potential. They then form great hopes of getting in return some highly profitable fallout. Hence, some of the migrating human capital would not exist in the first place, were it not for the opportunities opened by the international market for skilled labour.

Economists have tried to settle this dispute by using first theoretical reasoning. This issue was first analysed by trade theorists, using their standard tools of general equilibrium theory in the open economy. The market for non tradable goods plays a central part for determining the outcome. Rivera-Batiz (1982) showed, using a general equilibrium model without remittances, that those remaining behind incur a welfare loss. The set of possible transactions shrinks, as those remaining behind cannot anymore exchange non-tradable goods with the migrants. Under standard assumptions about preferences and technology, this entails a welfare loss. However, this neglects the important phenomenon of remittances. Djajic (1986) then showed that these transfers improve welfare in the country of origin, even of those who do not receive remittances, because the latter enlarge the set of possible exchange of tradable and non-tradable

goods. The net effect is then ambiguous, and the hope of getting a clear diagnosis about the welfare impact of migration by pure theory vanishes. The bottom line of this theoretical literature is that remittances are at the centre of the stage, and that their impact is crucial for determining the outcome.

Many empirical studies have been devoted to the impact of remittances, in the context of international migrations as well as of domestic rural-to-urban migrations. This literature addresses in fact two issues, one dealing with production, and one with income distribution. Rempel and Lobdell (1978) use household survey data from rural Kenya and conclude that remittances from rural-to-urban migrants have little impact on the development of the region of origin. By contrast, Collier and Lal (1984) show in the case of rural Kenya again, that remittances enable the recipient families to hold more productive capital than the others. They thus bring out the role of migration and remittances as a means to overcome capital market imperfection, and to bring home some capital for funding productive investment. This fact had also been described to some extent by Bates (1976), in the case of Zambian migrants. This effect is emphasized even more strongly in Collier and Lal (1986), in the case of rural Kenya again. Poirine (1997) provides some further analysis of "remittances as an implicit family loan arrangement", emphasizing both the collective organization of the financial flows within the family, and the inter-temporal calculus involved. This is used to explain some data from Samoan and Tongan migrants. Other papers show how investing in migration can circumvent problems related with imperfect insurance markets. Remittances are then viewed as absorbing random shocks, like bad crops or illness, thus providing some informal insurance services (e.g. Gubert, 2002). The present paper will mainly discuss the latter literature, without neglecting entirely the income distribution issue.

It is fair to say that the empirical literature on migration and remittances has devoted more attention to income distribution issues. In his early study of migration from Kasumpa village in Zambia, Bates (1976) shows that households earning lower incomes in the village receive more remittances from town than richer ones, after controlling for demographic composition. Stark, Taylor and Yitzhaki (1988) show that this type of transfers reduces income inequality in a Mexican village having migrants in the USA, but suggest that the poorest are excluded from migrating. Banerjee and Kanbur (1981) and Faini and Venturini (1993) conclude, by different routes, that migration benefits more the middle income classes of

the society of origin than the two extremes of the distribution, in India and Southern Europe respectively. By contrast, Gustafsson and Makonnen (1993) conclude that poverty in Lesotho would go up by about 15 % were the flow of transfers sent by the migrants working in the mines in South Africa to stop. Azam and Gubert (2004) show that this issue is probably more subtle than it looks, as the correlation between poverty and low measured (earned) income can be misleading. Their results are discussed below.

The wide diversity of empirical results on the effects of migration and remittances on the migrants' economy of origin is matched by the variety of micro-theoretic models presented to analyse them. Here again, the first line of research has looked for the various market imperfections that migration and remittances help to overcome. The early papers focused on the allocation of labour across regions, and looked at the differentials in wages and employment conditions between rural and urban areas or between countries. In the Todaro model, for example, the potential migrant compares the present value of expected urban earnings to the present value of rural earnings (Todaro, 1969). Then, migration improves the allocation of labour by channelling it to the places where its social value is the highest. Bates (1976) emphasizes the inter-temporal investment dimension, within a life-cycle framework, thus showing how migration helps improving the allocation of consumption between the present and the future. So does Poirine (1997). The "new economics of labour migration" (Stark, 1991) views migration as an intra-family co-insurance arrangement aimed at minimizing income risks and smoothing consumption. The basis for this approach is that income risks are strongly correlated locally in the rural areas of low-income countries. This implies that formal institutions for managing risk are imperfect or absent, giving rural households an incentive to self-insure through the geographical dispersion of their members. Families can then rely on the migrants for financial support in case of transitory income shocks due to unforeseen bad local conditions (*e.g.* weather variation, disease, pests and fire, fall in crop price, etc.). Migrations and remittances are then improving the allocation of resources across states of nature, in a risky environment. This line of research has thus shown how migration and remittances are contributing to the efficient functioning of the economy, by helping to allocate resources optimally across space, time, and states of nature, in the spirit of the Arrow-Debreu general equilibrium model.

However, this view of the world begs the question of the enforcement mechanisms: what makes these implicit contracts work? Are there institutions that help enforcing the promises implicitly made by the migrants to repay their debt to their group of origin, or to provide the promised insurance services in case the family left behind is affected by an adverse shock? Part of the literature has looked for the enforcement mechanisms used by villagers for inducing the migrants to deliver. Lucas and Stark (1985) analyse various potential motivations explaining why migrants transfer some income to their relatives remained in the village, for testing various forms of altruistic or egoistic behaviour. Using survey data on Botswana, they conclude that mixed motivations of moderate altruism or enlightened egoism seem to prevail. Their empirical analysis supports the view that the migrants do provide some insurance services, by transferring more money when a drought threatens the livestock. They also show that wealthier families receive more than poorer ones, suggesting that the migrants are defending their inheritance rights or their ability to come back to the village with dignity. Hoddinott (1992) gets a similar result using a household survey conducted in Kenya. Azam and Gubert (2004), whose analysis is described below, provide some additional elements shedding some more light on why richer families get more remittances. Similarly, de la Brière *et al*. (2002) find evidence of these two effects using data from the Dominican Sierra, bringing out additionally how gender affects the migrant's remittance behaviour. Notice how this literature on the motivations to remit has turned over the causality between the wealth of the recipients and the amount of remittances received. In Collier and Lal (1984), we found above that those receiving more remittances had more productive capital than the others, while here, causality seems to run the other way round: those who own more assets are getting more remittances, for incentive reasons. Moreover, this line of analysis seems difficult to reconcile as well with the results found by Bates (1976) in Zambia, mentioned above, suggesting that the households with the lowest incomes are the ones who get the most in remittances, or with the standard theory of relative deprivation, which claims that the poorest families are the ones who send migrants away (Stark, 1991). Azam and Gubert (2004) provide a reconciliation of these views by showing why rich people often have low earned incomes, while they get a lot of remittances.

Moreover, this enforcement mechanism based on the defence of inheritance rights does not solve all the potential contractual problems raised by remittances. The central issue is probably to determine

how much is each migrant supposed to remit, and on which occasion. This is especially relevant in the case where migration is viewed as an insurance device. For example, the geographical dispersion of the individuals who might benefit from such a risk-pooling arrangement makes it difficult to monitor performance and creates moral hazard (e.g. Binswanger and Rosenzweig, 1986, Newbery, 1989, Platteau, 1991). Without monitoring, each participant in the insurance pool has an incentive to underreport income or to reduce effort in order either to be eligible for financial assistance or to be dispensed from supporting others. Thus, while the distance between contracting agents provides a risk-pooling benefit, it also increases information and enforcement costs.

Many theoretical papers have emphasized the trade-off between incentives and insurance, but few empirical tests have appeared in the recent literature. Exceptions include Dubois (2002) and Wydick (1999). Azam and Gubert (2004) provide the first analysis investigating empirically whether migration, considered as an insurance mechanism, is actually giving rise to moral hazard. That paper uses an original data set collected in the Kayes area in the Senegal River valley in Western Mali. The aim of that survey was to investigate whether migration and remittances are affecting negatively technical efficiency in agriculture because of moral hazard. Their results form the core of the presentation made below. Some additional evidence is also used for complementing the analysis.

The present paper tries to make two points, in the light of these survey data. The first one is discussed in the next section, which shows that the decision to migrate cannot be understood as an individual decision, based on the usual microeconomic calculus. There is a fundamental collective dimension, in that the family sends its best offspring away to a distant place, or even abroad, with a strategic view. They invest resources for financing the migration itself, and very often also for providing the migrant with the required level of education. The most important cost incurred by a farming family when sending a young member away in migration is the opportunity cost of labour. The departing worker would have helped producing crops, and would have relieved the burden of the older family members. The idea behind such a collective investment decision is to build a consistent network in which people have uncorrelated incomes, and can thus provide each others with reliable insurance services. These network effects can be checked on our data sets by observing for example that the migration behaviours of

different ethnic groups living in the same areas, and facing the same economic conditions, are completely different. All the evidence, including the historical evidence available, suggests that the networks play a crucial part in determining both the migration and the remittance behaviour. The survey data discussed here suggests that the value of the network, and the threat of being expelled from it in case of misconduct, is probably the mainstay of the enforcement mechanism involved. The second point made in this paper is that the reliable insurance provided by migrants induces a significant "shirking" behaviour on the part of those remaining behind. These ones use their productive resources with a significantly lower level of efficiency than those without migrants, or with only unreliable ones. We report some econometric results found by Azam and Gubert (2004), showing that the families with reliable migrants are found much further below the efficiency frontier than those without.

2. Network Externalities and Migration

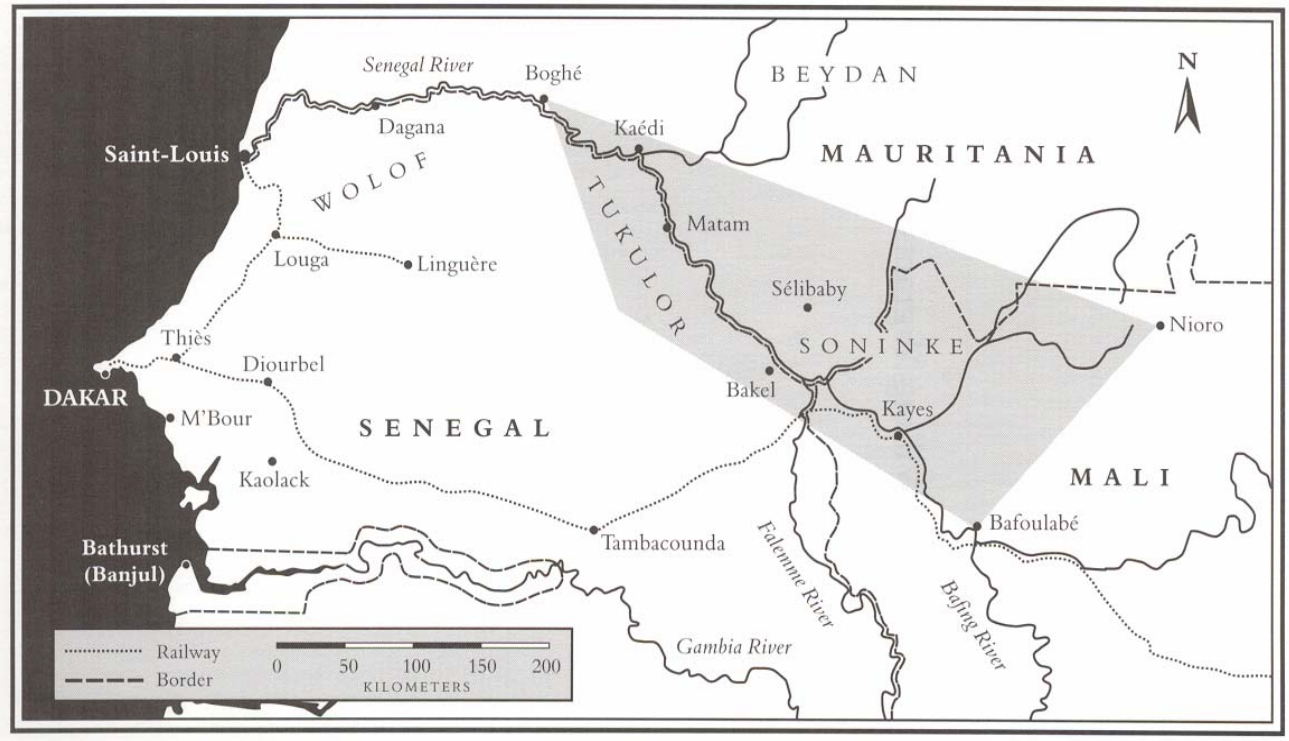
Most of the results discussed here are derived from a survey conducted by one of the authors in eight villages of the Kayes area, along the Senegal River, between January and April 1997[1]. The Kayes area is especially interesting for several reasons. First, most Malian migrants to France come from this place. In view of the political turmoil surrounding illegal immigration from that country that occurred in France, there is a need for some dispassionate empirical analysis of the determinants and the consequences of this migration flow. In 1997, just after our survey was performed, France launched a new policy of "co-development" aimed at complementing repressive measures against illegal immigration at the other end with an aid program promoting stay-at-home development in the migrants' countries. As the main source of Sub-Saharan Africans to France, the Kayes area is one of the main targets of this co-development. Documenting the effects of remittances on the families left behind is thus important for designing appropriate policies to be implemented there.

Two main ethnic groups live there, generally in separate villages: the Soninke and the Khassonke. In order to have roughly an equal number of households from each group, the villages have been separately drawn at random by ethnic affiliation, within about 50 kilometres from Kayes, both upstream

[1] *i.e.* Djimekon, Fanguine Koto, Moussa Waguya, Kerouane, Dyalla Khasso, Somankidi, Diakandape and Gakoura.

and downstream along the Senegal River. Because Khassonke villages are generally smaller in size, a sample of three Soninke villages and five Khassonke villages was drawn. In the former, households were drawn at random, while the whole population of the latter was included in the sample. The resulting sample has 305 rural households. Following Meillassoux (1975), a household was defined as "a group of individuals who produce in common on at least one field, receive food out of a common store and eat from a single pot". This is what we called "family" in the discussion above. In the Sahelian area, it is typically comprised of the family head, his wives, his young brothers, and their dependents over two or three generations.

Map 1: Geographical Origin of the Soninke Migrants



Source: Manchuelle (1997) (originally from Diarra, 1969).

A migrant household is defined by the following characteristics: at least one person who was previously a member of the household has left for more than six months to live or work elsewhere, either in Mali or abroad. Women who out-migrated for marriage and children below 18 years of age at the time

of interviews were excluded.[2] Of the 305 rural households in the survey, 224 sent at least one household member in the migrant labour force (73.4%) and 182 sent at least one household member abroad (59.7%). Their distribution by ethnic group is given in table 1. It shows that the incidence of migration is more frequent among Soninke households, and especially so for migration abroad.

Table 1. Distribution of sample households by migration status and ethnic group

Ethnic group	Soninke	Khassonke	Other	Total
Number of households	148	145	12	305
Number of households with at least one migrant	127 (85.8 %)	90 (62.1 %)	7 (58.3 %)	224 (73.4 %)
Number of households with at least one migrant abroad	124 (83.8 %)	53 (36.6 %)	5 (41.7 %)	182 (59.7 %)

Source: Gubert, 2000.

Hence, a close examination of the data shows that all the people of the Kayes area are not equally concerned by migration in general and even more strikingly so by migration abroad. This is also true of course when migration to France is concerned. One ethnic group, namely the Soninke, is significantly more involved than the others. Its region of origin straddles the borders between Mali, Mauritania, and Senegal, along the Senegal River (see map.1). In fact, whether these African migrants to France (and nowadays to many other countries, including Japan and the USA) are Malian, Mauritanian or Senegalese nationals matters less than their ethnic origin. Because migrant networks reduce information and psychological costs at the other end, by providing specific job information, accommodation and supportive relationship, migrants connected by ethnic links are vastly more represented than the others. This fact suggests that a pure economics approach to African migration would necessarily miss a crucial point, and that some help from anthropology is required. Fortunately, quite a lot of information has been accumulated about this group, by anthropologists and historians.

[2] Women provide only minimal assistance to their parents once they are married. Hoddinott (1994) reports a similar result using survey data from Kenya.

The History of the Soninke Migration

This group has been involved in migrations for centuries and has been thoroughly studied by anthropologists and historians. This provides a rich opportunity for combining the tools of empirical economics with those from these neighbouring social sciences. In particular, the book by the late François Manchuelle (1997) is an incredible sum of historical and anthropological information on this group. The next paragraphs summarize some relevant aspects of this historical experience. They suggest that the economist's view of migration as an insurance device, while basically correct, must be qualified to fit the facts. The social-anthropological dimension helps understanding its determinants more accurately. The objective pursued by this insurance system is not only to protect the family left behind from income or consumption fluctuations, but also to defend and reinforce a given social status.[3] This important nuance can be accommodated by the economist without any major theoretical revolution. The social status of the whole clan would be seriously tarnished if the consumption of those remaining in the village was to fall drastically in the wake of a failed harvest. Defending the family's pride is the main motivation behind the willingness of the migrants to cover the risks of those remaining in the village through transfers (see *e.g.* Manchuelle, p.20). It is less an aversion to consumption fluctuations which is at stake than the shame that would affect the whole clan were the family to be visibly weakened after an exogenous shock.

The Soninke lived originally in the upper Senegal River Valley, which encompasses what are nowadays Eastern Senegal, Southern Mauritania and Western Mali. Today, some of their descendants may be found in Central Africa, in Europe and even in North America and Japan. Originally, the Soninke community was a highly hierarchical society, with a rigid caste system, which is still affecting people's behaviour. There was a strong separation between slaves, artisans or craftsmen, and aristocrats from the "chiefdom", *i.e.* members of the village community with specialized functions (either economic, religious or military). In fact, the fate of the slaves was often preferable to that of many craftsmen, if they had belonged to rich families for more than one generation.

[3] The idea that migration is motivated by status considerations has already been put forward in Stark's relative deprivation approach (*e.g.* Stark, 1984). However, relative income considerations in our framework play a different role than in his approach, which fits better some of the facts brought out by anthropologists and historians (foremost among these facts is the downward social spread of Soninke labour migration, when Stark's theory would predict an upward social spread of migration).

During the 18th century, the upper Senegal River area was the chief grain producer of West Africa, exporting its millet either to the north, trading with the white nomads of the desert, or to the south. Production was largely performed by slaves, who accounted for between one third and one half of the population. Many religious men and other free people were involved in trade. The Soninke country was in direct contact with the desert people, who were selling salt, livestock, and gum Arabic, in exchange for grain and slaves, as well as for grazing rights during the dry season. The Soninke were importing more of these goods from the desert than their consumption needs, and formed trading expeditions toward the south, for on-selling these goods and the millet as far south as the north of modern Cote d'Ivoire and Guinea. They were bringing back such southern products as cola nuts, and most importantly slaves.

During the 19th century, traders from Europe, especially from France, came to participate in this commerce. The French built the fort of Bakel, along the Senegal River, at the western end of the Soninke land, for housing a trading post. Their aim was to take advantage of the possibility of shipping the cargo down the Senegal River, downstream of Bakel, up to Saint Louis and the Atlantic Ocean. The Soninke soon realized that it was quite inefficient to keep on producing in the upper Senegal River valley, and then to transport the produce to Bakel for trading it against slaves and the manufactured goods brought there by the European traders. Sailing on this part of the river, upstream from Bakel, is uneasy, and becomes impossible from November on, especially during the driest years. They found far more efficient to migrate for the rainy season to the Bakel area, to go and grow cereals, and then more and more groundnuts, on rented land. The produce could be sold on the spot, and this allowed sailing back upstream much earlier in the year. This so-called "navetane" system of temporary migration formed the basis of the enrichment of many Soninke families.

Later, as this trade was growing in size, new jobs became available on the steam boats transporting these goods up to Saint-Louis, and from there to France. The Soninke migrants were then hired as "laptots" (indigenous sailors) on these boats, getting in these jobs higher earnings than as "navetanes". Young men of royal lineage were particularly attracted by these earnings, which allowed them to accumulate quickly a substantial capital and to be less dependent from their elders. At first, they were sailing between Bakel and Saint-Louis, and sometimes further down to Dakar. A direct route to

Dakar was also opened in 1923, as the railway between Thiès and Kayes was completed. The latter runs through the groundnut basin of Senegal, and many young men then migrated there as “navetanes”, around Kaolack. Aristocrats were more attracted by sailor positions, and quickly got jobs on ocean going ships sailing from Dakar to Bordeaux or Marseilles. There, they established the first Soninke communities in France, from which they moved to other cities, including Paris. This movement went on expanding up to the present time. Most of the time, they hold low-qualification jobs and live in poor conditions in immigrants’ hostels. They save most of their earnings for preparing their return to their country. They invest in small productive projects there to some extent, but mainly in their social network, which will ensure their dignity and their subsistence for their old days. Thus, migration can be viewed as a means to produce remittances, which are the ultimate goal of all this travelling.

Social Anthropology

In fact, Soninke migrants do not uniformly come from all the social strata. Only families with a fairly high social status are investing in circular migration. Among them, the religious caste and the aristocrats, and their slaves, are particularly concerned. The participation of slaves in circular migration needs to be explained. The Soninke aristocracy has been widely criticized in the literature because of the harsh way it treated slaves. This is particularly true for slaves of the first generation, who were living with their masters. As soon as they got married, slaves of the second generation benefited from a more favourable treatment, close to the serf’s one in Europe in the Middle Ages or in Russia before the October revolution. They could till their own plot of land in exchange for some labour time spent on their masters’ plots. Many slaves were thus reasonably well off and could buy in turn their own slaves to support them in their old days.

Initially based on the ownership of the fertile land located near the river, power and honour in the Soninke society were highly dependent on wealth and on the number of clients. Slaves were playing a major part, and many of them were able to gain some political and economic influence within their master’s clan. Observers are often surprised that most slaves decided to stay on with their masters after the abolition of slavery, although they could legally leave them. What the abolition of slavery actually did was to strengthen their bargaining position to some extent, by allowing them to leave their former masters

in case of conflict. But it did not fundamentally alter the economic link between them. Former slaves were still highly dependent on their master to find a spouse, and their children were still entrusted to them. The lot of slaves owned by wealthy families was actually much preferable to that of most free individuals (especially the artisans). Former slaves and their descendants did improve their legal rights, but even today, they still bear the constraints related to their social status. The most surprising is their role in the migration system. Very often, they are allowed to migrate far away, even to France. This is partly due to the fact that their wife and children are staying behind, but this is endogenous to some extent. A returning migrant with a large capital can earn a fairly high social status in his society, even if he belongs to the former slave caste. He must give a share of his capital to his master, who will give him in return a position in his clientele, with some positive fall out. His new status within the clientele will be marked by the performance of some visible tasks in some ceremonies, and by various gifts that he will receive regularly.

Therefore, the Soninke, who comprise a large share of the African migrants to France, or to other places in Africa, Europe, or even America, belong in fact to some relatively high-ranking clans, whose wealth and size ensure prestige and political clout in their society of origin. Competition between these clans played initially a crucial role in providing the incentives for some aristocratic families to look out for additional sources of wealth, by migrating further and further away. They thus established bridgeheads on which to build larger and larger networks, by helping more and more of their relatives to migrate. Prestige accrues to the one who gives, as in most other African societies, and the welfare of his clientele guarantees it (N'Diaye, 1995). The "griots" (praise singers) ensure his reputation, as a function of the gifts received, and it will spill over to the whole clan. By giving away a share of his earnings in favour of his clan, the migrant reinforces both his position within the clan, and the status of his clan within the Soninke society. His own position within the society thus depends as much on that of his clan as on his own one.

Insuring the Pride of the Clan

The model presented by Azam and Gubert (2004) aims at translating this anthropological information into the language of standard microeconomics. It is a simple partial equilibrium model, focusing on the main point of the subsequent empirical exercise, i.e. an analysis on the impact of remittances on the behaviour of those left behind. It may thus be viewed as a complement to de la Brière

et al. (2002), who focus on the determinants of remittances. The key insight from social anthropology is that the risk against which the family seeks some insurance is not just the loss of utility due to a consumption shortfall entailed by a negative shock. The family is in fact protecting itself against the shame that would affect the whole clan if the family's standard of living was to fall below some norm, corresponding to its social status. The simple theoretical model presented in Azam and Gubert (2004) captures this phenomenon by emphasizing the utility cost of a shortfall of consumption below some family-specific threshold, rather than the usual consumption-smoothing objective that is found in standard insurance theory. This view was very much supported by the survey, showing that the village families can quantify with some precision their "needs" and their "deficit".

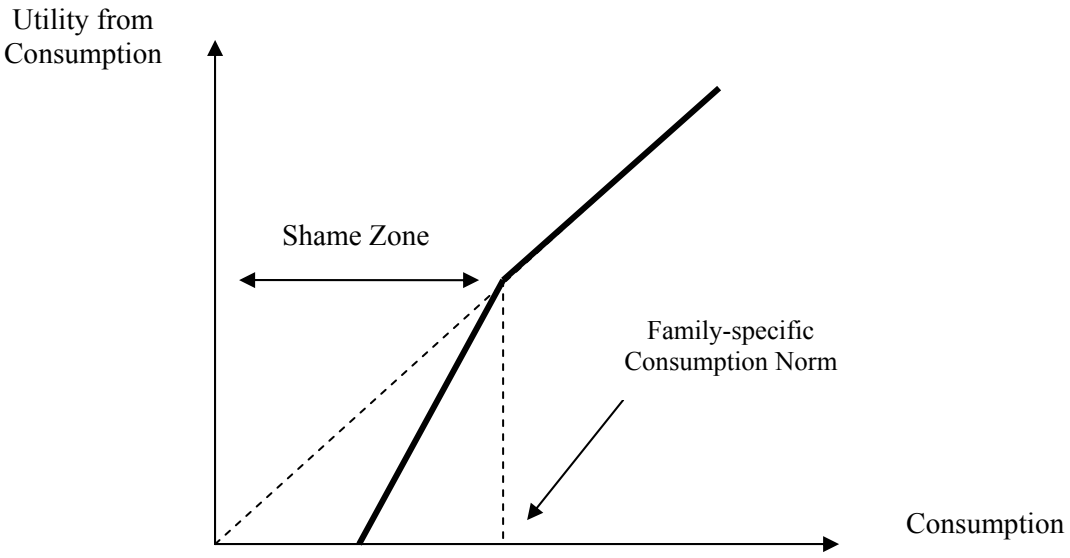


Figure 1: Utility from Consumption with a Risk of Shame

Figure 1 represents the resulting utility function. If the level of consumption of the family back in the village was to fall below the family-specific consumption norm, then the loss incurred by the whole family would combine two effects. In addition to the standard loss of utility due to reduced consumption, the whole family would incur a loss of prestige and its social status would suffer. This is captured by the break in the objective function at the level of the consumption norm. Notice that this creates some risk aversion, even if we assume that utility proper, narrowly defined as the utility derived by consuming a

given level, irrespective of the social pressure, is linear. Hence, this shame effect is enough for creating a demand for insurance, even if the family would otherwise be indifferent to consumption risk. This assumption explains why we observe only a downward insurance effect. In standard Neo-Classical insurance theory, we would observe households trying to cut fluctuations in both directions. Here, risk aversion is amplified downwards by this shame effect. Azam and Gubert (2004) derive from this model the effort level that the family left behind in the village will put into production, as a function of the insurance service that they expect from its migrants. In fact, the family has two instruments for insuring itself. It can first self-protect, by working harder, aiming at producing some excess of expected output over the true needs of the family. Then, any given percentage loss due to a drought or an attack of some pest, will be less likely to cut income below the norm. Second, and this is what the Soninke from the upper caste are more prone to doing, they can choose to send a promising son or slave to migration abroad. Hence, we can predict that there is some possibility of substituting at the margin migration for effort, for any given desired level of protection. Because of their widespread network, the Soninke have relatively low migration costs, and tend to rely more on migration than on production effort. The Khassonke do not have such a long tradition of migrating, probably because their society is less hierarchical, and hence only have a pretty poor network of relatives living in valuable locations. Therefore, the model predicts that they will invest more in production effort for insuring themselves, and less in migration.

Enforcement Mechanism

A further survey was performed by Demonsant in the Senegal River valley in the spring of 2004, with a view to understand better the enforcement mechanisms involved in the migrants' remittance behaviour. The standard view described above, and due originally to Lucas and Stark (1985), is that migrants are delivering remittances with a view to defend their inheritance rights. This was tested and not rejected on some household survey data from Botswana, as mentioned above. However, this view raises a problem in Muslim societies, as inheritance is there governed quite rigidly by the law. The father has then very little room for manoeuvre for bequeathing an unequal lot to each of his sons, even for rewarding better care and support. So, the location of Demonsant's survey was chosen so as to try and reduce to the minimum the influence of bequest, while observing a lot of remittances. Hence, the Futa Toro was chosen,

to the West of the Soninke area described above, downstream from Bakel. On map 1, the surveyed area can be spotted not far upstream from Matam.

The people there are neither Soninke nor Khassonke, and call themselves Alpularen (*The Pular-speaking Ones*). They are often called the Tukulor, as on map 1, because their language is often called that way. In fact, it is better to reserve the name Tukulor for a subset of them, the warriors who followed Sheikh Umar Tall in his attempt to build an empire in central Mali, in the 19th century. He "disappeared" in the village of Deguembéré, down the Bandiagara cliff, where he lived for quite a long period with his warriors. The Alpularen are descending from nomadic herdsmen, related to the Fulani, who settled in the Futa Toro, probably in the 18th century. Their migrating tradition is not as rich and documented as that of the Soninke. Nevertheless, the area has been progressively deserted by most of the young generations in the last few decades, especially as a response to the droughts of the 1970s and 1980s. The French had invested in some sizable irrigation perimeters in the 1950s, in particular, but the droughts of the 1970s and 1980s have destroyed any hopes of making that area a promising agricultural land. Irrigation equipments have now fallen into disrepair, and are almost not functional anymore. Migration to the city is the only strategy providing some prospect of a decent life. Hence, the value of any potential bequest of agricultural land is now essentially negligible. Still, the elders remaining in villages are receiving a lot of remittances that cover most of their needs. Demonsant's survey was precisely aimed at understanding why the young generation is still delivering remittances in such a setting. Given that love and the sense of duty do not provide a credible enough explanation for the economic theorist, something more must be at play here. Here again, the evidence is pointing in the direction of the value of the network of relatives. A funny hint about this is provided by the fact that most of the migrants from the surveyed villages are working as cooks, either in restaurants or in private homes, mainly in Dakar. This is too striking to be regarded as a random draw, and the story seems to be that some of the elders started as cooks in the past, and have established a bridgehead in that profession, from which the network has been able to dispatch the flow of new migrants for years.

Hence, the value of belonging to the network is the key to the success of a migration experience. It turns out that the elders have some leverage for blackmailing the young ones, using the implicit threat of

getting them expelled from the benefit of the network externality. The network of migrants from the same village is providing each of them with a lot of services. They help newcomers finding jobs and accommodation; they provide some help in case of problem, including some monetary support in case of hardship, and many other services. In particular, the mutual services of credit and social insurance that they provide one another are fundamentally based on trust. Belonging to such a network is based on an implicit promise: "I will not defect when you need me!" One person in the network has some centralized information about the trustworthiness of the members, namely the patriarch. The latter is in a position to observe a relatively large sample of actual remittances, and some other services, delivered by the migrants. He alone can provide a relatively well informed rating of each of the network's member's reliability. Then, when the day of dying comes, the patriarch will usually call his sons to visit him, and he will give the "Baraka". This is a blessing which seems to be of the utmost importance among the Alpularen, and many other people in Africa. However, the importance of this blessing does not seem to stem only from religious beliefs or tradition. What is crucial is that if the father refuses the "Baraka" to one of his sons, the latter is immediately expelled from the network. The father is then signalling publicly that this son did not fulfil his duties towards him, and cannot be relied upon. His name is "spoilt", as they would say further south in Côte d'Ivoire. Hence, there is this implicit threat that those who defect will be deprived of the benefit of the network externality. This is the most valuable inheritance that is handed over from one generation to the next.

The Case of Street Children

The importance of belonging to the network for the migrants, as a reward for good behaviour, can be checked by other means. Léa Salmon-Marchat, an Ivoirian sociologist, has looked at this problem from the other side. She has performed a survey of the street children of Abidjan. Of course, Abidjan is far away from the Senegal River valley, and we must expect to find some significant differences among the observed behaviours in the two places. Nevertheless, she has found one key point that sheds some useful light on the discussion at hand (Salmon-Marchat, 2004). Most of the street children that she found in her sample have broken away from their family, because the latter was not providing a service worth the money demanded in return. Most of these kids are sons or daughters of migrants from the north, who did

not make it. Most of them are Djula or Senufo, and they break away from home because they want to keep their earnings for themselves. On average, these kids are earning two and a half times the official poverty line, and they are probably the only people in town who save a sizable share of their earnings for the future. They entrust this money to the Mauritanian money keepers, who can be trusted. The reason why they don't want to give any money to their parents or their brothers is that they regard them as losers, people whose name does not give access to any valuable network. They choose instead to create new ties with the other street children, who will provide a more valuable network when they grow up. In fact, social anthropologists, including Léa Salmon-Marchat, have described how these street children have developed new social links, and developed some valuable substitutes to family links. Older boys are sometimes called "Old Father", when they acquire a leading role in the group, and they have some collective celebration when one of them creates a firm in the informal sector. These children are teenaged entrepreneurs, and the most entrepreneurial of them will be the next generation of informal sector investors. This example shows that parents are regarded as access points to useful social networks, and will be dumped if they fail to deliver. This is especially important for migrants, who left behind most of the social protection given by the traditional village behaviour. Then, to maintain contact with that network, the young generation is prepared to invest quite a lot of remittances and other services to the elders. However, shame on the one who did not make it, and whose name does not give access to a valuable network. His most promising sons will walk away from him, and will not give him any money.

Therefore, the behaviour of these street children can be viewed as being part of a complex enforcement mechanism by which migrants are delivering remittances in return for being connected to a valuable network. Each generation has an incentive to behave well and respect the tradition, because this gives access to the benefit of the network. Those who do not deliver are excluded, and will be left on their own to make it. However, those ones do not only loose the support of the network members of their own generation, who will not trust them any more if the patriarch has not certified them as reliable, by giving his blessing, but they will also be dumped by their best offspring. What they can offer is not worth the price demanded.

Table 2. Mean Predicted Probabilities by Place of Residence

	Mean	Standard Error	n
Internal migrant	0.26	0.18	175
International migrant	0.77	0.27	385
France	0.90	0.13	276
Any foreign country except France	0.42	0.20	109

Source: Azam and Gubert (2004)

Most of the time, however, the migrants fulfil their duties, or default only under legitimate circumstances, which are allowed for by some implicit escape clauses. This comes out from table 2, which reports the mean predicted probabilities of remitting as a function of the migrant's place of residence, from the survey in the Kayes area. These numbers are computed from a Probit regression, that controls for some of the migrant's characteristics, like age and the family links to the recipient household (son, brother, etc.), in addition to the place of residence. The very best migrants are those staying in France, as can be seen from that table, and we know that they are predominantly Soninke. Then, the insurance mechanism is pretty reliable, and is giving rise to some moral hazard problems. This is discussed in the next section.

3. Remittances and Moral Hazard

The first point that comes out very clearly from the Kayes survey is that migration and remittances are not side shows at all, and are instead at the centre of the stage in that area. This is noticeable first by looking at the number of household members who are engaged in migration. Migrant households reported on average 2.6 migrants, with a minimum of 1 and a maximum of 11. Hence, the households have invested on average quite a sizable labour force in migration. This turns out to be clearly a profitable investment, if one regards remittances as the return on the latter. Table 3 reports the average amount of remittances received per household according to the number of out-migrants. The figures

include both cash and in kind remittances and refer to 1996.[4] The amounts at stake are considerable: using the World Bank's poverty line of $1 a day (or, equivalently of CFA F 700 a day), remittances received per household represents on average no less than the annual consumption expenditures required for keeping three individuals just above the poverty line.[5] It is far from certain that these 2.6 migrants, on average, would have been able to produce an output worth that amount, had they stayed with their family. It is almost certain that they would not have been able to produce such a surplus over and above their own consumption.

Table 3. Amount of Remittances Received per Household in 1996

Number of Migrants Within the Household (*)	Mean Amount of Remittances Received	Number of Households	Number of Migrants in France within the Household	Mean Amount of Remittances Received (**)	Number of Households
0	100,856	81	0	48,188	167
1	479,802	72	1	1,040,057	65
2	1,004,857	70	2	1,656,593	39
3	1,143,994	28	3	1,995,484	15
4	1,415,631	18	4	2,546,413	8
5	1,562,826	14	5	2,598,363	6
6	2,401,997	16	> 5	3,918,465	5
> 6	2,182,542	6	-	-	-
All	799,918	305	All	740,145	305

Source: Gubert, 2000. Amounts in CFA francs (1 US $ ≅ 700 CFA F in 1996).

(*): Male adults aged 18 or more, who have left their village for more than six months.

(**): Remittances from France only.

[4] Migrants living in France often send goods instead of money. More precisely, families receive order forms that can be traded for goods with local suppliers. Suppliers are then directly paid by the migrants. This is probably aimed more at involving witnesses in the transfer process than at influencing the consumption pattern of the village household, because of fungibility.

[5] Many households receive remittances from distant relatives or friends too. This explains why some non-migrant households get a positive amount of remittances.

Table 4. Sources of Income in 1996

	Income per Capita (CFA F) Households without Migrant Abroad (n=123)	**Income per Capita (CFA F) Households with Migrants Abroad (n=182)**
Farm-earned income	30,400 (44.7%)	22,139 (20.9%)
Non-farm earned income	19,904 (29.3%)	6,214 (5.9%)
Remittances	10,415 (15.3%)	53,810 (50.8%)
Pensions, rents	7,227 (10.6%)	23,714 (22.4%)
Total	67,946	105,878

Source: Gubert, 2000. Amounts in CFA francs (1 US $ ≅ 700 CFA F in 1996).

As a result, remittances play a critical part in the economies of the sample households, as shown by table 4. In 1996, they accounted for 40.1% of total gross income for all the 305 households, and 50.8% of total gross income for all the 182 households with at least one member abroad. For households not involved in international migration, farm revenues, measured as the sum of the value of all crops and animal products either marketed or home-consumed during the year, are by far the most important source of income. Another striking feature emerges from these figures, which puts out a serious challenge to the prediction of the standard model. On the one hand, farm- and non-farm earned incomes per capita in households with international migrants are much lower on average than those of non-migrant households. This might be viewed at first sight as a vindication of the well-known "relative deprivation" approach, advocated by Stark (1991). However, such an interpretation seems to miss a crucial point, which can be seen by looking at the bottom line of this table, which sums up all the sources of purchasing power accruing to either type of households. The households with migrants abroad get in general about 56 % more income per capita than the others. This is hardly a sign of "relative deprivation", even if an important share of their income is made of remittances from migrant workers. As mentioned above, this

result might in fact reflect the disincentive effect of remittances on the productive behavior of agricultural households, as argued by Azam and Gubert (2004). Some further evidence is provided below[6].

Gubert (2002) has tested various determinants of the remittance flow, using the same data set. Three different econometric methods are used for performing that test, in order to take into account the censored nature of the remittance flow. There is a non negligible fraction of the migrants who are not delivering any transfers on the year of the survey. The equations control for various personal characteristics of the migrants, like age, education level, destination, relationship with the household head, and other characteristics of the family or the village of origin. Then, the impact of various shock variables is tested. The number of household members who fell ill during the year turns out to be significant in most specifications. The number of those who died during the year is also significant, but with a lower margin. Then, three different measures of crop income shock are tested as well, two of them generated as residuals from a production function. The results suggest that negative income shocks are a robust determinant of remittance flows, providing some further support to the insurance hypothesis. They do not reject the loan interpretation either, as a variable indicating whether the migrant received some financial assistance from a household member also has a significant impact. Nevertheless, the insurance motive seems quite remarkable. From one of the equations presented, estimated as a Tobit equation using the maximum likelihood method, one can derive the following comparative statics predictions. Consider a migrant and a household with mean characteristics, and assume that this household suffers from a grain shortfall of 500 kg. This amount corresponds to the shortfall declared by 10 % of the households. Then according to the estimates presented, such a shortfall would increase the remittance flow by 48 %. Performing the same type of comparative statics with one death and one sick household member during the year increases the remittance flow by 124 %. These calculations suggest that the insurance motive is really a key determinant of remittance flows.

[6] This result agrees with those in Bates (1976), or in Stark (1991) on relative deprivation. However, its interpretation is the opposite: households with migrants can afford to produce less income locally than the others, and still remain richer.

Moral Hazard and Productive Efficiency

The findings discussed below support conventional wisdom about the effects of insurance with imperfect monitoring of effort: the more insurance is provided by the migrants, the less incentive their families have to work. We find that the farmers left behind in the village indulge in some "shirking", when they are insured by one or several migrants from their family. This result provides some insights into the relationship between labor migration and agricultural production.

Table 5. Distribution of Common Plots by Primary Crop and Migration Status in 1996

Crop	**All (%)**	**Non-Migrant (%)**	**Migrant (%)**
Sorghum	45.8	48.8	44.7
Maize	45.1	44.4	45.4
Rice	1.3	0.6	1.5
Millet	1.3	2.5	0.8
Groundnuts	4.7	3.1	5.3
Gombo	1.6	0.6	1.9
Others	0.2	0	0.2

Source: Gubert, 2000.

The lower incomes earned from farming by migrant households is not due to obvious differences in cultivation practices, like crop choice or use of farming equipment. The survey was specifically designed to assess the impact of migration and remittances on agriculture, and it provides some rich and reliable information on each household's cultivated plots. The data include location of plots, types of crop, production levels, amounts of male and female labor inputs and amounts of other inputs such as hired labor, fertilizer and equipment. Data on the level of outputs were first collected using local measurement units (*muud*) and then converted to kilograms. Information on farm operations, inputs and outputs on each of the households' plots concerns the 1996 wet season. The farming system is typical of rain-fed agriculture in Sahelian Africa. Active members of a household work on common plots, the output from which is used for fulfilling the basic consumption needs of the household. Each household owns on

average two such common plots. In addition, each woman in the household cultivates one or more individual plot and has full control over the output from her field(s). On average, each woman controls two individual plots[7]. Crop choice is different by gender: plots controlled by men are generally devoted to cereals (sorghum and maize) while plots controlled by women are mainly devoted to groundnuts. Migrant and non-migrant households show similar patterns in crop choices with all farms cultivating sorghum, maize and groundnuts, as shown by table 5. Agricultural production is mainly devoted to family consumption: sales of crops are infrequent and account for a negligible fraction of total income. Despite increased population pressure, land remains abundant and extensively farmed in all eight villages.

Table 6. Farm Tools and Cultivation Labor, by Migration Status

	All (n=303)	**Non-Migrant (n=81)**	**Migrant (n=222)**	**z (*)**	**P>|z|**
Farm Tools					
% of households owning ox plough	19%	15%	20%	-1.07	0.28
% owning donkey plough	50%	30%	58%	-4.46	0.00
% owning cart	45%	25%	53%	-4.46	0.00
% owning seeder	13%	9%	15%	-1.42	0.16
% of plots with plough	77%	70%	80%	-2.49	0.01
Cultivation Family Labor					
Adult male labor	4.0	3.0	4.4	-4.24	0.00
Adult female labor	5.5	3.4	6.3	-6.21	0.00
Child labor	1.0	0.7	1.1	-1.97	0.05

Source: Gubert, 2000.

(*): Mean comparison test.

Tables 6 and 7 provide information concerning farm tools, labor force and crop output among the sample households, by migration status. Two farming units were dropped from the sample because they did not actually till any fields during the 1996 wet season. A significant difference comes out from comparing the two sub-samples regarding their equipment. The figures shown in the top part of table 6

[7] The data reveal no statistically significant difference in the number of common plots per household and in the number of individual plots per woman between migrant and non migrant households.

suggest that the adoption of modern agricultural tools such as ox plough or cart is strongly and positively correlated with out-migration. Moreover, discussions with farmers during the fieldwork revealed that the acquisition of productive agricultural assets always followed migration, suggesting, as first pointed out by Bates (1976) and Stark (1978), that migration contributes to relax the credit constraint through remittances. The lower part of table 6 shows that these migrant households have also a higher labor endowment than the non-migrant ones. However, this evident richer endowment in agricultural productive assets does not translate into higher output. In fact, we have already seen exactly the opposite emerging from table 4, with farm income per capita being lower by about a third than that of non migrant households. The data suggest that this is due to lower productivity.

Table 7. Value of Aggregated Crop Output, by Migration Status (1,000 CFA F)

Crop Output	All (n=303)	Non Migrant (n=81)	Migrant (n=222)	t	P>|t|
1995 crop output	435.8	303.9	484.0	-4.15	0.00
1996 crop output	365.7	311.3	385.6	-1.85	0.07
1995 crop output per cultivator	45.2	46.3	44.9	0.37	0.71
1996 crop output per cultivator	42.9	54.4	38.07	3.28	0.00

Source: Gubert, 2000.

Note: For the computation of the number of cultivators, family members from 14 to 65 years of age were counted as one irrespective of gender, elders over 65 and children below 14 as one half.

Table 7 shows that despite a better endowment in physical assets, migrant households do not achieve significantly higher yields in terms of the value of output per working household member than non migrant households.[8] Although yields do not differ appreciably across the two groups in 1995, they do significantly differ in 1996, with higher yields on non-migrant farms. Therefore, although the evidence presented so far only allows for an impressionistic assessment, it does not contradict the view that migrant

[8] The number of household members working on the farm is a proxy for the size of cultivated land, in a context of extensive farming.

households are exerting less effort in production. However, a more thorough econometric analysis was required to confirm this impression.

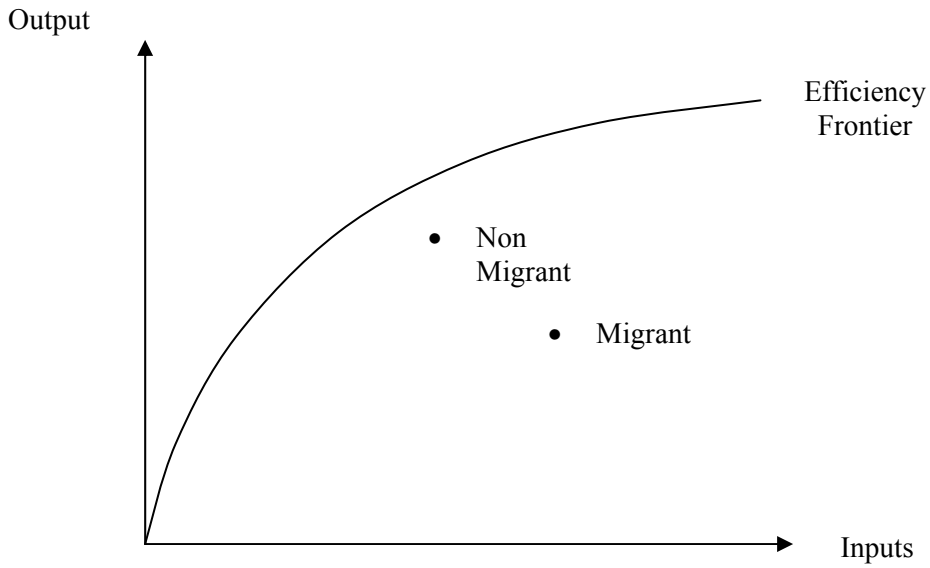


Figure 2: Migrant- and Non-Migrant Households' Productive Efficiency

Figure 2 offers a stylized representation of the Azam-Gubert hypothesis, reconciling the observation made that migrant households have more inputs and less output than non-migrant households. The empirical analysis presented in Azam and Gubert (2004) brings out more rigorously the technical inefficiency of the migrant households, while controlling for many other potential sources of lower performances. The empirical strategy used in that paper involves three steps. First, a plot-level production function is estimated, from which each household's level of inefficiency, or distance to the frontier, is derived as a fixed effect. Then, for each migrant household, a reliability index is estimated, taking due account of the different probabilities of remitting of each type of migrant, and of the number of the latter sent by each household. The last step in the analysis is to test whether the impact of the latter reliability index is a significantly negative determinant of the household's inefficiency level. That model does not reject the hypothesis that migrant households use inputs in such a way that they operate much further from

the efficiency frontier than non migrant households. This brings out the type of moral hazard involved, as the effort level of the village family is not contractible with the insuring migrant.

Hence, for constructing a relevant indicator of each household's unobserved technical efficiency with which to test the hypothesis formulated above, Azam and Gubert (2004) follow Udry (1996) and estimate a plot-level production function using a panel estimation technique with household-specific fixed effects. Each household in the Kayes sample tills simultaneously several plots, eight plots per household on average in 1996. The two dimensions of the panel are therefore plots and households. After eliminating observations with missing data, the sample consists of 291 farm households with usable data on a total of 2,248 cultivated plots. Many control variables have been included in that equation, including physical inputs, location of plot, type of plot and type of plot × type of crop, as well as village indicators interacted with type of crop.[9] All input coefficients have positive and highly significant coefficients. The estimated coefficient for the dummy variable for no plough use is significantly negative implying that the intercept of the production function is lower for farmers who do not use a plough. Conversely, the estimated coefficient for the dummy variable for no use of hired labor is significantly positive. As in Binswanger and Rosenzweig (1986), this implies that hired labor is more costly than family labor because it either requires some supervisory inputs by family members or it leads to less effort in the absence of supervision. Moreover, the distance of the plots from the village is positively related to production levels up to a certain point (around 6.5 kilometers). More distant plots, however, are associated with lower production levels. Such a pattern may be due to high fixed travel costs for working on distant plots, while plots too close to the village are exposed to vagrant goats and other petty predators. Lastly, common plots, generally controlled by household heads, have significantly higher output than individual plots controlled by women. This result may be due to systematic differences in the size or quality of the plots farmed by men and women or to differences in labor intensity, as women often combine cultivation activities with child care (Udry, 1996).

[9] Interaction effects were also included to test the hypothesis of an identical technology across plots controlled by migrant and non-migrant households. Results indicated that this hypothesis cannot be rejected.

The Determinants of Households' Efficiency

Table 8. Determinants of technical efficiency

Dependent variable: Predicted household-specific fixed effects

Variables	**Coef.**	**t**	**P>|t|**	
Intercept	- 0.21	- 1.12	0.27	
Household observable characteristics				
Reliability Index	- 1.19	- 2.12	0.03	**
% of educated members in the household	- 0.02	- 0.10	0.92	
Household size	-0.001	- 0.26	0.79	
Number of common plots				
/total number of cultivated plots	- 0.93	- 3.26	0.00	***
Social status (dummies)				
Noble	0.14	1.59	0.11	
Artisan caste	0.03	0.19	0.85	
Off-farm work (dummy)	- 0.10	- 1.27	0.20	
Village observable characteristic				
Main ethnic group (dummy: 1 if Khassonke)	1.10	12.54	0.00	***
Number of observations	291			
F(8, 282)	27.73			
Prob>F	0.00			
Adjusted R^2	0.44			

Note: t-ratios and test statistics are based on heteroscedastic-consistent estimates of the variance-covariance matrix. The omitted social category is "all others" (former slaves, shepherds, etc.).

Given the household fixed effects derived from the estimated plot-level production function, Azam and Gubert (2004) have tested whether the reliability of the migration-based insurance mechanism is negatively correlated with the measure of unobservable household-specific productivity level mentioned above. Hence, the household-specific fixed effects derived from the production function have been regressed on a vector of observable household characteristics including the reliability index. This assumes that the household's decision to reduce its effort affects all plots equally. Household characteristics

include the household's size, the percentage of educated members within the household, a dummy variable indicating whether the household earned any off-farm wages or rents during 1996, dummy variables related to the household's social status[10], the number of common plots divided by the total number of cultivated plots among the household, and the adjusted number of out-migrants divided by the number of resident members in the household. In order to get a dependable indicator of the reliability of the insurance mechanism, each migrant was first weighted by his estimated propensity to remit (see Azam and Gubert, 2004, for details). A dummy variable indicating whether the main ethnic group of the village is Khassonke is also included. The results from estimation by OLS are presented in Table 8. Estimates indicate that the null hypothesis of moral hazard, corresponding to a statistically negative coefficient associated with the index of insurance reliability, is strongly supported by the data. The implicit insurance contractual arrangement between the migrants and their family could thus partly explain the poor performance of agriculture among migrant households.

Households' technical efficiency levels are influenced by other variables. The negative sign associated with the proportion of collectively cultivated plots may reflect an incentive problem insofar as each cultivating member is not the sole residual claimant on profits on those fields. It may also capture an organizational effect, as the work on common plots is performed under the authority of the elders, while the work on individual plots allows more personal initiative. More appropriate decisions might be taken in the latter case, while some more rigid behavior might be required in the former one, for comforting the elders' authority. Second, households' efficiency levels are significantly higher in Khassonke villages. The explanation may be as follows: the involvement of Khassonke villages in migration is more recent and far less intense than in neighboring villages. Acts of collusion between households and peer pressure are thus less likely to emerge, and a comparison of family output with that of others may provide the migrants with an efficient mechanism for monitoring productivity. Lastly, it is worth mentioning that the

[10] As might be expected, the survey that we carried out included no direct question on social status. However, households' last name is a very reliable indicator of social status. Consider, for instance, the Diabira and Sarambounou families in the village of Gakoura, the Konate family in the village of Fanguine, the Sissoko family in both the villages of Moussawaguia and Djimekon and the Kouma family in the village of Kerouane, all belong to the upper social strata (*i.e.* all have a long period of residence in the village or can trace their ancestry back to the founders of the village).

dummy variables related to social status are not significant. This result suggests that all the variables included in the first regression to control for land quality actually did their job. Indeed, noble families are usually entitled to plots of higher fertility, mostly by the riverside.

Many robustness checks are presented in Azam and Gubert (2004). The most important empirical issue concerns the reliability index, i.e. the ratio of the weighted sum of migrants to household size. First, does it properly reflect the effect of the reliability of the insurance mechanism on technical efficiency? Following Greene (1997, p.981), the answer is no if the typical household who chooses to purchase insurance through migration was relatively less efficient to start with, whether or not it had a migrant.[11] If this self-selection problem was present, then the least squares coefficient in the regression of the household-specific fixed effect on the reliability index would actually overestimate the insurance effect. This is tested and rejected, using Heckman's two-step technique (Heckman, 1979). The results suggest that household self-selection do not play any significant role in this case. Second, it might be argued that since the reliability index might be correlated with household relative wealth, the observed inverse relationship between the latter and household productive efficiency may simply result from a higher opportunity cost of labor for migrant families, assuming that consumption and leisure are normal goods. However, the Kayes survey data does not provide any support to this argument. To begin with, summary statistics reveal that the correlation coefficient between the reliability index and income per capita (including remittances) is rather low (0.18). To be more persuasive, an indicator of household wealth was also included in the regression in order to control for the opportunity cost of labor. The data show that the richest families within that sample are those with retired migrants receiving a pension from France. The amount of old age pension received in 1996 divided by the number of persons living in the household can thus be used to proxy household wealth. Estimates show that there is no evidence of a lower technical efficiency among wealthy families. There is no evidence, therefore, that a higher opportunity cost of labor underlies the technical efficiency differential between migrant and non-migrant families. Third, it might be argued that migrant households do worse, not for lack of effort, but because those who are left behind

[11] Unobserved agricultural inputs such as soil quality could well be correlated with the migration decisions of farm households.

are the least capable or because migrant households use much riskier agricultural practices. Indirect arguments contribute to disprove these hypotheses. Gubert (2000) shows that migration decisions are made by household heads and that the migrants are mainly selected on the basis of birthright. As a result, the family members that migrate are more likely to be the oldest sons, while those that remain in the local economy are more likely to be the youngest ones. To our knowledge, no study has shown that oldest sons were systematically more productive (nor more migration-prone) than their younger siblings. Of course, the oldest sons could be more educated. But because returns to schooling in the immigrant labor market are likely to be very low in France, a negative relationship between the probability of international migration and schooling was actually found.

6. Conclusions

The description of the Kayes survey data has revealed that, although migration has certainly enhanced the adoption of improved agricultural technology, migrant households do not show better agricultural performance than non-migrant households, quite the opposite. Our theoretical assumption is that the implicit insurance contract between the migrant and his family gives rise to opportunistic behavior resulting in technical inefficiency among migrant households. The estimation of a production function using panel data with household-specific fixed effects does not reject this hypothesis. The sum of weighted out-migrants divided by the household size is the proxy used for the reliability of the insurance mechanism. It has a significant and negative effect on households' unobserved level of productive efficiency. The hypothesis of a trade-off between insurance and labor efficiency has already been mentioned in the economic literature (Fafchamps, 1992). The new result reported here is that such a trade-off is likely to be observed in the specific context of contractual arrangements between a migrant and his family.

Should one be worried by such a free riding behaviour and conclude that restrictions on emigration flows from the area or on remittances should be imposed for improving technical efficiency? Certainly not, as it would replace a distortion resulting from informational asymmetry by another distortion based on the coercive power of the state. Moreover, if a tax on remittances were introduced in

France, the migrants would almost certainly choose another destination. Some of them have already chosen to live in other European countries, in the USA and even in Japan. Besides, in a society where touching a hoe was historically considered a dishonour for an aristocrat (Bathily, 1975), X-inefficiency may be one of the major ingredients of the prestigious image of a family, leaving the *miskino* (poor or "small" people) to use all means they have to provide for their families. Thus the results reported here give a clear indication of how an aid policy in favour of the Kayes area should be designed. Clearly, it should not be targeted at promoting productive and labour-saving investments by migrant families, since they are already wasting the capital that they own. By contrast, policies targeted at helping non-migrant families could create enough emulation to encourage the former ones to be more efficient.

Moreover, the sheer size of the remittance flows sent back by migrants, especially from France, raises the issue of the appropriate aid policy that the latter should adopt (Gubert, 2003). Before 1974, immigration from former French colonies in Sub-Saharan Africa was free, and did not give rise to anything like an invasion. Second, there are 38,600 Malian migrants officially registered in France, and an estimated 60,000 illegal ones. A reasonable estimate is that the total amount of remittances from these migrants adds up to about 100 million euros, consistent with the figures discussed above. By comparison, the French official aid flow to Mali is about 60 million euros, equivalent to the remittances that about 60,000 additional migrants to France would send back. Most probably, nobody in France would notice if the latter number of additional Malian migrants were allowed to come to France, which has more than 61 million people. However, so many French civil servants are making a living out of either fighting illegal immigration, or in the foreign aid business…

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