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Heterogeneous migration flows from the Central Plateau of Burkina Faso: the role of natural and social capital

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This paper uses a system of labour supply equations and data from Burkina Faso collected in 2003 to test the conditions underlying two different migratory movements: continental and intercontinental migration. We provide theoretical reasoning and empirical evidence that heterogeneity in migration is related to heterogeneity in rural households. We find that comparatively asset-poor households embark on continental migration, whereas intercontinental migration takes place in comparatively wealthy households in response to opportunities for accumulation of wealth in Europe. We also find that access to religion-specific migrant networks plays a positive and negative role in explaining, respectively, intercontinental and continental migration.

KEY WORDS: West Africa, migration, rural households, networks

Introduction

The African continent has a long history of migration and labour is still particularly mobile in this part of the world. Migratory movement in West Africa has long since taken place in response to drought and low agricultural productivity but became particularly prominent during colonial times when labour was needed in mines and on plantations. With the rise of the second wave of globalisation, intercontinental migration, in particular to Western Europe, has become more important over the past few decades for African migrants (Adepoju 1977; Arthur 1991; Findley 1997; Yusuf 2003).

Migration is deemed to play an important role in development and poverty reduction. Experts from FAO and the World Bank have estimated that exit from agriculture and migration could account for 30% and 50–60% respectively of poverty reduction in the agro-pastoral millet/sorghum system and pastoral/arid areas in West Africa (Dixon *et al*. 2001). A recent World Bank investigation has identified a positive significant relationship between international migration and poverty reduction at the country level (Adams and Page 2003). Therefore, policy formulation for economic development in West Africa needs to consider migration as a crucial variable (Adepoju 1977; Findley 1997). The consideration of migration as a crucial variable requires a clear understanding of the determinants and constraints of migration at the household level. Although studies on the determinants of migration in West Africa do exist [see for example Konseiga (2007) on Sahelian seasonal migration and Henry *et al*. (2003) on interprovincial migration in Burkina Faso], these have generally not analytically distinguished between different destinations of migrants. However, within rural areas of developing countries, different forms of migration tend to co-exist. Adams (1998), for example, demonstrated that, for Pakistan, internal and international migration are crucially different in the sense that the latter involves high entry costs but also generates remittances that impact much more strongly on the accumulation of physical assets than do internal remittances. Following this approach we propose that instead of a general concept of migration, two different forms of migration need to be distinguished in West Africa: migration within and outside the African continent.

Using data from Burkina Faso collected by one of the authors in 2003 and econometric methods, we

show that these two forms of migration – continental and intercontinental – are fundamentally different in underlying conditions. Continental migration takes place from households that are less well endowed, probably in response to consumption pressure and the need for income diversification, whereas only comparatively wealthy households are able to finance intercontinental migration due to high entry costs. Long-distance migration is also found to be linked to the existence of community and family networks, particularly because such networks loosen the entry constraint to this form of migration (e.g. Massey *et al*. 1993; Winters *et al*. 2001).

This paper first provides background information on migration in rural Burkina Faso. The third section presents a simple model describing the household decision to allocate labour to continental or intercontinental migration, which provides the conceptual basis for the analysis. The fourth section gives background information in the form of a description of the data and the study area. The econometric model used to determine the decision to engage in continental or intercontinental migration appears in the fifth section. The sixth section reports results of the estimation of the model. Based on the results of the estimation, conclusions are formulated in the final section.

Migration in rural Burkina Faso

Burkina Faso is a poor landlocked country situated in the West African Semi-Arid Tropics. With a population of around 12.1 million in 2005 (World Bank 2005), Burkina Faso is one of the most densely populated countries of the West African Sahel (World Bank 2003). For the majority of the population, agriculture forms the main source of subsistence (World Bank 2005). Conditions for agriculture are far from favourable in most of the country. It has a limited resource base and a harsh climate with limited rainfall, and land degradation is a predominant feature (World Bank 2003). In view of these unfavourable conditions, it should not be surprising that rural households have resorted to income diversification strategies, such as migration, to secure their livelihood.

Population movements in Burkina Faso date back several centuries but large-scale migration finds its origin in colonial times. During this period large numbers of rural Burkinabé migrated to work on plantations and mines in countries such as Ghana, Nigeria and the Côte d'Ivoire, among others, to be able to pay taxes introduced by the colonial government (Adepoju 1977; Arthur 1991). Migration to Côte d'Ivoire has continued until recently. However, due to the unstable political situation, ethnic tensions, and the anti-foreigner sentiment in Côte d'Ivoire, this migratory movement now barely exists and remittances have all but dried up. Many Burkinabé now migrate to the capital of their country, Ouagadougou. In West Africa, the distinction between migration within a country and migration within the region is often blurred by a close cultural affinity between homogeneous peoples on opposite sides of national borders – which leads migrants to regard intraregional migration merely as an extension of internal movement (Adepoju 2007). Intercontinental migration, in particular to Western Europe, has become more important over the past few decades for African migrants (Adepoju 1977; Arthur 1991; Findley 1997; Yusuf 2003).

Various theories that explain why people migrate have been postulated. According to Ravenstein (1889), household members migrate from areas with few opportunities to areas of high opportunity predominantly motivated by economic considerations. Lee (1966) subdivides these economic considerations into push and pull factors. Todaro (1976) highlights the importance of the expected rather than the actual earnings differential as a pull factor. Stark (1991) emphasises that migration is not necessarily an individual decision, but the result of a complex set of negations within the household. According to Stark, to explain migratory movement, attention needs to be paid to conditions in the area of origin, in particular to income uncertainty, missing or imperfect markets, and risk. A complementary line of research on the determinants of migration has focused on the importance of migrant networks in the migration decision. It has been postulated that the network theory of international migration provides a framework for understanding the relative importance of non-economic versus economic factors. However, if networks are a means of transmitting information from those with migration experience to potential migrants, and network members assist new migrants, networks lower the entry costs to migration and are therefore likely to serve an important economic function that influences the decision to migrate (Winters *et al*. 2001).

Studies explaining migratory movement often consider migration to be a homogeneous act, whereas with the rise of migration to Europe, two forms of migration need to be distinguished in the context of rural Burkina Faso: migration within the African continent and migration between continents, primarily to Europe. These two forms of migration may in fact have different explanations. Intercontinental migration is highly lucrative in terms of remittances sent back to the household but involves high entry costs. It is therefore likely that households able to engage in intercontinental migration are comparatively wealthy and can respond to opportunities for wealth accumulation elsewhere[1]. Continental migration generates comparatively little money in terms of remittances and it can be hypothesised that households engaging in continental migration are comparatively poor and members are pushed out of rural areas due to consumption pressure and/or the need to diversify sources of income[2]. In addition to differences in physical wealth, networks are also likely to play differential roles in internal versus international migration. Networks serving to reduce the entry cost of

migration are likely be more important in assisting more costly international migration than less costly internal migration (Taylor 1986).

Theoretical considerations

Migration influences household utility in a number of ways. It reduces household size, freeing up resources for the remaining household members. Migration is also likely to result in remittances, as migrants tend to send part of their income back to the household. In a perfect market environment, these would be the only effects of migration. Survey results, however, suggest that households in rural Burkina Faso are confronted in their decision-making with three missing markets, for labour, land and credit.

Households hardly make use of hired labour. In the survey, only about 2% of total labour use in agriculture in days consisted of paid labour. Exchange labour in the form of work parties is slightly more common, but is limited to a few crops with particular patterns of seasonality. The missing market for labour in this case may be explained by the lack of a landless class and high homogeneity in factor endowments (De Janvry *et al*. 1991). There also appears to be a cultural barrier to offering one's labour for a wage as it is thought to show lack of ability to sustain production on one's own fields (Mazzucato and Niemeijer 2000).

In rural Africa land markets often barely function and are generally quite thin (Lanjouw *et al*. 2001). For Burkina Faso, research findings suggest that cultivation on the basis of hereditary possession is most common (Ouedraogo *et al*. 1996). Using a 4-year panel study (ICRISAT) of households in three different agro-climatic zones of Burkina Faso, Udry (1999) finds evidence for a missing land market when testing for profit maximisation in agriculture. In the study villages, where high population density has led to land scarcity (Kessler and Geerling 1994), not a single land transaction was recorded in the data[3].

The lack of commercial land market transactions implies that land cannot function as collateral for credit. Restricted options for collateral and collateral substitutes imply severe limitations in access to a formal credit market. In addition to a lack of collateral, it has been shown that credit and insurance markets in low-income countries often suffer from moral hazard, information problems and covariance of crop output for households in the same region (Binswanger *et al*. 1989; Binswanger and Rosenzweig 1986; Fafchamps *et al*. 1998; Reardon *et al*.1992).

If a perfect labour market does not exist, migrants present households with a loss of labour that can hardly be replaced by hired labour. This potentially creates a trade-off between household production and migration. In the absence of credit and insurance markets, migrants can be considered as financial intermediaries providing the household with a source of liquidity in the form of remittances, possibly influencing investment behaviour.

Migration constitutes an alternative mechanism of exchange in an imperfect market environment. Migration, particularly to intercontinental destinations, is costly and the differing income–time profile of the migrant and the household is likely to give rise to a contractual arrangement between the two parties. Such an arrangement spells out the distribution of gains (remittances) and losses (labour) associated with migration (Stark and Bloom 1985). The rationale for entering in such a contract is that each party, the migrant and the household, faces an income–time profile where a risk has to be incurred first and increased benefits are derived later. For West Africa, Gubert (2002) provides evidence that remittances are an important insurance mechanism for households.

Migration can thus be considered as a collective decision of the household and the (potential) migrant. The formal presentation of the model begins with the household's utility function which is concave and non-satiated and is defined over two goods: consumption of a composite good, X_c, and leisure, X_l; Z_u is a vector of household characteristics influencing utility:

$$U = U(X_c, X_l; Z_u) \tag{1}$$

The household budget constraint is given by:

$$p_c X_c = Y \tag{2}$$

where p_c is the price of the composite good and household income Y is derived from production of agricultural output (staple cropping, cash cropping and livestock keeping), Q_a, according to the following production function:

$$Q_a = Q_a(L_a, V_a, \bar{A}) \tag{3}$$

where L_a is household labour allocated to agriculture, V_a are variable inputs, and $\bar{A}$ represents fixed assets, including land. Households also generate income through production of self-employment output, Q_n:

$$Q_n = Q_n(L_n, \bar{A}) \tag{4}$$

where L_n is household labour allocated to self-employment activities. Households can also allocate labour to continental migration, L_c, to generate remittances, R_c:

$$R_c = \delta_c L_c w_c \tag{5}$$

where δ_c is the fraction of earnings from continental migration remitted and w_c are wages earned. Finally, remittance income, R_{ic}, can be earned by allocating household labour, L_{ic}, to intercontinental migration:

$$R_{ic} = \delta_{ic} L_{ic} w_{ic} \mid E \tag{6}$$

In equation (6), δ_{ic} indicates the fraction of earnings from intercontinental migration remitted and w_{ic} is the wage rate at the intercontinental destination. E indicates an entry constraint to intercontinental migration:

$$E \leq W^{max} = f(\bar{A}, N) \tag{7}$$

Intercontinental migration, as mentioned, generates high remittances ($w_{ic} > w_c$) but also involves high entry costs, particularly in the form of transport. It is therefore reasonable to assume that the entry constraint in the form of the costs that need to be met for sending out an intercontinental migrant, is a function of household wealth, W, where the maximum wealth, W^{max} available to a household is a function of fixed assets, A, as well as its access to a network, N. If entry costs exceed available wealth, international migration is not possible, and international remittances are zero.

Household income can thus be defined as follows:

$$Y = p_a Q_a(L_a, V_a, \bar{A}) - q_a V_a + p_a Q_a(L_a, \bar{A}) + \delta_c L_c w_c - c_c L_c + \delta_{ic} L_{ic} w_{ic} \,|\, E - c_{ic} L_{ic} \tag{8}$$

In equation (8), p_a are prices for agricultural produce, while q_a refers to the cost of purchasing inputs and c_c and c_{ic} refer to the costs involved in, respectively, continental and intercontinental migration. In the absence of a perfect labour market, labour allocation to the different activities is constrained by the time endowment of the household, T, given by:

$$X_l = T - L_c - L_{ic} - L_a - L_n \tag{9}$$

Incorporating the time constraint in the utility function and adding the budget constraint gives the following Lagrangian of the household's maximisation problem:

$$c_c L_c - \delta_{ic} L_{ic} w_{ic} \,|\, E + c_{ic} l_{ic} + p_c X_c \tag{10}$$

After rearranging first order conditions for labour, allocation can be combined in one equation and expressed as:

$$\begin{aligned} \frac{\partial U}{\partial x_l} &= \lambda p_a \frac{\partial Q_a}{\partial L_a} = \lambda p_n \frac{\delta Q_n}{\delta L_n} = \lambda(\delta_c w_c - c_c) \\ &= \lambda\left(\delta_{ic} w_{ic} \left| \frac{w_{max}}{E} - c_{ic}\right.\right) \end{aligned} \tag{11}$$

Equation (11) indicates that, at the optimum, households allocate labour across activities so as to equate the marginal value of household leisure with that of time spent on each productive activity, that is, with the marginal product of labour. The solution to the maximisation problem is a set of labour supply functions for agriculture, self-employment, continental migration and intercontinental migration derived as functions of all exogenous variables:

$$L_i = l(Z_u, N, T, \bar{A}, w_c, w_{ic}, p_a, p_n, q_a, c_i, c_c, c_{ic}) \tag{12}$$

Data and study area

To uncover motives for household labour allocation to continental and intercontinental migration we apply the model developed above to data from a household survey held in two villages in rural Burkina Faso in February and March 2003. The two villages were purposively selected to test for heterogeneity in migration. The selection criterion was the prominence of intercontinental migration in these specific villages in addition to the much more common continental migration. Cross-section data were recorded for a random sample of 60 households in Niaogho and 43 in Béguédo.

The survey villages, Niaogho and Béguédo, are situated on the southern part of the Central Plateau. The Central Plateau comprises the central region of Burkina Faso and represents a part of Burkina territory where the intensity of soil occupation is much higher compared with other regions. The Central Plateau has a population density of 54 inhabitants per km^2, whereas population density is 30 inhabitants per km^2 for the country as a whole (Breusers 1998). Soil occupation is particularly intense in the regions where the survey villages are located (Djiguemdé 1988). High population density is said to have led to a saturation of space on the Central Plateau. In addition, lands on the Central Plateau are generally overexploited and degraded (Brasselle *et al*. 2002; Breusers 1998; Reyna 1987).

Households were selected as randomly as possible in the absence of any pre-existing census maps. This first entailed determining the layout of a village. Subsequently, each enumerator was sent out in a different direction and selected households at an equal distance from one another, ensuring that all peripheral areas were covered. Although an attempt was made to interview several household members, in practice the head of the household answered most of the questions.

Farm households in Niaogho and Béguédo can generally be described as extended, as they often not only comprise the household head and his wives, but also their grown-up sons with their wives and children. Family members were included in the extended household definition if they were living in the same compound and had meals together. The average resident household contains around 13 members of whom about 60% are active. Migrated members were included if they were taken into account by the head of the household in the household inventory[4]. Information on migrated household members was obtained from the head of the household, including duration of absence, destination, reasons for migrating and remittances received by the household.

Agriculture constitutes the largest income share for households in the two villages. Households were found to engage in the cultivation of staple crops, mainly millet and sorghum. A number of households

Table 1 Income composition across per capita household income quintiles (2002)

Quintile	Income per capita (FCFA)[a]	Staple cropping	Cash cropping	Livestock	Non-farm	Remittances continental	Remittances intercontinental
Lowest	11 839 (4231)[b]	65 (100)[c]	12 (65)	0 (25)	14 (30)	5 (45)	4 (5)
Second	24 219 (2793)	59 (100)	25 (100)	1 (55)	10 (25)	0 (25)	5 (15)
Third	36 419 (4201)	40 (100)	16 (85)	5 (85)	23 (60)	5 (40)	11 (35)
Fourth	53 528 (7822)	36 (100)	15 (90)	2 (65)	26 (55)	5 (40)	16 (35)
Highest	110 675 (38 783)	27 (100)	12 (90)	10 (85)	23 (60)	4 (20)	24 (50)

Source: Wouterse's survey of 103 households

Notes

Migrants are not included as household members.

[a]200 FCFA = 1$ (PPP 2005) (World Bank 2008),

[b]Standard deviations in parentheses.

[c]Figures in parentheses are percentage of households in income quintile that participated in respective activity.

were found to engage in horticulture on waterside plots. In addition to cropping, many households keep cattle and small ruminants. Income derived from livestock is mainly in the form of embodied production (increase in weight or herd size) while the sale of livestock produce is rare. Households also engage in non-farm activities to supplement agricultural income. Non-farm activities tend to be self-employment and labour-intensive activities such as pottery baking, weaving, and food preparation and sales. A missing market for agricultural labour and the finding that most non-farm activities are self-employment activities and not wage labour indicate that local labour market perspectives are limited. The nearest big city, the capital Ouagadougou, is located at such a distance from both villages that migration is required to take advantage of the labour market there.

In both villages, household members were found to engage in migration. In fact, 72% and 51% of households in Niaogho and Béguédo respectively had had one or more migrant(s) during 2002. Household members were classified as migrants if they had been absent from the household for a period of more than a month during a 1-year period. Migrated household members were found to nearly always stay away permanently, which is defined as absence throughout the year (Stark and Fan 2007). With regard to the destination of migrant(s), two forms of migration can be distinguished: continental and intercontinental migration.

Continental migrants are generally young men who leave to attempt to find work elsewhere. As mentioned previously, the destination of many continental migrants has until recently been Côte d'Ivoire but now tends to be areas of presumed higher opportunity, such as the capital within Burkina Faso. Intercontinental migration is in nearly all cases embarked on by young men who have left for Italy to initially engage in horticulture around Naples. More than 90% of households with an intercontinental migrant receive remittances whereas the figure is much lower for continental migrants, at only about 60%. To find out in which households the two different forms of migration are prominent it is useful to distinguish households by income quintile.

Table 1 shows that intercontinental migration takes place mainly in the highest income group, in which 50% of households have at least one intercontinental migrant. Clearly, the highest income households earn a much higher share of income in remittances from intercontinental migration. These results correspond to the findings of Adams (1998) for rural Pakistan.

To find out more about intercontinental migration one of the authors surveyed 20 Burkinabé migrants, who are members of the households included in the Burkina Faso survey, in Italy in 2004. The survey results suggest that migration to Italy started in the early 1980s when a Bissa from Béguédo working in Côte d'Ivoire was invited by his employer, an Italian, to work for him as a driver around Rome. Migration to Italy by men from Niaogho and Béguédo subsequently gained momentum through a network of mainly information. Although initially engaged in horticulture, most of the surveyed migrants now work as low-skilled labourers in industry in northern Italy, primarily around Bergamo and Brescia. These migrants have tended to leave alone but may send for their wife and children to come over at a later stage. Most migrants were found to have travelled by plane, which implies high entry costs, particularly in the form of transport to the destination. Survey findings highlight the importance of household physical capital as most households sold off liquid assets to finance migration to Italy. In addition to the important role played by physical capital in determining intercontinental migration, social capital in terms of access to a network also appears to be important.

Migration is an inter-temporal phenomenon, and because of its permanent nature (i.e. absence throughout the year) for the majority of migrants, labour

Table 2 Household descriptives (2002)

Variable	(1) Share of migration = 0 (*N* = 47)	t-test means (1) – (2)	(2) Share of continental migration > 0 (*N* = 28)	t-test means (2) – (3)	(3) Share of intercontinental migration > 0 (*N* = 28)	t-test means (3) – (1)
Household land holdings (ha)	3.51 (2.43)[a]	–0.57	3.84 (2.52)	–2.85	7.49 (6.29)	–3.89
Log waterside land (m^2)	5.16 (3.01)	–0.92	5.84 (3.17)	–1.13	6.84 (3.44)	–2.21
Number of adult sons	2.53 (1.28)	–4.77	4.29 (1.90)	–1.80	5.18 (1.81)	–7.40
Dummy for religion of head (1 = Muslim)	0.79 (0.41)	–1.16	0.89 (0.31)	–1.03	0.96 (0.19)	–2.13
Education level of head (years)	0.43 (1.66)	–0.28	0.54 (1.64)	–0.62	1.00 (3.59)	–0.94
Age household head	49.36 (13.39)	–0.20	50.04 (14.83)	–2.28	57.75 (9.98)	–2.87
Koranic school (number of adults)	2.42 (2.01)	–0.06	2.46 (4.41)	–1.65	4.64 (5.44)	–2.54
Secondary education (number of adults)	0.23 (0.94)	–1.28	0.54 (1.07)	0.75	0.36 (0.68)	–0.61

Source: Wouterse's survey
Note
[a]Standard deviations in parentheses.

allocation to migration during the survey year is likely to be a function of a decision taken some time before the survey was held. When estimating household labour allocation across income-generating activities, we can thus only consider variables that are presumed to have remained unchanged over time. Table 2 gives an overview of such variables.

With regard to household characteristics, a missing market for land implies that the quantity of land can be assumed to have remained unchanged over time. Land is considered to be a determinant of the income-generating ability of the household. The table shows that households with intercontinental migrants have much more land available for cultivation whereas the opposite applies for continental migrant households. Differences for waterside plots are less pronounced. Arguably the larger the area of waterside land, the wealthier is the household, as these plots are used for horticulture, a relatively lucrative activity. However, access to waterside land also presents the household with an on-farm income diversification option, which may reduce the need for migration to diversify income sources.

It is important to realise that, primarily due to polygamy, household size is often not stable over time. In Burkina Faso as in other parts of West Africa, the majority of the rural population lives in complex household units. Often, households are fraternal and married brothers of the head of the household live in the same compound and work the household fields, or paternal in which married sons work on their father's fields (Becker 1990). Both household forms imply that sons tend to stay within the household whereas daughters move to the household of their husband. The number of adult sons, including migrants, can therefore serve as a proxy for household size at the time of migration. Table 2 shows that households that allocate labour to migration of either type have more adult sons compared with households without migrants.

Human capital in the form of education may facilitate migration as it could function as an information provider. Education of the head of the household can be taken as an indicator of human capital in the household at the time of departure of the migrant. The access to a network of potential migrants and their households is also likely to explain migratory movement. Generally, the literature distinguishes the role of family and community networks in explaining migration. Both networks are expected to provide varying degrees of assistance and information to potential migrants. It is often assumed that the relevant social unit, and thus the network, is geographical in nature. Few empirical studies consider how networks may vary by community or individual characteristics, such as ethnicity, religion, or gender. Here we propose that the common characteristic of the network is not geographical but religious. In Burkina Faso, as in other countries, social contacts are often determined by religion; Burkina Faso has a large Muslim population. As in many other Muslim countries, public schools offer none or little religious education so children are sent to informal Koranic schools in which a master (*marabout*) teaches his method (*tariqah* which means 'way' or 'path') to his disciple (*talibe*). The ultimate aim of this school is to prepare the student to become a good Muslim. The individual relationship between *talibe* and *marabout* has always been the basis of a wider network of solidarity. Certain *marabouts* and brotherhoods of *marabouts* have developed and exer-

cise major political and economic power in the countries concerned. For example, those involved for years in the cash crop trade in Niger, Mali and Senegal have developed well capitalised commercial networks with ramifications in urban real estate and industry, and increasingly abroad, illustrated among others by the involvement of the Sufi brotherhood in migration from Senegal to New York (Massey and Taylor 2004). Muslim brotherhoods have also been recorded to give out loans to aspiring migrants and their households in Burkina Faso (Findley 1997). It is thus likely that households containing male household members who have attended Koranic school as children have access to a network through contact with a *marabout*, facilitating migration by lowering its entry cost. In our sample, only about half of Muslim households contain adults that have attended Koranic schools as children. Household wealth has been shown to determine the number of years children spend in Koranic schools, with wealthier households able to afford to keep their sons, sometimes even their daughters, in Koranic school longer. Further, ethnic group variables as well as membership data of a particular brotherhood, which were not collected here, have been shown to be important determinants of both attendance and duration of Koranic education. Finally, Koranic education tends to be negatively correlated with the formal education level of the household head (André and Demonsant 2009). Table 2 shows that intercontinental migrants originate from households where more adults have attended Koranic school during their childhood.

Empirical analysis of motives for migration

The differences in descriptive statistics at the household level, as given in Table 2, enable the postulation of the hypothesis that intercontinental migration, in contrast to continental migration, is an accumulation strategy embarked on by relatively wealthy households. As mentioned previously, a land market does not exist; thus, migration cannot facilitate land acquisition. Households with intercontinental migrants must thus have been comparatively wealthy from the outset, which explains their ability to overcome the entry barriers to this form of migration. In addition, networks appear to play differential roles in migration, being particularly important in explaining long-distance intercontinental migration.

To formally assess the determinants of household labour allocation to migration, a system of labour supply functions as specified in equation (12) is estimated. Equation (12) shows that labour allocation to agriculture, non-farm activities and continental and intercontinental migration is influenced by household characteristics influencing utility, household size, the household time endowment, prices, costs, household assets, networks, and wages for continental and intercontinental migrants. As mentioned, when investigating the motives for labour allocation to migration using cross-section data, it is only possible to use variables presumed to have remained unchanged over time. Household characteristics that influence utility and can be assumed to have not changed over time are the education level of the household head and his religious affiliation. Both household size for consumption and time endowment of the household can be approximated by using a variable for household size, as is common practice in modelling migration (Taylor *et al*. 2003). As mentioned above, the number of adult sons, including migrants, presents a stable indicator of household size over time. Prices are assumed to be region specific. We include village fixed effects to capture regional price differentials. Household assets also explain the probability that the household sends out a migrant. An important indicator of household wealth is the quantity of land available for cultivation. As mentioned above, a commercial land market is missing, and land quantity can be taken as given. In addition to the land quantity variable, the surface of waterside plots has been included[5]. Access to networks is captured by including the number of adults in the households who have attended Koranic school. Wages earned by the migrant and costs involved in migration largely relate to the destination of the migrant.

Our empirical model is a system of five jointly estimated labour supply equations appropriate in the case of different, competing livelihood strategies (Shively and Fisher 2004). Although generally labour supply tends to be estimated in hours or days, to avoid artificially converting the number of household members involved in migration to a time variable, we follow the approach proposed by Shively and Fisher (2004) in a developing country context and estimate labour share equations. Most analyses of labour supply encounter situations where selectivity in activity participation exists, thus raising the issue of selectivity or censored samples. Standard approaches to dealing with such censoring include the methods of Heckman and standard Tobit models (Mishra and Goodwin 1997). In this analysis significant proportions of farm households did not participate in self-employment, continental or intercontinental migration. Following Mishra and Goodwin (1997), this censoring is recognised through the application of maximum likelihood estimation of Tobit models for these activities[6]. Clearly, household decisions to allocate labour across activities and to leisure consumption are related and simultaneous equation estimators should be adopted. To estimate this multi-equation mixed process model, we make use of the maximum likelihood estimator using the Geweke–Hajvassilou–Keane (GHK) multivariate normal simulator (Roodman 2009; Ito and Kurosaki 2009). By construction the labour allocation shares sum to one; however, as we do not encounter households that are completely specialized, we do not need to impose

Table 3 Effects of household characteristics on labor allocation to migration

Explanatory variables	Labor allocation to continental migration (share)	Labor allocation to intercontinental migration (share)
Household land holdings (ha)	–0.02 (0.01)*[a]	0.02 (0.01)**
Log waterside land (m^2)	–0.00 (0.02)	–0.01 (0.01)*
Number of adult sons	0.10 (0.06)*	0.06 (0.01)**
Dummy for religion of head (1 = Muslim)	0.05 (0.10)	0.05 (0.06)
Education level of head (years)	0.01 (0.01)	0.03 (0.01)**
Age household head	–0.02 (0.01)**	–0.01 (0.02)**
Koranic school attendance (number of adults)	–0.02 (0.01)**	0.01 (0.00)*
Secondary education (number of adults)	–0.02 (0.04)	–0.04 (0.03)
Village fixed effects (Beguedo = 1)	–0.15 (0.06)**	0.08 (0.03)**
R^2	0.31	0.24
Number of observations	103	

Source: Wouterse's survey
Notes
*Denotes significance at the 10% level, **at the 5% level.
[a]Robust standard errors in parentheses.

this as the upper censoring value; we drop the equation for non-farm activities to avoid singularity of the disturbance covariance matrix.

It is important to note that omitted variable bias is a serious concern in a cross-sectional regression. Estimates using cross-sectional data will be biased if unobserved determinants of labour allocation are correlated with household characteristics. To the extent that unobserved village factors affect migration, adding village fixed effects addresses this source of bias. We use a robust estimator to account for the possibility of heteroskedasticity.

Table 3 presents the estimation results for two equations of the system of labour allocation shares – household labour allocated to continental or intercontinental migration. Findings demonstrate for the land variable that the two migration decisions are indeed different strategic decisions. Continental migrants are likely to originate from poorer households, that is, households with less land compared with households without migrants, while intercontinental migrants tend to come from wealthier households. The important role that networks play in more costly intercontinental migration by lowering entry cost to this form of migration is illustrated by the positive and negative influence of the number of adults that have attended Koranic school on intercontinental and continental migration respectively. Again, this finding underlines that the two forms of migration are different strategic decisions. In combination, these results support the hypothesis that continental migration arises from a lack of wealth and should be linked to push factors, whereas intercontinental migration as a constrained choice stems from wealth, and could be linked to pull factors. With regard to household size, Table 3 shows that the larger the household, that is, the more adult sons, the more likely it is that migration of either form will take place. The findings presented above could suffer from econometric problems inherent in the use of cross-section data and these should be kept in mind while interpreting our results. Labour allocation to migration during a particular period, in this case the year 2002, is likely to relate to a household decision to send out a migrant, which was taken some time before the survey took place. To address this possible source of endogeneity, our right-hand side variables have been selected because of their relatively time-invariant nature.

Conclusion

In this paper the conditions underlying two different forms of migration taking place in two villages in Burkina Faso have been investigated. The econometric findings have identified continental and intercontinental migration as two different strategic decisions. A positive significant relationship has been established between wealth and intercontinental migration. Households with intercontinental migrants are wealthier and able to respond to opportunities for wealth accumulation in Europe. The negative significant relationship between wealth and continental migration indicates that households that send out continental migrants are relatively less well endowed and are not able to take advantage of more lucrative opportunities for migration. It is likely that these households send out migrants in response to push factors, such as lack of land and consumption pressure. In addition to wealth, religion-specific networks are also important in explaining intercontinental migration. Religion-specific networks are likely to loosen the entry constraint to this form of migration.

Our findings suggest that a distinction between two different forms of migration is necessary not only for an understanding of the causes but also of the consequences of migration for developing countries. Intercontinental migration generates high income in terms of remittances and could therefore play an important role in local economic development. However, long-term and long-distance migration of relatively well educated and wealthy men could cause a 'brain drain' from the rural economy, lowering the productivity level, and hence wages, of complementary labour in migrant-sending areas.

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Notes

1 Although a couple of households had both continental and intercontinental migrants, continental migration for these households had taken place in nearly all cases for educational purposes or had taken place in Côte d'Ivoire, preceding intercontinental migration. In addition, testing for equality of means for remittances and household characteristics does not reveal any significant differences between the few households with both types of migration and households with only intercontinental migrants. Bearing this in mind, and the limited number of observations, households with both types of migrants were included in the group of intercontinental migrant households.

2 We encountered a few households with only internal migrants, that is, migration within Burkina Faso. However, the limited number of observations does not allow for the creation of a separate category for households with this type of migrants. Furthermore, internal migration is similar in the two characteristics considered relevant here: cost of entry and remittances, justifying incorporation of households with internal migrants in the continental migration category.

3 A couple of irrigated plots in the two northern villages were found to be rented.

4 Women who out-migrated for marriage were not considered as migrants.

5 Holdings of waterside land vary greatly. Taking the quantity of waterside land in log-form reduces this variation.

6 A drawback of this approach is that its validity is based on the assumption that the decision to participate in a particular activity is similar to the decision of how much labour to allocate to that activity, given participation.

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