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**Internal Migration and Rural Service Provision in  
Northern Ghana**

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Knowledge, Capacity, and Innovation Division

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## **ABSTRACT**

This paper uses a two-stage conditional maximum likelihood procedure and new data from Ghana to identify the determinants of rural-urban migration at the individual, household and community levels, with a particular focus on rural services. The econometric evidence supports the theoretical expectation that human-capital and network variables as well as assets are important determinants of migration. Taking the possible endogeneity of rural services into account, the evidence suggests that rural service improvements aimed at reducing economic isolation can enhance labor mobility and free up on-farm labor for migration by lowering transaction costs.

**Keywords:** West Africa, rural-urban migration, rural services



# 1. INTRODUCTION

Diversification into non-crop income-generating activities has been identified as a critical livelihood strategy for rural households, particularly in Africa (Barret et al. 2001). The reasons why individuals and households pursue diversification as a livelihood strategy are often divided into two overarching considerations: necessity and choice (Ellis 2000). Migration represents one diversification strategy, and the mobility of rural dwellers is often explained as being the result of push and/or pull factors (e.g., Bigsten 1996). Push factors refer to factors that induce desperation and trigger involuntary migration (e.g., land scarcity), while pull factors refer to those that trigger proactive, voluntary migration (e.g., high urban wages) (Bigsten 1996).

However, although the division of the determinants of migration into push and pull factors is descriptively attractive, it is misleading. In practice, migration reflects a continuum of causes, motivations, and constraints that vary across individuals and households at a particular point in time, and for the same individuals or households at different points in time (Ellis 2000). Instead of the pull-push dichotomy, the determinants of migration may be more appropriately divided among a number of key considerations: seasonality, risk, labor markets, credit markets, asset strategies, and coping behavior (Ellis 2000). These considerations are not mutually exclusive as determinants of diversification; rather, they constitute distinct but overlapping forces and processes leading to diversification. Extra-household variables, such as rural services and the proximity of a developed urban center, may influence these key considerations in various ways. For example, a developed urban center may provide employment opportunities for supplementing farm income (Bilsborrow et al. 1987); infrastructure could enhance market participation by reducing transaction costs, thereby improving rural incomes (Renkow et al. 2004); and credit provision could address an important source of market failure.

Decentralization involves the transfer of authority and responsibility for public functions and/or financial and infrastructural resources from a central government to subordinate governments at the provincial and/or local levels. By allowing public expenditure decisions to be made at a level of government that is closer and more responsive to a local constituency, decentralization is thought to have the potential to improve local service provision (Litvack and Seddon 1999), which is intimately linked to migration and its determinants. For example, improvements in infrastructure that facilitate access to input and output markets could improve agricultural productivity, consequently reducing an individual's need to migrate away from consumption or security concerns. Improvements in agricultural services, such as credit provision, could reduce the need to migrate by improving the availability of funds for purchasing inputs or capital equipment. However, it is also possible that new economic and other opportunities (e.g., a labor market) provided by the urban centers hosting these lower levels of government could divert rural migrants away from the larger urban centers. The relationship between migration and rural-service provision is therefore ambiguous, and should be determined empirically.

This paper uses econometric methods and new data from Ghana to explore the determinants of internal migration at the individual, household and community levels. The analysis is based upon unique new panel data collected by the International Food Policy Research Institute (IFPRI) in collaboration with the Institute of Statistical Social and Economic Research (ISSER) in early 2008 and 2009, from 390 households in 30 communities representing two districts in the northern region of Ghana. Northern Ghana has long been characterized by outmigration. Rural households in these communities send out internal migrants for prolonged periods, primarily to the large urban centers in the south (although there is also some circular migration). In 1988, the government of Ghana initialized a decentralization program intended to improve public services and reduce poverty by "bringing government closer to the people." A key objective of the decentralization program is the promotion of district capitals as a means of reducing rural-urban migration and slowing down the rapid growth of the large urban centers. So far, however, decentralization has not yet managed to achieve the latter goal (Owusu 2005).

The present paper tests the determinants of long-term internal migration at the individual, household and community levels. The results show that human capital is important at the individual level,

while assets and networks explain migration at the household level. At the community level, rural services that reduce economic isolation are positively associated with migration. Improved rural services facilitate integration of the markets for goods and labor, and free up on-farm labor for migration by lowering transaction costs.

The remainder of the paper is organized as follows: Section 2 describes the importance of migration in Ghana and examines some of the theories regarding its determinants. Section 3 describes the study area and the data. Section 4 presents the methodology used to explore the determinants of internal migration, and provides the conceptual basis for the empirical analysis. Section 5 reports the econometric results. Section 6 concludes by discussing implications for understanding the determinants of migration, particularly the role of rural services.



## 2. BACKGROUND

### Past and Present Migration in Ghana

Ghana's population is characterized by high mobility: 54 percent of Ghana's population was classified as migrant in 1991-92, and the migrant share in the population was 50 percent in 1998-99 (Litchfield and Waddington 2003). Migratory movement within and out of Ghana dates back to a period long before colonization, when trading activities stimulated flows of traders from neighboring territories. More recently, the development of gold mines and cocoa farms in the late nineteenth century through the second half of the twentieth century attracted many migrants. Historically, Southern Ghana was the main region of immigration by predominantly unmarried young males (Anarfi et al. 2003). Ghanaians began to emigrate around 1965, when the country experienced a severe economic crisis. Larger-scale emigration began in the 1980s, when many unskilled and semiskilled Ghanaians left the country in search of jobs in neighboring West African countries. This most recent phase of Ghanaian emigration, which has been classified as "the new diaspora," has increasingly involved skilled migrants and more diverse destinations, such as the U.S. and Europe (Abdulai 1999; Anarfi et al. 2003).

Despite these trends of international migration, a Ghanaian household is more likely to produce an internal migrant than an international migrant. Northern Ghana in particular has long been a region of internal outmigration. The British recognized that the southern forest region had the country's strongest potential for development, and accordingly promoted the northern savannah largely as a major source of labor for southern industries and agriculture. This held true even in more recent years, further impoverishing the north and stimulating a buoyant urban economy in the south and center (e.g., Kumasi) of the country (Anarfi et al. 2003). Traditionally, north-south migration in Ghana was largely male-dominated, long-term and long-distance. More recently, however, a new dominant north-south migration stream has emerged: that of female adolescents moving independent of their families, largely towards the cities of Accra and Kumasi (Awumbila and Ardayfio-Schandorf 2008). This form of migration appears to be part of a pattern of labor circulation between the north of Ghana and Accra. Moving costs are relatively low, and migrants typically move more than once in their lifetimes. In terms of remittances, a study found that only one in four internal migrants transfers money back to the household, and these transfers are generally low (Tutu 1995).

### Determinants of Internal Migration

The Harris-Todaro (1970) two-sector model of migration dominated economists' thinking about migration in developing countries through most of the 1970s. During this period, empirical studies (e.g., Fields 1982; House and Rempel 1980) used aggregate data to look for evidence of migration leading to the equilibration of expected wages, where the likelihood of finding employment in the urban sector was factored into the migrants' expectations of wages at their destinations. However, these studies revealed that changes in the conditions at the migration origin do not always lead to the outcomes predicted by the Harris-Todaro model. In particular, the above-cited studies found that higher incomes in the migration origin did not necessarily deter outmigration. Therefore, in the 1980s, development economists began to turn their attentions towards 'push' and 'pull' factors in the outmigration decision. More recently, it has been suggested that migration decisions are made in the context of existing institutional and structural labor market conditions, local wealth-property relationships, and geographic disparities in economic opportunities and services (Bilsborrow et al. 1987). Instead of a push-pull dichotomy, the determinants of migration may be more appropriately cast along a continuum that can be divided into six key considerations: seasonality, risk, labor markets, credit markets, asset strategies, and coping behavior (Ellis 2000). For example, migration is likely to stem (at least in part) from the need for risk reduction (Barret et al. 2001). Rural households are frequently faced with a high degree of income variability. In the face of incomplete insurance markets, remittances provide an income source that is not correlated with agricultural income (Reardon et al. 1992). At the village or community level, assets (e.g., infrastructure)

and the operation of credit markets have been shown to lead to significant differences in migration outcomes at the household level (Nabi 1984). Areal, or contextual, variables often closely approximate policy instruments, and decentralization in particular influences the geographic disparities in economic opportunities and services (Bilsborrow et al. 1987).

The determinants of migration are thus likely to lie within the important key considerations that characterize the livelihood positions and prospects of households in rural communities. However, not all individuals can respond to migration opportunities in the same way; instead, the characteristics of the potential migrant play a vital role in explaining migration. At the individual level, the selection aspects of migration, particularly immigration, have been highlighted. The human-capital view of migration, for example, implies that individuals who self-select into migration are those for whom, over time, the expected-income differential between migration and non-migration is greatest and/or the migration costs are lowest (Taylor and Martin 2001). It has been argued that selection decisions are related to immigrant quality outcomes. The selection of immigration by an individual is therefore seen to be indicative of that individual's true quality relative to the home country's population (Borjas 1987).

The causes and dynamics of internal migration in Ghana have been the topic of numerous studies. The high population growth rate in Ghana over the past three decades is thought to have encouraged migration by generally increasing the domestic supply of labor and putting pressure on the available cultivable land (Abdulai 1999). The macro-economic environment is also believed to have influenced rural-urban migration in Ghana; urban-biased policies have resulted in terms of trade that are unfavorable for agriculture and rural areas, widening the rural-urban income differentials (Abdulai 1999). In a study of the Volta Basin, Tsegai (2007) found that income differentials were an important determinant of migration. In terms of determinants related to individual characteristics, Twumasi-Ankrah (1995) reported that the background of the rural-urban migrant population in Ghana is mixed, and that education enables migrants to take advantage of employment opportunities offered in urban areas. However, other determining factors, such as the lack of prestige of farm work, the social degradation and stigma associated with rural living, and the lack of appropriate jobs and social amenities, are thought to have similar effects on both educated and uneducated individuals. The recent stream of young female migrants circulating between northern Ghana and Accra, where they tend to work as porters (*kayayei*), has been shown to be related to poverty, a lack of education and employment opportunities, and the need to accumulate wealth in preparation for marriage (Awumbila and Ardayfio-Schandorf 2008).

The issue of migration is particularly important to Ghana because the country has a long tradition of population mobility and is at the forefront of the urbanization trend, with continuing increases seen in both the scale of rural-urban migration and its proportion of all migration. However, although numerous studies have examined migration in Ghana, some important gaps remain in the literature. The existing studies on the dynamics and determinants of internal migration in Ghana have largely focused on individual- and household-level characteristics, even though Ghana has implemented a decentralization program requiring the transfer of financial resources, infrastructural resources, power, and authority to the district level.

One possible starting point for examining the relationship between decentralization and migration is the use of a farm household model (Singh et al. 1986; Ellis 1993). The household economic model predicts migration as a function of on-farm returns to labor time compared to off-farm earning opportunities. With a given asset base (i.e. land plus farm infrastructure and equipment) and a given amount of total labor time, the household's decision is based on a comparison of the returns to using more of that time on the farm versus deploying it to non-farm wage earning or other income-generating activities. Factors that increase the returns to time spent on farm activities would tend to reduce the motivation to migrate. Two such important factors are increases in farm output prices and farm productivity. Conversely, a rise in off-farm wage rates and greater opportunities to undertake remunerative off-farm employment would increase the motivation to migrate.

Decentralization is expected to improve service and infrastructure delivery in poor rural communities (Owusu 2005). Improved infrastructure and service provision can work in a number of ways to enhance the returns to the on-farm labor supply. Better transportation and communication infrastructure

facilitates spatial integration of product and factor markets, thereby lowering transactions costs. By lowering the transaction costs of market exchange, infrastructure can boost the net returns to agricultural production (Renkow et al 2004). By increasing the returns to agricultural production, decentralization may therefore reduce the need for migration as means to supplement agricultural income or reduce risk through income diversification. However, improving rural service delivery by reducing economic isolation may also foster the movement of labor. Finally, and of particular importance in an imperfect market environment where hired labor cannot easily substitute for own-farm labor, reductions in transaction costs due to better infrastructure can relax the time constraint of a household. This could free up labor to take advantage of the off-farm employment opportunities that may become more readily available and remunerative due to the increased spatial integration of the factor markets.

The important role of decentralization in the Ghanaian economy implies that migration cannot be analyzed without taking institutional factors into account. Recent studies have largely focused on the dynamics, causes and consequences of international migration, with relatively less attention paid to movements within the country, even though the latter remain significant and are almost certainly more relevant to the poorest sections of the population. This study is the first to empirically link community-level rural service provision to the determinants of migratory movement.

### 3. DATA AND STUDY AREA

The data used herein to identify determinants of internal migration at the individual, household, and community levels come from two surveys. The first data source is an IFPRI-ISSER household- and community-level survey aimed at assessing ways to make rural service provision work for the poor. This survey was conducted in four districts of Ghana from February to April of 2008, and includes data on markets, rural service provision and infrastructure. The second data source is a survey in which 390 households from 30 communities in two of the originally surveyed districts (Tolon Gumbungu and West Gonja) in the northern region of Ghana were revisited in April 2009. The northern region, which is mainly covered by savannah, represents one of Ghana's key agro-ecological zones. Within this region, the two districts were selected to represent differences in agricultural productivity and the level of service provision. Tolon Gumbungu is more densely populated, has a higher road density, is more productive in terms of cereal yield, and has higher yield and production growth for this crop. However, poverty is more widespread, with a headcount ratio of 83.5 (compared to 57.2 for West Gonja) and a much larger poverty gap. The population density is about seven times higher in Tolon Gumbungu than in West Gonja. Agriculture is the main income-generating activity, explaining (at least in part) the difference in the headcount poverty ratio. For the survey, the selected communities were sampled proportional to the number of Electoral Areas (EAs) in the two districts. Tolon Gumbungu comprised 41 EAs, 20 of which were randomly selected, while West Gonja had 20 EAs, 10 of which were picked at random. From each selected EA, a single community was randomly selected; subsequently, 13 households were randomly sampled from each selected community. The data collected in the household survey include household characteristics, information on migration (e.g., the absence length, destination, and activity of current and returning migrants, as well as remittances), detailed plot-level data on agricultural production, income data for other activities, information on household assets, and detailed expenditure data.

The farm households in the study area can be described as extended. In a polygamous setting, they often comprise not only the household head and his wife (wives) but also their grown children (usually sons, as daughters often move to their husband's compounds) and grandchildren. In the survey, an individual was included as a household member on the basis of being present and usually eating and living in the household. Among the surveyed households, agriculture (cropping and livestock rearing) was the major economic activity; maize was the main food crop, while groundnuts were cultivated mainly for cash purposes.

In the studied region, cultivation is mainly rain-fed, and there is a unimodal rainfall of erratically distributed torrential rains (Mensah-Bonsu 2003). The region's soils are generally low in organic matter. In northern Ghana, the high rate of population growth has decreased the frequency of fallow periods to a point that is inadequate for soil-fertility restoration. The consequent deterioration of farmland has led farmers to increasingly cultivate marginal lands (Mensah-Bonsu 2003). Livestock rearing remains mainly free-range. Larger animals, particularly cattle, sheep and goats, are kept for multiple purposes. Most importantly, livestock represents a capital asset, enabling the farm household to meet unexpected expenditures, for example when income is low due to a shock (Udo and Cornelissen 1998). The self-insurance value of livestock is more limited in the case of correlated shocks (e.g., drought) that affect both livestock and crop production (Dercon 2002). Livestock also functions as a portfolio investment option in the absence of other means for storing wealth (Moll 2005).

Contrary to the situation in South Asia and many other areas of the developing world, farm income and overall wealth are not well correlated in rural West Africa (Abdulai and Delgado 1999). This is probably due to the lower constraints on land access in West Africa, along with the relative scarcity of high-yielding agricultural technologies in Africa. This suggests that access to non-farm income in West Africa may be a critical means for alleviating poverty in rural areas (Abdulai and Delgado 1999). In the survey area, households were found to supplement their agricultural incomes with traditional non-farm activities such as shea butter extraction and grass weaving. Migration also represented an important non-farm activity for the surveyed households. Migrants tended to stay away for more than a year, although

circular migration was also reported. In terms of migration typologies, rural-urban migration was most common, although rural-rural migration also took place.<sup>1</sup> The urban centers (Tamale, Accra and Kumasi) were important destinations of the migrants. In terms of prominence per district, the incidence of migration was somewhat lower in Tolon Gumbungu, where 18 percent of households had at least one adult rural-urban migrant who left after February 2008 for economic reasons. This is in comparison to 23 percent in West Gonja. Remittances sent back to the household by an internal migrant were about 100 Ghana Cedis (GHS) on average during 2008.<sup>2</sup>

In terms of markets, the survey results indicate that hired labor was used on about one third of the farms during all three stages of the production process (i.e., preparation and planting, weeding and fertilizing, and harvesting). In terms of land, although northern Ghana has a history of land abundance and free access for those willing to settle in the region, the lack of written records and basic data concerning transactions, the lack of permanent boundary indicators, and the demand for “drink money” by some corrupt land owners are said to have led to land disputes, litigation and related problems in some parts of the north (Kasanga and Kotey 2001). In Ghana, the allodial title<sup>3</sup> to land (i.e., ultimate control) is often vested in the community, and individuals and families from the landholding group have a “customary freehold” denoting the near maximal interest in land. These interests are secure, alienable and inheritable. Generally, inheritance and succession to land are determined by patrilineal systems, and research suggests that customary inheritance practices persist, particularly in rural areas (Kasanga and Kotey 2001). In the study area, therefore, although some households leased their land, plots were generally not registered, and there was no formal land market.

In 1988, Ghana initiated a decentralization process in which it transferred financial resources, infrastructural resources, power, and authority to district assemblies, charging them with enhancing the living standards in rural settlements and other centers at the lower levels of the settlement hierarchy. To date, Ghana’s decentralization program has been associated with a considerable variation in service delivery performance. Access to credit is generally low; 7.3 and 4.6 percent of households in Tolon Gumbungu and West Gonja, respectively, received a loan from outside the community during 2008.<sup>4</sup> In terms of agricultural services, extension visits have not been widespread; only 8.4 and 6.9 percent of households were visited by an agricultural extension agent during 2008 in Tolon Gumbungu and West Gonja, respectively. Substantial differences exist at the district level in terms of the number of agricultural services located in a given community. The surveyed agricultural services included the presence of a grinding mill, a bullock or tractor that may be hired for plowing, a vehicle to transport agricultural outputs, a vehicle to transport harvest, a donkey for hire, and veterinary services. Communities in West Gonja had access to an average of five of these services, whereas communities in Tolon Gumbungu averaged only four. A large difference was seen in grinding mills, which were present in 67 percent of the communities in West Gonja versus only 33 percent of the communities in Tolon Gumbungu. In terms of market availability, the distance to the nearest output market for the main crop was about 7.5 kilometers on average for communities in Tolon Gumbungu and 8.6 kilometers for communities in West Gonja. Markets were held weekly near more than half the communities in the former district, whereas they were held less frequently in most of the communities in West Gonja. The difference between the two districts in terms of distance to the nearest input market is substantial: The communities in West Gonja were located about 25 km from an input market, versus 13 km in Tolon Gumbungu. Regarding infrastructure, a

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1 Of all individuals engaged in migration, either currently or in the past, only about 10 percent were rural-rural, in the sense that they migrated to a rural area and engaged in agricultural activities at their destination.

2 In 2007 PPP (Purchasing Power Parity) 0.41 GHS=1US\$ (World Bank 2008).

3 In some systems of property law, allodial title describes a situation where land is owned free and clear of any encumbrances, including liens, mortgages and tax obligations. Allodial title is inalienable, in that it cannot be taken by any operation of law for any reason whatsoever.

4 In terms of demand for loans, 5.5 percent of households indicated that they had applied for a loan and been refused. About 15 percent of households indicated that they had not applied for a loan because they did not have collateral. This seems to indicate that there is a demand for loans which may exceed the supply in the studied region.

surfaced feeder road (asphalt, gravel or bitumen) led to 60 percent of communities in West Gonja, versus only 30 percent of the communities in Tolon Gumbungu.

Overall, households in the much more densely populated and poorer district of Tolon Gumbungu seemed to be better off in terms of market proximity, whereas households in West Gonja were better off in terms of infrastructure and agricultural services. The effect of this disparity in rural service provision on outmigration is ambiguous. Economic isolation has been associated with higher transaction costs. Spatial integration through improved rural services (e.g., infrastructure delivery or proximity to markets) is thus likely to boost net returns to agricultural production and reduce the need for migration (Renkow et al. 2003). However, improving rural service delivery by reducing economic isolation may foster the movement of labor.

## 4. METHODOLOGY

Migration decisions are made in the context of prevailing institutional and structural labor market conditions, local wealth-property relationships and geographic disparities in economic opportunities and services. In addition, the characteristics of the potential migrant and his/her household are also important. The investigation of the factors that influence migration is thus best carried out using a model that incorporates factors at both the micro (or individual/household) and areal (or contextual) levels. Omission of either of these subsets of explanatory variables is likely to result in misspecified equations and biased estimates of causal relationships (Bilsborrow et al. 1987). This study uses an econometric analysis of rural households in northern Ghana to identify determinants of internal migration at the individual, community and household levels. Survey data collected in origin areas are used to examine how origin characteristics affect outmigration from rural to urban areas. Outmigration may occur in two ways: First, one or more individuals may migrate while other members remain behind; second, the entire household may migrate. In the latter case, there is no one left in the area of origin to provide details on the circumstances surrounding the household's departure. Therefore, an origin-area survey can only provide reliable information for analyzing the determinants of outmigration by individuals (Bilsborrow et al. 1987).

Migration decisions are based on a process whereby an individual  $i$  in household  $j$  in community  $k$  takes into account information at all three levels. The simplest form of a general multilevel model of individual migration, as applied by Bilsborrow et al. (1987), takes the following form:

$$M_{ijk,t} = f(X_{ijk,t}, X_{jk,t}, X_{jk,t-1}, X_{k,t-1}) \quad (1)$$

where  $M_{ijk,t}$  refers to the probability of migration of the  $i$ -th individual in the  $j$ -th household in the  $k$ -th community at time  $t$ , and  $X_{ijk,t}$ ,  $X_{jk,t}$ ,  $X_{jk,t-1}$  and  $X_{k,t-1}$  refer to individual characteristics at time  $t$ , household characteristics at times  $t$  and  $t-1$ , and community-level characteristics at time  $t-1$ , respectively. The dependent variable is a simple binary choice variable: whether or not to migrate from a rural area. Here, I analyze the probability of an adult son or daughter (15 years or older in 2008) of the household head to have left the rural household and gone to an urban location for economic reasons between February 2008 and March 2009, relative to being a non-migrant during that period. The one-year cut-off was chosen to focus on recent behavior and to allow the analysis to incorporate household- and community-level data collected in February 2008. Notably, this classification excludes a large category of women who migrate for marriage. Migration for educational reasons is classified as being for economic reasons, as this choice is generally motivated by long-run economic goals.

Establishing a relationship between migration and rural services is a complex matter, as the assignment of rural services in a particular community may be non-random. It is therefore essential to follow a methodology that effectively controls for the endogeneity of rural services. Given the different aspects of rural services, it is unsatisfactory to measure them through a simple counting procedure. Instead, I use one discrete and two continuous and possibly endogenous variables. For each of these variables, a reduced-form linear probability model must be computed and residuals extracted. An instrumental variable probit is not appropriate when one or more of the endogenous regressors are binary. Therefore, I herein use a method originally explored by Rivers and Vuong (1988), namely two-stage conditional maximum likelihood (2SCML). The 2SCML procedure begins with estimations using the endogenous explanatory variables as dependent variables in first-stage reduced-form regression models. In the second stage, the residuals of the first-stage models are included in the probit model as additional variables, along with the original endogenous regressors. In addition to producing consistent estimates and accurate standard errors, this allows statistical testing for endogeneity (Rivers and Vuong 1988).

To ensure proper identification of the rural service and migration equations, it is necessary to find a set of suitable exogenous variables. As instruments, I herein use ethnic fractionalization at the community level, the size of the community (number of households), the size of the EA (derived from the

Ghana 2000 census and given as number of persons), a dummy variable that takes the value of one if the main crop cultivated in the community was maize, and a district dummy. Ethnic fragmentation is likely to affect the ability of a community to attract rural services. Following the procedure described by Mauro (1995), ethnic fractionalization is calculated as:

$$EF = 1 - \sum_{i=1}^I \left(\frac{n_i}{N}\right)^2, i = 1, \dots, I, \quad (2)$$

where  $n_i$  is the number of households in the  $i$ -th ethnic group,  $N$  is the total number of households in the community, and  $I$  is the number of ethnic groups in the community. Thus,  $EF$  measures the probability that two randomly selected households from a given community will not belong to the same ethnic group. The higher the  $EF$  index, the more fragmented the community. The sizes of the community and EA are also likely to explain the level of rural service provision. As mentioned previously, district-level differences exist in terms of population density and poverty, which may explain the level and type of rural services provided.

The (potential) migrant's decision is specified as a function of variables measured at the individual, household, and community levels. An overview of the explanatory variables included in the econometric model is given in Table 1.

**Table 1. Descriptive statistics of explanatory variables at the individual, household and community levels**

Variable	Non-migrant	Migrant	T-test
<i>Individual level</i>			
Age	23.22 (7.99) <sup>a</sup>	22.07 (5.68)	1.03
Sex (1=male)	0.68 (0.47)	0.35 (0.48)	4.96
Dummy for primary education	0.16 (0.36)	0.07 (0.26)	1.65
Dummy for secondary education	0.16 (0.37)	0.31 (0.47)	-2.86
<i>Household level</i>			
Household size in 2008	8.30 (4.44)	6.81 (4.14)	2.35
Age of household head	61.28 (15.29)	59.15 (15.09)	0.98
Landholdings in Feb. 2008 (acres)	7.04 (7.62)	8.46 (9.39)	-1.30
Cattle holdings in Feb. 2008	2.96 (6.88)	1.17 (3.57)	1.87
Dummy for migration history of head	0.05 (0.22)	0.13 (0.34)	-2.55
Household had electricity in Feb. 2008	0.26 (0.44)	0.31 (0.47)	-0.92
<i>Community level</i>			
No. of agricultural services Feb. 2008	4.31 (1.63)	4.21 (2.01)	0.44
Dummy for gravel, asphalt or bitumen feeder road in 2008	0.41 (0.49)	0.45 (0.50)	-0.66
Distance to input market in Feb. 2008 (km)	17.00 (18.65)	13.39 (17.21)	1.46

Note: <sup>a</sup> Standard deviation is given in parentheses.

In terms of individual characteristics, human-capital theory (Sjaastad 1962) predicts that migrants will tend to be younger than their non-migrant counterparts. However, as Table 1 shows, there is no significant age difference between migrants and non-migrants in the study population. In both districts, migrants are more likely than non-migrants to be female. As mentioned, female migration has recently become more prominent in Ghana. The education variables were created to capture the effect of educational attainment on the propensity for migration. The dummy for primary education takes the value of one if the respondent completed only a primary-level education, and zero otherwise. The dummy for secondary education takes the value of one if the respondent completed a secondary-level education (both



junior and senior high school) and zero otherwise. Education has typically been found to promote rural outmigration, but does not promote migration to all potential destinations equally; individuals tend to take their education to labor markets where they will reap the highest economic returns to their schooling (Taylor and Martin 2002). It has been suggested that individuals with mid-level education are more likely to migrate internally rather than internationally, where the return to education is higher (Taylor 1986). In general, it is thus expected that the coefficient for primary education will be negative, whereas the coefficient for secondary education will be positive (Bilsborrow et al. 1987). Table 1 shows for the present sample that migrants tend to be better educated than non-migrants, with a larger proportion of the former having received a secondary education.

At the household level, there is no significant difference between migrants and non-migrants in terms of the age of the household's head, which is a proxy for experience. In terms of assets, cattle holdings in early 2008 are larger among non-migrants, whereas there is no significant difference in landholdings between migrant and non-migrant households. Rural households in Sub-Saharan Africa generally consider holding livestock as an important route to furthering wealth; they can use livestock as collateral for loans to start non-farm enterprises, and the revenues from selling animals and by-products can be included in non-cropping income (Reardon et al. 1992). Consistent with the extensive evidence supporting the importance of networks in migration (e.g., Taylor and Martin 2002), migrants are more likely to originate from a household whose head had a past history of migration.

In terms of determinants at the community level, the number of agricultural services could potentially influence the decision to migrate, but the relationship is ambiguous. Increased availability of agricultural services is likely to lower the transaction costs for marketing of production outputs, thereby increasing the returns to agricultural production and reducing the need for migration to supplement agricultural income. However, the availability of agricultural services could also affect the household time constraint and free up labor for migration. Community-level characteristics include a dummy that reflects whether a surfaced road existed in the community. A gravel, asphalt or bitumen road (as opposed to a dirt road) is likely to improve the accessibility of a community, particularly during the rainy season. This contributes to market integration and could facilitate the movement of labor; however, it could also, by lowering transaction costs, reduce the need for migration to supplement agricultural income. A third community-level variable is the distance to the nearest input market. The further removed a community is from an input market, the higher the transaction costs and potentially the cost to migrate. Although there are no significant differences in individual community-level characteristics, it is likely that in combination they could affect the migration decision. This is discussed further below.

## 5. FINDINGS

The results for the second stage of the 2SCML estimation for the migration decision are given in Table 2 (the first-stage estimation results are given in the Appendix). At the individual level, the probability of migration increases non-linearly with age. As age increases, individuals are more likely to migrate, but at a decreasing rate. Also, females are significantly more likely to engage in rural-urban migration compared to males. These findings are similar to those of Mensah-Bonsu for Northern Ghana (2003). In a reversal of traditional sex roles, autonomous female migration, especially that of educated and commercially enterprising women, has become more prominent in Sub-Saharan Africa in recent years (Adepoju 2006). In terms of education, better-educated individuals are more likely to engage in migration, lending support to the human-capital model.

At the household level, landholdings positively affect migration. It is likely that migration requires some monetary and information resources, and households with little land may not be able to mobilize the resources necessary for a household member to move. However, it is also possible that the results for landholdings in the present study suffer from a selection bias resulting from the lack of landless households in the sample. Landless households would be expected to be particularly prone to migration. If these households were still living in the community and had been included in the sample, this would be likely to negatively adjust the positive coefficient on landholdings.

**Table 2. Results from the 2SCML estimation**

Variable	<i>Migrant</i>
<i>Individual level</i>	
Age	0.10 (0.05)*
Age squared/100	-0.19 (0.09)**
Sex (1=male)	-0.62 (0.13)**
Dummy for primary education	-0.34 (0.26)
Dummy for secondary education	0.31 (0.18)*
<i>Household level</i>	
Household size in 2008	-0.06 (0.02)**
Age of household head	0.00 (0.01)
Landholdings in Feb. 2008 (acres)	0.05 (0.03)**
Landholdings squared/100	-0.09 (0.07)
Cattle holdings in Feb. 2008	-0.02 (0.01)
Dummy for migration history of head	0.43 (0.23)*
Household had electricity in Feb. 2008	-0.31 (0.19)**
<i>Community level</i>	
Number of agricultural services Feb. 2008	0.25 (0.11)**
Distance to input market in Feb. 2008 (km)	-0.02 (0.01)**
Dummy for gravel, asphalt or bitumen feeder road	0.54 (0.32)*
Number of observations	703
Wald-test of exogeneity chi2(3)	18.56
Prob > chi2	0.0001
Pseudo R-squared	0.22

Notes: \*Significant at the 10 percent level, \*\* significant at the 5 percent level.

<sup>a</sup> Robust standard errors are given in parentheses.

The availability of electricity reduces the migration probability of a given individual. The lack of amenities has been shown to positively influence migration in several studies (e.g. Bilsborrow et al. 1987). The coefficient on the migration history of the head is positive and significant, underlining the important role of networks in migration.

In terms of community-level characteristics, the presence of a surfaced feeder road increases the probability of migration. This finding offers tentative support for a first hypothesis that rural services that reduce economic isolation can increase outmigration. Better connectivity of a community with its surroundings is likely to facilitate the spatial integration of its product and factor markets, thereby enhancing the mobility of labor.

The number of agricultural services offered in the community increases the probability of migration, while increased distance from an input market decreases the probability of migration. It has been demonstrated elsewhere that economic isolation is positively associated with transaction costs (Renkow et al. 2004) and combining the findings at the community level with those at the household-level for income-producing assets lends support to a second hypothesis that improved rural services such as those included in this study lower the transaction costs involved in agricultural production, thereby freeing up farm labor for migration.

## 6. SUMMARY AND IMPLICATIONS

Although past quantitative research on the determinants of migration decisions has largely focused on investigating factors captured at the individual and household levels, areal or contextual factors are thought to have a profound effect on migration decisions. In this study, I use data from two consecutive-year surveys of 390 households in 30 communities from two districts of northern Ghana to empirically link community-level rural service provision to the determinants of migratory movement. The results from the present econometric analysis lend support to the human-capital and network theories, and underline the important role of assets in the migration decision. The results also demonstrate that factors at the community level have significant effects on rural-urban migration flows. Migration is less prominent in communities that are economically isolated in terms of lacking rural services. Thus, improvements in rural services that increase the spatial integration of goods and factor markets would be expected to enhance the migration of labor. Further, rural services that lower the transactions costs associated with agricultural production will reduce the demand for on-farm labor, thereby freeing up individuals to engage in migration.

Of interest to policymakers aiming to reduce migration by addressing determinants that stem from a lack of rural services (e.g., limited infrastructural assets), these findings demonstrate that rural services capable of fostering spatial integration would have the opposite effect (i.e., they could actually promote migration). However, this finding should be treated with caution; although the present study indicates that the probability of migration increases with better connectivity of a rural community, a more detailed investigation is needed to examine the direction of migration. It is still possible that spatial integration redirects migration from large urban centers to district capitals.

## APPENDIX: 2SCML, FIRST STAGE

**Table A.1. OLS estimation of distance to the input market (km)**

<i>Explanatory variable</i>	<i>Distance to the input market (km)</i>
Size of electoral area in 2000 (number of persons/1000)	7.55 (0.51)**
Ethnic fractionalization index	-1.42 (2.93)
District dummy (West Gonja=1)	11.36 (1.31)**
Size of community (number of households)	-0.02 (0.00)**
R-squared	0.32
Number of observations	703
F (4,698)	81.40
Prob>F	0.0000

Notes: \*Significant at the 10 percent level, \*\* significant at the 5 percent level.

**Table A.2. OLS estimation of agricultural services (number)**

<i>Explanatory variable</i>	<i>Agricultural services</i>
Size of electoral area in 2000 (number of	0.11 (0.05)**
Ethnic fractionalization index	-4.04 (0.27)**
District dummy (West Gonja=1)	1.22 (0.12)**
Size of community (number of households)	0.01 (0.00)**
R-squared	0.27
Number of observations	703
F (4,698)	65.97
Prob>F	0.0000

Notes: \*Significant at the 10 percent level, \*\* significant at the 5 percent level.

**Table A.3. Probit estimation of surfaced road in community**

<i>Explanatory variable</i>	<i>Surfaced road</i>
Size of electoral area in 2000 (number of persons/1000)	0.12 (0.05)**
Ethnic fractionalization index	-3.54 (0.33)**
District dummy (West Gonja=1)	1.61 (0.16)**
Size of community (number of households)	0.01 (0.00)**
Pseudo R-squared	0.39
Number of observations	703
LR chi2 (4)	371.06
Prob>chi2	0.0000

Notes: \*Significant at the 10 percent level, \*\* significant at the 5 percent level.

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