e **J A D E**
electronic **Journal of Agricultural and Development Economics**

Agricultural and Development Economics Division (ESA) FAO
available online at www.fao.org/es/esa/eJADE

Vol. 1, No. 1, 2004, pp. 117-137

Responding to Economic Shocks in Ghana: The Agricultural Sector as a Social Safety Net

Daniel Bruce Sarpong and Samuel Asuming-Brempong

Department of Agricultural Economics and Agribusiness
University of Ghana
Legon, Accra
Ghanaakwei7@yahoo.com

Abstract

The objective of this paper is to document, assess and characterize the role Ghana's agriculture has played as a safety net when the urban labor market suffered economic shocks. The study explores how agriculture influences non-agricultural dependent households. Specific attention is given to the implicit value of the informal insurance role that rural households play in supporting family members who lose jobs acquired after migrating to urban areas. The paper analyses Ghanaian agriculture's social security role in the late 1980s and 1990s. This well documented period in Ghanaian economic literature, coincides with both natural and macro policy shocks and the policy measures taken to cope with the shocks.

Keywords*: Ghana, labor, migration, rural development, safety nets*

1. Introduction

Between 1980 and 2000, Ghana suffered a series of severe internal and external shocks. Table 1 presents these crises and their impact on welfare indicators. The shocks include adverse terms of trade shocks, exchange rate upheavals, large budget deficits, bush fires and droughts. The 1981-83 drought also caused the and worst energy and power crisis in the country's history. A power crisis resurfaced in 1997-98. Ghana is heavily dependent on hydropower for energy generation and during both periods energy dependent firms and enterprises scaled back operations, shedding labor.

The authors gratefully acknowledge research funding from the Government of Japan for the FAO Project, *Socio-Economic Analysis and Policy Implications of the Roles of Agriculture in Developing Countries the Roles of Agriculture* (GCP/INT/772/JPN ROA). We also thank gratefully acknowledge the useful comments and suggestions of ROA Central Team, the Ghana Inception Workshop, the Ghana ROA National Workshop, the FAO International Conference on the Roles of Agriculture, 20-22 October, 2003, and Andre Croppenstedt.

Table 1 Some Macroeconomic crisis indicators in Ghana and their impact on welfare, 1980-2000

Crisis	Main Crisis Indicators	Health Indicators	Education (School enrolment) Indicators	Poverty Incidence Indicators	Employment indicators
Worsening/Adverse terms of trade	• Trade balance worsened from a deficit of US$36.2 million in 1985 to a deficit of US$ 321 million in 1991 • Real GDP growth fell from a positive value of 6.25% in 1980 to a negative value of 4.56% in 1983 • Price of Gold fell by 14.5% in 1987, 21.9% in 1990 and by 9.2% in 1992 • 1.2 million Ghanaian emigrant workers were expelled from Nigeria in 1983	• Average calorie availability as a percentage of requirements fell from 88% in late 1970s to 68% in the early 1980s • Infant mortality rate increased from 86 per 1000 live births in the late 1970s to 107/120 per 1000 live births in the early 1980s • Between 1984-86, Ghanaians obtained only 76% of required daily calorie intake	• Growth in gross primary school enrolment declined from 5.89% in 1983 to –3.28% in 1984 and 11.52% in 1985	• Real national. Income per capita fell by 7.7% between 1981-1983 • Average earnings of workers declined from an index of 100 in 1977 to 21.9% in 1983	• Unemployment rate is estimated at about 20% for 1993 • Estimates of underemployment for 1990s ranges between 64% and 80% of the total labor force
Forced return of migrants from Nigeria Drought/Bushfires/Famine	Real GDP of agriculture fell by 7% in 1983 and by 2% in 1990 Per capita food availability in 1983 was 30% lower than in 1974 Inflation reached a peak of 129% in 1983				
Energy crisis (1982 – 1984) Energy crises 1997-1998	• Power generation at Akosombo fell by almost 50 percent • Output of electricity and water sub-sector declined • Energy supplies to business and industry fell				
Fiscal Crisis (Huge Budget Deficits)	• Fiscal Account fell from a surplus of 1.5% of GDP to a deficit of 4.8%, 5.6% and 4.3% of GDP in 1992, 1993 and 1995 respectively			• Real income per capita fell by 27% between 1975 and 1983	• Public Sector employment was cut by 60% between 1985 and 1991
Exchange rate upheavals	• Cedi depreciated by 192% between 1983 and 1984, 40% between 1984 and 1985, 34% in 1986/87 and 11% in 1988/89				
Increased level of Debt Servicing	• Total debt service payments increased from US$375 million in 1990 to US$409 million in 1994 • Total government expenditure on social services declined from 39.9% in 1983-91 to 28.1% in 1992-94	• Real educational expenditures declined by over two-thirds between 1975 and 1982 • Total government expenditure on health decreased from 21% in 1990 to 13% in 1994 • Rates of immunization were low at only 39%	• Real educational expenditures declined by over two-thirds between 1975 and 1982	• 36% of Ghanaians lived below the poverty line between 1987-8 • Poverty levels increased dramatically in Accra from 8.5% in 1987-8 to 23.9% in 1991-2	

Sources: ISSER (1994), Appleton & Collier (1990), Hutchful (2002), Appiah, Demery & Laryea-Adjei (2000), Harrigan & Oduro (2000), QDS (June 1998), Wetzel (2000), Canagarajah & Mazumdar (1997).

In 1983, Ghana began the Economic Stabilization and Structural Adjustment Programme (ESAP) to address distortions in the pricing and exchange systems following years of heavy government intervention and massive expansion of the public sector (Aryeetey 1996). The consequences of the macroeconomic policy adjustments only seemed to exacerbate poverty indicators, leading to declines in access to health, education and other social services. Low income and labor dependent families were hit hard as massive public sector layoffs effected workers, laborers, cleaners, drivers, sweepers, messengers and workers in the lower grades of the public service – mostly low paid, unskilled jobs. Cornia *et. al*. 1987 assert that ESAPs often exerted an adverse impact on poorer households and vulnerable groups such as women and the unskilled.

Between 1987 and 1991, about 50,000 workers were dismissed from public service. Another 20,000 were dismissed from the Ghana Cocoa Board (COCOBOD - the agency responsible for Ghana's cocoa marketing) with the intention to relocate and redeploy labor within the private sector. During the 1997-98-power crisis, job security was further threatened as medium sized power consuming factories produced below planned output. Larger power consumers like the Volta Aluminum Company (which consume 50% of total hydropower generated in the country) shutdown 3 of its 4 operating pot-lines and dismissed about 38% of its total workforce. Major steel mills operated at 50% of their 1997 production levels, losing 30% of their domestic market share and meeting only 50% their export demands (Quayson 1998). The mining sector also had its share of labor market adjustments, as a result of the financial/commodity market crisis. In 1999, a major gold producing company dismissed more than 2,500 workers.

2. Agriculture as a safety net

This study examines what role the agriculture sector played during these crisis. Among the ways agriculture can be a safety net or an economic buffer for those losing their jobs in urban areas include: (i) the opportunity for relatives that have lost their jobs in urban areas the opportunity to come back to the farm and be temporarily employed; and (ii) through direct rural to urban intra-household cash transfers. Looked at from this perspective, rural family support in times of crises can be considered an insurance pay-off for the migrating family member who sent remittances home to their rural families. Remittances therefore become the monetary premium that migrated household members pay in order to purchase the insurance that will pay off when a major event takes place, such as loss of a labor market (Bresciani, 2002).

The objective of this paper is to document, assess and characterize the role Ghana's agriculture has played as a safety net when the urban labor market suffered economic shocks. The study explores how agriculture influences non-agricultural dependent households. Specific attention is given to the implicit value of the informal insurance role that rural households play in supporting family members who lose jobs acquired after migrating to urban areas. The paper analyses Ghanaian agriculture's social security role in the late 1980s and 1990s. This well documented period in Ghanaian economic literature, coincides with both natural and macro policy shocks and the policy measures taken to cope with the shocks. The study uses the Ghana Living Standards Surveys (GLSS) 2 (1988/89), GLSS 3 (1991/92) and GLSS 4 (1998/1999) surveys for the documentation and analysis. The GLSS 4 data is utilized for the remittance function to test the social security role of agriculture.

The following section discusses labor market adjustments including occupation switches, and the role of the state in mitigating the social impact of macroeconomic crises, cataloguing informal and state-sponsored safety nets for urban labor markets. Section 4 examines the role of agriculture as a safety net. Evidence on rural-urban migration and access to formal private and public insurance against unemployment and evidence on use of remittances by families are analyzed. Section 5 tests, empirically, the social security role of agriculture. Section 6 provides conclusions and policy implications for the study.

3. Ghana's macroeconomic shocks: impact on labor market and available safety nets

The 1984 census reports the national unemployment rate at 3% with an ever lower 1.5% rate in certain rural areas (ISSER 1992). The farm-sector has been the largest non-formal employment source for Ghanaians. Data indicate that of those with primary education or less, only 14% were employed by the public sector, while 75% worked in farming or informal sector occupations. Of those with post secondary or university education, more than 50% had jobs within the public sector (GLSS, 1987-88).

Over the ESAP period, however, formal sector employment reduced by about 60%, representing an average annual decrease of 10%, compared with an average 2.3% annual growth rate of the labor force (ISSER, 1995). It is estimated that open unemployment was about 20% for 1993 (ISSER 1994). The jump in unemployment and underemployment rates has been attributed to labor market adjustments exacerbated by the ESAP, a programme aimed at addressing the low investment rates and the lack of employment growth in the private sector. ESAP envisaged job growth through that social security would be extended to those who lost their jobs through an expansion in private sector employment, the use of more labor-intensive techniques of production with the active involvement of self-employed people and expansion of micro-enterprises.

The ESAP period in Ghana in the 1980s, saw periodic but significant reverse migration from urban areas back to rural areas (Ewusi 1987; Fosu 1989, 1996; Abdulai 1999) and saw remittances from urban to rural households drop significantly.

The Programme of Action to Mitigate the Social Cost of Adjustment (PAMSCAD) focused on providing vocational skills and jobs for those who had lost work due to cutbacks. These jobs were community based and geared to rehabilitate and construct social and economic infrastructure, generate employment and address needs of vulnerable groups. PAMSCAD created public works including food-for work projects, labor-intensive feeder road projects and Public Works Projects. The incentive package directed workers toward the agricultural sector, offering them assistance for land acquisition, tractor services, farm inputs, as well as extension, credit and technical services (Government of Ghana 1999).

Coping with the macroeconomic shocks in Ghana

When shocks occur in an economy, households cope in a variety of ways, including selling livestock or other assets or calling on support networks for transfers and loans (World Bank, 2001). The state also ensure additional forms of social security provision for the affected labor. Households, ex-ante manage risks by diversifying income through their involvement in a variety of activities, and also cope with risks through forms of self insurance, (eg. precautionary savings, consumption credits and assets build up) and through informal group-based risk sharing mechanisms (Glewwe and Hall 1998; Eswarn and Kotwal 1989; Dercon 2000).

One potential safety net for the informal sector is engagement in multiple occupations. According to the GLSS, about 58% of second jobs in Ghana were in agriculture. During the initial ESAP period many professionals and non-professionals temporarily drove their cars as taxis (Hutchful 2002) after official working hours as a means of improving livelihoods. In large institutions, workers, particularly women traded on-the-job.

Kabeer (2002) summarizes household assets and related consumer goods in times of retrenchment which often begins with property owned by women – jewelry and household utensils.

Deaton (1991) describes the how households self insure via asset accumulation. Households build assets in good years and deplete them in bad years, although the strategy is fallible when there is an overall shock since everybody wants to sell assets at the same time, pushing down prices on the supply side (not to mention the weaker demand side). Asset prices will collapse affecting consumption that can be purchased with the sale of assets (Dercon 2000). In developing economies, common assets include livestock of all forms, savings and loans.

In Ghana over the ESAP period, the GLSS surveys provide per capita holdings in livestock for 1988/89, 1991/92 and 1998/99 survey periods. The trends are summarized in Table 2.

Table 2 Est. per-capita number of type of livestock/poultry kept by household

Type of Livestock (selected)	Per Capita Livestock holdings		
	GLSS 2 (1988/89)	*GLSS 3 (1991/92)*	*GLSS 4 (1998/99)*
Draught Animals	--	3	2
Cattle (Incl. Cows)	7.1	7	9
Sheep	5.6	6	1730**
Goats	5.1	5	2483**
Pigs	6.4	5	7
Chickens	14.9	16	260**
Other Poultry	9.4	10	12

Source: GLSS 2, Table 72; GLSS 3, Computed from Table 8.2; GLSS 4, Computed from Table 7.2 (**) These figures are not mis-type.

Livestock (draught animals, cattle, pigs, sheep, goats and chickens) owned by households are concentrated in rural areas, particularly the rural savanna and forests. The rural savanna also has the majority of the draught animals which are mostly hired out. Table 2 shows that the estimated per-capita holdings of livestock between 1988/89 and 1991/92 were unchanged, implying that households in the predominantly rural areas did not dispose off their assets to smooth consumption patterns. Comparable per-capita figures in 1998/99 for sheep, goats and chickens surged for all households.

Between 1991/92 and 1998/99, the proportion of households maintaining savings accounts in Accra fell from 46% and 35%. Other urban areas registered a drop from 36% and 35% respectively. The proportion of those in other localities maintaining savings accounts either increased or did not change. The proportion of urban households maintaining savings accounts dropped significantly, possibly in order to smooth consumption.

Informal social protection schemes

Ghana has two basic types of informal social protection: the extended family and voluntary or compulsory savings associations (Gockel 1996). One is the extended family. For years, the extended family system has been the primary form of social security as members become old or are threatened by economic deprivation, disability or social isolation. Individuals and households are protected in times of crisis through making claims for assistance on kin in the form of labor transfer (for farming), food and shelter until the crisis subsides; and children provide needed services including fetching water and firewood and generally staying with the needy, especially the elderly to run errands or perform other domestic chores, with the elderly who are economically inactive, providing home tutelage to the children.

A second informal safety net system is voluntary and compulsory savings associations including rotating savings and credit associations and credit unions -- a semi-formal institutionalized social security system. These associations complement rather than substitute social protection mechanisms offered by the extended family system. The extent to which these informal social security schemes buffeted the labor dismissed during the Ghanaian economic crisis and adjustment period is difficult to quantitatively assess. However, a rural finance study by Bentil *et al* (1988) estimated that saving with informal financial institutions made up about 60% of total financial savings in rural Ghana in 1988. Another study of urban market women's saving behavior in Ghana by Aryeetey and Gockel (1990) indicated that about 77% of market women saved with informal institutions. However, these non-formal financial institutions played an important role in social protection when the state withdrew subsidies, price controls and full employment policies (Gockel, 1996).

State sponsored safety nets

Over the ESAP period, the state relied on its pension and social security schemes as well as state-sponsored social relief programs to buffer the dislocations in the labor market.

Table 3 summarizes mean annual amounts of income received by urban and rural households from a variety of sources for the 1991/92 (GLSS 3) and 1998/99 (GLSS 4) periods in constant 1991 prices. In the urban and rural households, mean income of central government state pension increased, in real terms, between the 1991/1992 and the 1998/1999 surveys. Social security and retirement benefits declined relatively in real terms. Dowry and inheritance income in both the rural and urban households increased several fold and was the single most important source of income.

Table 3 Mean annual amounts of income received by households from a variety of sources, and estimated total miscellaneous income (constant 1991 cedis)

Source of Income	Mean Household Income						Est. Total Misc. Income (Bil Cedis)	
	Urban (Cedis)		*Rural (Cedis)*		*All (Cedis)*			
	GLSS 3	*GLSS 4*	*GLSS 3*	*GLSS 4*	*GLSS 3*	*GLSS 4*	*GLSS 3*	*GLSS 4*
Central Government								
Social Security	700	237.2	100	304.9	300	271	1	1.1
State Pension	3,900	4590.9	1,600	1694.1	2,400	2761.3	8	11.2
Other	1,500	101.6	500	667.6	900	474.3	3	1.9
Other Sources								
Retirement Benefits	5,300	2270	2,300	169.4	3,300	948.7	11	3.8
Dowry or Inheritance	1,100	4438.4	2,500	4201.3	2,000	4286	7	17.5
Other (excluding susu)	11,000	2693.5	1,100	1507.7	4,500	1931.2	15	7.9
Total	23,400	14332	8,200	8545	13,500	10,673	45	43.4

Source: GLSS 3 (Table 11.3) and GLSS 4 (Table 9.26). Constant 1991, using CPI national.

Trends in the number of beneficiaries of the different types of benefits provided by a Provident Fund Scheme between 1966-1990 show that super-annuation (old age) benefits rank the highest in terms of numbers benefiting while unemployment benefits were barely claimed despite the massive retrenchment of labor over the 1983-1990 period. Gockel (1996) indicates that eligibility requirements for unemployment benefit were so stringent that hardly anyone qualified. If the applicant received redundancy or severance pay from his former employer then that person did not qualify for unemployment benefits. During the labor retrenchment period, employers (mostly the state) were obliged to make severance payments to workers, thus disqualifying them for unemployment benefits.

Four years into the ESAP, the state provided social protection to disadvantaged groups including workers who had lost their jobs through PAMSCAD. PAMSCAD, however, was plagued with implementation problems, and did not coherently address project issues. Gender differentials for comparative analyses of social and economic characteristics of the project beneficiaries were not explicitly defined and PAMSCAD targeting was also flawed (Alexander *et al*., 1995).

4. Economic shocks and agriculture as a safety net

During Ghana's economic decline, agricultural and rural sector real incomes suffered declines. Between 1970-1980, real income agricultural income declined by 72% (Ewusi, 1984). The real producer price of a load of cocoa (62.5kg) declined. When the cocoa farmer is compared to the average wage earner in the modern (urban) sector, there is a worsening position. From an index of 100 in 1970, the cocoa farmer's position dropped to 26.4 in 1980. The cocoa farmer's relative position weakened by 73.6% during the 1970-1980 period (Ewusi, 1987). However, over the

ESAP period, the relative position of farmers vis-à-vis unskilled workers in the urban (modern) sector were restored to their 1970 levels due to labor retrenchment in the modern sector and policy re-orientation in favor of agriculture. By 1985-86, the producer price of a load of cocoa (62.5kg) and the monthly minimum wage were at the same level. In 1985, the producer price of cocoa was ¢1,700 per load, compared to a monthly wage rate of ¢1,750. In 1986, the producer price of cocoa was ¢2,552 but the monthly minimum wage was ¢2,250. By 1986, the real producer price of cocoa and the real monthly minimum wage were on par (Ewusi 1987). Further adjustments in the cocoa price led to divergence of rural-urban wage rates.

Over the period of massive labor cutbacks, agriculture posted an average real growth rate of 2.5% compared to 7.3% and 7.6% in services and industry respectively (Table 4). Whilst the modern sector (industry in particular) had to cut back on labor as a result of foreign exchange shortages and over-valued exchange rates to sustain positive growth rates (compared to the period 1976-1980), the agricultural sector absorbed the workers who had lost their jobs due to the effect of the shocks to post positive growth rates. In contrast to the large labor emigration in the 1970s that caused shortages in labor for the agricultural (particularly cocoa) sector and a significant fall in agricultural output *ceteris paribus*, the equally large number of returning migrants of labor in the early 1980s was easily absorbed in the agricultural sector. This helped to prevent a sudden reduction in living conditions for those who resided or moved into the rural sector.

Table 4 Average sectoral growth rates of Ghana's economy

Year	Agriculture	Services	Industry
1976-1980	4.7	1.2	-5.6
1984-1993	2.45	7.34	7.64
1994-2001	3.76	5.26	3.83

Source: Computed using data from Ghana Statistical Service (GSS), various issues.

During macroeconomic crisis period (in particular, 1983-1988), the agricultural sector provided the majority of revenue needed to support the economy. Export duty on cocoa provided the bulk of domestic revenue while agricultural produce of cocoa contributed the largest proportion of export revenue in real terms. While agriculture provided the bulk of the revenue generation to support the economy during the macroeconomic crises, it did not benefit the most in terms of budgetary support in the form of total recurrent and development expenditures, in real terms. Thus, the agricultural sector was a net revenue generator, during most of the 1980s, helping sustain the fiscal policies of the government during the macroeconomic crises.

The agricultural sector also provided several informal safety nets. Ease of entry into agricultural production with a variety of unskilled jobs and tasks. For the landless, there are several tenancy agreements that are very flexible and require very little or hardly any collateral. These include the share cropping systems of *abunu* and *abusa.* Evidence from the Ghanaian case indicates that backyard farming was very common among households especially during periods of high cost of food (Hutchful, 2002). Hutchful (2002) further indicates that most urban dwellers reactivated their rights to village lineage lands for both subsistence and commercial farming "through their remittances and various types of investments". In certain extreme instances, some urban dwellers gave up their wage labor and immigrated to the rural areas. Within the poorer urban households, changes in nutrition and diet were means of managing the impact of the crisis. This was achieved through a shift from relatively expensive to cheaper food by either substituting meat with fish or deleting both meat and fish from their diet (Hutchful 2002). Other strategies included skipping one or more meals and in certain instances, some households experimented with new food sources even from the wild. The agricultural sector allowed households to draw directly on nature and in the reactivation of rural industries utilizing local inputs such as wood and wood extracts.

Labor in Ghana has seen continued rural to urban migration. However, at the height of Ghana's economic crisis and adjustment in the 1980s, the flow of migration from rural to urban areas

decreased and in some periods even reversed. Beaudry and Sowa (1994) provide information that relates net migration for different regions and periods in Ghana.

Table 5 shows that up to 1970, net migration was from the Central, Eastern, Volta and Northern and Upper regions towards Accra, Western and Ashanti regions. However, in the 1980s, the pattern of net migration was reversed with destination towards the predominantly agricultural regions of the Western, Eastern, Ashanti and the Northern and Upper regions.

Table 5 Net migration flows (percent)

REGION	(1) Up to 1970		(2) Up to 1987		(3) 1982 - 1987	
	Destination	*Origin*	*Destination*	*Origin*	*Destination*	*Origin*
Western	21.1	--	74.0	--	39.0	--
Central	--	22.4	--	11.0	--	6.8
Accra	46.5	--	--	15.0	--	57.6
Eastern	--	17.0	--	3.0	27.1	--
Volta	--	28.9	--	31.0	--	15.3
Ashanti	12.3	--	13.0	--	13.6	--
Northern & Upper	--	31.8	13.0	--	20.3	--
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table adapted from Canagarajah and Mazumdar (1997), Table 6.9

Table 6 provides data on remittances from rural to urban households . In real terms, for 1991/92 survey, urban-rural remittances was ¢2 billion whilst rural-urban remittances was ¢ 9 billion. By 1998/99 survey, urban-rural remittances were ¢2.9 billion whilst rural-urban remittances had increased to ¢26.3 billion.

Table 6 Est. total annual income from remittances of persons (Bil 1991Cedis)

Locality	Urban		Rural		Abroad		Total	
	GLSS 3	*GLSS 4*	*GLSS 3*	*GLSS 4*	*GLSS 3*	*GLSS 4*	*GLSS 3*	*GLSS 4*
Urban	18	42.4	2	2.9	16	45.6	35	92.3
Rural	9	26.3	13	12.2	4	11.9	25	50.3
Total	27	70.1	15	15.1	20	57.4	60	142.6

Note: Figures are converted to real 1991 cedis using national CPI. Source: GLSS 3 and GLSS 4.

Although comparable figures in the GLSS in 1987, 1988/89 and earlier periods are not available, the trend from 1991/92 and 1998/99 surveys indicate a sharp reduction in the growth of urban-rural remittances compared to the growth in remittances from rural to urban households. It is important to note that responses to the value of total cash, food and goods remitted were solicited from the migrant head of household. It is therefore possible to undervalue remittances coming from the urban areas and to over value those from the rural household to the urban centers. Reverse checks are non existent.

5. Test of social security role of agriculture in Ghana.

The safety net role of agriculture in Ghana during the economic crises manifests itself in urban-rural return migration for temporary employment and support from farm family members to urban migrants.

The farm family support may be seen as an insurance pay-off to migrated family members who contributed, through remittances, to supporting the rural family. Remittances therefore are the monetary premium that migrated household members pay in order to insure themselves in case of loss of employment.(Bresciani, 2002).

Theory and evidence

Evidence on patterns of transfers (remittances) indicates a variety of functions and effects: old-age support, providing credit in helping households overcome borrowing constraints and dealing with risks, helping finance human capital investment by supporting younger workers who have recently left home, and help during illness (Cox 2002). Remittances are interpreted as repayments for assistance with migration or as insurance premiums against shortfalls in income (Rempel and Lobdell, 1978). Kaufmann and Lindauer (1986) view private transfers as the outcome of an implicit social insurance contract among a network of related households with transfers to temporarily disadvantaged households acting as insurance payments.

Both altruistic and self-interested motives generate these functions and effects (Cox and Jimenez, 1995). Altruism presumes the migrant derives utility from the utility of those left at home (Stark, 1991; Hoddinot, 1992) so cares for them. Remittances therefore have an effect on contributing to equity. Self-interest in sending remittances may be the result of the migrants': aspiration to inherit, maintenance and care of assets left back, intent to return home and thus investment in assets that will be covered later, and insurance against income or employment shocks while in the urban sector (Stark, 1991).

Stark (1991) attempts to rationalize the flow of remittances as a manifestation of enlightened self-interest or tempered altruism. Cox and Jacubson (1989) indicate that even if transfers are influenced by both motives, only one pre-dominates in any given instance.

Cox and Jimenez (1990) indicate a distinguishing test for altruism and self-interest exchange based on the relationship between the recipient pre-transfer income and the transfer amount received. The altruism model predicts that it is always negative. Shortfalls in the recipients' resources, for example, always prompt more generous transfers. But the exchange model admits a positive relation between the two variables. Higher income strengthens the bargaining position of recipients in exchange so that when their income increases, they can get higher transfers.[1]

Stark (1991) categorizes the motives for remitting into purely altruistic or purely selfish motivations in Botswana for the period 1978-79. Remittances were found to be significant and positively related to (a) the level of education with significant evidence for females who invest in their young an understanding of subsequent remittance; (b) aspirations to inherit as measured by sons who remit to families with larger herds; (c) drought conditions, where the worse the drought, the more is remitted. Knowles and Anker (1981) provide analytical evidence for Kenya on the characteristics and determinants of remittance and income transfers. The decision to make transfers is positively and significantly related to income, education, urban residence, male sex, migrant status, ownership of a house in the home area (by migrants), a wife residing away, and the number of household members other than wives and children residing away.

Hoddinott (1992) observed that though migrant's income tend to influence remittance flow positively, land holdings and education of the male household head lower the likelihood and level of remittances, with education exhibiting a quadratic relationship with the level of remittances. Ravallion and Dearden (1988) find whilst transfer receipts and outlays are income inequality reducing in rural areas, this is not the case in urban areas. They also find evidence of transfers being targeted to disadvantaged households such as the sick, elderly and for urban areas, the unemployed. Agarwal and Horowitz (2002) using household survey data from Guyana find evidence to support the altruistic incentive to remit with significant differences in remittance behavior of multiple and single migrants.

Modeling: approach to the empirical analysis of remittances

Assuming self-interest is the motivation, the level of remittances is associated with farm and other assets such as livestock, land, machinery, *ceteris paribus*. Most importantly, the average level of remittances should also be associated with the riskiness of the migrant's income. The riskier the income, the higher the willing to pay, all else equal. A higher flow of remittances to the farm or in other types of productive assets improves the family's ability to buffer the migrants' income or

[1] Cox and Jimenez (1990) indicate that Kaufman and Lindauer (1986) for El Salvador; Kaufmann (1982) for the Phillipines; Ravallion and Dearden (1988) for rural households in Java, and Tomes (1981) for bequest in the United States found an inverse relation between these variables whilst Lucas and Stark (1985) for Botswana; Cox (1987) for the US; Ravallion and Dearden (1988) for Java and Cox and Jimenez (1989) for Peru find a positive relationship.

employment shocks. As such, the migrant is investing in his family as a way to substitute for an otherwise absent formal or state-backed unemployment insurance scheme. The part of remittances that can be imputed to the payment for an insurance premium are an *ex ante* implicit valuation of the social security role provided by the family.

The use of remittance functions in empirical analysis is evident in the works of Knowles and Anker (1981), Ravallion and Dearden (1988), Stark (1991), Hoddinott (1992), Agarwal and Horowitz (2002), among others. Knowles and Anker (1981) estimate two basic models consisting of the following:

$$P(R>0) = f(\mathbf{X}) \quad (1)$$

$$E(R \mid R>0) = g(\mathbf{X}) \quad (2)$$

where P(R>0) is the probability that remittances are sent, E(R | R>0) is the expected amount of money transferred among households transferring some income and **X** is a vector of independent (economic and socio-economic) variables. The formulation of the dependent variables implies that those individuals who did not remit were dropped from the sample. The two separate models, one determining the decision to transfer and the other the amount that is transferred, together constitute a twin linear probability function. They predict that income earned by the migrant is expected to affect transfers positively whilst income earned by household members residing away should have a negative effect on remittances.

Stark (1991) postulates the following model:

$$R_i = h(\mathbf{X}) \quad (3)$$

where R is the logarithm of monthly remittances and **X**, (like in Knowles and Anker), is a vector of independent variables with various interactive terms. Their model takes note of two estimation issues. Firstly, the estimation of a hazard rate to correct for in-sample selection bias and secondly, in the absence of data on earnings of absentees, the estimation of earnings equations estimated from household data, so that absentees' earnings could be predicted if they are reported to be working, with explanatory variables confined to information known about each absentee.

Hoddinott (1992) corrects for zero-remittance observations in a specification of remittance flows for Kenyan rural household survey. Hoddinot (1992) sample selection corrected estimation involves the following. Let the decision to remit, P (where P=1 if $R_i > 0$) be a function of observed (G) and unobserved (ß) characteristics:

$$P = P(G, ß) \quad (4)$$

Conditional on P=1, the level of remittances R are a function of observed (X) and unobserved (g) characteristics:

$$R = R(X, g) \quad (5)$$

There is the possible correlation between the two unobserved characteristics (ß,g) if equations (4) and (5) were estimated separately that suggest a two step approach. First, estimate a probit for the decision to remit:

$$P_i = b' G_i + u_i \quad (6)$$

From this, compute the inverse Mill's ratio, λ where,

$$\lambda = \phi(b' G_i) / \Phi(b' G_i) \quad (7)$$

and ϕ_i and Φ_i are the density and distribution functions of the standard normal distribution evaluated at **b´G/σ** . The inverse Mill's ratio is then included as an additional regressor in the level equation, conditional on P=1:

$$R_i = \beta' X_i + \beta_\lambda \lambda_i + v_i \quad (8)$$

From equation (8), there is a direct effect, as captured by β, and an indirect effect through the inverse Mill's ratio. Hoddinot (1992) suggests that variables such as migrant's earnings, migrant's level of education, rural household land holdings and migrant's role in decision-making on the family farm and his intention to return should enter the remittance function.

A recent work by Agarwal and Horowitz (2002) follows the empirical methodology outlined by Hoddinot (1992; 1994) that corrects for the decision to remit as a variable in the level of remittance. Agarwal and Horowitz (2002) model however, takes account of the probability of a "bad state" in which, for the self-interest motive, defines an implicit remittance function (R^I) as

$$R^I = r\,(Y_m, Y_m^2, \pi) \quad (9)$$

Y_m is a first period income of migrant. Y_m^2 is a second period unknown income when remittances are made and may be high (Y_m^1) or low ($Y_m^2 = Y_m^1 - L$, $L > 0$). Y_m^2 occurs with a probability π ($0 < \pi < 1$) for a "bad state" and a probability of 1- π for a "good state". The bad state arises as a result of sickness, accident or unemployment. $Y_{m,}$, Y_m^2, and π are hypothesized to influence remittance levels positively, negatively and positively, in that order. They also define an implicit function for the case of pure altruism as

$$R^A = (Y_m, Y_h, \alpha_I, n, m, x, \pi) \quad (10)$$

where Y_m , π are as previously defined; Y_h, α_I, n, m, x are total household income (Y_h), the migrants "altruism weight" towards the i^{th} household (α_I); the number of non-migrating household members (n), additional migrants (m) who remit the household and the amount (x) remitted. By their altruistic model, $\delta R / \delta Y_m > 0$, $\delta R/ \delta Y_h < 0$, $\delta R/ \delta \alpha_I > 0$, $\delta R/ \delta m < 0$, $\delta R/ \delta x < 0$, $\delta R/ \delta n$ and $\delta R/ \delta \pi$ are ambiguous. A key testable implication of their altruistic model is the effect of multiple migrants upon average remittance levels. Under pure insurance (self-interest) motives, the number of other migrants from the same household would not affect own remittance.

Agarwal and Horowitz (2002) empirical model uses a number of proxies for some of the variables outlined in equation (9) and (10). Unemployment rate is used as a proxy for the "bad state" and un-reported migrant income proxied by migrants socio-economic characteristics including location of remitting migrant. Ravallion and Dearden (1988) also employ an unemployment variable (a dummy = 1 if head of household is in workforce but out of work in previous week and zero otherwise) as an important influence on transfer behavior.

Model Specification of the present study

The specification for the remittances from migrants to their family's back home follows that of Stark (1991) for Botswana, Hoddinot (1992) and Agarwal and Horowitz (2002). The structure of the basic model estimated is:

$$R = \theta_0 + \omega_1 y + \omega_2 W + \omega_3 \zeta + \omega_4 FA + \omega_5 MA + \omega_6 \lambda_i + \omega_i X_i + e_i \quad (11)$$

where R is a measure of the level of migrant's remittance, y is a measure of family's per capita income, W is migrant's wage or self-employed income, ζ is a measure of migrant's unemployment risk, FA is family's assets, MA is migrant's assets, λi is the inverted Mills ratio as an additional regressor and Xi is a vector of individual and location factors that bear on the migrant's remittances such as age, educational level and number of other migrants remitting to the same household. **θ** and **ω** are estimated parameters and **e**'s are independent, normally distributed error

process. In addition, interactive terms of the individual and location factors with the other variables are explored.

For the rural to urban transfers, following from Ravallion and Dearden (1988), the estimated econometric model is:

$$R = b_0 + b_1 y + b_2 X + b_3 \zeta + u_i \quad (12)$$

where variables are as previously defined but specific to household transfer characteristics.
Whilst the Mill's inverse ratio variable (λ) is estimated from equations (6) and (7), the unemployment risks, ζ, is a variable that is not observed and is estimated. Use is made of the labor survey (employment) component of the GLSS 4. An equation of the probability of being employed, controlling for known individual characteristics such as age, education, gender and dummies for location, among others, is estimated:

$$P_i = \alpha + \beta X_i + \rho D_i \quad (13)$$

where P_i represents the probability of the individual being employed (P=1 when the individual has an employment[2] and 0 otherwise) and X_i and D_i are the individual characteristics and the dummies, respectively. Equation (13) is estimated using the probit model. This estimated equation is used to predict each migrant or head of household unemployment risk, $\zeta = (1 - P_i)$, based on their known socio-economic characteristics and location. This expected unemployment risk variable represent an *ex antes* measure of the perceived probability of loosing a job in the next period.

Hypothesis tested

The average level of migrant's remittance is associated with the riskiness of the migrant's income. The riskier his income, the higher the premium he is willing to pay, *ceteris paribus*. The migrant's income risks are associated with the unemployment risk variable. The main hypothesis tested (equation 11), where Ho is the null and Ha the alternative, is:

$$\text{Ho: } \omega_3 = 0$$
$$\text{Ha: } \omega_3 > 0$$

The hypothesis is evaluated using the *student-t* statistic. A rejection of the null hypothesis provides a test of the social security hypothesis (that in the absence of formal unemployment insurance, the migrant's insurance towards unemployment risks is increased remittance to rural farm family to provide support at times of crisis) at the household level.

Description of the data for the remittance functions

The analysis of the remittance functions is based on data from the national household standard of living survey conducted in Ghana from April 1998 to March 1999 (GLSS 4: 1998/99). This study adopts the Agarwal and Horowitz's (2002) convention that household refers to the migrants household of origin, and migrant refers to a household member who is spatially separated from his/her household) is adopted. The GLSS 4 data are grouped under different sections and files. The various data sets were matched using same household identification number and enumeration area number. Since the total sample in the GLSS 4 were matched for the relevant information, it is assumed that the final sample utilized for the analysis is representative of the total sample. The data set in the GLSS 4 covering households who sent any money or goods in the past 12 months to migrated household members was 2587 (43%) of the 5985 respondents, whilst from migrated household members to family members back home were 866 (31%) of 2824 respondents after the data matching. Household heads of migrant origin provided information on migrant

[2] An individual is considered employed if he did some work for profit or family gain in the past seven- (7) days prior to the survey. It does not take into account the amount of time spent on that work.

characteristics. However, information on migrant age, educational background, length of absence from household, and income is not provided.

Results and discussion

Variable description, their measurement and their moments (mean and standard deviation) are presented in Appendix 1.

Appendix 2 presents the probit estimation of the probability of being employed from which the probability of being unemployed is estimated. It is a postulated function of personal traits (age, square of age and sex), the level of education and location.

Migrant to households

Table 7 presents the estimated remittance equation of the level of the amount[3] of remittances made by migrated family members to their families' back home. The estimation procedure is the OLS.[4]

Table 7 Estimated remittance equation of migrants to households

Variable description	All Migrants (Log REMITT)	Variable description	All Migrants (Log REMITT)
Constant	3.2151*	*Education of head of household*	
EMPRISK (ζ)	7.3277***	EDKP	0.4161*
log (FPCI)	0.3771***	EDMJSS	0.3850*
log (LAND)	0.1451***	EDSSS	0.293
log (LAND) x DCHILD x SEXCODE	-0.0886	EDLEARN	-0.0833
log (MREMIT)	0.1783	*Relation of head of household to Migrant*	
log (AGE)	-0.1546	DPARENT	-0.3703
log (AGE) sq.	-0.0274	DSPOUSE	1.1678***
DCHILD x SEXCODE	0.5666*	N	252
SEXCODE	0.6367***	R2(adj)	0.2348
Location of head of household		DW	1.9263
RUSAV	-0.612		
RUCOS	0.3407*		
OTHUR	0.1733		

Notes: See Appendix 1 for list of variables, definitions and measurement. *, ** and *** represent significance at the 10, 5 and 1 percent levels respectively. Source: Authors' calculations.

Table 7, variables that are statistically significant (at either the 1%, 5% and 10% levels) are the migrants unemployment risk level, home family's per capita income and home family's assets (proxied by the amount of land holdings of the household). Other variables, statistically significant, are the location of the head of family in the rural coastal area, male migrant, son of the head of family, educational level of the head of family and spouse of the migrant. The unemployment risk variable[5] is positive and statistically significant at the 1-percent level. The

[3] It has not been possible to estimate a decision to remit function as only one migrant did not remit after the data structuring process. The inverse Mills ratio ((Yi-Xß)/(-Xß)) variable is hence omitted.

[4] The Ordinary Least Squares (OLS) procedure utilized the White Heteroscedasticity-Consistent Standard Errors and Covariance procedure provided by the program EVIEWS

[5] The estimated employment equation in Appendix 2 was used. Due to limited information on the migrated family member, only gender and location of migrant variables are utilized in the computations.

higher the probability of being unemployed, the higher the level of the amount remitted.[6] The result tends to support the self-insurance motive of migrants. Migrants amount remitted and per capita income of family back home show a positive and highly significant association. Again, this observation tends to support the self-insurance motive, as migrants seem not to be remitting more to support lower incomes back home. Whilst family asset (land holdings) is positively and significantly related to migrant level of remittance, the interactive term of land and son of head of household is not statistically significant. The aspiration to inherit motive of remittance is not detected. Sons and male migrants, however, tend to remit more. Remittances from migrants are geared more toward spouses. Lower education levels of the head of household do influence the amount of remittance whilst age does not. Migrant remittances appear to be targeted, significantly, to rural coastal family homes than other locations. The number of other migrants of the same household remitting has no significant effect on the average amount remitted. This observation also tends to support the self-insurance motive of migrants.

Household to migrant

Table 8 gives the Probit estimates of the coefficients of equation (6) and OLS estimates of the households (urban-urban, rural-urban) remittance function based on equation (12).

From Table 8, the decision to remit[7] is dependent (statistically significant at either the 5% or 1% levels) on per capita income (negative), location of migrated household member, relation of migrant to head (positive) and the (un) employment status of the head (negative). The decision to remit is influenced positively by the level of education of head of household. The location of head is also a significant variable. Age of head of household is not a significant variable in the decision to remit. The results of the decision to remit agree well with Agarwal and Horowitz (2002) although their data is for migrants to households.

Table 8 also reports the estimation for the level of the amount of remittances from heads of households to migrated family members.

The estimation procedure was ordinary least squares (OLS). The results are for the total household. All rural and all urban household samples are included for comparison.

The results in Table 8 for the total household sample indicates that household per capita income (total expenditures per capita), gender of head, level of education of head, location of migrant (Accra and Kumasi), child of head and whether child is a male, spouse of head (wife), other relatives of the head and the unemployment probability of head of migrants household are statistically significant mainly at the 5% and 1% levels.

In contrast to the decision to remit function, income is a positive and statistically significant determinant of the amount remitted. Age of head of household is not a significant determinant of the amount remitted. Again, location of migrant (Accra) has a negative and statistically significant (10%) influence on the amount remitted.

[6] Location of the migrant (as a proxy for migrant income) was included in the function but was all negative and statistically insignificant hence dropped from the analysis. We attribute the insignificant parameter estimates to a possible high correlation between these variables and the unemployment risk variable.

[7] Estimation of the parameters of the decision to remit function utilized the Maximum likelihood Probit procedure. From the structured data, the proportion of heads of households actually remitting was 97.3% of all the household heads. In the estimation, however, given missing information on other characteristics of the head of household, only two (2) non-remitting heads of households were captured Hence the decision to remit was estimated for only the total sample. The corresponding computed inverse Mills ratio was dropped from the analysis.

Table 8 Estimates of the decision to remit by heads of households and heads of household remittances to migrants

Dependent variable:	**DUMREMIT**		**Log (TOTREMIT)**	
Variable	*Decision to Remit*	*Total Households*	*All Rural Households*	*All Urban Households*
Constant	72.6920***	3.0015***	2.6652***	4.4234***
log (PCI)	-3.9780***	0.6188***	0.6217***	0.6018***
log (AGE)	-1.4665	0.0490	0.0710	-0.1106
SEXHH	10.4087***	0.2079***	0.2882***	-0.0197
Dummy: where migrant live				
Dlive1	---	---	---	---
Dlive2	-2.3460***	-0.1633*	0.0022	-0.2833**
Dlive3	7.8123***	0.2001**	0.1932	0.3829**
Dlive4	---	-0.0314	-0.1780	0.3016
Dlive5	---	-0.4297	-0.5136	-0.2679
Dlive6	---	---	0.0463	---
Dlive7	6.7187***	---	0.1376	0.0238
DCHILD	9.9390***	0.2490***	0.3003***	0.2122
DCHILD x DSEXMIGM	---	0.2429**	0.1478	0.4773**
DSPOUSE	---	0.6544***	0.7832***	0.3522
DKIN	---	-0.2633***	-0.2639***	-0.2159*
Education of Head of Household				
EDKP	---	0.0609	0.0289	0.1300
EDMJSS	11.9888***	---	---	---
EDSSS	8.8353***	0.1124	0.0363	0.1337
EDHIGH	3.9361**	0.2999	0.1270	0.2630
EDLEARN	9.8941***	0.2759**	0.2988*	0.2396
Location of Head of Household				
ACCRA	---			
RUCOS	4.1670***			
RUFOR	-5.5102***			
RUSAV	---			
OTHUR	5.4983***			
EMPRISK (ζ)	-29.8937***	-2.2179**	-1.426	-6.9826***
N obs=1 (1922)	Obs= 0 (2)	1918	1155	763
Log Likelihood	-3.4233			
Restricted LogL	-15.737			
LR Statistic (15 df)	24.6273			
Probability (LR stat)	0.0552			
McFadden R2	0.7825			
R2(adj)		0.175	0.153	0.176
DW		1.620	1.694	1.556
F-stat		26.47	12.61	10.59
Prob (F-stat)		0.000***	0.000***	0.000***

Notes: See Appendix 1 for variable definition and measurement. 1. The base category for education is EDNO. That for where migrant live is DLIVE8. 2. *, ** and *** represent significance at the 10, 5 and 1 percent levels respectively. Source: Authors' calculations.

The implications derived from the results of the household remittance equation are that:

(a) Per capita income is a positive and a major determinant of the level of amount of remittances sent. The estimated marginal utility of income is inelastic, on the average (approximately 0.61), for all households and all locations.

(b) The location of migrated family member (Accra and Kumasi, in particular) receiving transfers is a major determinant of the amount transferred. This reflects (rural) household transfers to migrated household members temporarily affected by (economic) crises in the major cities, *ceteris paribus*.

(c) Remittances to child of head, particularly to sons and spouse of head (wife), appear to be a motive in determining the level of amount remitted. Other relatives of the head (brothers and sisters) receive significantly less (negative) of the amounts remitted.

(d) The unemployment variable is a statistically significant variable in explaining the levels of the amount remitted. The lower the probability of being unemployed, the higher the probability of remitting higher amounts, *ceteris paribus*. See Ravallion and Dearden (1988). If the remittance motivation by the migrant is to insure against loss of employment through increased remittances and be able to fall back on the household in times of crisis then the household would have to invest its income, ceteris paribus, on its assets to accumulate resources to pay out the indemnity in the event that the insurance is triggered.

(e) Education of the head of household is not a major determinant of the levels of amount remitted, although heads of households with vocational skills influence the decision to remit and level of amounts remitted.

(f) Age of head of household is not a major determinant in the remittance function.

In summary, similar sets of factors determine remittances from rural and urban households to migrated family members in the urban areas (Accra and Kumasi). These remittances seem to redistribute income (altruistic motive) to the spouses and children in the urban areas but not to other relatives.

6. Conclusion and policy implications

The impact of the macroeconomic crises and remedial policy induced several dislocations in the labor market. Thousands of formal sector employees were dismissed, increasing unemployment. Job switching from formal to informal sector activities increased. The dismissed workers were directed specifically into the agricultural sector. The period also saw significant reverse migration flows from urban (non-agricultural) back to rural (agricultural) areas. Several strategies for coping with the macro-crisis were initiated. The state provided formal pension and social security schemes and social relief programs to buffer dislocations in the labor market. The extended family system and voluntary or compulsory (savings) associations provided informal social protection. The agricultural sector acted as a safety net and buffer for non-agricultural dependent households in the urban and rural areas by providing migrated relatives who lost their jobs with the opportunity to come back to the farm for temporary employment and the provision of direct intra-households transfer from rural to urban households.

The range of roles that agriculture played in the context of Ghana's socio-economic development over the macro-crises (principally economic growth and food security roles) are widely perceived as the fundamental contributions of agriculture. One of the more important roles played by the agricultural sector is as a safety net. . Empirical evidence shows that the *rural farm family served as migrants' insurance towards unemployment in the absence of formal insurance*.

The findings have important policy implications. The rural household support system is an addition function played by the rural sector in its capacity of complementing formal social security markets. Agriculture (rural households) is not just a source of food, employment, and income and of labor supply. Helping the rural sector reduce aggregate risks in income through increased rural activity diversification can enhance the existence and effectiveness of this positive externality whereby agriculture (the rural sector) engages in unemployment risk sharing scheme. As rural household per capita income increases, remittances from migrants increases (the informal

insurance premiums goes up, increasing investment funds at the rural level) and remittances to migrated household members to cushion economic effects also increases. The policy focus must therefore emphasize on rural infrastructure improvements (roads, electricity, education, and health) and rural initiatives that can bring the hither-to-fore production of non-tradables at the rural areas more into the domestic and international markets. These are issues government policies could address to enhance the role of agriculture in mitigating macro-shocks in an economy at the household level.

APPENDIX 1: Variable definitions, means and standard deviations

(A) Probability of being Employed Data Set variables

Variable	Variable definition and measurement	mean	std. deviation
EMPLOY	Dummy=1 if individual did some work for profit or family gain in the past seven (7) days and zero (0) otherwise	0.8775	0.3279
AGEY	Age of respondents in years	34.9145	13.3250
SEX	Dummy for Gender of respondents: Male =1, zero (0) otherwise	0.4259	0.4955
RUFOR	Dummy for location of respondent in the rural forest area. The locations are coded from the CLUSTER code in the GLSS 4 data. RUFOR =1, else zero (0)	0.3653	0.4816
RUCOS	Dummy for location of respondent in the rural coastal area. The locations are coded from the CLUSTER code in the GLSS 4 data. RUCOS =1, else zero (0)	0.1421	0.3492
RUSAV	Dummy for location of respondent in the rural savanna area. The locations are coded from the CLUSTER code in the GLSS 4 data. RUSAV =1, else zero (0)	0.1266	0.3326
OTHUR	Dummy for location of respondent in other urban areas. The locations are coded from the CLUSTER code in the GLSS 4 data. OTHUR =1, else zero (0)	0.2612	0.4393
ACCRA	Dummy for location of respondent in the Accra area. The locations are coded from the CLUSTER code in the GLSS 4 data. ACCRA =1, else zero (0)	0.1048	0.3063
EDNO	Dummy for no education/other of respondent. EDNO =1, else zero (0).	0.1003	0.3004
EDKP	Dummy, kindergarten and primary education of respondent. EDKP =1, else zero (0).	0.3439	0.4751
EDMJSS	Dummy, Middle and JSS education of respondent. EDMJSS =1, else zero (0).	0.4216	0.4939
EDSSS	Dummy, SSS/GCE-O/A level education of respondent. EDSSS =1, else zero (0).	0.0659	0.2481
EDHIGH	Dummy, tertiary (Univ., Poly.) education of respondent. EDHIGH =1, else zero (0)	0.0139	0.1171
EDLEARN	Dummy, vocational (teacher training, nursing, etc) education of respondent. EDLEARN =1, else zero (0).	0.0545	0.2270

(B) Migrant to Household Data Set variables

Variable	Variable definition and measurement	mean	std. deviation
REMITT	Average total value of remittances (cash and kind) of migrants to the same household (totremit/mremit)	204195.5	580236.2
TOTREMIT	Total value of remittances (cash and kind) of migrants to the same household	330462.6	841989
MREMIT	Total number of migrants remitting to the same Household	1.713933	1.0930
EMPRISK	Probability of being unemployed variable (see text for computation procedure) for migrant	0.3891	0.0767
FPCI	Per-capita total expenditure (value) of family household as a proxy for per-capita income of household	1052152	846494
LAND	Total family land holdings in hectares	10.7281	50.9873
RUSAV	Dummy for location of head of household in the rural Savanna area. RUSAV =1, else zero (0)	0.0497	0.2175
RUCOS	Dummy for location of head of household in the rural coastal area. RUCOS =1, else zero (0)	0.2370	0.4255
OTHUR	Dummy for location of head of household in other urban area. OTHUR =1, else zero (0)	0.1665	0.3727
EDKP	Dummy, kindergarten and primary education of head of household. EDKP =1, else zero (0).	0.4098	0.4923
EDMJSS	Dummy, Middle and JSS education of head of Household. EDMJSS =1, else zero (0).	0.3940	0.4890
EDSSS	Dummy, SSS/GCE-O/A level education of head of Household. EDSSS =1, else zero (0).	0.0427	0.2028
EDLEARN	Dummy, vocational (teacher training, nursing, etc) education of head. EDLEARN =1, else zero (0).	0.0396	0.1951
SEXCODE	Dummy for Gender of migrant: Male =1, zero (0) Otherwise	0.5833	0.4933
CHILD	Dummy =1, if migrant is child of head of household	0.2687	0.4435
DPARENT	Dummy =1, if head of household is parent of migrant	0.0560	0.2300
DSPOUSE	Dummy =1, if migrant is spouse of head of household	0.0485	0.2150
AGE	Age in years of head of household	46.4867	15.7385

(C) **Household to Migrant Data Set variables**

Variable	Variable definition and measurement	mean	std. deviation
DUMREMIT	Decision to remit. Dummy =1, if household remit and zero (0) otherwise	0.9694	0.1722
TOTREMIT	Total value of remittances (cash and kind) of households to migrants	291935.8	647040
PCI	Per-capita total expenditure (value) of family household as a proxy for per-capita income of household	1408951	1348235
AGE	Age in years of head of household	43.6718	14.9278
EMPRISK	Probability of being unemployed variable (see text for computation procedure) for head of household	0.0886	0.0487
EDMJSS	Dummy, Middle and JSS education of head of household EDMJSS =1, else zero (0).	0.3974	0.4895
EDSSS	Dummy, SSS/GCE-O/A level education of head of Household. EDSSS =1, else zero (0).	0.0745	0.2626
EDHIGH	Dummy, tertiary (Univ., Poly.) education of head of Household. EDHIGH =1, else zero (0).	0.0191	0.1369
EDLEARN	Dummy, vocational (teacher training, nursing, etc) education of head. EDLEARN =1, else zero (0).	0.0652	0.2469
SEXHH	Dummy for Gender of head of household: Male =1, zero (0) otherwise	0.7109	0.4535
DCHILD	Dummy =1, if migrant is child of head of household	0.2423	0.4286
DKIN	Dummy =1, if sister/brother of head of household	0.1663	0.3724
DSPOUSE	Dummy =1, if spouse of head of household	0.0324	0.1772
DSEXMIGM	Dummy =1, if migrant is Male	0.3473	0.4762
RUFOR	Dummy for location of head of household in the rural forest area. RUFOR =1, else zero (0)	0.4237	0.4942
RUCOS	Dummy for location of head of household in the rural coastal area. RUCOS =1, else zero (0)	0.1648	0.3710
OTHUR	Dummy for location of head of household in the other urban area. OTHUR =1, else zero (0)	0.2470	0.4314
DLIVE1	Dummy =1, if migrant is in the same village/town as Head of household, else zero	0.1490	0.3562
DLIVE2	Dummy =1, if migrant lives in Accra area, else zero	0.1319	0.3384
DLIVE3	Dummy =1, if migrant lives in Kumasi area, else zero	0.0876	0.2828
DLIVE4	Dummy =1, if migrant lives in Sek'di/Tak'di area, else zero	0.0163	0.1268
DLIVE5	Dummy =1, if migrant lives in Tamale area, else zero	0.0076	0.0867
DLIVE6	Dummy =1, if migrant lives in other urban area, else zero	0.3024	0.4594
DLIVE7	Dummy =1, if migrant lives in rural area, else zero	0.2908	0.4542
DLIVE8	Dummy =1, if migrant lives abroad/other, else zero	0.0143	0.1189

APPENDIX 2

Maximum Likelihood-Binary Probit Estimation[8] of the Probability of being Employed
Dependent variable = EMPLOY

Variable	Coefficient	Standard error	z-statistic	Prob
Constant	-0.2144	0.1691	-1.2680	0.2048
Personal traits:				
AGEY	0.0456	0.0078	5.8295***	0.0000
AGEY sq	-0.0005	0.0001	-4.9083***	0.0000
SEX	0.2312	0.0526	4.3964***	0.0000
Education:				
EDHIGH	0.1236	0.2531	0.4885	0.6252
EDSSS	0.0673	0.1346	0.4999	0.6172
EDKP	-0.0384	0.0878	-0.4378	0.6616
EDLEARN	-0.0178	0.1407	-0.1262	0.8996
EDMJSS	-0.0505	0.0889	-0.5680	0.5700
Location:				
RUFOR	0.5277	0.0772	6.8366***	0.0000
RUCOS	0.4848	0.0919	5.2757***	0.0000
OTHUR	0.3946	0.0806	4.8956***	0.0000
ACCRA	0.4471	0.1049	4.2619***	0.0000

N 4388, LR Statistic (12 df) 116.05, Log Likelihood -1574.69, Probability (LR stat) 0.0000, Restricted LogL -1632.72, McFadden R^2 0.0355

_____

Notes: See Appendix 2 for definition of variables and their measurement

1. The base category for education is EDNO. That of location is RUSAV.

*, ** and *** represent significance at the 10, 5 and 1 percent levels respectively.

[8] The estimation procedure used the Huber/White Quasi-Maximum Likelihood.

References

Abdulai, A. 1999. "International Migration and Agricultural Development in Ghana". *Scandinavian Journal of Development Alternatives and Area Studies*, Vol. 18, No. 1. March.

Agarwal, R. and A.W. Horowitz. 2002. "Are International Remittances Altruism or Insurance? Evidence from Guyana Using Multiple-Migrant Households". *World Development* Vol. 30, No.11, pp. 2033-2044.

Alexander, M., C. Graham, M. Schacter, and M. Scindt. 1995. "Social Programmes and Social Funds: A Review of Design and Implementation in Sub-Saharan Africa", the World Bank.

Aryeetey, E. 1996. *Structural Adjustment and Aid in Ghana*. Friedrich Ebert Foundation, Ghana Office.

Aryeetey, E. and F. Gockel. 1990. "Mobilizing Domestic Resources for Capital Formation in Ghana: The Role of Informal Financial Markets". AERC Research Paper 3, Nairobi.

Beaudry, P. and N.K. Sowah. 1994. "Ghana" in *Labor Markets in an Era of Adjustment,* edited by Horton, Kanbur and Mazumdar, EDI Development Studies, World Bank, Washington DC.

Bentil *et al.* 1988. "Rural Finance in Ghana", Bank of Ghana and IPC of Germany. A Research study sponsored by the GTZ.

Bresciani, F. 2002. The Role of Agriculture as a Buffer in Times of Crisis. ROA Project Draft. Theoretical Notes. FAO. Rome.

Cornia, A.P., R. Jolly and E. Stewart. 1987. *Adjustment with a Human Face*. Oxford, Cleveland Press.

Cox, D. 2002. "Private Inter-household Transfers in Vietnam in the Early and Late 1990s", Part of a World Bank Funded Project on Economic Growth and Household Welfare – Policy Lessons from Vietnam, June.

Cox, D. and G. Jakubson. 1989. "The Connection between Public Transfers and Private Interfamily Transfers". Boston College, Chestnut Hill, Mass. Processed.

Cox, D. and E. Jimenez. 1990. "Achieving Social Objectives Through Private Transfers", *The World Bank Research Observer, Vol. 5 No.2, pp 205-18*

Deaton, A. 1991. "Savings and Liquidity Constraints", *Econometrica*, Vol. 59, No. 5, 1221– 48.

Dercon, S. 2000. Income Risk, Coping Strategies and Safety Nets. Centre for the Study of African Economies. WPS/2000-26. Oxford University.

Eswarn, M. and A. Kotwal. 1989. "Credit as Insurance in Agrarian Economies", *Journal of Development Economics*, Vol.31, p.37-53.

Ewusi, K. 1984. "Dimensions of Rural Poverty in Ghana", FAO, Rome.

Ewusi, K. 1987. *Structural Adjustment and Stabilization Policies in Developing Countries: A Case study of Ghana's Experience in 1983-1986*. GPC, Tema.

Fosu, K.Y. 1989. "Agriculture in Ghana's Post-1970 Development Process". Paper at the 5th Biennial Conference of the W. African Econ. Ass., Lome, Togo.

Ghana Living Standard Surveys 2, 3 and 4. Statistical Service. Govt. of Ghana.

Glewwe, P. and G. Hall. 1998. "Are Some Groups More Vulnerable to Macroeconomic Shocks than Others? Hypothesis tests based on panel data from Peru", *Journal of Development Economics*, Vol. 56, pp.181-206.

Gockel, A. F. 1996. "The Formal Social Security System in Ghana", published by Friedrich Ebert Foundation, Ghana Office.

Government of Ghana. 1999. "Labor Re-deployment Programme: Achievements, Problems and Prospects". Issued by the Secretariat of the Programme's Management Committee.

Hoddinott, J. 1992. "Modelling Remittance Flows in Kenya", *Journal of Agricultural Economics,* Vol. 1. No. 2, 206-232.

Hutchful, E. 2002. "Ghana's Adjustment Experience: The Paradox of Reform", United Nations Research Institute for Social Development, Geneva, Switzerland.

ISSER. 1992. *State of the Ghanaian Economy in 1991*. Published by Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Legon.

ISSER. 1994. *State of the Ghanaian Economy in 1993*. Published by Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Legon.

ISSER. 1995. *State of the Ghanaian Economy in 1994*. Published by Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Legon.

Kabeer. N. 2002. "Safety Nets and Opportunity Ladders: Addressing Vulnerability and Enhancing Productivity in South Asia." *Overseas Development Institute Working Paper 159.* London, UK.

Kaufmann, D. and D.L. Lindauer. 1986. "A Model of Income Transfers for the Urban Poor." *Journal of Development Economics 22* (July - August): 337-50.

Knowles, J. C. and R. Anker. 1981. An Analysis of income transfers in a developing country: The case of Kenya. *Jour. of Dev. Economics*, (2): 205-226.

Quayson, A. 1998. *The Ghanaian Chronicle,* 27-28th May Edition.

Ravallion, M. and L. Dearden. 1988. "Social Security in a 'Moral Economy': An Empirical Analysis for Java", *The Review of Econ and Stat*, Vol. 70, 36-44.

Rempel, H. and R. A. Lobdell. 1978. "The Role of Urban-to-Rural Remittances in Rural Development." *Journal of Development Studies 14* (April): 324-41.

Stark, O. 1991. *The Migration of Labour*. Basil Blackwell (ed.).

Statistical Service, Ghana. Quarterly Digest of Statistics (QDS), various issues.

World Bank. 2001. *World Development Report 2000/2001: Attacking Poverty*, Oxford University Press, Inc. New York, N.Y.