# Capital and credit sources and household non-farm income in Ghana

**Peprah, J. A[1]. and Koomson, I [1.]**

**Department of Economics, University of Cape Coast**

## Abstract

This paper examines the effects of the various sources of capital and credit available for financing non-farm enterprises in Ghana. A maximization of the household production function yields linear equations for estimating the key parameters of interest. Capital from bank, family, NGOs and money lenders significantly influence non-farm income. In terms of business expansion, credit from bank, cooperatives and family/friends are very important. Regional differences also appear to be significant as well as the ecological zones. Gender differences in capital and credit sources affect income of non-farm enterprises.

**Keywords:** non-farm enterprise, income, credit, capital, Ghana

## Introduction

Non-farm income sources in Ghana include wages from employment (28.6%), self employment income (24.5%) and rent, remittances and others (15%). Non-farm income constitutes 65.2 percent of household income thus making it more important than other sources of household income. It is therefore not by chance that households engage in small scale non-farm economic activities (GSS, 2008) either as a way of livelihood diversification or as a source of livelihood. Some studies have looked at the reasons as well as factors that influence the participation in non-farm activities by households in developing countries. For example, Mduma and Wobst (2005) found, in Tanzania, that educational level, availability of land, and access to economic centers and credit are important factors that determine the number of households that participate in non-farm income generating activities. Bezu, Holden and Barrett (2009) also looked at the activity choice in rural non-farm self-employment in Ethiopia and found education, gender, and land holding to be important determinants of non-farm activity choice.

The importance of non-farm income to households can therefore not be underestimated. Reardon, Crawford and Kelly (1994) report an average share of 42 percent of non-farm enterprise income in total rural household income in Africa, 32 percent in Asia and 40 percent in Latin America. To show the importance of non-farm income, Haggblade, Hazell and Reardon (2002) estimated that non-farm income contributes between 30 percent and 45 percent of rural household incomes among households in the developing countries. Thus, in an attempt to reduce poverty, non-farm activities cannot be relegated to the background. This is confirmed by Buchenrieder (2003), Knerr and Winnicki (2003) who

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reported that non-farm activities can reduce poverty by generating alternative income sources and stimulate agricultural growth and diminish rural-urban migration.

Even though non-farm activities are of paramount importance, there still remain some challenges. Access to capital and credit continue to be a major constraint to non-farm businesses. For example, a study on Ghana by Aryeetey et al. (1994) concluded that such enterprises have greater problems with credit than larger firms. This is also corroborated by Abor (2008) in a study on the determinants of capital structure of Ghanaian firms. In a related development, how women finance their businesses seems to be different from that of men. Whereas men obtain capital from formal commercial banks women tend to rely on informal sources of financing. This disparity has implications for income generation among men and women (Tigges & Green, 1994).

According to the Ghana Statistical Service (GSS, 2008), the main source of capital for non-farm enterprises is household savings (60%). This clearly shows that either access to external capital is limited or households are not interested in external financing. The Ghana Statistical Services (GSS) reports that credit for expanding non-farm activities in Ghana is mainly from informal sources. In general, both access to capital for new businesses and credit for business expansion seems to be limited. This is likely to affect the income generation of non-farm businesses. Aside from these, there is little or no study that has focused on how capital and credit sources influence income from such activities. In fact, earlier studies have looked at SMEs in general (Mensah, 2004) with little focus on non-farm enterprises. Even studies that have looked at non-farm enterprises focused on diversification of farm activities (McNamara & Weiss, 2001; Mahaja & Gupta, 2011). Thus, as some earlier studies have looked at why households diversify by engaging in non-farm activities, an important extension is to investigate what factors affect income that accrue from non-farm activities (Mahaja & Gupta, 2011). A more recent study about the subject matter on Ghana focused on effects of non-farm income and inequality but no mention was made of capital and credit sources (Senadza, 2011). The difference between this study and earlier studies that have looked at non-farm enterprises and SMEs in general is clear in the sense that this study focuses on the effects of capital and credit sources on household non-farm income. It is worthy to note that the analysis of this study is done with the household as the unit of analysis by restricting data to the household head. To this end, household head and household are used interchangeably and male and female also refer to male-headed and female-headed households respectively.

The objective of this paper is in two folds. The first is to examine the effects of capital and credit sources on non-farm enterprises of household heads while the second objective is to analyse the gender differences in the effects of capital sources on no-farm enterprises of household heads. The paper, therefore, addresses the following research questions among others: (1) how do the various capital and credit sources affect non-farm business income? (2) Do regional differences exist in household non-farm income? (3) Does gender difference play a role in the effects of capital sources on non-farm enterprises? Controlling for other

covariates the study tests one main hypothesis: capital and credit sources do not significantly influence the level of household non-farm income. The rest of the paper is structured as follows: the next section writes on non-farm activities in Ghana followed by literature. Section 4 looks at the methodology and 5 provides the results and discussion of findings. Section 6 concludes the study.

**Non-farm activities in Ghana**

In 1998/99 approximately 1.9 million households or 49 percent of all households operated nonfarm business with women operating two-thirds of these businesses while approximately 3.2 million households, representing 46 percent of all households, were operating non-farm enterprises during the 2005/06 GLSS-5 survey. In relative terms households in non-farm businesses declined from 49 percent in 1998/99 to 46 percent in 2005/06. Since 2005/06 women have been the major players in the non-farm sector and retail trading has been the dominant activity in the non-farm business with the rest being some kind of manufacturing (GSS, 2008).

Non-farm activities comprise activities outside the farm. Lanjouw and Lanjouw (2001) define non-farm activities as a set of economic activities carried out in the rural areas that are not agricultural. This definition is narrow in scope in that in most countries non-farm activities do not only occur in rural areas. In the same vein, even though farm activities dominate in the rural areas, some households in urban communities also engage in farm activities. In Ghana non-farm activities occur both in the rural and urban communities but majority of these activities are concentrated in the urban areas.

Every three in four (75%) of manufacturing and every four in five (80%) of trading businesses are operated by women. Rural savannah has the highest proportion (86%) of female in the manufacturing sector while rural coastal has the highest proportion (89%) for trading. The proportion of females in urban settings that engage in trading and manufacturing is 78 and 64 percent respectively. Other urban businesses besides manufacturing and trading, however, have higher proportions of males more than females. Non-farm manufacturing activities include processing of sheanuts, fish, cassava, maize, and oil palm fruits. The critical issue for the development of non-farm enterprises in Ghana is access to credit. Figure 1 shows the various sources of capital for financing non-farm enterprises in Ghana. More females (73%) finance their activities with own savings as compared to males (27%).

For those who used household savings, 27 percent were males while 73 percent were female. For Bank capital, 29 percent were males while 71 percent were females. Twenty percent of those who used remittances from abroad as capital for their non-farm enterprises were men while 80 percent of them were women. Using income from family farm as capital saw 34 percent of males using it while 73 percent of females used this source. Capital source coming from the District Assembly was used by only women. The least used source of capital by men was that coming from friends/relatives while the least used source of capital by females was that from family farm. The GSS report shows that, in Ghana, household savings

is the most important source of capital for most household enterprises so one would expect that it will impact positively on household enterprises. This is what informed the usage of savings as the reference category (base) in the capital regression output.

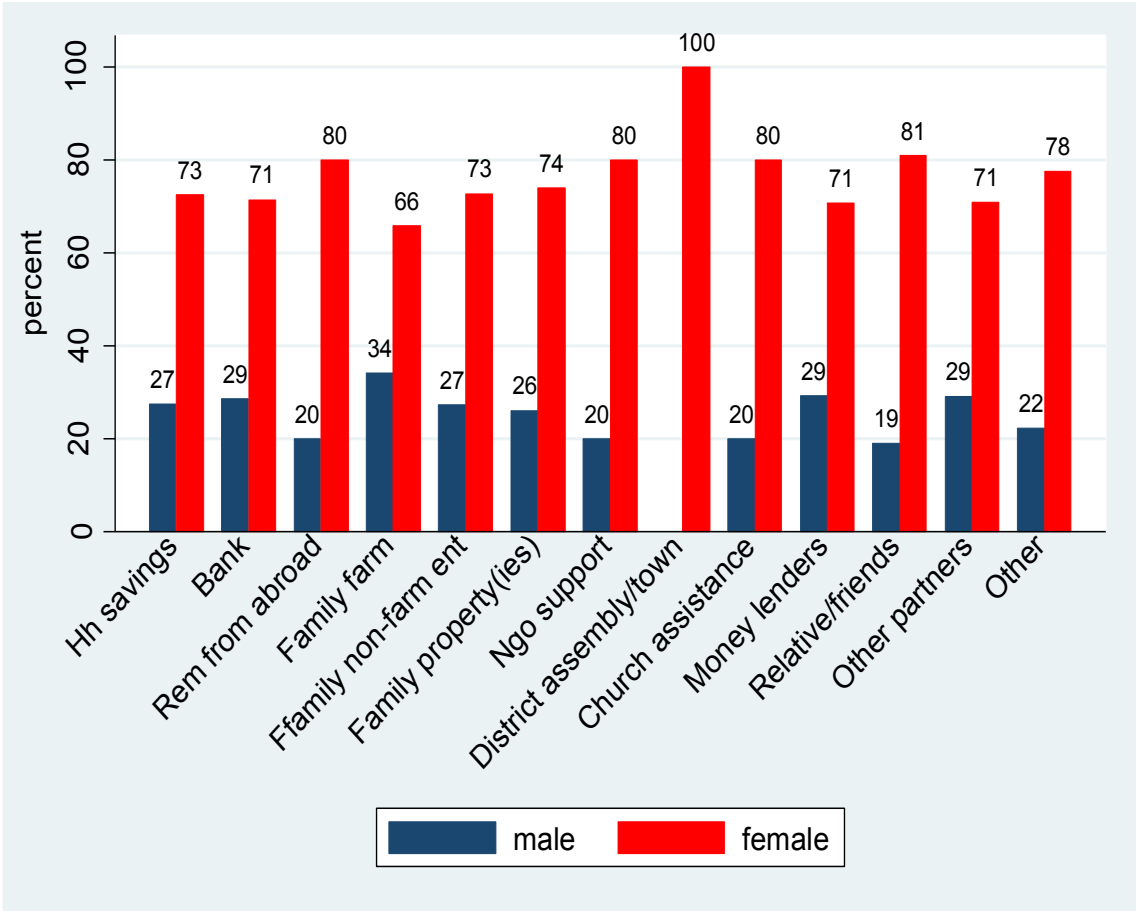


**Figure 1: Sex of business operator and main source of capital (%)**
**Source: GSS, 2008**

A major problem associated with non-farm activities is lack of the needed capital for business start-up and credit for expansion. Senadza (2011) indicates that, as a result of lack of needed capital to engage in lucrative self-employment, many households engage in low skilled wage employment. Thus, access to capital and credit serve as a barrier to entry into non-farm activities.

Households engage in non-farm activities such as sale of motor vehicles, quarrying of stone, clay and sand. manufacture of bakery products, preparation and spinning of textiles, finishing of textiles, installation of all kinds of utility, gold mining/dredging, manufacture of other food products, soft drinks and carbonated water, retail of automotive fuel, other entertainment and recreational activities, hairdressing and other beauty treatment, undifferentiated goods-producing and many others. These activities (see Table 1) are broadly

categorized into manufacturing, trading and other non-farm activities by the Ghana Statistical Service (2008).

**Table 1: Non-farm activities and Gender Composition**

| Principal Non-farm Activity | All Person Involved | | Totals |
|---|---|---|---|
| | Males | Females | |
| Manufacturing | 664,846 (35.5%) | 1,298,735 (37%) | 1,963,581 (36.6%) |
| Trade | 609,329 (32.5%) | 1,641,394 (47%) | 2,250,723 (42%) |
| Others | 599,391 (32% ) | 553,862 (16%) | 1,153,253 (21.4%) |
| **Total** | **1,873,566 (100%)** | **3,493,991 (100%)** | **5,367,557 (100%)** |

**Source: GSS, 2008**

Table 1 shows that in general, out of the 5,367,557 respondents, 1,963,581 (36.6%) were into manufacturing, 2,250,723 (42%) were involved in trading while the remaining 1,153,253 (21.4%) were engaged in other non-farm activities. Taking the 1,873,566 male respondents, 664,846 (35.5%) were engaged in manufacturing, 609,329 (32.5%) were into trading while 599,391 (32%) were involved in other forms of non-farm activities. Also, the 3,493,991 females had 1,298,735 (37%) of them engaged in manufacturing, 1,641,394 (47%) were into trading with the remaining 553,862 (16%) involved in other non-farm enterprises. The sources of credit available to these main activities are also shown in Table 2.

**Table 2: Age of Business and Main Source of credit (%)**

| | Age of Business | | | |
|---|---|---|---|---|
| Main Source of Credit | Up to 20 years | 21-40 years | 41-60 years | 61-80 years |
| No Credit Used (Savings) | 89.12 | 90.23 | 86.36 | 100 |
| Bank | 2.15 | 1.86 | 4.55 | 0 |
| Other Financial Agencies | 0.6 | 0.93 | 0 | 0 |
| Cooperative | 0.38 | 1.4 | 0 | 0 |
| Money Lender | 1.06 | 0.93 | 0 | 0 |
| Family/Friend | 4.99 | 3.26 | 4.55 | 0 |
| Proceeds From Other enterprises | 0.23 | 0.47 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Government Agencies | 0.49 | 0.47 | 0 | 0 |
| Ngo's | 0.3 | 0 | 0 | 0 |
| Other | 0.68 | 0.47 | 4.55 | 0 |
| Total | 100 | 100 | 100 | 100 |

**Source: GSS, 2008**

Age of business is tabulated with the main source of credit available to non-farm enterprises in Table 2. It can be gleaned that for non-farm enterprises that were up to twenty years, a majority (89.12%) of them used their own internally generated funds, 2.15 percent used credit from the bank and 4.99 percent used credit from family/friends. But it must be noted that firms in this age range made use of sources of credit cutting across the various sources available to them. For non-farm enterprises that were 20-40 years, a majority (90.23%) of them still did not use credit, 3.26 percent of them used loans from family/friends. In this category as well, these firms used almost all the sources available to them with none going in for NGO credit. Non-farm enterprises that were aged 41-60 years also had 86.36 percent not accessing credit and 4.55 percent across the board using credit from bank, family/friend and other sources. As regards non-farm enterprises aged 61-80 years, none of them used credit. This is in line with the pecking order theory that puts retained earnings ahead of debt that comes from outside the firm or is external to it (Myers, 1984). This explains why aged firms use more of internally generated funds compared to external finance. It must be noted that the pecking order theory looks at the ranking of finance options available to firms but does not look at the age of the firm in relation to these finance options. Table 2 shows that firms in their early stages need credit from external sources more than mature firms. This is because as firms age, they accumulate assets and make enough revenue from which much is retained and ploughed back into the expansionary ventures of these firms.

## Literature

The pecking order theory explains that firm's financing decision follows a hierarchical order with firms preferring to finance themselves internally through retained earnings which is least affected by information cost(s) and is less risky. According to Myers and Majluf (1984), if debt were available and risk-free, it would work as well as internal financing. In this regard, Myers (1984) argues, intuitively, that the firm ought to fall somewhere between retained earnings and equity thus creating the pecking order and that, in fact, he argues that adverse selection implies that retained earnings are better than debt and debt is better than equity. Companies issue debt because it is the financing option that will exert the least outside influence on decision making and ownership of the firm. In the last instance the firm resorts to new capital in the form of equity. This is due to the type of message that the different types of securities send to the market: while debt signals to investors that management are

confident of debt repayment, equity signals that management believes that the firm is overvalued and could potentially trigger a fall in its share price. In this sense, pecking order theory describes financing decisions as one that is potentially affected by managerial attempt to minimize supervision from shareholders (Myers & Majluf, 1984). Frank and Goyal (2007) indicate that the use of internal financing would result in higher welfare. Thus, retained earnings are preferred to debt because debt is just as good in their model in which equity is inefficient.

Empirical research has found conflicting evidence on the ability of this theory to explain how firms go about their financing decisions; however, it has substantially enhanced the understanding of the factors that influence capital structure. Psillaki and Daskalakis (2009), find evidence consistent with pecking order theory, that credit tends to be positively correlated with the size of a firm and the portion of its assets that are tangible, while it tends to be negatively linked with its profitability. This implies that company managers may decide not to launch potentially profitable projects if they have to be financed by risky financial instruments (Myers & Majluf, 1984). At the same time, the owners of SMEs may decide not to seek finance that dilutes their interest.

Canvas (1992) in Coetzee (2002) argues that the concept of hierarchical preference between external and own-financing bridges an important gap usually present in financial market research. It follows from the pecking order theory that, profitable efficient firms will borrow relatively less than other firms since they will finance their investment expenditures with retained earnings. If outside sources are used, the first choice is from informal financial intermediaries, followed by formal finance.

Recent studies have emphasized the inability of pure traditional farm activities to sustain households, especially in Africa. Alarya, Corniauxband and Gautierc (2011) found that livestock ownership and other pure farm activities are not major source of income for households in Niger Republic. They concluded that, irrigated agriculture and non-farm income from self-employment are the main sources of income for the wealthy group. This study did not consider sources of financing non-farm enterprises even though it is an established fact that financing such enterprises is a major problem in Sub-Saharan Africa.

Different sources of capital affect the activities of household enterprises. For example, in rural India, evidence shows that bank loan and loan from money lenders impact positively on household enterprise activities according to Imai and Arun (2008). In this study the authors identified bank loans and credit from money lenders as additional sources of credit and they observed that households that obtain bank loan and loans from money lenders are able to make productive gains. Other sources of credit available to the informal households are government and NGO-supported credit programs. Some researchers have hypothesised that, these forms of credit may crowd out the financial services offered by other financial institutions because they come with no cost or very low interest rates (Diagne, Zeller & Sharma, 2000).

Age of business is assumed to enhance the possibility of businesses sourcing for capital. In most cases since SMEs do not have access to the public equity market, long years of business could connote long business relationships with external debt providers and that increases their chances of acquiring external long-term debt finance (Abor, 2008). Age of firms is used as a proxy for reputation of firms since firms that have been in business for long are assumed to be having good standing and there is high likelihood that, such firms can easily source for external funding. Again, firms that have been in business for long are assumed to be doing better than younger ones and for that matter, age of firm is likely to correlate positively with revenue size. Earlier study by Stinchcombe, (1965) suggests that older firms are more experienced, have enjoyed the benefits of learning, are not prone to the liabilities of newness, and can therefore enjoy superior performance.

High enterprise income can be linked to high enterprise profits. Profitable firms are more capable of tolerating more debt since they may be in a position to service their debt easily and on time. Profitable firms are more attractive to financial institutions as lending prospects; therefore they can always take on more debt capital (Ooi, 1999). Scherr, Sugrue and Ward (1993) in a study on financing small firm start-ups found that start-up firms with higher anticipated profitability have higher debt to equity ratios meaning businesses that are likely to reap more profits have the urge to be financed by large proportion of debt relative to equity. Small firms with low profit capacity will have to resort to alternative forms of funding.

Non-government organizations (NGOs) have been involved in financing of SMEs and most of them seem not to have had positive performance. Their inexperience in financial intermediation and limited financial resources has constrained their potential. There is little coordination among the NGOs, resulting in duplication of resources and activities. Most of them are donor based and sponsored, lack adequate funding, and are limited in their geographical coverage. They also discriminate against small-scale enterprises who get rationed out by lenders since cheap credit creates excess demand for loanable funds, forcing lenders to lend to large enterprises that have collateral and are perceived to be less risky (Atieno, 2001). The cheap source of credit used by NGOs pre-supposes that they lend at cheap interest rates which probably accounts for their ineffectiveness like most government funds. Traditionally too, NGOs are gender biased towards women.

Gender heterogeneity may also affect the source of capital and credit for expanding enterprises. Traditionally, men have easy access to start-up capital and credit for obvious reasons (Peprah, 2013). Women tend to rely on semi-formal and informal sources of funding for their enterprises. For instance, Scherr et al. (1993) contend that women-owned businesses are less likely to use formal sources of funds and for that reason they may resort to informal sources. Aryeetey et al. (1994) agree that the access of women entrepreneurs is limited principally by their concentration in smaller enterprises and their lack of fully documented property as collateral and this may deprive them from accessing formal bank loans. None of

the above mentioned studies also looked at how the various capital sources affect enterprise performance.

## Study methodology

### Data

The study uses the round five of the Ghana Living Standards Survey (GLSS 5). The GLSS 5 is a nation-wide survey which collected detailed information on topics, including demographic characteristics of the population, education, health, employment and time use, migration, housing conditions and household agriculture as well as income and expenditure of households (GSS, 2008).

The survey introduced a special module on non-farm household enterprises thus this paper relies mainly on the sections one and ten of the survey. In order to obtain certain variables of interest the poverty data file was also used. These three sets of files were merged using the household identification units. Since the unit of analysis is at the household level, all individual data in the selected files were merged. The dependent variable (income) was obtained by taking the enterprise income for the past two weeks preceding the survey for the sake of easy recall. Following data cleaning, the number of observations was reduced and varied by income for the past two weeks because income values for the past 12 months preceding the survey had a lot of missing figures. The final data for the study comprised of 2,846 observations made up of 742 males and 2,104 females.

### The model

Participation in non-farm activities is a function of incentives and constraints (Barret & Reardon, 2000; Reardon et al., 2006). Incentives include the level and variability of prices and wages in non-farm activities. These prices may differ substantially among households due to heterogeneous access to markets, human capital, and assets endowments.

The framework of this paper builds on family theories of enterprise choice and following Chawanote (2012), the following assumptions underpin the theoretical and empirical framework of the study: assume total household labour endowment is 1 and it can be allocated to work on farm ($L^F$), non-farm employee ($L^w$), or run non-farm enterprise ($L^{NF}$). Assume also that non-farm profit is a function of household labour, capital, and credit. Suppose capital and credit are used for either farm production ($K^F$) or non-farm production ($K^{NF}$). The profit of the enterprise can be stated as follows:

$$\pi_i^{NF}\left(L_i^{NF}, K_i^{NF}\right) = \max_{L^{NF} K^{NF}} P_i F\left(L_i^{NF}, K_i^{NF}\right) - w_i^H L_i^{NF} - r K_i^{NF} \quad (1)$$

$$s.t. 0 \leq K_i^{NF} \leq A_i + S_i - K_i^F \quad (2)$$

Where: $W^H$ = wage paid to household labour that is used for non-farm enterprise.

$A_i$ = total factor productivity

$S_i$ = personal savings

Suppose household utility is a function of consumption ($C_i$) and separable in each period. Household budget constraints also reflect whether a household starts non-farm (NF) enterprise or not. Then the household utility problem is shown as:

$$\max_{C_i, L_i, L_i^W L_i, K_i^F, K_i^{NF}} U(C) = \sum_{1=0}^{\infty} \beta' u(c_i) \quad (3)$$

Subject to the following constraint:

$$C_i + S_i = \pi_i^F (L_i^{NF}, K_i^F) + w_i^H L_i^w - w_i^H L_i^{NF} \quad (4a)$$

$$C_i + S_i = \pi_i^{FW} (L_i^F, K_i^F) = \pi_i^{NF} (L_i^{NF}, K_i^{NF}) - w_i^H L_i^w - w_i^H L_i^{NF} \quad (4b)$$

$$A_i = (1+r)[A_i + S_i] \quad (4c)$$

$$0 \leq K_i^F, K_i^{NF} \leq A_i + S_i \quad (4d)$$

$$0 \leq L_i, L_i^W L_i \leq 1 \quad (4e)$$

Whether household decides to start non-farm enterprise or not is shown by;

$$\max_{L_i^{NF}, K_i^{NF}} \{0, \pi_i^{NF} (L_i^{NF}, K_i^{NF})\} \quad (5)$$

Maximizing (5) yields (6) in a general form:

$$Y^{NF} = \alpha + \beta X + \mu \quad (6)$$

The dependent variable income is suspected to have a lot of outliers and thus transforming it into log will smoothen out the outliers. Therefore the equation to be estimated is of the form:

$$\ln Y^{NF} = \alpha + \beta X + \mu \quad (7)$$

Where:

$\beta$ = coefficients to be estimated

X = vector of explanatory variables

μ = error tem

The vector of explanatory variables include capital source, credit source, regional dummies, ecological zone dummies, household size, age of business, age of business square and sex of business operator. In order to make sure that our results are consistent, robust and valid, we perform diagnostic checks such as multicolliniarity and model misspecification test. The dependent variable is the log of non-farm income and this is informed by the presence of outliers in the distribution of the variable across the sampled households in the study. Household enterprises are assumed to rely on household labour which does not usually attract any wage. More so, the focus of the study is on self-employment enterprises where all labour

is supplied by the owner of the business, the operator or members of the household. For this reason, wage is not included in this analysis.

**Empirical model**

From (7) empirical models for capital and credit sources as well as the gender differences are derived as follows:

**Model for source of Capital**

$$\ln Y^{NF} = \beta_0 + \beta_1 Capsource + \beta_2 \text{Re}\,gion + \beta_3 Ezone + \beta_4 Hhsize + \beta_5 Agebus + \beta_6 Opsex + \beta_7 Agebus^2 + \mu \quad (1)$$

**Model for source of Credit**

$$\ln Y^{NF} = \lambda_0 + \lambda_1 Credsource + \lambda_2 \text{Re}\,gion + \lambda_3 Ezone + \lambda_4 Hhsize + \lambda_5 Agebus + \lambda_6 Opsex + \lambda_7 aAgebus^2 + \mu \quad (2)$$

Where:

$\ln Y^{NF}$ = log of non-farm income

Capsource – Source of capital

Credsource – Source of credit

Region – regional dummy

Ezone - ecological zone

Hhsize – household size

Agebus – age of business

Opsex – sex of business operator

$Agebus^2$ – square of the age of business

$\beta_1(\lambda_1) – \beta_7(\lambda_7)$ – parameters to be estimated

$\mu$ - error term

**Model for gender differences**

$$\ln Y_{Sex}^{NF} = \alpha_0 + \alpha_1 Capsource + \alpha_2 \text{Re}\,gion + \alpha_3 Ezone + \alpha_4 Hhsize + \alpha_5 Agebus + \alpha_6 Agebus^2 + \mu \quad (3)$$

Where:

$\ln Y_{Sex}^{NF}$ = log of non-farm income by sex

Capsource – Source of capital

Region – regional dummy

Ezone - ecological zone

Hhsize – household size

Agebus – age of business
Agebus$^2$ – square of the age of business
$\alpha_1 - \alpha_6$ – parameters to be estimated
μ - Error term

**Results and Discussion**

**Descriptive statistics**

In Ghana, the level of income that non-farm enterprises earn varies and this is shown in Figure 2. The level of income varies across non-farm enterprises in different regions of Ghana. The GSS captured income as all revenues accruing to the non-farm enterprise two weeks before the survey. Enterprises in Greater Accra region produce higher income as compared to the other regions with Upper West region producing the lowest level of business income. Ashanti region ranks second in terms of non-farm enterprise income. In fact, it is not surprising to see that non-farm enterprises in Greater Accra obtain the highest mean income from their activities. This is because in comparison with other regions, Greater Accra is the most vibrant in terms of economic activities. Again it is also not surprising that the two upper regions (Upper East and Upper West) recorded the least mean income for the two-week period before the survey.

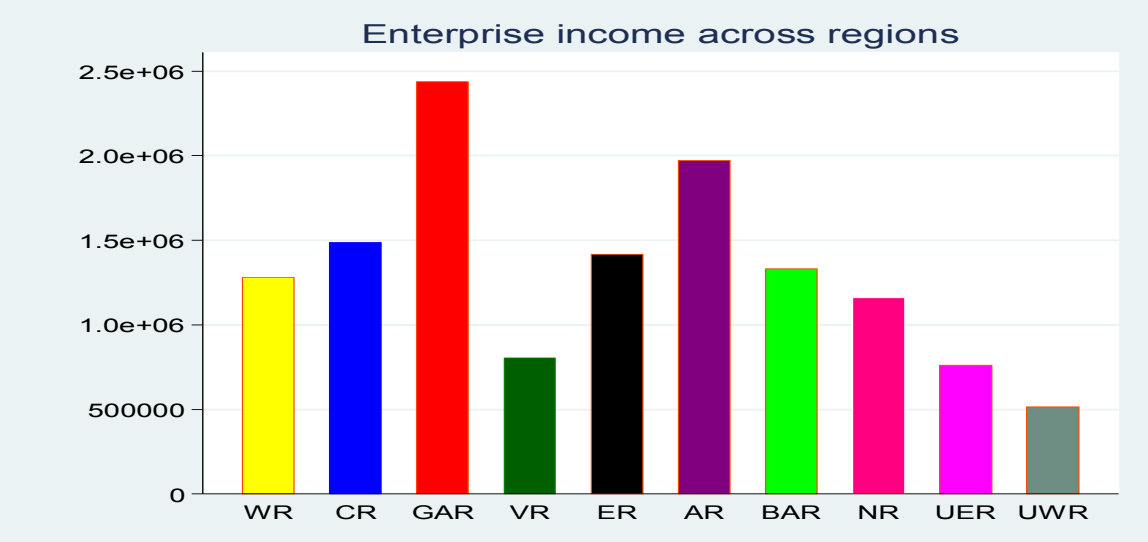


**Figure 2: Enterprise income across regions**
**Source: Computed from GLSS 5 survey**

**Regression results**

We first present the diagnostic test namely, multicolinearity and model specification tests. In determining the presence or absence of multicolinearity the variance inflation factor (VIF) was used. It is measured as: $VIF = \frac{1}{1-R^2}$. The model specification test used is the Ramsey Regression Equation Specification Error Test - RESET test. This is a general specification test for the linear regression models. It tests whether non-linear combinations of the fitted values help explain the response variable. The intuition is that if non-linear combinations of the explanatory variables have any power in explaining the response variable, the model is mis-specified. The null hypothesis that there is mis-specification is accepted at 5 percent (Ramsey, 1969). Heteroscedasticity is most commonly found in cross-sectional data studies (Gujarati, 2003) and so following Stock and Watson, as a rule-of-thumb, estimation of every cross-sectional model always requires an assumption of heteroscedasticity (Stock & Watson, 2003). In order to correct for heteroscedasticity we run the robust standard errors which in essence uses the White's heteroscedasticity-consistent variances and standard errors. According to Gujarati (2004), White has shown that this estimate can be performed so that asymptotically valid (i.e., large-sample) statistical inferences can be made about the true parameter values.

**Capital sources and non-farm income**

Table 3 presents the regression results with capital sources as the main variable of interest after controlling for other covariates. The regression passed both the model specification and multicolinearity tests. The Ramsey RESET test gave P>F = 0.9524 which indicates that the model is correctly specified while the VIF also gave 2.55, also indicating that the model does not suffer from multicolinearity. Enterprises in Ghana start businesses with capital from different sources.

**Table 3: Regression results for capital sources and income**

| Lnincome | Coefficient | Robust Std. Err. | T |
|---|---|---|---|
| Capital source | | | |
| Bank | 0.6436 | 0.2286 | 2.82* |
| remittances | 0.5363 | 0.3437 | 1.56 |
| Family farm | -0.1665 | 0.1001 | -1.66*** |
| Family non-farm ent. | 0.0602 | 0.1847 | 0.33 |
| Family property | -0.1017 | 0.2530 | -0.4 |
| NGO support | -0.7060 | 0.3174 | -2.22** |
| District assembly | 0.4439 | 0.5279 | 0.84 |
| Church assistance | -0.2296 | 0.7744 | -0.3 |
| Money lenders | 0.5145 | 0.2371 | 2.17** |
| Relatives and friends | 0.0241 | 0.0656 | 0.37 |
| Other partners | 0.2994 | 0.1773 | 1.69*** |

| | | | |
|---|---|---|---|
| Region | | | |
| Western | 0.8849 | 0.1721 | 5.14* |
| Central | 0.7718 | 0.1779 | 4.34* |
| Greater Accra | 0.9341 | 0.1810 | 5.16* |
| Volta | 0.2313 | 0.1579 | 1.47 |
| Eastern | 0.5171 | 0.1575 | 3.28* |
| Ashanti | 1.0322 | 0.1683 | 6.13* |
| Brong Ahafo | 0.6373 | 0.1587 | 4.02* |
| Northern | 0.4261 | 0.1441 | 2.96* |
| Upper West | -0.6742 | 0.1568 | -4.3* |
| Ezone | | | |
| Forest | -0.2220 | 0.0840 | -2.64* |
| Savannah | -0.1163 | 0.1244 | -0.93 |
| Household size | 0.0435 | 0.0112 | 3.88* |
| Age of business (Age) | 0.0294 | 0.006 | 4.87* |
| Sex of Operator (Female) | 0.2929 | 0.0638 | 4.59* |
| $Age^2$ | -0.0007 | 0.0001 | -5.03* |
| _cons | 11.9982 | 0.1836 | 65.35* |
| F(27, 2818) = 14.17 | P>F = 0.00 | Rsq= 11% | N= 2846 |
| Ramsey RESET test (P> F = 0.9524) | | | |
| VIF = 2.55 | | | |

*, **, and *** significant at 1%, 5% and 10% respectively.

**Source: computed from GLSS 5 survey**

With reference to own savings, bank credit (64.3%, t=2.82), NGO support (-70.6%, t=-2.22) and capital from money lenders (51.4%, t=2.17) significantly influence non-farm income however, capital from NGO support impact negatively on business revenues. It must also be noted that proceeds from family farm has a negative relationship with non-farm income (-16.7%, t= -1.66) and is significant at 10 percent. This is due to the fact that as proceeds from family farm increases more funds are channeled to the farm and less to the households' non-farm enterprises.

Regional differences are also important factors that affect non-farm enterprise income. The 10 regions were, in nominal order, coded as follows: Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East and Upper West. The reference region is Upper East and this is chosen arbitrarily. With the exception of Volta region which does not seem to impact non-farm income, enterprises in the rest of the regions (excluding Upper west) are capable or have the tendency to grow their incomes.

Non-farm enterprises in the Upper West have their incomes declined by almost 67 percent in comparison with Upper East. The region with the highest impact (103.2%) on income is Ashanti. This is not surprising because Ashanti is the second most developed

region in Ghana where business activities are found to be very flourishing. Also, Ashanti is the second most important trading centre in Ghana after Accra.

Ecological zones in Ghana include coastal, forest and savannah. The reference category in this study is coastal zone. With reference to coastal zone, the forest zone negatively impacts (-22%, t=-2.64) the revenues generated by non-farm households while the savanna zone does not significantly impact non-farm revenue. Household size has a positive impact (4.3%, t=3.88) on business revenues. This shows that the larger the household, the higher the revenue generated by such enterprises.

Sex of business operator (1=male/2=female) is negative and significant at 5 percent. With reference to businesses operated by males, female businesses generate less income. Stated differently, non-farm enterprises operated by males are more profitable than that of females assuming other factors that affect business operations are held constant. This is not surprising since traditionally men seem to be more efficient than women (Soderbom, 2008).

Age of business is positive (2.9%, t=4.87) and significant (1%) whereas the square of age of business is negative and significant (1%). Our result is consistent with Rahman et al. (2009) that age has a significant positive effect on household income and asset.

**Gender heterogeneity in capital sources**

Separate OLS regressions are run for male sub-sample (742) and female sub-sample (2,104) as shown in Table 4. Capital from the bank influences both male and female owned businesses but the effects are not the same. As bank capital increases, income from male businesses increases by 90 percent, but it increases female businesses by just 27.13 percent all at 5 percent level of significance. Starting business with proceeds from family farm reduces non-farm income by 21.7 percent in the case of female owned businesses while this variable is not significant at all in the male sample. This finding supports that of Imai and Arun (2008) that bank loan impacts positively on household enterprise activities.

**Table 4: Male-female differences in sources of capital**

| | | Males | | | Female | |
|---|---|---|---|---|---|---|
| | | Robust | | | Robust | |
| Lnincome | Coef. | Std. Err. | T | Coef. | Std. Err | T |
| Capsource | | | | | | |
| Bank | 0.9004 | 0.4802 | 1.88** | 0.5617 | 0.2714 | 2.07** |
| remittances | 0.7417 | 0.8635 | 0.86 | 0.4939 | 0.3818 | 1.29 |
| Family farm | -0.007 | 0.2170 | -0.03 | -0.2168 | 0.1064 | -2.04** |
| Family non-farm ent. | 0.3340 | 0.3700 | 0.9 | -0.0388 | 0.2177 | -0.18 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Family property | -0.0801 | 0.4444 | -0.18 | -0.1161 | 0.2786 | -0.42 |
| NGO support | -1.2316 | 0.3276 | -3.76* | -0.4847 | 0.3639 | -1.33 |
| District assembly | -0.0372 | 0.4530 | -0.08 | 0.4642 | 0.5303 | 0.88 |
| Church assistance | -1.7097 | 0.2499 | -6.84* | 0.0304 | 0.8917 | 0.03 |
| Money lenders | 0.5414 | 0.4727 | 1.15 | 0.5633 | 0.2582 | 2.18** |
| Relatives and friends | 0.1270 | 0.1524 | 0.83 | 0.0009 | 0.0732 | 0.01 |
| Other partners | 0.7156 | 0.4038 | 1.77** | 0.1403 | 0.1814 | 0.77 |
| Region | | | | | | |
| Western | 0.3326 | 0.374219 | 0.89 | 1.0892 | 0.1897 | 5.74* |
| Central | 0.2255 | 0.3819 | 0.59 | 0.9649 | 0.1978 | 4.88* |
| Greater Accra | 0.8527 | 0.3935 | 2.17** | 0.9788 | 0.2010 | 4.87* |
| Volta | -0.1522 | 0.3623 | -0.42 | 0.4046 | 0.1705 | 2.37** |
| Eastern | 0.1394 | 0.3459 | 0.4 | 0.6616 | 0.1730 | 3.82* |
| Ashanti | 0.7065 | 0.3647 | 1.94** | 1.1419 | 0.1846 | 6.18* |
| Brong Ahafo | 0.2744 | 0.3391 | 0.81 | 0.7511 | 0.1748 | 4.3* |
| Northern | 0.0828 | 0.3180 | 0.26 | 0.5374 | 0.1561 | 3.44* |
| Upper West | -1.0924 | 0.4047 | -2.7 | -0.5258 | 0.1527 | -3.44* |
| Age of business | -0.0158 | 0.0110 | -1.44 | 0.0488 | 0.0073 | 6.64* |
| Age of bus. squared | -9E-05 | 0.0002 | -0.4 | -0.0009 | 0.0002 | -5.45* |
| Household size | 0.0405 | 0.0223 | 1.82** | 0.0477 | 0.0130 | 3.66* |
| Ecological zone | | | | | | |
| Forest | -0.0964 | 0.1809 | -0.53 | -0.2297 | 0.0953 | -2.41** |
| Savannah | -0.0087 | 0.2737 | -0.03 | -0.1536 | 0.1399 | -1.1 |
| N=742 | | | | N=2,104 | | |
| R squared= 0.1047 | | | | R squared= 0.1222 | | |
| Prob > Chi2=0.000 | | | | Prob > Chi2=0.000 | | |

*, **, *** significant at 1%, 5% and 10% respectively.

**Source: Computed from GLSS 5 survey**

Capital obtained from NGOs has negative and significant effect on male non-farm income but does not significantly influence that of females. Most NGOs do not target men on the economic grounds that men are better-off than women. The same negative sign appears for females even though there is no effect on female non-farm income. Capital from church is significant but has negative effect on male non-farm income. Church monies are given as charity to church members who are in need of assistance or contribute to church activities. Like NGO money, church funds are free money and might not be put into productive use. These funds usually behave like government funds that crowd out private investments. They are not sustainable as the pool may dry up quickly and the beneficiaries may not have alternative funding sources. Capital from money lenders is significant and has positive effect

(56%) on female non-farm income but not that of males. Capital obtained from other partners significantly influence income from male non-farm income but not that of females. It is not surprising because men are able to arrange for better financial links than women (Brush, 1992).

**Credit sources and non-farm income**

Table 5 shows the effect of credit sources on non-farm income. The Ramsey RESET test of P>F = 0.9524 indicates that the model is correctly specified while the VIF =2.55, also indicates that the model does not suffer from multicolinearity. For most non-farm activities, informal sources of credit seem popular and more reliable. Conversely, large scale commercial businesses benefit from bank credit and other formal credit sources. Credit in Ghana is basically for business expansion and may come in two main forms: direct credit in the form of cash and indirect credit in the form of tradable goods. The sources may also be formal or informal. It is well documented in Ghana and most parts of Sub-Saharan African countries that, access to credit is a major component of business constraints (Asiedu, Kalonda-Kanyama, Ndikumana, & Nti-Addae, 2013). In this paper, sources of credit include: Personal savings (no credit used), bank credit, other financial agencies, co-operative, money lender, credit from family/friend, proceeds from other enterprises, government agencies, NGO and other sources.

With reference to no credit used, bank credit, credit from other financial agencies, co-operative credit and credit from family/friends significantly influence non-farm enterprise income. However, the most important source of credit that affects non-farm enterprise income is credit from other financial agencies (155.8% and significant at 1%). These other financial agencies include microfinance institutions (MFIs). The next important source of credit is bank loans (92.5% at 1% level of significance) followed by credit from co-operative credit unions (55.8% at 5% level of significance) and lastly credit from family and friends (27.3% at 5% significance level). With reference to Upper East region, all regional dummies positively and significantly influence non-farm enterprise income except Upper West region, which showed a negative influence. However, the effect differs in terms of the coefficients. For example the region with the highest effect is Ashanti (106.9%) followed by Greater Accra (97.7%). The region with the least significant effect on non-farm enterprise income is Volta (27.1%). In terms of credit sources, enterprises in Ashanti region are likely to perform better than other regions.

**Table 5: Regression results for Credit Sources and Non-Farm Income**

| Lnincome | Coef. | Robust Std. Err. | t |
|---|---|---|---|
| Credit source | | | |
| Bank credit | 0.9254 | 0.2263 | 4.09* |

| | | | |
|---|---|---|---|
| Other fin agencies | 1.5580 | 0.3147 | 4.95* |
| Co-operative | 0.5581 | 0.2581 | 2.15** |
| Money lender | 0.2858 | 0.2730 | 1.05 |
| Family/friends | 0.2729 | 0.1262 | 2.16** |
| Other enterprises | -0.2901 | 0.3797 | -0.76 |
| Gov't agencies | -0.6828 | 0.5302 | -1.29 |
| NGO | 0.4490 | 0.4162 | 1.08 |
| Other sources | 0.0094 | 0.3895 | 0.02 |
| Region | | | |
| Western | 0.9412 | 0.1715 | 5.49* |
| Central | 0.8145 | 0.1770 | 4.6* |
| Greater Accra | 0.9770 | 0.18010 | 5.42* |
| Volta | 0.2719 | 0.1569 | 1.73*** |
| Eastern | 0.5765 | 0.1565 | 3.68* |
| Ashanti | 1.0688 | 0.1662 | 6.438* |
| Brong Ahafo | 0.6372 | 0.1551 | 4.11* |
| Northern | 0.4595 | 0.1422 | 3.23* |
| Upper West | -0.6903 | 0.1578 | -4.37* |
| Ecological zone | | | |
| Forest | -0.2427 | 0.0850 | -2.85* |
| Savannah | -0.1308 | 0.1239 | -1.06 |
| Household size | 0.0396 | 0.0110 | 3.61* |
| Age of business | 0.0259 | 0.0060 | 4.31* |
| Operator sex | 0.2856 | 0.0633 | 4.51* |
| Age of bus squared | -0.0006 | 0.0001 | -4.63* |
| _cons | 11.9806 | 0.1790 | 66.92* |
| F(25,2819)=16.61 | P>F=0.00 | Rsq=11.8% | N=2845 |
| Ramsey RESET test (P>F = 0.6448) | VIF = 2.62 | | |

*,**,*** significant at 1%, 5% and 10% respectively.

**Source: Computed from GLSS 5 survey**

**Discussion**

Capital from formal banks and money lenders have the potency of increasing non-farm income while capital obtained from NGOs decreases income. A couple of reasons might account for this observation. First, capital from formal banks comes with market interest rate which has to be repaid at a specified time period. Failing to repay such monies means the banks can take defaulters to court. As a result, many borrowers are compelled to make good use of their funds in order to avoid any future embarrassment. The increasing effect of capital from formal banks on non-farm income is in line with the assertion made by Levine (1993) that the financial sector mobilizes and channels credit into highly productive investments.

Second, NGO funds usually come at no cost. There is therefore no pressure on beneficiaries to pay back. In spite of the high interest rates that money lenders charge, businesses that obtain capital from them are able to increase their income.

An issue of concern is that even though these sources (bank and money lenders) significantly impact income, Figure 1 shows that only a handful of male respondents (29%) indicated that they obtained capital from banks and the same percentage of respondents also obtained capital from money lenders. These two important sources (though insignificant in terms of percentage distribution) that constitute debt financing for non-farm enterprises in Ghana have some implications. First, debt financing of enterprises is an important way of increasing non-farm income. If debt-financing is significant then it would be advisable for firms to prioritize external sources of financing. This assertion contrasts the pecking order theory (Myers, 1984) that firms should consider internal sources of funds first before falling on external sources. Second, both formal and informal sources of capital are important for non-farm enterprises and for that matter non-farm enterprises need a mix of capital.

Consistent with the above is Imai and Arun (2008) that in rural India, transactions with formal banks and loans from money lenders show positive and significant signs and that they serve as complements to MFI loans. On the assumption that banks and money lenders charge high rates it stands to reason that high cost of funds does not really affect income if and only if the funds are used for the intended purposes. It can also be argued that funds that come with higher cost are likely to benefit businesses as compared with cheap funds with low interest rate. This goes to support the win-win proposition which posits that households require access to credit, not cheap credit (Morduch, 2000).

Both formal and informal credit sources significantly influence non-farm income. This suggests that non-farm enterprise operators need a mix of credit to expand their businesses. Again, it can be inferred from the second regression results that it is not high interest rate that affects businesses' ability to make more revenue but it the use of the funds obtained from the banks. Once formal credit positively affect business income it stands to reason that profitable firms are more attractive to financial institutions as lending prospects, therefore they can always take on more debt capital as proposed by Ooi (1999). If this proposition is valid then bank credit will be a better source of expanding non-farm enterprises. Like the capital sources model (Table 3), there is positive regional effect on non-farm enterprise income except enterprises in Upper West region. Ashanti region has the highest regional positive effect on non-farm income (107.8%) but this is also not surprising because after Greater region, Ashanti region is the next developed region in Ghana where business activities are vibrant.

As usual, females are constrained in terms of bank credit (Peprah, 2013). This might be the reason why capital obtained from banks impact more significantly on male operated enterprises than those operated by females. Again, funds lent to females might not be enough to start their businesses and thus its operational cost might lead to profit depletion. Family funds are generally controlled by men according to the Ghanaian culture which means that women do not have easy access to family funds.

## Conclusions

The study sought to examine the capital and credit sources that influence income from household non-farm enterprises in Ghana in 2005/06. Controlling for other factors capital obtained from banks and money lenders have positive impact on revenues while capital from NGOs affect revenues negatively. In the case of credit for expansion, bank credit, credit from other financial institutions, co-operative credit, and credit from family and friends affect revenues positively. Gender differences also exist in terms of capital and credit sources and how they affect non-farm income.

Male-owned businesses seem to be more profitable than women businesses and this explains why women are constrained. Starting a business is very critical and obtaining external financing is more important. Banks need to open up to non-farm enterprises to enable them to make use of available facilities for start-ups. There is the need to formalize the operations of money lenders by bringing them under an apex body like that of the microfinance institutions. Once this is done, their activities will be regulated to benefit those they serve. This will also enable them serve the capital needs of those households who do not have access to bank facilities.

There is the need for government to open up the dialogue with and appeal to the banks to create instruments that will enhance the supply of financial services to make non-farm enterprises more vibrant. As capital mix is important, semi-formal credit such as funds from credit unions is also important for non-farm enterprise. Effort should be made by the government to strengthen co-operative credit unions by passing the credit union bill which is still in parliament. Non-farm enterprises must be profitable in order to grow and be able to attract more external finance. It is therefore necessary to create an environment that affords the necessary incentives for enterprise growth.

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**Apendix: Summary statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Lnincome | 2847 | 12.92651 | 1.457244 | 7.600903 | 19.42131 |
| Sourceofcr | | | | | |
| Bank credit | 2888 | 0.0215 | 0.1450 | 0 | 1 |
| Other fin agencies | 2888 | 0.0062 | 0.0787 | 0 | 1 |
| Co-operative | 2888 | 0.0045 | 0.0670 | 0 | 1 |
| Money lender | 2888 | 0.0104 | 0.1014 | 0 | 1 |
| Family/friends | 2888 | 0.0485 | 0.2148 | 0 | 1 |
| Other enterprises | 2888 | 0.0024 | 0.0492 | 0 | 1 |
| Gov't agencies | 2888 | 0.0048 | 0.0695 | 0 | 1 |
| NGO | 2888 | 0.0028 | 0.0526 | 0 | 1 |
| Other sources | 2888 | 0.0045 | 0.0670 | 0 | 1 |
| Region | | | | | |
| Western | 2890 | 0.1003 | 0.3005 | 0 | 1 |
| Central | 2890 | 0.0844 | 0.2781 | 0 | 1 |
| Greater Accra | 2890 | 0.1401 | 0.3472 | 0 | 1 |
| Volta | 2890 | 0.0990 | 0.2987 | 0 | 1 |
| Eastern | 2890 | 0.1173 | 0.3218 | 0 | 1 |
| Ashanti | 2890 | 0.1858 | 0.3890 | 0 | 1 |
| Brong Ahafo | 2890 | 0.0862 | 0.2806 | 0 | 1 |
| Northern | 2890 | 0.0872 | 0.2822 | 0 | 1 |
| Upper West | 2890 | 0.0422 | 0.2011 | 0 | 1 |
| Ecological zone | | | | | |
| Forest | 2890 | 0.4260 | 0.4946 | 0 | 1 |
| Savannah | 2890 | 0.2692 | 0.4436 | 0 | 1 |
| Hhsize | 2890 | 4.4405 | 2.5416 | 1 | 18 |
| s10aq7a | 2888 | 8.2299 | 9.0956 | 0 | 80 |
| head_sex | 2890 | 1.3308 | 0.4706 | 1 | 2 |
| age_bus_sqr | 2888 | 150.4335 | 368.1652 | 0 | 6400 |

**Source: computed from GLSS 5 survey**