The Determinants of Access to Credit for Cash Crop Production in Ghana: A Case Study of the Cocoa Industry

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Abstract

The study was conducted in order to ascertain the determinants of access to credit for cash crop production in Ghana with special reference to the Cocoa Industry. The study adopted a descriptive survey design. Simple random sampling technique was used to sample 150 respondents for the study. A binary probit model was used to estimate the probability of access to credit by farmers. The determinants of access to credit for the cocoa farmers were assessed with variables like; saving level, belonging to lending group, knowledge of microfinance institution and association/trade group/farming body of respondents. A research question was formulated to guide the study.An interview guide was used in collecting responses from the farmers. Factors that tend to improve the farmers' literacy, savings and revenue result in pushing the farmers away from relying on credit from these financial institutions whereas factors that make farmers worse off leads them to go for more credit. Results from the regression analysis show that savings level of the farmer, revenue from sales, farm size and how long a farmer has been into farming significantly determine a farmer's chance of having access to credit from formal and informal credit sources. It was recommended that extending credit to women will not only accelerate the growth of their micro-farms but also has tickle down effects on their entire households as income earned from their farms is mostly used to cater for their household.
Keywords: Cocoa, Farmer, Loans, Savings and Interest rates

1.1 INTRODUCTION

Since the early 1980s many African countries, including Ghana, have put great emphasis on agricultural development programs and projects. This was mainly to promote productivity of the agricultural sector and thereby to improve the living standards of the rural poor population whose mainstay is agriculture. During this period many African countries launched a package of rural development programmes and policies that mainly included various credit schemes and the provision of basic education, extension and research services to farmers.

The provision of credit enables farmers to mobilize savings and promote investment so as to bring about sustainable economic growth in the country. However, despite such concerted efforts by the government, and more recently non-government organizations in promoting the cultivation of cocoa, its adoption remains low. It is often asserted that in addition to taste and preference, on-farm storage constraints (Smale, 1995), and risk aversion (Simtowe et al, 2006), credit constraints are widely responsible for the low adoption of cocoa due to its requirements for costly inputs.

A substantial amount of literature has reported on the impact of access to credit on productivity with a good deal of it showing that credit has a positive impact on agricultural innovations. For example, Feder and Umali (1993) and Cornejor and McBrid (2002) reviewed factors that affect technology adoption, and they highlight access to credit as a key determinant of adoption of most agricultural innovations. Nevertheless, most studies that have looked at the determinants of credit have generalized their analysis by assuming that credit access should always lead to positive outcomes. Credit access will only be effective for the credit "constrained" – thus those with the access to remunerative consumption, production and investment opportunities are unable to pursue the opportunities for lack of financial resources. A lack of access to credit may not necessarily imply an unmet credit need (De Janvry et al, 1997). In the same way, the marginal contribution of credit is likely to be high in households that have a larger binding credit constraint than those that are less constrained (Simtowe and Zeller, 2006).

The notion of most industrialized countries seems to point to the fact that the development of agriculture is a precondition to general economic growth and development. Hence, it remains the main occupation of most developing countries and the pre-occupation of their governments as well. Whether the final

goal of economic growth in Ghana is industrialization or rural transformation, it is a truism that sound and viable agricultural programmes combined with well-coordinated credit facilities and adequately organized research and extension services with minimum costs will provide the soundest foundations for the country's progress. In order for the sector to continue to play this role, there must be accelerated growth of production in the sector. Growth of agricultural production, in turn, depends upon a sustained utilization of active labour forces and a stream of improved technologies suited to local conditions.

Appropriate rural credit facilities could by far play a crucial role not only to advance industrialization and to absorb the rural exodus but also to stimulate the internal and external development of a country's economy. Financing the cocoa industry as well as the agricultural sector through well-organized, efficient and effective credit facilities is an important requirement for accelerated growth of agriculture production and the development of other economic sectors. In addition, attitudes with regards to the operation and the utilization of institutional farm credit itself, the market opportunities and their efficiency, government policy in relation to agricultural output prices and land tenure system of a country are other relevant factors that should not be neglected when one is focusing on the sustainability of the agricultural sector.

1.2 OBJECTIVES OF THE STUDY

The main objective of this study is to assess the determinants of access to the demand for credit by cocoa farmers in Ghana. In line with this, other objectives which will be looked at include;

a. The history of cocoa production in Ghana;
b. Problems in the cocoa sector
c. Recommendations for policy-makers in the cocoa sector

1.3 JUSITIFICATION FOR THE STUDY

The cocoa industry in Ghana continues to play an important role in the developmental efforts through the generation of foreign exchange and employment. Thus, any study that seeks to find ways of improving its level of output in Ghana is worthy. Though in recent times the output levels of cocoa has increased peaking at over 700,000 tonnes in 2005 from 395000 tonnes in 2000, the level of cocoa yield is below the international average (FAO 2005, ICCO, 2007). The World Bank (2007) is of the belief that the world price of cocoa will continue to increase. In this regard, efforts must be made to increase the output level to continuously gain from it. Credit availability can be a route to attaining this. Feder and Umali(1993) and Cornejor and McBrid (2002) review factors that affect technology, adoption, and they highlight access to credit as a key determinant of adoption of most agricultural innovations. Thurlow et al (2008) projected that an annual increase of 60,000 tonnes will help Ghana achieve the millennium development goals by 2015. With the objective of Ghana to achieve a million metric tonnes by 2010 of cocoa output (NDPC 2006), there was the need to look at avenues other than what the government had already done then. This study is thus important as it tries to find other routes that will help increase the level of cocoa production which is usually ignored in the research on the cocoa industry.

2.1 THEORETICAL LITERATURE

The role between finance and economic growth have long time been discussed in economics. This role of the financial sector in economic growth has remained rather unclear. In the demand for credit, literature has identified two major sources which are formal and informal sources (Straub, 2005; Gupta and Chaudhuri, 1997). In trying to analyse these, we encountered three broad theories which tried to give the theoretical understanding of the determination and allocation of credit in any economy. These theories are the classical theory and the Bernanke-Blinder Model. In addition, we undertake a review of the characteristics of the financial system in developing countries which differ extremely from what exists in the advanced countries.

### 2.1.1 Access to Credit: The Classical School of Thought

Classical economists were those who believed in the efficacy of markets. They regarded the interest rate as the price of a loan which will be determined by the demand for and supply of loans (Credit). The classicals consider the main demanders of loans to comprise firms who borrow in order to expand their capital (building, machinery etc). In other words the demand for loans was primarily seen as demand for funds for the purposes of investment. On the supply side the classicals consider loans as coming from financial institutions – banks, building societies, money and capital markets. They however, consider these institutions as merely financial intermediaries. The ultimate suppliers of loans are the firms and individuals who provide the intermediaries with funds i.e. savings. There are three credit market variables: Price of loans: the interest rate (r), Demand for loans: investment (I), Supply of loans: savings (S).

The price of loan is also referred to as the interest. Loans are not homogeneous. They come in different sizes, for different time periods. Snowdon and Vane (2005) maintains that with loanable funds broadly defined to capture the variety of ways that real investments can be financed, the corresponding interest rate that equilibrates this market must be understood in terms that are similarly broad. However, such a spectrum of interest rates will tend to move up and down together (Lipsey and Chrystal, 2007).

The demand for loan in the original classical sense comes from only the demand by firms for purposes of investment. However, Lipsey and Chrystal (2007), add two other categories- consumer credit (CC) and Public Sector Borrowing Requirement (PSBR). The relationship between the interest rate and the investment is traced through the Marginal Efficiency of Investment (MEI) which shows an inverse relationship between investment and interest rate. Thus

Demand for Loanable fund (credit) = I + CC + PSBR

Overall, then, loan demand will be inversely sensitive to interest rates because two of its components (I, CC) are highly determined by interest rate. The loan demand curve for the classicals is therefore a typical demand curve as
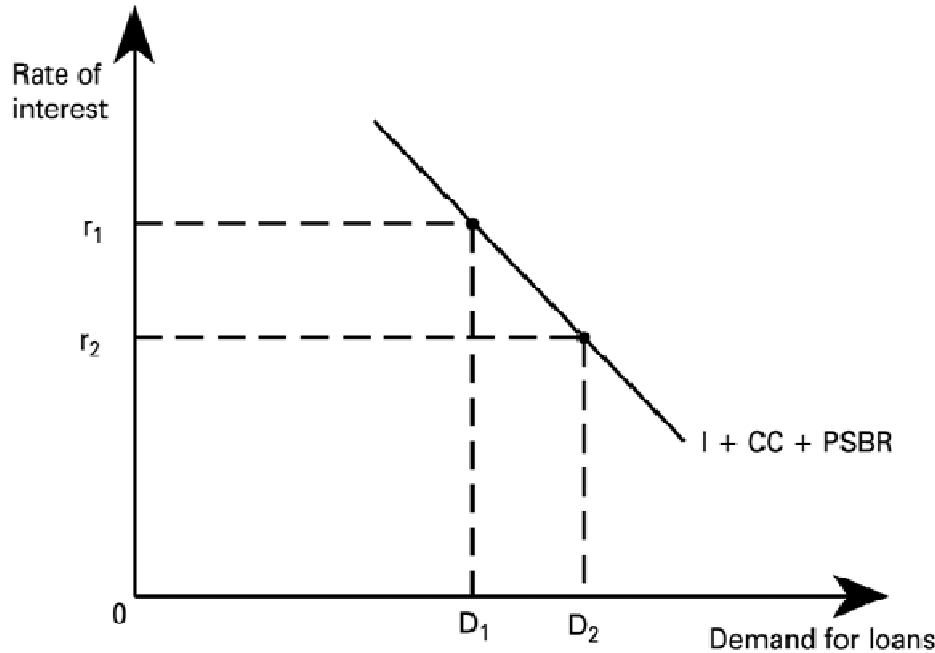
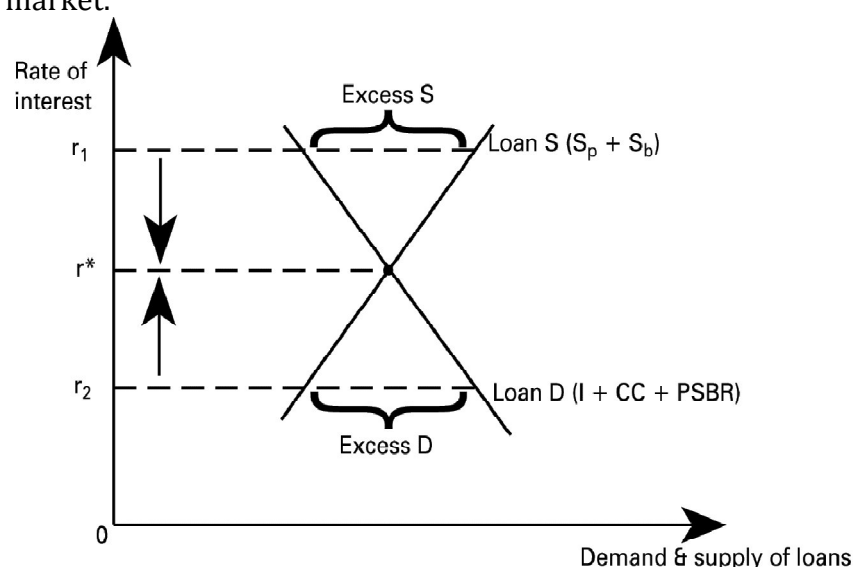**Figure 1.1: Demand curve for loanable fund (Credit)**

According to the classicals the supply of loanable funds (credit) comes from the flow of funds from savings. The saving is defined as any money placed in the financial institution with the motivation of obtaining some interest rather than to hoard it (Lipsey and Chrystal, 2007). Savings come from two main sources; personal (S_p) and business (S_b). There exists a direct relationship between savings and interest rate as shown in figure 2.2.
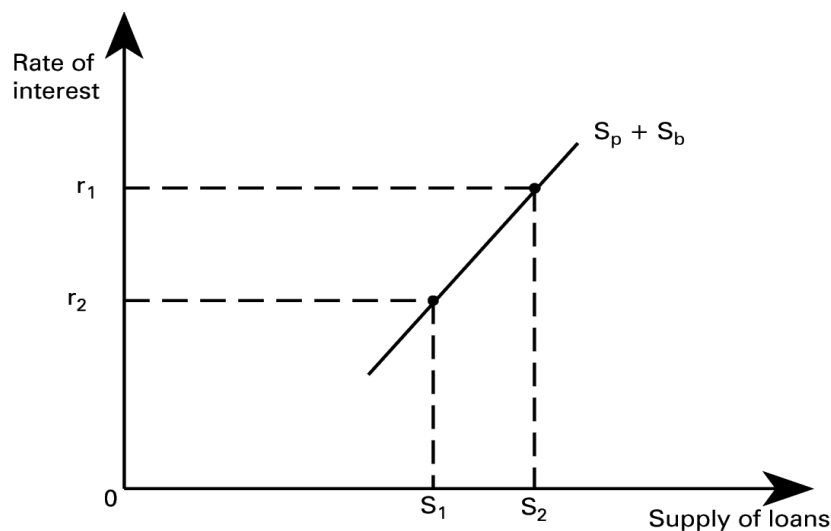
Figure 1.2: The supply of loans (saving) curve

The interaction between the supply and demand for loans leads to the establishment of the equilibrium market interest and loans. Pressure to get rid of this loan will cause suppliers (savers) to reduce the interest rate to clear the market. Similarly when there is excess demand for loans, pressure from investors and households

(demand) will cause the interest rate to shoot up to restore equilibrium. Only $r*$ is stationary in the market.

Figure 1.3: The market for Loanable funds

2.1.2 Bernanke and Blinder Model

Bernanke and Blinder (1988) provided a macroeconomic model that incorporates the role of credit in policy. This model of aggregate demand allows roles for both money and "credit" (bank loans) which is at variance with the textbook IS/LM model. In their model they abandoned the perfect substitutability assumption between bond and credit and ignore credit rationing. Their model has three assets: money, bonds, and loans. Only the loan market needs explanation. They assume that both borrowers and lenders choose between bonds and loans according to the interest rates on the two credit instruments. If ρ is the interest rate on loans and i is the interest rate on bonds, then loan demand is: $L^d = L(\rho, i, y)$. The dependence on GNP (y) captures the transactions demand for credit, which might arise, for example, from working capital or liquidity considerations.

Also the supply of loan function for a simple bank balance sheet consist of the assets- reserves (R), bonds (B^b), loans (L^s), and liabilities- deposits (D). Since reserves consist of required reserves (τD), plus excess reserves (E), the banks' adding-up constraint consist of $B^b + L^s + E = D(1-\tau)$. They further assumed that the returns of the desired portfolio proportions depend on rates of return on the available assets (zero for excess reserves), and established a market clearing condition for loans as

$L(\rho, i, y) = \lambda(\rho,i)D(1-\tau)$.

After further manipulations they derived a CC (i.e. commodities and credit) equation below represented by a negatively sloped curve like the conventional IS curve that can be shifted by

$Y = Y(I, \phi(i, y, R))$,

i.e., either monetary policy (R) and by credit-market shocks that affect either the $L(\rho, i, y)$ or $\lambda(\rho,i)D(1-\tau)$ functions, while the IS curve is not.

The CC curve reduces to the IS curve if loans and bonds are assumed to be perfect substitutes either to borrowers or to lenders, or if commodity demand is insensitive to the loan rate -which would make the loan market irrelevant to IS/LM. This clarifies the special assumptions implicit in the money-only view. The opposite extreme, or credit-only view, would arise if money and bonds were perfect substitutes, which would make the LM curve horizontal. Keynes' explanation for the liquidity trap is, of course, well known. They postulated high substitutability as more likely to arise from financial innovation which creates new money substitutes. However, even with a liquidity trap, money still matters because it influences the CC curve.

The policy implications in their model are similar compared with how most conventional shocks work in their model just as they do in IS/LM. For example, an expenditure shock shifts the CC curve along a fixed LM curve, and a money demand shock shifts the LM curve along a fixed CC curve. One difference in this model is that a rise in bank reserves might conceivably raise the rate of interest in the credit model. Economically, the credit channel makes monetary policy more expansionary than in IS/LM and therefore raises the transactions demand for money by a larger margin than in the conventional model. Greater interest is attached to issues that elude the IS/LM model. An upward shift in the credit supply function, $\lambda(.)$ (Which might correspond, for example, to a decrease in the perceived riskiness of loans) shifts the CC curve outward along a fixed LM curve, thereby raising i and y. The interest rate on loans, ρ, falls, however. An upward shift in the credit demand function, $L(.)$, which might correspond to a greater need for working capital, has precisely the opposite effects.

2.2 EMPIRICAL LITERATURE

This section undertakes a review of the empirical literature on the determinants of access to credit. The review ranges from individual studies on specific countries as well as on specific groups in society.

Access to credit has taken on many definitions, Diagne and Zeller (2001) outlined a methodology that defined access to credit using two approaches. Their approach differentiates between access to credit and participation in a credit programme or in the informal credit market. A household has access to credit from a particular source if it can borrow from that source. A household participates if it borrows from that source of credit. Thus a household can have access but choose not to borrow, i.e. does not participate in the credit market. A non-participating household that has access can still benefit as it can take on risky but high-yielding activities (Eswaran and Kotwal, 1989) and also do away with precautionary savings and negative returns (Deaton, 1991). The extent of access is determined by the maximum amount that person can borrow from that source. This is referred to as the person's credit limit or credit line, if this amount is positive, the household is said to have access.

A household is said to be participating if it is borrowing from a source of credit. A household is credit constrained when it lacks access to credit or cannot borrow as much as it wants. These distinctions are particularly important because, as discussed previously, a household living in a risky environment may benefit from mere access to credit even if it is not actually borrowing (Diagne and Zeller, 2001). Economic literature points to a wide range of factors that influences access to credit, including: the age of the firm or the enterprise, size of enterprise, cost of borrowing, availability of collateral, income/revenue level, sex and the level of education of the entrepreneur (Mohammed, 2003). Mohammed (2003) uses survey data to determine the factors that influence accessibility to formal credit by small farmers and artisanal fishermen in rural Zanzibar. Also the study sought to establish the empirical linkage between credit use and poverty alleviation by attempting to make an assessment of the impact of the credit on income and improvement of standard of living of the credit user. Using a logit regression, evidence suggests that income levels and degree of awareness on credit availability influence credit accessibility by small holder farmers. Also results of the mean significant t-tests indicate that there is a significant difference between the credit users and non-users in relation to income levels and value of productive assets owned by the respondent.

Zeller (1994) uses a univariate probit model to estimate the factors that determine an individual's borrowing decisions, in terms of their participation in formal or informal credit markets in Madagascar. The results show that among the informal lenders, age, schooling, wage income, sick days and household headship are significant determinants of applications for credit. On the other hand, sex and social events are not significant. Age, the year of schooling and the ratio of outstanding loans increase the probability of being supply constrained. Higher household wealth reduces the probability of being constrained. In the formal sector, being male scientifically increases the probability of applying for a loan.

Schreiner and Nagarajan (2000) investigate whether publicly observable characteristics help predict which household get access to informal finance or not. This is due to the fact that informal lenders are astute judges of creditworthiness and because publicly observable characteristics are cheap information for formal lenders. In view of this formal lenders may be able to follow in the footsteps of informal lenders if publicly observable characteristics predict the decision of informal lenders well. Results from the study indicate that for some characteristics, this is indeed the case. In particular, being female and having borrowed from other informal sources is a good predictor of whether informal lender will judge a potential borrower to be creditworthy or not.

Bokosi (1998) also looked at the factors that affect household demand for credit by small holder farmers in Malawi. The paper's aim is to provide a better understanding of the household's personal characteristics not only because they influence the household's demand for credit but also due to the fact that potential lenders are likely to base their assessment of borrowers' credit worthiness on such characteristics. Using descriptive analysis, Bokosi determines the relationship between participation in credit markets and socio-economic characteristics. He finds that education positively influences household demand for credit.

On the other hand it is found that asset endowments such as land and capital stock have a very weak effect on the ability to borrow, which is probably a reflection of low collaterisability of farm assets in Russia. Also another deviation from the pattern of market economies is that overdue debt does not significantly restrict the ability to borrow presumably because of the general acceptance of budget constraints in the system.

Farmers in Ghana are characterized by low level of technology, minimal capital, risk averse and a low level of education. They run their farms on "owner-employee" or family business bases. Consequently, a virtual stagnant growth is a more pronounced feature of cocoa farmers in Ghana. In part this feature can also be attributed to lack of innovation and drive on the part of entrepreneurs. This feature is in conformity with technological element in investment as defined by Dawson and Jeans (1997).

Cocoa farmers have little or no collateral. Their required amount of loan instalments is small, the transaction costs are high and formal lenders are discouraged to extend credit to them. As a result, informal credit sources also provide most of the credit to the poorer small scale farmers (Zeller, 1993). Smallholder credit has a direct link to firm's security which ties in with a household's nutrition and health status. Access to

consumption credit as observed by Eswaran and Kotwal, (1989) is based on difference in risk behaviour of households. It has been found that poorer small and medium scale farmers get excluded from the formal credit (Basu et al, 2004) due to lack of collateral, long and complicated processing and physical inaccessibility. On the other hand, informal market which consists of credit from merchants, relatives and friends is easily accessible mainly to farmers. Oxfam (1987) observed that in the formal institutions, credit uptake by the poor households have been non existence. There are several reasons which account for the poor access to formal credit for small borrowers. First, it is very difficult to access credit in formal finance institutions because of the conventional collateral requirements against credit-worthiness of the poor farmers who mostly lack productive resources and have no property rights and are therefore not able to provide the collateral in order to gain access to credit to finance their business activities. Second, the cost of borrowing is very high and unbearable in formal credit markets.

3.1 Sample

The data used for this study was obtained from a field survey conducted by the researchers in most cocoa producing regions in Ghana, namely Western, Ashanti , Brong Ahafo and Eastern Region . A Sample of 150 cocoa farmers were drawn from these regions and subjects were at least twenty (20) years of age and might have been in farming for at least one (1) year. The random sampling method was then used to select the cocoa farmers. These regions were selected based on the production of cocoa. The pre-selection of areas did not hamper the quality of the sample chosen, because the respondents were randomly selected within these regions.

3.2 Instrumentation

A research questionnaire was used in the survey. The questionnaires were administered to the sampled cocoa farmers to elicit information on their demographic characteristics, savings ability and access to financial services and credit (see the appendix for the questionnaire).

The original questionnaire was developed in English but due to the low literacy rate among most of farmers, the questionnaire was used as an interview schedule. To make the questions more understandable to the respondents, the questions were translated with the help of three field assistants into the local languages.

3.3 Data Analysis

3.3.1 Demographic and Socio-economic Characteristics of Respondents

Before discussing the results from the estimation, we present selected descriptive statistics from the survey data. The table presents the descriptive statistics of the key variables used for our regressions. The survey results show that out of 150 farmers interviewed, about 59% had access to credit while the remainder had never had access to credit. Age, sex and education are variables of interest in most social research since they determine many things in social settings hence their influence on people's behaviour. Precisely, they determine when people start work and also the extent to which one is credit worthy.

Table 1.1 shows the age, sex and educational distribution of the farmers and marital status.

Table 1.1 Socio-economic and Demographic Characteristics of Respondents

Access to Credit Characteristics	Percent
Have ever had access to credit	58.5
Never had access to credit	41.5
Age Composition	
Age <= 30	21
31- 40	28
41 – 60	46
Above 60	5
Sex	
Male	68.5
Female	31.5
Educational Level	
No Education	14.5
Low Education	28
Higher Education	57.5
Marital Status	
Married	55
Single	45

Source: Author's Computation from Survey Data, 2012

Out of the 150 farmers interviewed, 21% fell within thirty (30) years, while 28% fell between thirty (30) to forty (40) years. About forty-six percent (46%) fell within the ages of 41 and 60 with five percent (5%) above sixty (60) years. The results show that 69% of those interviewed were males with the others being females. The

high percentage of farmers in the category of 41 and 60 in the study area was mainly attributed to the frequent out-migration of the lower age groups to the cities to seek "greener" pastures.

On the level of education attained by the farmers, indicate that about 58% had education up to post-secondary, 27% secondary level and 15% had no education at all. The result shows that majority (i.e. 84%) of the farmers are literate. This result may be partly attributed to the availability and affordability of educational institutions to the farmers. On the marital status of respondents, fifty-five percent (55%) of the sampled farmers were married with 28% single. Seventeen percent of the sample had separated or were widows (ers).

Tables 1.2 depicts the mean, standard deviation and mean chi-square test of the respondents who had access to credit and those who never had access to credit.

Table 1.2: Descriptive Statistics: Mean of Dependent Variables

Variable	Access to Credit Mean (Std)	Non Access to Credit (Mean (Std)	Mean Test: Chi^2
Age	40.76 (12.74)	43.06 (10.52)	31.71
Sex			0.13
Male	0.68 (0.47)	0.70 (0.46)	
Female	0.33 (0.47)	0.30 (0.46)	
Marital Status			33.46***
Married	0.41 (0.49)	0.76 (0.43)	
Never Married	0.32 (0.47)	0.23 (0.42)	
Was Married (widow/divorced)	0.28 (0.45)	0.01 (0.11)	
Educational Level			14.64***
No education	0.19 (0.39)	0.08 (0.28)	
Low education	0.33 (0.47)	0.20 (0.41)	
Higher education	0.48 (0.50)	0.71 (0.46)	
Savings Level	1.11 (0.32)	1.46 (0.50)	30.73**
Revenue	7068.80 (5422.65)	7912.49 (5566.46)	64.35
Bags	41.56(31.85)	46.69 (32.57)	64.35
How-far	14.25 (9.03)	15.94 (8.51)	30.27

Source: Authors' Computation from Survey Data, 2012

Out of the number of the respondents interviewed the mean for those who had access to credit is 0.68 for males, with a standard deviation of 0.47. Males who had no access to credit have mean and standard deviation of 0.70 and 0.46 respectively. The chi^2 value for both male and female who had access to credit and those who had no access to credit was 0.13. The chi-square test of significance is carried out to determine the extent of the association between the concerned variables.

The mean and standard deviation for those who were married and had access to credit were 0.41 and 0.49 respectively. Those who were married and had no access to credit however, had a mean and standard deviation of 0.76 and 0.43 respectively. Farmers who never married and had access to credit had a mean of 0.32 and standard deviation of 0.47 as compared to those who never married and had no access to credit with a mean and standard deviation to be 0.23 and 0.42 respectively. The widowed/divorced who had access to credit mean and standard deviation 0.28 and 0.45 as compared to those in the same category who had no access to credit mean and standard to be 0.01 and 0.11 respectively. The mean Chi-Square test is 33.46, and it was significant at 1 percent level of significance.

The number of those who had no education and had access to credit had a mean of 0.19 and standard deviation of 0.39. And those who had no access to credit had a mean of 0.08 and a standard deviation of 0.28. Those who had access to credit and low education had a mean and standard of 0.33 and 0.47 respectively while those with low education and had no access to credit had a mean of 0.20 and standard deviation of 0.41. In the case of those with higher education with access to credit had a mean and standard deviation to be 0.48 and 0.50 respectively. With those who had higher education without credit accessibility had a mean of 0.71 and standard deviation of 0.46 with mean chi-square test for educational level as 14.60.

On the other hand, the savings level of the respondents, revenue from the sale of their produce and the number of years a farmer has been into farming also generated the following results; With the number of the

respondents interviewed those who had access to credit had a mean of 1.11 and standard deviation of 0.32 as compared with those who had no credit accessibility of 1.46 as mean and 0.50 as standard deviation for the savings level.

The number of bags produced and how far a farmer has been in production also generated these results. In terms of production, those who had access to credit had a mean of 41.55 and a standard deviation of 31.85, those who did not get access to credit had a mean to be 46.69 and a standard deviation of 32.57 and in general had a chi^2 of 64.35. The age of the farm also showed a chi^2 to be 30.26 and had a mean and standard deviation for those who had access to credit to be 14.25 and 9.02 as compared with those who did not get credit accessibility as 15.94 and 8.51 respectively.

4.1 REGRESSION RESULTS AND ANALYSIS

Table 1.3 shows the result for the coefficients of the probit index. These coefficients are not generally very useful as they only indicate the effect they have on the probit Index or score through their signs. Generally, a negative sign such as education coefficient (-0.9) implies a reduction probit index (i.e a reduction in the probability of the event or outcome happening). The explanation for the negatives starting with education is that farmers with low education level will less probably have access to credit. This may be explained by the fact that better-educated farmers may be able to exploit investment opportunities and to better understand loan regulations as well as the borrowing procedure of the formal sector (Nguyen 2001). Farmers with low educational levels may not be abreast with some of the procedures associated with securing credit and as such, they may choose not to apply for credit. But it is significant at 1% level.

Table 1.3 Regression Results

Variable	Coefficient	Std. Error	Z	P>|Z|
Savings	3.703193***	6.076343	6.09	0.000
Revenue	0.233506**	.0117303	1.99	0.047
Farmsize	0.0992048**	0.0472567	2.10	0.036
Education	-0.9297735***	0.233005	-3.99	0.000
Bags	-3.980187**	1.996774	-1.99	0.046
Sex	-0.1698939	.4021764	-0.42	0.673
Howfar	0.088137***	0.0297269	2.99	0.003
Age	0.180465	0.0254873	0.71	0.479

Number of Obs=150   LR chi(2) = 75.68   Prob > chi2 = 0.0000

Pseudo R2 = 0.2820   Log likelihood = -96.346278

***(1% significant level) **(5% significant level) *(10% significant level).

Source: Authors' Computation from Survey Data, 2012

The next factor that determines access to credit is sex with a negative coefficient (i.e., -0.2). This negative coefficient implies that being male or female can reduce the probability of accessing credit. Essel (2001) and Ekuma (2003) observed that men are more likely to apply and secure loans since most men are risk lovers. On the other hand, women who are organized as a group in their trade are believed to have access to credit (Seligon 1996) hence the negative sign.

The number of bags produced also shows a negative probit index coefficient. This may be attributed to the fact that the sector is believed to consist of the aged and they tend to produce at lower marginal output level. This supports Kotlikoff and Gokhale (1992) and Xavier Sala (1995) claim that productivity at age 65 is less than 1/3 of what they would have produced at age 45. Consequentially, the elderly exert negative externality on the rest of labour force. The reason is that aggregate output is higher if the elderly do not work. Savings, revenue, farm size, and how far a farmer has been into farming yielded positive result and are significant at 1 to 5 percent level of significance. The index coefficient for savings, revenue, farm-size and how far a farmer has been in farming are: 3.7, 0.2, 0.09 and 0.08. Age, though also has a positive index coefficient, it is not significant. These results indicate a remarkable and highly favourable impact on access to credit.

Table 1.4 presents results of the binary probit regression showing variables which are important for

determining access to credit. The result shows that the model is robust with a log likelihood function value of -96.3 when all coefficients are zero. On the other hand, the probability of the model being plausible is nil, indicated by Prob > chi2 of 0.00. This also reports a null hypothesis of no monotonic relation between access to credit and the independent variables. According to Gujarati, (2003), robust logit estimation reports the LR Chi-squared and the pseudo R-squared. The R-squared measures the portion of variation explained by the model. Although the R-squared value from our estimation is low i.e. 28%, the pseudo R-squared is not solely reliable as a measure of overall goodness of a model since the logit procedure is non-linear. Meanwhile it has been argued that low R-squared needs not imply that the model is not good. Eventually the result from our estimation clearly suggests that the model as a whole is significant, since the calculated LR-Chi2 is significant at 1%.

4.1.1 Determinants of Access to Credit: Marginal effect

In order to determine the magnitude of the effects of the variables that influence access to credit, we estimate the marginal effects of variables found in table 4.4. Marginal effect (dy/dx) means the change in the dependent variable resulting from an infinitesimal change of a continuous independent variable or a discrete change in a dummy independent variable. For example, when the marginal effect (dy/dx) of a variable is 0.1, a unit change in x leads to a rise in the probability of one of the outcomes of y by 10 percent. From the marginal effects of the variables in table 1.4, we obtained results presented in table 4.5. Since the marginal effects vary depending on the values of the independent variables the baseline values for the independent variables are also presented in the column X. Unlike odd ratios, the marginal coefficients can take the sign of negative which does not imply that the probability is negative, but the direction of the effect of the positive probability on the baseline probability of the dependent variable.

Table 1.4 Estimated Results for Marginal Effects

Variable	Dy/dx	Std. Error	Z	P> Z	95% C.	I.	X
Savings	0.7017022	0.06485	10.82	0.000	0.574602	0.828802	0.745
Revenue	0.0056695	0.00297	1.91	0.056	-0.00015	0.011484	7418.9
Farmsize	0.0240867	0.01149	2.10	0.036	0.001568	0.046605	15.735
Education	-0.225747	0.05639	-4.00	0.000	-0.33626	-0.11523	3.465
Bags	-0.966380	0.50504	-1.91	0.056	-1.95624	-0.02348	43.68
Sex	-0.040998	0.0965	-0.42	0.671	-0.23014	0.148144	.682
Howfar	0.0215637	0.00718	3.00	0.003	0.035637	0.007491	14.95
Age	0.004010	0.00561	0.71	0.475	-0.00699	0.015012	48.449

Source: Authors' Computation from Survey data, 2012

Results from the regression analysis show that savings level of the farmer, revenue from sales, farm size and how long a farmer has been into farming significantly determine a farmer's chance of having access to credit from formal and informal credit sources. The greater percentage of the respondents did save with financial institutions. Out of the respondents interviewed, 75% save with financial institutions while 26% do not save at all. Moreover, about 43% took loans from the financial institutions to finance their farms while 57% finance their farms through personal savings as well funds from other sources. This indicates that few farmers have good relationship with banks. This result seems to confirm most of the descriptive inferences. Based on these results we make certain conclusions and recommendations in the next chapter.

5.1 CONCLUSION

The key objective of this study was to determine the factors that influence farmers' access to credit. The study adopted both descriptive and regression analysis as methods of data analysis. The study revealed that the major determinants of access to credit are savings, revenue, farm size and age of the farm.

Using a cross section of 150 farmers a probit regression analysis was used to determine the extent of influence of variance such as: savings level of the farmer, size of the farm, sex, age of the farmer and the farm and the level of education on access to credit. The result from the probit regression shows that years in farming, savings level, and revenue generated from sales, bags produced, farm size and education significantly influence farmer's chance to access credit from formal and semi-formal sources. The results indicated that sex and age of the farmer insignificantly influence farmers' chance to access credit. The study found that most of the farmers did save with financial institutions thus about 74.5% out of the respondents interviewed.

5.2 RECOMMENDATIONS

The crucial role of credit in the development of female owned farm cannot be over emphasized. It is therefore recommended that credit policy for small farmers lending needs to be specifically formulated to meet the need of woman farmers. The government in collaboration with various development partners should consider the possibility of establishing a specialized credit institution to cater for specific credit and other financial needs of woman farmers.

Extending credit to women will not only accelerate the growth of their micro-farms but also has tickle down effects on their entire households as income earned from their farms is mostly used to cater for their

household.

Cocoa farmers should be encouraged to cultivate the habit of savings at the banks to enable them qualify for loans to maintain and expand their farms to increase output. Also government should launch campaigns that attract the youth into cocoa production because this group of farmers will be more receptive to adoption of technologies that can improve their productivity and output.

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