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Estimating the effects of formal and informal credit on farm household welfare: A hierarchical competitive welfare model approach

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This paper uses the hierarchical competitive welfare model approach to estimate the effects of credit from formal and informal sources on welfare development of farm households in Ghana. Data used for the econometric analyses came from the Ghana Living Standards Survey Round 5 dataset. The results showed that when a farm household is given GHC100 as formal credit, its welfare expenditure would increase by about GHC6. On the other hand, GHC100 given to a farm household as informal credit reduces its welfare expenses by about GHC10. There are two possible explanations for the negativity of informal credit on household welfare expenses. The first is that most informal credit is delivered in material forms instead of cash, which therefore reduces how much borrowing households expend on those materials. The second possible explanation is that informal credit borrowers get trapped in the vicious cycle of poverty such that it reduces their capacity to expend towards the attainment of their welfare outcomes such as food security, healthcare, education and general well-being. A paradigm shift towards the integration of formal and informal financial markets of Ghana is recommended.

Key words: Ghana, welfare, farm household, credit, hierarchical competitive model.

INTRODUCTION

Credit has over the years been used as a development tool, especially in the developing world mostly targeting poor and vulnerable farm households. Evidence from the empirical literature indicates that credit enables poor households against starvation, illiteracy and all other adversities that impinge on their welfare (Afrane, 2002) and improves household power relations (Pitt et al., 2006). It is, however, important to note that the impact of credit on welfare is context specific. According to Mayoux (1999), the level of impact of credit on livelihoods depends on the context within which beneficiaries find themselves. Whereas access to credit is said to narrow the gap between the poor and rich in some cases, it rather widens the existing inequality gaps in other cases (Mayoux, 2001).

It has been reported in Ghana that credit from formal sources helps boost welfare development (Alhassan and Akudugu, 2012; Al-hassan and Sagre, 2006; Dadzie and Ghartey, 2010). As a result, successive governments in the country (Ghana) have never relented in formulating
and implementing policy reforms and regulations in the financial sector to ensure increased access to credit by all, especially those in the rural areas where agriculture is the main source of livelihood. Notable amongst these policy reforms and regulations are the establishments of the Agricultural Development Bank (ADB) in the 1960s, Rural and Community Banks (RCBs) in the 1970s, the Financial Sector Adjustment Programme (FINSAP) in the 1980s and the establishment of Microfinance Institutions (MFIs) across the country in the 1990s and 2000s. Most of these policy reforms and regulations with assistance from multinational development institutions such as the World Bank and International Monetary Fund (IMF) were largely designed to do away with the informal financial sector.

Unlike the credit from formal sector lenders such as banks and MFIs, credit from informal sector lenders such as input dealers, traders, relatives, friends, and moneylenders in Ghana has always been seen to have negative effects on the welfare development of borrowers. This is because informal lenders are blamed for charging exorbitant interest payments (Schindler, 2010). That notwithstanding, the informal financial market of Ghana continues to exist with many people across the country relying on it to meet their financial needs. The question therefore is, does informal credit really negatively affects the welfare development of farm households in Ghana? This question has largely not been answered in the empirical literature, as there have been very little investigations into how credit from the informal financial market affects the welfare development of their borrowers. Much of the empirical literature on the influence of credit on welfare development quoted above only considers formal credit. This paper estimates the effects of formal and informal credit on the welfare development of farm households in Ghana using the hierarchical competitive welfare model approach.

METHODOLOGY

The hierarchical competitive welfare model was used in the paper as a means to get valid and relevant instrumental variables (IV) for the estimation processes. It follows the work of Khandker and Faruqee (2003) who used similar approach to estimate the impact of farm credit in Pakistan. A detailed discussion of how the model works is provided in the proceeding paragraphs. The econometric framework employed for the analyses was setup through the following reduced form outcome model:

\[ y_{ij} = x_{ij} \beta_j + c_{ijk} \delta_j + c_{ij} \gamma_i + \mu_j + \mu_k + \varepsilon_{ijk} \]  

(1)

Where \( y_{ij} \) represents expenditure on health, education, food, performance of socio-cultural activities, shelter, energy and sanitation, a proxy for welfare of household in community \( j \) in district \( k \). \( x_{ij} \) is a set of observed characteristics of household in community \( j \) in district \( k \). \( c_{ijk} \) is the amount of formal credit received by household in community \( j \) in district \( k \). \( C_{ijk} \) is the amount of informal credit received by household in community \( j \) in district \( k \). \( \beta_j \) and \( \delta_j \) represent factors in community \( j \) and district \( k \) that affect household welfare, \( y_{ijk} \) but are unobservable to the researcher. \( \varepsilon_{ijk} \) is non-systematic errors, partly representing the unmeasured determinants of \( y_{ijk} \) that vary across households in community \( j \) and communities in district \( k \), such that:

\[ E(\varepsilon_{ijk} | x_{ijk}, \mu_j, \mu_k) = 0 \]  

(2)

Assuming all factors were observable to the researcher, the effects of credit from formal and informal sources on household welfare could have been measured by \( \delta_j \) and \( \delta_k \), respectively without bias.

Unfortunately, factors contained in \( \mu_j \) and \( \mu_k \) cannot be observed by the researcher and may correlate with \( C_{ijk} \). which results in selectivity bias that occurs when there is a correlation between the error term and the independent variables (Heckman, 1976, 1979, 1990; Heckman and Li, 2003; Heckman and Sedlacek, 1990; Hausman and Wise, 1976, 1977; Lee, 1982, 1983, 1994; Das and Vella, 2003; Vella, 1998; Winship and Mare, 1992; Khandker and Faruqee, 2003).

Some of the unobserved variables contained in \( \mu_j \) and \( \mu_k \) may be used by lenders to determine, which borrower to grant credit to. For instance, it is possible that lenders in formal and informal credit markets may be advancing credit to only households with certain level of endowments. Under such circumstances, lenders might only select households with the required level of endowment for credit delivery. This is because lenders are rational economic agents who allocate credit in the best possible ways that minimise defaults and maximise repayments. This assertion is in line with the arguments that selectivity bias is pervasive and emanates from human behaviour (Roy, 1951; Gronau, 1974; Heckman, 1990). However, researchers are unable to observe all the underlying factors considered by lenders in their lending activities. In simple terms, not all farmers and farm households in the selected communities across the different districts and ecological zones may have equal chances of selection by lenders for credit advancement hence selectivity bias. As such, analysing the outcome of Equation 1 by the ordinary least squares (OLS) estimation method yields biased estimates because selectivity bias violates the assumption of OLS that the error and independent variables are uncorrelated.

To deal with the selectivity bias in credit delivery as described above, the IV approach was employed. This is estimated through the Two-stage least squares (TSLS) estimation which is the commonly used IV estimator (Murray, 2006b; Hahn et al., 2004). The TSLS estimator is good in dealing with selectivity problems caused by simultaneity, measurement errors or omitted variables among others (Cameron and Pravin, 2005; Greene, 2008; Kennedy, 2003; Angrist and Krueger, 1991; Cameron and Pravin, 2009; Murray, 2006a; Wooldridge, 2008). The choice of the IV approach is in conformity with the assertion that the models for
To get valid and relevant instruments, three key assumptions were made in this study. The first assumption was that the lendable funds available to formal and informal lenders in Ghana are fixed and limited. The second assumption was that the demand for credit is more than the supply, which triggers competition among borrowers. The third assumption was that there are many borrowers competing for the limited lendable funds available to few lenders at the formal and informal credit markets of Ghana. Based on these assumptions, it is not the price of credit but the availability of funds and level of competition that matters most in determining how much a household could borrow from formal and informal credit markets. This leads to the issue of credit allocation hierarchy as funds are competed for at the national, regional, district, and community levels. At the national level, different regions compete for lendable funds available to lenders in the formal and informal credit markets. At the regional level, different districts compete for lendable funds. At the district level, different communities compete for lendable funds and at the community level, different households compete for the lendable funds available to lenders. So the lendable funds are subject to competition at each level and the final amounts of credit that households are able to get from the credit markets are the cumulative outcome of all the competitions.

Given the available funds, the amount of credit a household is able to borrow from the formal or informal credit market depends not only on its own characteristics but also on the characteristics of other competing households who also seek credit. The competitor’s characteristics were therefore considered as appropriate instruments in estimating how much a farm household could borrow from the credit markets. Competitors to a borrowing household are at the national, regional, district and community levels. The characteristics of competitors at all the levels influenced the amount of credit households are able to borrow from the credit markets. For the purposes of simplification, the researcher assumed competition starting from the district level. Thus the amount of credit households are able to get is a culmination of the competition at all the different levels or hierarchies.

Specific household characteristics relative to district and community level competitors’ characteristics were used as instruments \(Z_{ij,k} \) These included community and district level average years of formal schooling, community and district level average household savings and the average amounts of formal and informal credit borrowed by computing households at the community and district levels. The selection of these factors were partly informed by the empirical literature that years of formal schooling and savings significantly influence the amounts of credit individuals are able to borrow from credit markets (Khandker and Faruque, 2003; Ayamga et al., 2006). The community level average characteristics were computed as sampled households excluding household \(i\) and that of the district level computed as sampled households across \(k\) districts excluding those in community \(j\). The selection models (Equations 3a and b) were re-specified as:

\[
C_{ijkf} = X_{ijkf} \beta_{cf} + Z_i + \mu_{cf} + \mu_{kf} + \epsilon_{ikf} \quad (3a)
\]

\[
C_{ijkt} = X_{ijkt} \beta_{ct} + Z_i + \mu_{ct} + \mu_{kt} + \epsilon_{ikt} \quad (3b)
\]

Where \(C_{ijkf}\) and \(C_{ijkt}\) are as defined above, \(X_{ijkf}\) and \(Z\) are household characteristics and IV, respectively that influence the amount of credit farm households could borrow from the formal and informal credit markets respectively. \(\beta_{cf}, \beta_{ct}, \lambda_{cf} \) and \(\lambda_{ct}\) are unknown parameters to be estimated. \(\mu_{cf}\) and \(\mu_{ct}\) are community level unobservable factors that influence \(C_{ijkf}\) and \(C_{ijkt}\), respectively and do not vary across households within community \(j\). \(\mu_{kf}\) and \(\mu_{kt}\) are district level unobservable factors that affect \(C_{ijkf}\) and \(C_{ijkt}\), respectively but do not vary across communities within district \(k\). \(\epsilon_{ikf}\) and \(\epsilon_{ikt}\) are non-systematic errors that represent the unmeasured determinants of \(C_{ijkf}\) and \(C_{ijkt}\), respectively which vary across households and communities and are such that:

\[
E(\epsilon_{ikf}|X_{ijk}, Z, \mu_{cf}) = 0 \quad (4a)
\]

\[
E(\epsilon_{ikt}|X_{ijt}, Z, \mu_{ct}) = 0 \quad (4b)
\]

Identifying appropriate IV was a key component of this study. According to Demand theory, the price of a commodity is a good instrument for estimating its demand. In this regard, the price of credit from formal and informal credit markets, which are the interest charges, could be good instruments. Unfortunately, these hardly vary within credit markets. Hence, the interest charges could be good predictors of the inter-market demand for credit but not intra-market demand. To implement the first stage, the following selection models (Equations 3a and b) were re-specified as:

\[
C_{ijkf} = X_{ijkf} \beta_{cf} + \bar{X}_{j,i} \lambda_{cf} + \bar{X}_{k,j} \lambda_{kf} + \mu_{cf} + \mu_{kf} + \epsilon_{ikf} \quad (5a)
\]

\[
C_{ijkt} = X_{ijkt} \beta_{ct} + \bar{X}_{j,i} \lambda_{ct} + \bar{X}_{k,j} \lambda_{kt} + \mu_{ct} + \mu_{kt} + \epsilon_{ikt} \quad (5b)
\]

Where \(C_{ijkf}\) and \(C_{ijkt}\) are as defined earlier. The \(Z\) variables were replaced by \(\bar{X}_{j,i}\) and \(\bar{X}_{k,j}\) variables which are the community and district levels average household characteristics respectively that influence the amount of credit farm households could borrow from the formal and informal credit markets. \(\beta_{cf}, \beta_{ct}, \lambda_{cf}, \lambda_{ct}, \lambda_{df}, \lambda_{ct}\) and \(\lambda_{dt}\) are unknown parameters to be estimated.
estimated. \( \mu_{ij}^{\text{f}}, \mu_{ij}^{\text{d}}, \mu_{ij}^{\text{f}}, \) and \( \mu_{ij}^{\text{d}} \) are unmeasured determinants of \( C_{ij} \) and \( C_{ij} \) respectively and do not vary across households within community \( j \) and communities within district \( k \). \( e_i^{f} \) and \( e_i^{d} \) are non-systematic errors that represent the unmeasured determinants of \( C_{ij} \) and \( C_{ij} \) respectively which vary across different households within community \( j \) and are such that:

\[
E(e_i^{f}|X_{ij}, Z, \mu_{ij}^{f}) = 0 \tag{6a}
\]

\[
E(e_i^{d}|X_{ij}, Z, \mu_{ij}^{d}) = 0 \tag{6b}
\]

The estimated amounts of credit from formal and informal sources were derived as:

\[
\hat{C}_{ij} = X_{ij} \hat{\beta}_{cf} + \bar{X}_{j-i} \hat{\lambda}_{cf} + \bar{X}_{k-i} \hat{\lambda}_{kf} \tag{7a}
\]

\[
\hat{C}_{ij} = X_{ij} \hat{\beta}_{ci} + \bar{X}_{j-i} \hat{\lambda}_{ci} + \bar{X}_{k-i} \hat{\lambda}_{ki} \tag{7b}
\]

Where:

\( \hat{C}_{ij} \) = Estimated amount of credit from formal credit market;

\( \hat{C}_{ij} \) = Estimated amount of credit from informal credit market;

\( \hat{\beta}_{cf}, \hat{\beta}_{ci}, \hat{\lambda}_{cf}, \) and \( \hat{\lambda}_{ci} \) = Estimated parameters;

\( X_{ij}, \bar{X}_{j-i}, \) and \( \bar{X}_{k-i} \) are as defined above.

The corresponding outcome model of Equation 1, which constituted the second stage estimation through OLS, was re-specified as:

\[
y_{ijk} = X_{ij} \beta_{yj} + \hat{C}_{ijk} \delta_{j} + \hat{C}_{ikj} \delta_{i} + \mu_{ij}^{y} + \mu_{ik}^{y} + e_{ijk}^{y} \tag{8}
\]

In this regard, the coefficients of credit in the second welfare Equations 8 measured the effect of one more unit of credit from a credit market on the outcome of interest as defined above. In other words, it measures the effect of one more unit of credit denied by lenders in the credit market on household welfare.

To determine whether or not the use of IV was necessary in this study, the Durbin-Wu-Hausman (DWH) test proposed independently by Durbin (1954); Wu (1973) and Hausman (1978) was conducted. This involves using an augmented regression analysis (Davidson and MacKinnon, 1993) by including the residuals from the first stage estimations in the second stage estimations (Baum et al., 2007; Antonakis et al., 2010; Khandker and Faruqee, 2003). Significant residuals imply credits from formal and informal sources, which are the mediators, are indeed endogenous and thus must be instrumented and thus TSLS should be preferred to OLS. This is because the assumption that the independent variables, in this case formal and informal credits are uncorrelated with the residuals (error term) is violated. The independent variables were tested for multicollinearity using the variance inflation factor (VIF). Theoretically, VIF is derived as \( 1/(1-R^{2}) \) for each \( k \) \( = \) 1 independent variable equations (Robinson and Schumacker, 2009). The rules of thumb for VIF include the fact that 1 means no multicollinearity and 10 means severe multicollinearity which must be corrected (O’Brien, 2007). Relevance and strengths of the instruments were determined by their associated t-values. White’s variance-covariance estimator was used to circumvent the problem of heteroscedasticity (Davidson and MacKinnon, 1993). Thus heteroscedasticity-corrected (HC) variance and robust standard errors were reported.

The empirical models are specified as (Table 1 for definition and measurement of variables):

\[
C_{ij} = \alpha_{0} + \alpha_{1} X_{j1} + \alpha_{2} X_{j2} + \alpha_{3} X_{j3} + \alpha_{4} X_{j4} + \alpha_{5} X_{j5} + \alpha_{6} X_{j6} + \alpha_{7} X_{j7} + \alpha_{8} X_{j8} + \alpha_{9} X_{j9} + \alpha_{10} X_{j10} + \alpha_{11} X_{j11} + \alpha_{12} X_{j12} + \alpha_{13} X_{j13} + \alpha_{14} X_{j14} + \alpha_{15} X_{j15} + \alpha_{16} X_{j16} + \varepsilon_{1} \tag{9a}
\]

\[
C_{ij} = \alpha_{0} + \alpha_{1} X_{j1} + \alpha_{2} X_{j2} + \alpha_{3} X_{j3} + \alpha_{4} X_{j4} + \alpha_{5} X_{j5} + \alpha_{6} X_{j6} + \alpha_{7} X_{j7} + \alpha_{8} X_{j8} + \alpha_{9} X_{j9} + \alpha_{10} X_{j10} + \alpha_{11} X_{j11} + \alpha_{12} X_{j12} + \alpha_{13} X_{j13} + \alpha_{14} X_{j14} + \alpha_{15} X_{j15} + \alpha_{16} X_{j16} + \varepsilon_{2} \tag{9b}
\]

The effects of credit from formal and informal sources on households’ welfare attainments were estimated as (Table 2 for definition and measurement of variables):

\[
y = \lambda_{0} + \lambda_{1} \hat{C}_{f} + \lambda_{2} \hat{C}_{i} + \lambda_{3} R + \lambda_{4} DR + \lambda_{5} FI + \lambda_{6} NFI + \lambda_{7} MA + \lambda_{8} \varepsilon_{f} + \lambda_{9} \varepsilon_{d} + \varepsilon_{2} \tag{10}
\]

In all, data from 3,600 households were used in this analysis. The data came from the Ghana Living Standards Survey Round 5, which was conducted in 2005/2006.

This test uses the F-statistic. A significant F-Statistic therefore implies a violation of the assumption in OLS that the independent variable and the residual (error term) are uncorrelated. On the other hand, insignificant F-Statistics means that OLS could have been used for the estimations. The independent variables were tested for multicollinearity using the VIF. Theoretically, VIF is derived as \( 1/(1-R^{2}) \) for each \( k \) \( = \) 1 independent variable equations (Robinson and Schumacker, 2009). The rules of thumb for VIF include the fact that 1 means no multicollinearity and 10 means severe multicollinearity which must be corrected (O’Brien, 2007). Relevance and strengths of the instruments were determined by their associated t-values. All the estimations were done using STATA Version 11.

**RESULTS AND DISCUSSION**

Different factors including credit from different sources influence how much households spend on their core welfare outcomes. The study results showed that the amount of credit households received from formal and informal sources significantly influence their expenditures on the welfare outcomes. Thus whereas there is positive relationship between formal credit and how much households spend on their core welfare outcomes. Thus whereas there is positive relationship between formal credit and how much households spend on payments of healthcare bills, education, housing, sanitation and energy among others, that of informal credit is negative. This means the influence how much households spend on their core welfare outcomes. The study results showed that the amount of formal credit received by farm households results in their welfare expenditures increasing by about GHS0.06 and this increase is statistically significant at 1%. On the other hand, a GHS1.00 increase in the
Table 1. Definition and measurement of variables of selection equations.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Definition and measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C_f$</td>
<td>Formal credit (Ghana Cedis)</td>
</tr>
<tr>
<td>$C_i$</td>
<td>Informal credit (Ghana Cedis)</td>
</tr>
</tbody>
</table>

Independent variables

<table>
<thead>
<tr>
<th>Definition and measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender of household head ($X_1$)</td>
</tr>
<tr>
<td>Purpose for credit accessed ($X_2$)</td>
</tr>
<tr>
<td>Collateral requirements ($X_3$)</td>
</tr>
<tr>
<td>Access to extension services ($X_4$)</td>
</tr>
<tr>
<td>Coastal ecological zone ($X_5$)</td>
</tr>
<tr>
<td>Forest ecological zone ($X_6$)</td>
</tr>
<tr>
<td>Mean household schooling ($X_7$)</td>
</tr>
<tr>
<td>Mean community schooling ($X_8$)</td>
</tr>
<tr>
<td>Mean district schooling ($X_9$)</td>
</tr>
<tr>
<td>Mean household savings ($X_{10}$)</td>
</tr>
<tr>
<td>Mean community savings ($X_{11}$)</td>
</tr>
<tr>
<td>Mean district savings ($X_{12}$)</td>
</tr>
<tr>
<td>Mean c’ty formal credit ($X_{13}$)</td>
</tr>
<tr>
<td>Mean district formal credit ($X_{14}$)</td>
</tr>
<tr>
<td>Mean c’ty informal credit ($X_{15}$)</td>
</tr>
<tr>
<td>Mean dist. informal credit ($X_{16}$)</td>
</tr>
</tbody>
</table>

Source: Author’s construct, 2013.

Table 2. Definition and measurement of variables for outcome equation.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Definition and measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welfare ($y$)</td>
<td>Household living expenses (Ghana Cedis)</td>
</tr>
</tbody>
</table>

Independent variables

<table>
<thead>
<tr>
<th>Definition and measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tilde{C}_f$</td>
</tr>
<tr>
<td>$\tilde{C}_i$</td>
</tr>
<tr>
<td>$R$</td>
</tr>
<tr>
<td>$DR$</td>
</tr>
<tr>
<td>$FI$</td>
</tr>
<tr>
<td>$NFI$</td>
</tr>
<tr>
<td>$MA$</td>
</tr>
</tbody>
</table>

Source: Author’s construct, 2013.

The amount of informal credit received by farm households leads to their welfare expenditures decreasing by about GH¢0.10 and this decrease is statistically significant at 1% (Table 3). In other words, if a household receives GH¢100.00 as credit from formal sources its welfare expenditures will experience a corresponding increase of about GH¢6.00. Similarly, when a household borrows GH¢100.00 from informal lenders, its welfare expenditure will decrease by about GH¢10.00, ceteris paribus. One of the possible reasons for this huge difference is the fact...
that formal credit is mostly well focused in terms of its usage compared to informal credit. Besides, formal credit comes as a package, which includes other services such as training all of which are critical for the attainment of the core welfare outcomes. Furthermore, informal credit is sometimes delivered in material forms such as food, which means that household expenditures on such items are reduced, ceteris paribus. It could also be that informal credit borrowers get trapped in the vicious cycle of poverty such that it reduces their capacity to expend towards the attainment of their welfare outcomes.

The positive and significant relationship between formal credit and household welfare is consistent with the literature that formal credit enables farm households to expand their farming and related livelihood activities and this helps them improve their living and welfare conditions (Gale and Collender, 2006; Coleman, 1999). It is further corroborated by Khandker and Faruquee (2003), Khandker (2005), Copestake et al. (2005), Dadzie and Gharney (2010) who concluded in their study that credit helps raise incomes and consumption of poor households in particular and welfare in general. Indeed, similar findings have been reported in related empirical studies in Bangladesh (Khandker, 2005; Pitt and Khandker, 1998; Mahjabeen, 2008; Ahmed et al., 2001; Amin and Sheikh, 2011), China (Li et al., 2011), Indonesia (Okten and Osil, 2004), Bolivia (Maldonado and Gonzalez-Vega, 2008), Vietnam (Duong and Izumida, 2002), Guatemala (Wydick, 1999), India (Imai et al., 2010), Ghana (Al-hassan and Sagre, 2006), Ethiopia (Sebhatu, 2012), Malawi (Swaminathan et al., 2010; Shimamura and Lastarria-Cornhiel, 2010; Hazarika and Alwang, 2003), and Tunisia (Foltz, 2004). These studies generally concluded that formal credit helps improve the welfare of borrowers as it empowers them in their decision-making processes, asset accumulation, political participation and legal awareness among others. It enables poor households stand against starvation, illiteracy and all other adversities that affect their welfare (Afrane, 2002). It also improves household power relations as both women and men are able to earn income, a major determinant of household power dynamics (Pitt et al., 2006) critical in the pursuance of sustainable welfare outcomes. With specific reference to informal credit, the negative relationship found is inconsistent with the views expressed by Schindler (2010) who in a study of informal credit as a coping strategy of market women in northern Ghana concluded that informal credit positively influence the welfare outcomes of women and their households.

It was also found that remittances had positive though insignificant effects on household welfare (Table 3). The a priori expectation of a positive relationship was met. This contradicts the finding of an earlier study by Gustafsson and Makonnen (1993) who concluded that remittances do not necessarily lead to poverty reduction and improvement in welfare conditions for that matter. It is however, corroborated by other earlier empirical studies by Diatta and Mbow (1999), Kannan and Hari (2002) and Litchfield and Waddington (2003) among others who concluded that there is positive relationship between remittances and welfare of recipient households. One of the possible explanations for the positive relationship between remittances and welfare expenses is that remittances often come in monetary forms which means that beneficiary households are then in a better position to expend on the core welfare outcomes. It must be noted however, that substantial amount of remittances is also received in material forms.

The level of dependency although negatively related to household welfare expenditures is insignificant. Farm income has negative and significant effects on household welfare expenditures. The a priori expectation of positive relationship was thus not met. This means that when farm income of households increases by GH¢1.00, their expenditures on the welfare outcomes decrease by about GH¢0.03 and this decrease is statistically significant at 1% (Table 3). This is inconsistent with the empirical literature that increased income leads to improved livelihoods (Dadzie and Gharney, 2010; Copestake et al., 2005; Khandker, 2005). One possible explanation to this is that most farm households in rural Ghana are into farming primarily for consumption and are therefore not selling their farm produce for income to finance the attainment of other welfare outcomes. Another possible explanation is that farm income might be mostly used for investments in farm and non-farm production activities as well as savings for ‘rainy days’ instead of financing welfare expenditures. Besides, wealthier farmers might be spending less on healthcare as they are healthier; education as they are mostly educated; housing as they have their own houses; and so on.

Non-farm income had significant and positive effects on household welfare expenses and therefore the a priori expectation of positive relationship was met. The results indicated that a GH¢1.00 increase in non-farm income results in about GH¢0.14 increase in household welfare expenditures. Again, this is consistent with findings of earlier empirical studies noted above. Market access is an insignificant determinant of farm household welfare development. The a priori expectation of positive relationship between market access and farm household welfare expenditure was not met (Table 1).

The VIF test indicates that the independent variables are uncorrelated to each other and thus there is no multicollinearity. The significant DWH also indicates that the instrumentation of formal and informal credit was appropriate as they are endogenous and would have yielded biased and inconsistent estimates without instrumentation. The implication of this is that the allocations of credit by formal and informal sector lenders are not done at random. This means that there are some factors which lenders consider in their credit allocations that may not be observable to researchers hence the biasness. The regression specification error test (RESET)
Factors Microcredit and poverty alleviation: An experimental paper made used of cross household welfare expenditures. Besides, this current might help reduce the negativity of informal credit on community level credit agents is informal credit markets with informal lenders acting as development in Ghana. Integration of the formal and informal credit significantly affects household welfare sources. The general conclusion is that formal and expenditures than those without non access to non expenses are negative. In other words, this paper demonstrates that unlike formal credit, informal credit negatively affects borrowing households’ expenditures on the key welfare outcomes - healthcare, education, food, performance of socio-cultural activities, shelter, energy and sanitation. The implication of this finding is that policies to promote welfare conditions of people in rural Ghana should lay more emphasis on the provision of formal credit. Remittances do not significantly influence household welfare expenditures. The effects of farm income on household welfare expenditures are negative and significant. This means that households with appreciable level of income from their farms rather spend less on the attainment of their welfare outcomes. Furthermore, the effects of non-farm income on household welfare expenditures are positive and significant. The implication of this is that people who have access to non-farm income spend more on welfare expenditures than those without non-farm income sources. The general conclusion is that formal and informal credit significantly affects household welfare development in Ghana. Integration of the formal and informal credit markets with informal lenders acting as community level credit agents is recommended. This might help reduce the negativity of informal credit on household welfare expenditures. Besides, this current paper made used of cross-sectional data and a quasi-experimental design the implication of which is that the estimated effects of formal and informal credit on welfare development is only for the short-term. Thus further research on the subject matter using experimental data and longitudinal research design is recommended.

Conclusion

Formal and informal credit has significant effects on the welfare expenses of farm households in Ghana. The effects of formal credit on household welfare expenses are however, positive and that of informal credit is negative. In other words, this paper demonstrates that unlike formal credit, informal credit negatively affects borrowing households’ expenditures on the key welfare outcomes - healthcare, education, food, performance of socio-cultural activities, shelter, energy and sanitation. The implication of this finding is that policies to promote welfare conditions of people in rural Ghana should lay more emphasis on the provision of formal credit. Remittances do not significantly influence household welfare expenditures. The effects of farm income on household welfare expenditures are negative and significant. This means that households with appreciable level of income from their farms rather spend less on the attainment of their welfare outcomes.

Table 3. Regression results of effects of credit on welfare expenditure (n=3600).

<table>
<thead>
<tr>
<th>Exogenous variables</th>
<th>Coefficient</th>
<th>Robust S.E</th>
<th>VIF</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated formal credit</td>
<td>0.0558</td>
<td>0.0122***</td>
<td>2.84</td>
<td>0.0320</td>
</tr>
<tr>
<td>Estimated informal credit</td>
<td>-0.1029</td>
<td>0.0168***</td>
<td>2.10</td>
<td>-0.1358</td>
</tr>
<tr>
<td>Remittances</td>
<td>0.0045</td>
<td>0.0063</td>
<td>1.00</td>
<td>-0.0077</td>
</tr>
<tr>
<td>Dependency</td>
<td>-0.0158</td>
<td>0.0125</td>
<td>1.03</td>
<td>-0.0403</td>
</tr>
<tr>
<td>Farm income</td>
<td>-0.0272</td>
<td>0.0085***</td>
<td>1.01</td>
<td>-0.0439</td>
</tr>
<tr>
<td>Non-farm income</td>
<td>0.1387</td>
<td>0.0081***</td>
<td>1.09</td>
<td>0.1228</td>
</tr>
<tr>
<td>Market access</td>
<td>0.0289</td>
<td>0.0644</td>
<td>1.04</td>
<td>-0.0973</td>
</tr>
<tr>
<td>Constant</td>
<td>29.8979</td>
<td>0.1188***</td>
<td>-</td>
<td>29.6650</td>
</tr>
<tr>
<td>R-Squared</td>
<td>4330.49</td>
<td>Prob&gt;F</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>DWH F(1, 3591)</td>
<td>3446.00</td>
<td>Root MSE</td>
<td>1.84</td>
<td></td>
</tr>
</tbody>
</table>

*** = 1%; VIF stands for Variance Inflation Factor; and RSE is the Robust Standard Errors; Source: Author’s computations based on GLSS5 Data, 2013.

Conflict of Interests

The author(s) have not declared any conflict of interests.

REFERENCES


NBER Working pp. 1-29.


