Determinants of Agro-Dealers' Participation in the Loan Market in Nigeria

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Abstract

Agro-dealership financing deserves policy attention if agro-dealers are to contribute to the success of the ongoing agricultural transformation in Nigeria. Thus, this study seeks to (i) examine the issues influencing the decisions of agro-dealers to participate in the loan market, (ii) analyze the demand for business loan by the agro-dealers and (iii) articulate policy measures for sustainable financing of agro-input business enterprises in Nigeria. The study employed primary data collected through structured questionnaires from 300 agro-dealers and used a Tobit type-II model for the analysis. The results show that interest rate, debt, value of asset, membership of trading association and source of credit are major determinants of loan demand. Agro-dealers need to organize themselves into input trading associations to enhance their creditworthiness and unleash the inherent social capital and information advantages for improved agro-dealership financing. Moreover, diversification of product coverage by agro-dealers and a value-chain approach that links internal financing in the form of trade credit within the agro-input sector with external financing from the commercial banks are strongly recommended.

Keywords: agro-dealers, business loan, demand, policy, Nigeria

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Introduction

Despite the efforts of the Nigerian government to transform the agricultural sector, modern inputs (such as fertilizers, improved seeds and agro-chemicals) that are critical to the attainment of the desired productivity increases and output targets under the ongoing agricultural transformation agenda (ATA) are not available in the right quantity, quality and price. Although the agricultural sector has been recording positive growth rates in recent times, the input distribution system has been in a parlous state. The inputs at the disposal of an average farmer remain grossly inadequate and are anything but modern – being of low quality and sub-optimal productivity. The agricultural transformation agenda (ATA) introduced in 2011 seeks to tackle the inefficiencies in the distribution of key inputs making them more readily available and affordable. In this regard the private sector agro-input business enterprises (agro-dealers) are assigned a critical role especially in the implementation of the growth enhancement support (GES) scheme which took off in 2012. They are involved in the procurement, distribution and delivery of inputs (fertilizers, improved seeds and agro-chemicals) to small-scale farmers. Under the scheme farmers are to benefit directly from an innovative electronic system of delivering subsidized inputs in which the subsidy payments are delivered directly to the beneficiaries through mobile phones.

A major policy stance underpinning the implementation of the GES was the withdrawal of the Federal government from the procurement and distribution of fertilizers and improved seeds in 2011. This is in a bid to decontaminate the input distribution system and promote effective service delivery. The commercial banks, fertilizer importers and major distributors, seed companies and agro-dealers are the key private sector groups that are to be relied upon for the successful implementation of the GES. The banking sector was expected to finance the participation of the agro-dealers in the procurement and delivery of inputs to farmers under the GES. The commercial banks were however, not forthcoming with the supply of the required loans during the first year of GES implementation in 2012. Many of the agro-dealers who could not obtain credit from other sources and who could not self-finance their investments failed to deliver the required inputs and many farmers did not use the modern inputs during the 2012 production season as expected. This type of disappointment created by agro-dealers should provoke a research investigation into the nature of their participation in the loan market with a view to articulating a sustainable financing mechanism for their business. Over the years, there have been attempts to develop agro-dealership, however, the level of organization and investment attained is far from being adequate for agro-dealers to cope with the large market they need to serve as far as distribution of inputs is concerned (IFDC 2012). The weaknesses in their financial capacity came to the limelight when many of them could not ordinarily provide the financial backing for their role in the distribution of inputs under the GES scheme. They are not also adequately equipped, organized or buoyant to a level where they can access adequate loan facilities from the commercial banks.

The foregoing raises the question as to which aspects of agro-dealership financing need to be transformed for effective input distribution in the country. What are the main sources of finance for the operations of agro-dealers and how reliable are they? What variables influence their decisions to borrow? For those who borrow, what factors determine their demand for credit? What sort of financial mechanisms will enable them to discharge their responsibilities in a

sustainable fashion? Some of these questions appear to be quite simple. However, they have been unasked and unanswered in the annals of agro-input business operations in Nigeria. Yet they are to be resolved in order to engender a viable architecture of agro-dealership financing and agricultural transformation in the country. This is particularly important in view of the limited research attention often devoted to agribusiness financial needs not only in Nigeria but also in many African countries.

In Africa, the literature on loan demand and the constraints confronting entrepreneurs in accessing loans from the financial system often places emphasis on small and medium-scale enterprises (SMEs) that have nothing to do with agriculture (Marziku 2012; Okurut et al. 2005; Ahiawodzi and Sackey 2013). Besides, studies that are related to agriculture often focus directly on small-scale farmers (Absanto and Aikaruwa 2013). In Nigeria in particular, recent studies in this regard consider how small-scale farmers are credit rationed by formal and semi-formal lenders (Eneji et al. (2013) and the factors influencing their access to credit (Sanusi and Adedeji 2010). Employing a probit model, the latter found that the level of education, membership of cooperative, contact with extension agent and present of collateral security positively and significantly determine the likelihood of farmers access to formal credit, while farming experience negatively determine the probabilities of farmers having access to formal credit. By and large, the agro-input business enterprises that are in dire need of debt capital have received little research attention (if any) in terms of determining the factors influencing their demand for loan and the articulation of appropriate financing mechanisms to support their business operations. This is not totally surprising however, since their role in the input market has just become more pronounced following the disengagement of the government from the procurement and distribution of agri-inputs in 2012. There is therefore, a great lacuna to be filled by this study. Thus, objectives of this study are to (i) examine the issues influencing the decisions of agro-dealers to participate in the loan market, (ii) analyze the demand for business loan by the agro-dealers and (iii) articulate policy measures for sustainable financing of agro-input business enterprises in Nigeria.

Theoretical Framework

The financial system in Nigeria, has witnessed a lot of policy incentives to ensure that actors in the agricultural value chains have access to credit to finance their operations. In this regard, the commercial banks, microfinance banks and Bank of Agriculture are being encouraged to increase the supply of credit to the agricultural sector. The analysis of credit participation by agro-dealers is one way of assessing how demand-responsive the activities of the lenders have been. To begin with, there is need to distinguish between credit access and participation in view of the tendency for analysts to use the terms interchangeable. Conceptually, access to credit differs from credit participation. According to Doan et al. (2010), access to credit means given the availability of credit, households are both able to borrow and can satisfy lending criteria established by lenders; regardless of whether they borrow or not. On the other hand, credit participation means that households have chosen to borrow and have already borrowed. A household that has participated in borrowing activities has, of course, access to particular credit resources, whereas a household having access to credit may choose whether or not to participate in borrowing activities. Thus, the borrowing decision and the factors influencing the choice to borrow in particular cannot be ignored in understanding credit participation. Indeed, credit

participation is more related to potential borrowers' choice (demand for credit), whereas credit access is more from the supply-side and related to potential lenders' choice (Diagne 1999).

In ascertaining the determinants of agro-dealers' participation in the loan market we consider the factors influencing their decision to borrow as well as the factors influencing their demand for business loan. As an entrepreneur, the agro-dealer is taking a decision to borrow to finance working capital requirements of procuring agricultural inputs which will later be sold to generate earnings that will enable him repay the loan at the end of the input procurement season. The lending rates from the various types of banks will affect the demand for credit. In general, and depending on the scale of operation of the firm, financing of investment in agrodealership can come from both internal and external sources. It can be assumed that in making an investment decision the enterprise faces a financing constraint which can be specified as follows (a la Vera 2002).

(1) $I + \Delta B^* = CF + \Delta CR$

According to Vera (2002) firms are equating total uses of funds for investment with total sources of funds. Thus, they must decide on the magnitude of their investment outlays in real assets, *I*, and on the magnitude of their investment in external financial assets, ΔB^*. Firms finance these decisions from cash flow, *CF* and variations in bank loans, ΔCR. Behaviorally, there is a possibility that firms could finance investment with increases in credit demand. It is also possible to associate changes in the financing composition of the corporations, whereby an increase in the cash flow, *CF*, would be associated with a reduction of credit demand, ΔCR. To operationalize the financing constraint under these behavioral assumptions, Vera (2002) theorized that demand for external financial assets, ΔB^*, will depend on two elements: (a) the expected return on those assets, r^*, and (b) the financing gap of the firm, *I-CF*, which is the difference between the required resources for the investment, *I*, and the portion available from internal financing, *CF*.

(2) $\Delta B^* = \Delta B^*(r^*, I\text{-}CF)$

Where $\dfrac{\partial \Delta B*}{\partial r*} > 0$ and $\dfrac{\partial \Delta B*}{\partial (I-CF)} < 0$

On the one hand, equation (2) indicates that an improvement in the expected return on foreign financial assets lead firms to acquire financial claims against non-residents. On the other hand, to the extent that the investment/internal financing gap becomes wider, part of it could be financed by liquidating positions in foreign currency, which explains the inverse relation between ΔB^* and $(I - CF)$. Further assumptions made by the author leading to the credit demand function are indeed very relevant and will be adapted in this study. For example, the author assumes that real credit demand depends directly on three factors: (a) the cost of credit, r_L, (b) the financing gap, and (c) variations in the real position of external assets, ΔB^*. In other words,

(3) $\Delta CR = \Delta CR(r_L, I\text{-}CF, \Delta B^*)$

The real investment function is an endogenous variable in the model (which makes the financing gap likewise partially endogenous). Real investment is assumed as determined by: (a) the level

of output, Q; (b) the cost of capital (given by the interest rate, r_L); (c) the corporate cash flow, CF; (d) the risk status of the economy, σ, and (e) the return on competing assets, in this case the foreign financial assets, r^*.

(4) $I = I(Q, r_L, CF, \quad \Box, r^*)$

The model is closed by making explicit the determinants of the return on external financial assets, r^*. Indeed, r^* will be determined endogenously as the sum of the foreign currency return on external assets, i^*, and the expected exchange rate depreciation, $\hat{e}^e$. The resulting representations are:

(5) $r^* = i^* + \hat{e}^e$

(6) $\hat{e}^e = \varphi(\bar{q} - q)$

If the interest rate on external financial assets, i^* and the equilibrium real exchange rate are taken as given, then (5) and (6) imply that the return on external assets is a function of the behavior of the real exchange rate. A real exchange rate appreciation (relative to its long-term value), for instance, will generate expectations of depreciation of the nominal exchange rate and consequently, an increase in the return on the external financial assets will be expected as well.

Substituting (5) into (2) and (4), and then (2) and (4) into (3), will result in a reduced form credit demand function as follows:

(7) $\Delta CR = \Delta CR(r_L, Q, CF, q, \Box)$

In theory, equation (7) is a function of five exogenous variables: the interest rate on loans, the level of economic activity, the corporate cash flow, the real exchange rate, and the index of macroeconomic risk. The signs of the partial derivatives for the interest rate on loans, the macroeconomic risk and the level of activity are evident; not, however, when evaluating the impacts of the cash flow variable and of the real exchange rate. An increase in corporate cash flow reduces the financing gap and consequently credit demand. However, it may also increase investment and the financing gap (increasing credit demand). The sign then will depend much on how sensitive is the investment function to changes in *CF*.

In his theoretical formulation, Vera takes a macroeconomic perspective in which time series data were used from 1986 to 1990 in the case of credit demand in Venezuela. In the Nigerian credit market with a cross-section data reflecting the demand for credit by firms in a particular sub-sector, modifications are required in the characterization of their participation in the credit market. In the neoclassical world of perfect competition with perfect information and zero transactions costs, the borrower gets the amount of money he desires to finance his business operations. However, with the imperfections in the credit market some borrowers are liquidity constrained because they are unable to obtain the same amount of credit they could receive if information were perfect and markets complete. This occurs because of market failure brought about by asymmetric information. There are two aspects of information asymmetry – adverse

selection and moral hazards. Adverse selection is an ex ante concept which explains how a lender's information on borrowers concerning the viability of an enterprise will be incomplete. The borrower with better information on his business concerning its high risk nature is prepared to borrow money at higher interest rate compared with a borrower whose business is less risky but not prepared to borrow money at a high interest rates. The lending institution will select the riskier business and this will marginalize some businesses in the credit market and affect the credit institutions' capital base. Due to this, the level of investible funds will be reduced; this will affect the performance of the whole economy.

As regards moral hazards, there is the tendency for borrowers to hide their true motives for request for funds (Stiglitz and Weiss (1981). In an ex post sense, this implies that the loans can be misapplied. For instance the loans can be diverted to speculative or consumption activities. If the investment gains are positive, the borrowers will settle their indebtedness and this will reduce lenders' risk. On the contrary, if the above does not happen, the investor will bear the full cost of the risk. Due to this phenomenon, there is the tendency for lending institutions to reduce the amount of loanable funds and they may even raise the interest rates to make up for the losses. According to the authors higher interest rates induce firms to undertake projects with lower probability of success but higher payoffs when they succeed (leading to the problem of moral hazard). Since the bank is not able to control all actions of borrowers due to imperfect and costly information, it will formulate the terms of the loan contract to induce borrowers to take actions in the interest of the bank and to attract low risk borrowers. The result is an equilibrium rate of interests at which the demand for credit exceeds the supply. Theoretically, raising interest rates or collateral in the face of excess demand is not always profitable to lenders and banks will deny loans to certain borrowers; since at higher interest rates, the expected return from a loan would start decreasing after a point due to higher defaults (Kundid and Ercegovac 2011).

Another dimension of the market imperfections is the fact that as borrowers embark on high risky projects lenders are apt to incur higher assessment and monitoring costs which in turn can lead to higher interest rate and thus impose an unbearable repayment burden on borrowers (Williamson 1987). Thus, the bank assumes that increasing the interest rate it charges borrowers may adversely affect the riskiness of the borrowers' projects or that increasing the interest rate can erode the ability to repay debt (Wolfson 1996). Thus, in the presence of information asymmetries in the market for loans and costly monitoring, banks would not use interest rates alone to equate demand and supply, but would ration credit. In the light of the foregoing, the literature is replete with situations in which lenders utilize non-price mechanisms to ration loans based on the attribute of the entrepreneurs and the characteristics of enterprises (Beck 2006; Han 2008; Muravyev et al. 2009).

Hence, in determining the participation of agro-dealer enterprises in the credit market, it is important to consider the some supply factors which banks will assess in evaluating borrowers' credit worthiness. In addition to interest rate therefore, we include a number of variables in the credit demand function which reflects the attributes of the entrepreneurs and characteristics of the agro-dealer enterprises. It was hypothesized that factors such as age, geographical location, membership of trading associations, savings, customer outreach and level of indebtedness (representing borrowing experience or credit history) have significant effects on their borrowing decisions. With regard to loan demand the hypothesis was that interest rate, savings, value of

asset, region, membership of trading association and source of loan are significant determinants. The demand function can therefore, be specified implicitly as follows.

(8) CR = CR (IR, S, V, REGION, LSOURCE)

Where IR is the interest rate, S is savings, V is value of assets REGION is geographical location and LSOURCE is source of loan. We expect an inverse relationship between CR and S and a positive relationship between CR and V. REGION is a dummy variable with a value of unity for borrowers in the northern part of the country and zero for those in the south. LSOURCE is also a dummy variable with a value of unity if the formal lender is a bank and zero otherwise.

Data and Methodology

The study employed primary data collected between February and June, 2013 through well-structured questionnaires from a cross-section of agro-dealers in all the six geo-political zones of the country. The six states covered are Sokoto (North-West), Bauchi (North-East), Benue (North-Central), Ogun (South-West), Ebonyi (South-East) and Cross River (South-South). Lists of agro-dealers were obtained from the relevant agro-dealer registration units of the Ministry of Agriculture and Natural Resources and the Agricultural Development Project (ADP) in each of the states. A random sample of 50 agro-dealers was selected to give a total of 300 agro-dealers included in the study. The data were collected by trained enumerators. The questionnaire was designed to elicit information on key areas of agro-dealership such as business activities, operational costs and main constraints, sale of agro-inputs, sources of finance, demand for loan as well as the socio-economic characteristics of the agro-dealers. The selected agro-dealer enterprises were traced to a total of 100 towns across the states included in the study. The proportion of each state in the total population of the six states was used as weights in subsequent analysis to ensure representativeness of the sample. This procedure of determining the actual borrowing status of the respondents circumvents the bottleneck often faced by analysts using survey data and who are not able to obtain the actual amount of loan obtained by households due to the difficulties surrounding the release of such data by lenders. And this is the advantage of a rigorous data collection exercise of this nature in which the borrowers and lenders have to authenticate the loan data. The loan data in respect of the respondents are obtained from them and crosschecked against the figures obtained from the lenders during the survey.

Econometric Model

The analysis of demand for business loan encompasses the participation in the loan market and the factors that prompt agro-dealers to decide to borrow from the formal sources. Aside from the determinants of loan demand, such factors are crucial in understanding the functioning of the loan market and interpreting the prospects of relying on it by agro-dealers for business financing. This implies that in addition to estimating a loan demand model a choice model that describes whether or not an agro-dealer decides to borrow needs to be estimated since the decision to borrow will affect the outcome of participation (amount of loan obtained) in the loan market.

Let D^* be the loan demand of an agro-dealer based on his own valuation of his credit need and D be the market demand based on lenders' assessment of his creditworthiness. An agro-dealer

participates in the loan market if D > D* otherwise he is not considered a participant in the loan market. In the sample there is observation on D for those who participate in the market while there is no observation on D for the non-participants. For agro-dealers not in the loan market, all that is known is that D* ≥ D. In other words, the sample is incidentally censored and yet the need often arises to use the sample data to estimate the coefficients in a regression model explaining both D* and D. This challenge underscores the need to model the sample selection process explicitly. A Tobit type-II model is employed to address the inherent selectivity bias. It is associated with data whose values of the regress and are not available for some observations although values of regressors are available for all the observations (Gujarati 1995; Wiboonpongse et al. 2006). The dependent variable has zero values for a substantial part of the survey data but is positive for the rest of the data. The model can be specified as follows.

(1) Regression equation: $d_i^* = x_i\beta_i + \varepsilon_{1i}$

Where x_i *is* a vector of exogenous variables and d_i^* the value of loan obtained by the ith agro-dealer. To characterize the borrowing status of the agro-dealer in terms of whether the person borrows or not, a second equation which is a binary choice model is specified as follows.

(2) Selection model: $b_i^* = z_i\gamma_i + \varepsilon_{2i}$

(3) $d_i = d_i^*$, $b_i = 1$ if $b_i^* > 0$

(4) d_i not observed, $b_i = 0$ if $b_i^* \leq 0$

where b_i^* is a latent endogenous variable and z_i is a vector of exogenous variables determining whether an agro-dealer will borrow or not. If b_i^* is greater than a threshold value of zero, then b_i, the observed dummy variable = 1 and otherwise $b_i = 0$. The regression equation observes value d_i (value of loan) only for $b_i = 1$ (i.e for the borrowers). The distribution assumption for the unobserved errors ($\varepsilon_{1i}, \varepsilon_{2i}$) is a bivariate normal with expectation zero, variances σ_1^2 and σ_2^2 and covariance σ_{12}. The signs and magnitude of the estimated coefficients may differ across equations (1) and (2).

The model is estimated in accordance with the Heckman (1979) two-step procedure. The estimation is based on the following regression.

(5) $d_i = x_i\beta_i + \sigma_{12}\lambda_i(z_i\hat{\gamma}_i) + \nu_i$

where $\lambda_i = \frac{\phi(z_i\gamma_i)}{\Phi(z_i\gamma_i)}$ is the Heckman's lambda otherwise known as the inverse Mills' ratio,
$\phi(.)$ is the standard normal density function while $\Phi(.)$ is the standard cumulative distribution function. The estimation task is to use the observed variables (d, **x**, b, **z**) to estimate the regression coefficients **β** that are applicable to the sample of agro-dealers whose values of d equal both 1 and 0. The contents of the λ_i term are estimated by a first-step maximum likelihood probit model regression of b_i on z_i. The second step is to estimate the regression model using ordinary least squares with the estimated bias term (inverse Mills' ratio) as an explanatory variable. A positive coefficient on the inverse Mill's ratio suggests that unobservables in the

probit equation that increase the probability of participating in the loan market also increase the amount of loan obtained (Heckman 1979; Halkos 2007; Pastrapa 2009).

The predictors included in the probit model are indicated as follows.

$$b_i = \gamma_o + \gamma_1 AGE + \gamma_2 DEBT + \gamma_3 SAVINGS + \gamma_4 CUSTOMER + \gamma_5 REGION + \gamma_6 ASSOC + \varepsilon_{1i}$$

The estimating equation for loan demand has the following variables.

$$d_i = \beta_o + \beta_1 IR + \beta_2 SAVINGS + \beta_3 ASSET + \beta_4 REGION + \beta_5 LSOURCE + \varepsilon_{2i}$$

Where d_i is value of loan and b_i is a dummy variable with a value of unity if agro-dealer is a borrower and zero otherwise. AGE is the age of the agro-dealer in years, DEBT is the amount owed and SAVINGS amount saved before loan application, CUSTOMER refers to the number of farmers patronizing the agro-dealer while REGION is a dummy variable for geographical location with a value of unity if agro-dealer operates in the northern part of the country and zero otherwise. The variable ASSOC is also a dummy with a value of unity if agro-dealer belongs to at least one agro-dealer association and zero otherwise while LSOURCE refers to source of formal loan with a value of unity if source is a bank and zero otherwise. The variable IR refers to interest rate while ASSET is the value of key physical assets owned by the agro-dealer.

Empirical Results

Opportunities and Constraints on Agro-dealership

The economic liberalization policies of government over the last one decade have created some opportunities within the private sector to permit entrepreneurs play an active role in the agricultural input distribution system. These opportunities should be recognized even in the presence of legendary constraints that seem to have stymied rapid development in the system. The identified opportunities include (i) availability of private sector companies with experience in importation and marketing of agricultural inputs, (ii) growing private sector capacity for imports and marketing of agricultural inputs, (iii) rapidly developing retail outlets for agro-inputs, (iv) policy emphasis on agro-dealers' services under the on-going agricultural transformation agenda (ATA). These opportunities need to be reinforced and at the same time the overwhelming constraints militating against the development of the agro-dealer sector need to be diagnosed and tackled.

Specifically, the financial constraints facing agro-dealers will have to be addressed to enable them participate effectively in the input market in accordance with the targets set for the ATA. To enhance their overall performance in carrying out their operations, it will also be necessary to relax the operational, logistic and marketing constraints. We found that the problem of inadequate skills needed for financial management, business planning, marketing, and forecasting of demand and supply is more severe in the north than south and among the female agro-dealers than their male counterparts implying that varying intensity of remedial measures will apply in different geographical domains taking due cognizance of gender disparities in skill

gaps. With regard to input marketing, the main marketing problems are inadequate number of input suppliers, irregular input supply, poor quality of inputs supplied, high prices charged by input suppliers and low customer demand for some inputs. Moreover, there are policy-related hurdles to be surmounted in ensuring effective agro-dealership. These include the weak regulatory framework for the control of product quality and for preventing anti-competitive behavior of importers and major distributors. The availability of adulterated products in the market frustrates the business of genuine dealers in view of the tendency to lose customers and face reduction in turnover. Similar effects have also been experienced on account of the inability of government to effectively monitor and enforce existing regulations thereby resulting in the sale of expired chemicals by some unscrupulous agro-dealers.

Some Features of Agro-dealers' Business Operations

The agro-dealer sector in Nigeria remains largely informal as evidenced by the fact that only about 38 percent of the agro-dealers' businesses are officially registered as business enterprises. This characteristic of the agro-dealer sector shows that it is still largely underdeveloped. The sector will require substantial upgrading if it is to be in a position to effectively perform the role assigned to it under the current agricultural transformation agenda.

Gender and regional differentiations are clearly reflected in the pattern of agro-dealership in Nigeria. We found that the proportion of agro-dealers selling all the three inputs is far higher in the south than north just as it is much higher among women than men. Areas and dealers with such diversity of business operation are likely to better address cash-flow problems and expand market share than situations where the focus is only on one product. The dominance of women in various combinations of agro-dealership is remarkable. There are regional and inter-regional gaps to be filled as well as gender and trans-gender gaps to be addressed to ensure that an increasingly higher number of agro-dealers are empowered to attain a viable business registration status in no distant future. This finding makes it imperative for policy makers to ensure that any policy incentive for the development of agro-dealership in the country gives due recognition to the participation of women irrespective of their scale of operation. Moreover, the proportion of agro-dealers that do not belong to any association is lower in the north than south whereas the proportion that belongs to more than two associations is higher in the south than north. In general therefore, membership of agro-dealer associations is relatively higher in the north than south whereas the diversity of membership is more prevalent in the south than north indicating the tendency of southern agro-dealers to have greater combination of inputs which they sell to farmers than it is the case in the north. This finding is of significant policy relevance as it points to the need to nuance the design of training programmes for agro-dealers across the regions and to redefine the curriculum to address the inherent product diversity among them.

Besides, the results show that the diversity of coverage of input to be sold to farmers diminishes with increases in the scale of operation. In the case of fertilizer, specialization increases with scale of operation (Figure 1). The proportion of agro-dealers at the micro-scale level selling only fertilizers is about 35 percent; it increases to 50 percent at the small-scale level, 62 percent at the medium-scale level and 80 percent at the large-scale level; implying that the large-scale operators are far more interested in selling fertilizers than other inputs.
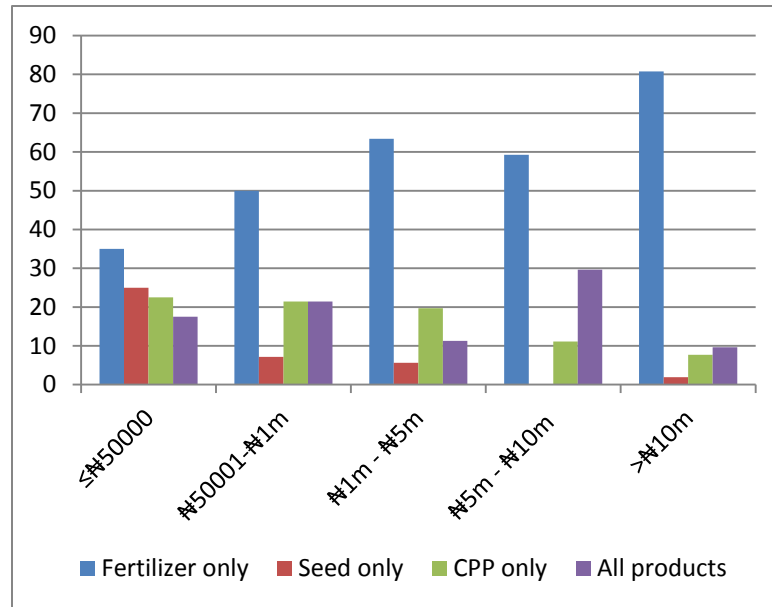
Figure 1. Dealership Status and Turnover of Agro-dealers

Factors Influencing Agro-dealers Borrowing Decision

The level of participation of agro-dealers in the formal loan market is still below expectation. Out of the sample of agro-dealers included in this study only 30 percent are borrowers; the remaining 70 percent are non-borrowers. As shown in Figure 2, there seems to be no perceptible difference between the level of participation of male and female agro-dealers. Even on regional basis, we found only a slight increase in the proportion of borrowers in the north compared to their counterparts in the south.
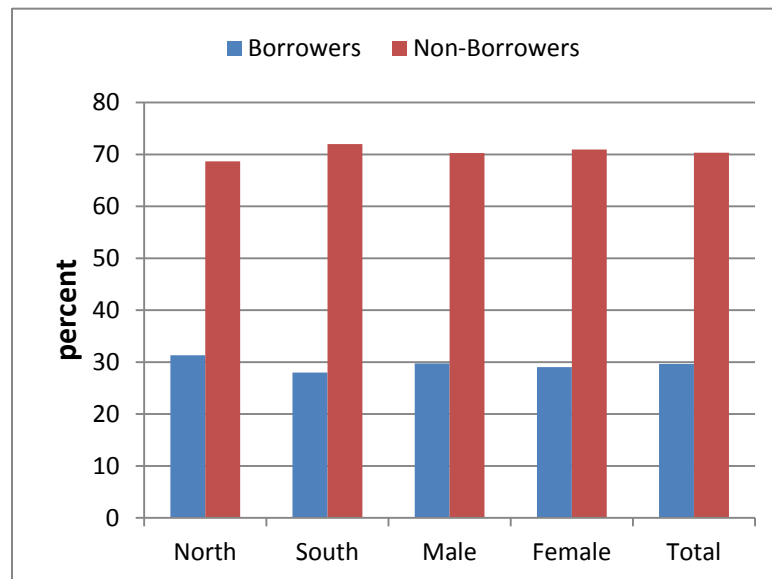
Figure 2. Borrowing Status of Agro-dealers by Region and Gender

The reasons for limited flow of external funds into the agricultural input supply chain are not far-fetched. More often than not, the banks have always been at the receiving end of the blames. On the demand side, there is need to examine the decisions of the agro-dealers and ascertain the factors that influence their decisions and whether some elements of these factors also determine their demand for loans. An in-depth analysis of these issues prompted the estimation of the probit model. The results are presented and discussed in this section.

As shown in Table 1 the significant predictors of participation in the loan market are age, debt, customer outreach, membership of associations and asset value. The marginal effects of these variables are shown in Table 2. The variables seem to have no significant effects are agro-dealers' business experience, educational attainment and location (region). The results show that the probability to participate in the loan market is higher among agro-dealers that belong to trading associations than their counterparts who are not affiliated to any of such associations. There is also a higher probability among the older agro-dealers to decide to borrow compared to the younger ones. On the one hand, agro-dealers with higher asset value and larger customer outreach may decide not to borrow while on the other hand, those whose level of indebtedness is higher (that is, borrowers with better borrowing experience) are likely to decide to participate in the loan market. The change in probability of participation is indeed extremely slim with regard to debt and asset value compared to the observed changes in the case of age, membership of association and customer outreach. This is evident in the marginal effects which are far more perceptible in the case of the three latter set of variables than the former set. For instance, an additional year of age is apt to raise the probability of being in the loan market by 5.3 percentage points. Also, if an agro-dealer belongs to a trading association, the probability of participating in the loan market is apt to increase by about 21.9 percentage points. Moreover, a marginal increase in customer outreach may reduce the borrowing probability by 0.04 percentage points.

Table 1. Probit Model of Agro-dealers' Borrowing Decision
Dependent Variable: Agro-dealers' Borrowing Status (Dummy)

Variable	Coefficient	S.E.	P[|Z|>z]
Age (years)	0.161***	0.046	0.000
Value of assets (₦)	-8.72e-07**	4.07e-07	0.032
Agro-dealership experience (years)	-0.035	0.064	0.579
Educational attainment (years)	0.064	0.059	0.288
Debt (₦)	1.20e-05***	2.62e-06	0.000
Membership of association	0.940**	0.500	0.060
Region (North/South)	-0.051	0.217	0.815
Customer outreach (no.)	- 0.0011**	0.0005	0.041
Constant	-2.736***	0.598	0.000

Log likelihood = -150.11
LR chi2(8) = 64.60
Prob > chi2 = 0.000
Pseudo R2 = 0.18
Number of obs = 300

Table 2. Marginal Effects of the Variables in the Probit Model

Variable	Coefficient	S.E.	P[|Z|>z]
Age (years)	0.053***	0.015	0.000
Value of assets (₦)	-2.88e-07**	0.000	0.033
Agro-dealership experience (years)	-0.011	0.021	0.580
Educational attainment (years)	0.021	0.019	0.288
Debt (₦)	3.97e-06***	0.000	0.000
Membership of association	0.219***	0.069	0.002
Region (North/South)	-0.017	0.071	0.815
Customer outreach (no.)	-0.0004**	0.0002	0.040

Source. Author's computation
Note. ***significant at one percent level
**significant at five percent level
*significant at ten percent level

Determinants of Demand for Business Loan by Agro-dealers

The agro-dealers obtained loans from banks and non-bank sources in 2012 from three types of banks. They are commercial banks, microfinance banks and Bank of Agriculture. As mentioned earlier, the non-banks refer to the on-lending schemes of various state governments. About 84 percent of the agro-dealers obtained loans from banks while 16 percent obtained loans from the non-bank sources. Female agro-dealers rely solely on banks unlike their male counterparts that have access to both sources. The fact that females are not observed to have access to non-bank sources stems from the limited number of female agro-dealers that are participating in the loan market. Out of the borrowers in the sample, only 10 percent are females. The problem seems more of a general lack of access rather than deliberate exclusion from the on-lending schemes. Moreover, demand for loan from non-bank sources in the south is below national average compared to the situation in the north. This finding could be due to the variation of the implementation mechanisms of the on-lending schemes and more importantly to the fact that some states in the south did not even bother to seize the opportunity offered by the terms of the CACS and simply prefer not to borrow the amount (up to ₦1.0 billion) meant for on-lending.

The determinants of demand for loan are examined on the basis of the Tobit type-II model earlier specified. The results of the two-step Heckman sample selection correction analytical procedure are presented in Table 3. The adjusted standard error for the demand equation regression is given by *sigma* ($\hat{\sigma}$ = 1.0703) and the correlation coefficient between the (unobserved) factors that determine selection into the loan market and the (unobserved) factors that determine demand for loan is given by *rho* ($\hat{\rho}$ = 0.7970). The statistic labeled '*lambda*' which is the estimated non-selection hazard or inverse Mills' ratio (lambda=sigma *x* rho) is positive and statistically significant. This suggests that the error terms in the selection (probit) and demand (regression) equations are positively correlated as expected (the real basis for the selection bias). Evidently the (unobserved) factors that make participation in the loan market more likely, have a tendency to be strongly associated with higher loan demand. Fitting the loan demand model through a direct application of OLS to the sample would mean that the selectivity bias is ignored and would have resulted in biased and inconsistent estimates. It is not in all cases that an empirical

analysis of this nature will justify the application of type-II Tobit model; much depends on the nature of the data and the relevance of the predictors. In a similar analysis (Wiboonpongse et al. 2006), the coefficient of the lambda statistic was not found to be significant and the null hypothesis that there is no correlation between the error terms in the selection probit and demand equations could not be rejected. The significance of *lambda* and other test statistics as well as the estimated coefficients as shown in Table 3, is an indication that the estimation of a Heckman selection model in this study is justified.

Table 3. Results of Heckman Selection Correction Model of Loan Demand by Agro-dealers in Nigeria
Dependent Variable: Amount of Formal Loan Obtained(Semi-log specification)

Estimated Demand Model	**Coefficient**	**S.E.**	**P>|t|**
Interest rate (%)	-0.148**	0.073	0.042
Age (years)	0.118	0.077	0.125
Value of assets (₦)	1.89e-06**	1.14e-06	0.098
Agro-dealership experience (years)	-0.030	0.083	0.716
Debt (₦)	6.95e-06***	3.08e-06	0.024
Membership of association	1.004	0.928	0.279
Credit source	1.386***	0.250	0.000
Constant	7.448***	1.668	0.000
Estimated Selection Model			
Age (years)	0.157***	0.046	0.001
Value of assets (₦)	-9.02e-07**	4.13e-07	0.029
Agro-dealership experience (years)	-0.058	0.066	0.381
Educational attainment (years)	0.052	0.059	0.372
Debt (₦)	1.23e-05***	2.66e-06	0.000
Membership of association	0.945**	0.508	0.059
Region (North/South)	-0.022	0.217	0.917
Customer outreach (no.)	-0.0012**	0.0005	0.030
Constant	-2.657***	0.599	0.000
Mills			
Lambda	0.853*	0.508	0.094
Rho	0.7970		
Sigma	1.0703		
Wald chi2(7) = 46.65	Prob > chi2 = 0.0000		

Source. Author's computation
Note. ***significant at one percent level
**significant at five percent level
*significant at ten percent level

The results show that four out of the seven variables included in the regression equation are significant determinants of demand for loan. The variables are interest rate, debt, value of asset, and source of credit. The coefficients of age, business experience and membership of association are not statistically significant even though age and membership of association have significant influence on the decision to participate in the loan market. The coefficients of elasticity of the

variables in the demand model are presented in Table 4. As expected the coefficient of interest rate is negative and statistically significant. The results show that an increase in the rate of interest by one percent is associated with a reduction of 0.05 percent in the value of loan. A change from non-bank to commercial bank sources is associated with an increase of 0.11percent in the value of loan. Also, if the amount of debt increases by one percent it is likely to be associated with 0.01percent increase in the demand for loan. The implications of these findings for improved financing of agro-dealership are quite succinct. The financing from commercial bank sources should be strengthened since it is apt to provide better access to a higher value of loan than non-bank sources. Moreover, the role of membership of input trading association in enhancing the creditworthiness of agro-dealers is very crucial. This should be vigorously promoted in the country to unleash the inherent social capital and information advantages for improved agro-dealership financing.

Table 4. Elasticity Coefficients of the Variables in the Heckman Selection Correction Model

Variable	Coefficient	S.E.	P[|Z|>z]
Interest rate (%)	-0.052**	0.025	0.043
Age (years)	0.089	0.062	0.151
Value of assets (₦)	0.021*	0.012	0.085
Agro-dealership experience (years)	-0.006	0.016	0.718
Debt (₦)	0.012**	0.005	0.043
Membership of association	0.093	0.089	0.295
Credit source	0.114***	0.023	0.000

Source. Author's computation
Note. ***significant at one percent level
**significant at five percent level
*significant at ten percent level

Policy Recommendations and Conclusions

This study sought to examine the constraints and opportunities for agro-dealership financing in Nigeria, analyze the business operations of agro-dealers and ascertain the factors influencing their participation in the loan market especially their borrowing decisions and determinants of loan demand. This is with a view to proffering policy measures for improved agro-dealership financing for effective input distribution under the agricultural transformation agenda in the country. In this regard this section presents the policy recommendations and round off with some concluding remarks.

Policy Recommendations

It is important to stress that the essence of a review of the role of agro-dealers in the implementation of GES scheme is to provide evidence-based information for policy decision making with regard to agro-dealership financing in the overall interest of the stakeholders in the agricultural sector. To my mind, an overhauling of agro-dealership financing is warranted on the strength of the findings of this study. The strategy of moral suasion adopted by the Federal Government to convince the banking sector about the need for improved financing of agro-dealership is desirable and should continue unabated. Financing from commercial bank sources should be strengthened since it is apt to provide the agro-dealers better access to a higher value

of loan than non-bank sources. The following financing mechanisms and complementary measures are recommended for sustainable agro-dealership financing in the country.

Value Chain Financing

Agro-dealers procure inputs from three main sources namely; importers, input distributors and retail market. Majority of the agro-dealers (68 percent) purchase their inputs from distributors, 22 percent purchase from importers while only 12 percent purchase from the retail market. To augment the financing from the banking sector, key participants in the agro-input supply chain

Can provide some form of financing. The approach being suggested here will involve the participation of commercial banks, importers, major input distributors, large-scale agro-dealers, microfinance banks, bank of agriculture as well as small and medium-scale agro-dealers. The federal government is expected to play a facilitating role by providing incentives in the form of loan guarantees to reduce the risk associated with lending by commercial banks. This can be achieved through the instrumentality of NIRSAL – the Nigerian incentive-based risk sharing system for agricultural lending currently being implemented in the country. In this value chain financing approach not all the players in the input distribution network will have to approach banks for loans. The commercial banks will lend directly to importers and major distributors who are expected to provide financial support to large-scale agro-dealers in the form of trade credit. The large-scale agro-dealers in turn will provide trade credit to agro-dealers (SMEs) who are in need of financial support. The latter can also obtain loan directly from microfinance banks and the bank of agriculture. To strengthen effective demand from farmers and to expand agro-dealers turnover, financial support can also be extended from the large-scale agro-dealers to the farmers. The farmers can also benefit directly from loans specially packaged by bank of agriculture (BOA) to finance the purchase of modern inputs by farmers and thus complete the cycle of financial support key actors in this value chain financing approach (Figure 5).
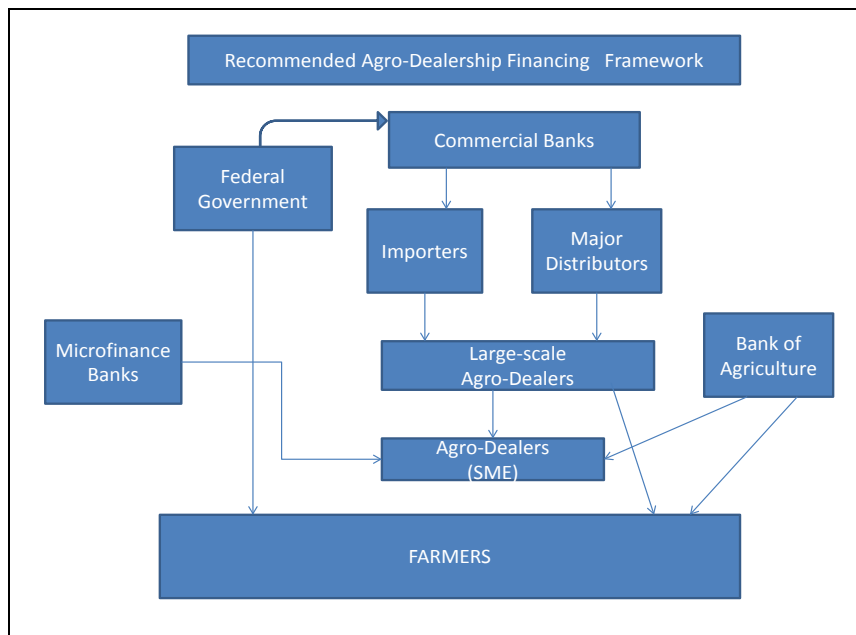
Figure 5. Recommended Agro Dealership Financing Framework

Build Human Capital for Improved Agro-dealership

As attempts are being made to modernize the distribution of agricultural inputs there is need to develop the variety of skills required for effective performance of the distribution system. Business, financial management and technical skills of key players such as importers, wholesalers and retailers have to be developed by implementing training programs in different parts of the country. Such programs can be financed through public-private-partnership (PPP) arrangements involving the FMARD, commercial banks, development partners and specialized NGOs. The technical training should cover all inputs rather than focusing only on fertilizer. There is need also to build human capital in the public sector to provide the regulatory framework and strengthen the enforcement of extant rules regarding standard and quality control.

Support the Development of Agro-input Trading Associations

The role of membership of input trading association in enhancing the creditworthiness of agro-dealers is very crucial. This should be vigorously promoted in the country to unleash the inherent social capital and information advantages for improved agro-dealership financing.

Curbing Agro-dealers' Black Market

Effective monitoring of business operations of agro-dealers involved in the GES scheme is crucial to prevent undue segmentation of the input market to the disadvantage of small-scale farmers. Essentially, there is need to ensure that the inputs are redeemed in the true sense of it rather than being allowed to be re-allocated, repurchased or repossessed in any way by any agent in the process of delivery to farmers. One way of sanitizing the market is to ensure that the farmers registered are genuine farmers. Second is to ensure that GESS participating farmers are not only eligible but also have effective demand for the inputs.

Sustainability of Government Support for Input Market Transformation

Three policy actions are required to address the issue of sustainability of current reforms involving agro-dealers and the general private-sector orientation of input procurement and distribution. Currently the GES is an incentive not only to the farmers but also to the importers, distributors and suppliers.

First, is a legislation to uphold recent reforms in the input sector in general and fertilizer, in particular. In this regard actions have reached an advanced stage to prepare a new fertilizer law that will effectively liberalize the fertilizer sector, facilitating private sector involvement and investment, and providing for regulatory oversight. When passed into law, the new bill being crafted (the Fertilizer Quality Control Bill) will repeal the National Fertilizer Board Act and the Fertilizer (Control) Act and will provide for a capacity to monitor the importation, manufacture and distribution of fertilizer and related products and quality control and assurance for fertilizer products. The existing Federal Department of Fertilizer (under FMARD) is expected to be the implementing agency. It is expected that the National Assembly will expedite action to pass the bill before the end of 2013 so that the implementation of the various provisions can start in earnest.

Second, is the need to put in place an exit strategy for the financial support before it spawns an unbearable fiscal impact. In this connection, FMARD needs to intensify efforts to expand the network of agro-dealers. If the participation of private entrepreneurs is increased then the input distribution market is apt to be far more competitive than it is currently the case and thus curb undue escalation of prices. This is important because there are farmers whose need for inputs will be far higher than the quantity covered by the GES scheme. Hence, creating healthy competition in the input market through substantial increase in the number of dealers and suppliers will prevail on agro-dealers to keep input prices at competitive levels so as not to adversely affect the demand by small-scale farmers.

Third, is for the Federal and state governments to create incentives for increased domestic production of fertilizers and crop protection chemicals and facilitate private sector involvement in the production of certified seeds. For instance, the Federal Government through the Nigeria chapter of the West Africa Agricultural Productivity Programme (WAAPP) has designed strategies to support the upstream segment of the input supply chain of prioritized crops under the ATA. Under the program, public agencies (including universities and research institutes) and commercial firms are being mobilized and funded to increase the production of breeder and foundation seeds.

Conclusions

The ongoing agricultural transformation agenda in the country has huge potential to create a considerable expansion in the quantity of modern inputs required by farmers and thus opening up a large window of demand for loan to finance the necessary transactions. The equity capital of agro-dealers and finance from informal sources are grossly inadequate to bridge the financing gaps that have emerged since the total liberalization of the input market in 2011. In the light of the foregoing, it is important to stress that the liberalization of the input procurement and distribution market and assignment of a crucial role to agro-dealers in the input supply chain, require the assurance of external flow of funds for proper functioning of the supply chain. Finance must flow from the banking sector which is expected to be catalyzed through the instrumentality of the Nigerian Incentive-based Risk Sharing for Agricultural Lending (NIRSAL) and from the importers, distributors and suppliers of inputs in the form of value chain financing. However, to have a better functioning of the input market and improved service delivery by agro-dealers, finance-related policies will not suffice. Finance will not be a substitute for missing input markets nor will it be the panacea for the critical infrastructural deficits, social insecurity and low effective demand by agro-dealers' customers which may on the long run have adverse effect on profitability. Thus, skill gaps in financial management, business planning and inventory management need to be bridged.

Furthermore, diversification of product coverage by agro-dealers is likely to enhance their credit rating. However, it is important to stress that efforts to ensure greater diversification of product coverage will need to be cognizant of the regional and gender variations in the existing pattern of agro-dealership as revealed by this study. In the same vein efforts aimed at expanding the scale of operation of agro-dealers in terms of financial incentives and skill development will need to be far more inclusive than hitherto has been the case especially to level the playing field for female agro-dealers. Finally, the low effective demand is symptomatic of a sector-related

conundrum in terms of the possibility of the agro-dealers turnover being adversely affected by limited purchasing power of farmers. This implies that efforts aimed at improving the input distribution system may not yield the desired outcome unless there is a simultaneous transformation of the output marketing system to enhance farmers' access to remunerative output markets and to stabilize their income. Policy actions in these areas should therefore, be expedited and evidence-based support to nurture the process is a strongly recommended area of further research.

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