Diversity among rural micro-enterprises and the causality of their disposition towards agro-dealership in developing countries

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Abstract

Rural micro-enterprises play a pivotal role in developing country agriculture as the major sources of inputs and ready markets for agricultural produce. This makes an understanding of their diversity and dynamism vital to issues of sustainable food security and poverty alleviation. This paper uses cluster analysis and a logit regression model to establish the factors underlying the heterogeneity of micro-enterprise firms with a view to unearth the reasons behind their inclination towards agro-dealership. Rural micro-enterprises were found to vary greatly due to size, firm life, capital intensity and their motives for entry into business. Capital intensity in tern determines firm size, willingness to expand and the firm's likelihood to stay in business. Larger firms with a long firm life and a high capital base were found to have a greater tendency to deal in agribusiness commodities as opposed to small firms with lower capital intensity and a short firm life. It was concluded that firm proclivity to agro dealership could be increased through increasing capital base and provision of incentives for voluntary entry into business.

Keywords: micro-enterprises; cluster analysis; agro dealership; logit model; capital intensity.

INTRODUCTION

The importance of micro-enterprises as sources of employment in rural areas, their convenient location for rural and farming communities and the tendency of the owners and employees of these firms to be situated at the lower end of the income spectrum make an understanding of the dynamics and existence of these firms essential to issues of labour market efficiency as well as of poverty reduction. According to the US government, "a micro enterprise" is a firm of 10 employees or less (including unpaid family workers) that is owned by a person with a low level of assets (USAID, 2004). In Zimbabwe, the interest in the operation of rural micro-enterprises is further spurred by their role as the main suppliers of agricultural inputs and as ready markets for agricultural produce (IFAD, 2002).

It is however intriguing that despite the central role played by micro enterprises in Zimbabwe's rural agribusiness markets, little has been done in an effort to understand the nature of existence of these firms and to find out the factors influencing decision making by micro entrepreneurs. As a result, data on Zimbabwe's rural micro-enterprise sector to date have largely been anecdotal and offer little information to explain micro-enterprise dynamism and their inclination to stock agribusiness commodities. This implies that it is difficult to understand the way the sector operates and hence to promote or regulate its activities.

In this paper, the following questions about Zimbabwe's rural micro-enterprises and their "reasons for being" are placed at the centre stage: Why are some micro- enter -prises smaller and opt to remain small even in the long run? Why do some people choose to leave salaried employment to start up new micro-enterprises? How do these micro enterprises manage to coexist with large and more established firms? And why do some micro enterprises deal in agricultural inputs and outputs while others do not?

This paper uses two econometric techniques: cluster analysis and logistic regression analysis, to permit the

segmentation of Zimbabwe's rural micro-enterprise sector to find out the main factors that lead to their heterogeneity and their proclivity to deal in agribusiness commodities (agricultural inputs and outputs). The main objective of this paper is to characterize Zimbabwe's rural micro-enterprises with a view to:
Determine the major factors contributing to their heterogeneity.
Determine the major driving forces to their establishment.
Unearth the determinants to their inclination to agro-dealership.

Literature Review

Efforts to increase the productivity of small firms in the economy are essential to achieving broad-based economic growth. In some countries, studies have shown that micro enterprises constitute the majority of businesses and account for a large share of total employment and gross domestic product. For Example, forms with less than five employees account for half of the non-farm workforce in Latin America and two-thirds of the non-farm workforce in Africa. Micro scale and small firms contribute an estimated 40% gross domestic product in Mexico and Brazil and around 70% in some African countries such as Nigeria, Egypt, Tanzania and Zambia (USAID, 2004).

The long-standing tradition however, has been to view the micro-enterprise sector as a subsistence holding for workers who are waiting to be employed in the formal labour market (Harris and Todaro, 1970). This view however, does not explain the heterogeneity and dynamism in size, ownership of rural micro-enterprises and the reasons why some people leave salaried employment to start up rural micro-enterprises. Keith and Hart, (2000) gave an important view on the dynamism and 'reasons for being' of Kenya's micro enterprises. The view emphasizes that workers prefer self- employment to salaried jobs. However, within this firm centred view coexist further contradictory hypothesis on the firm dynamics of rural micro enterprises and reasons why small firms are small. These include among others, satisfying behaviour versus structural constraints to growth or a desire to evade formal institutions versus lack of access to them (Marcouiller et al., 1997).

The other view as put forward by Jovanovich (1992) for the vast size diversity among rural micro enterprises is derived from a model where firms have differing cost structures. They offer a model where entrepreneurs have only a vague idea of what their true cost structures will be at the time of start- up; how good they are as managers and how good their location is. These entrepreneurs can only get a precise estimate with experience and if they find themselves with profits above expectation, they will lower their estimates of themselves far less profitable than expected will get out of business.

The prevalence of non-optimising, satisfying modes of production can be justified if we assume that firms aim to maximise their utility and not necessarily their profits. The life cycle hypothesis whereby workers enter salaried work; accumulate knowledge, capital and contacts; and then quit to open their own businesses can be another explanation to the existence of micro firms (Levenson and Maloney, 1998).

Methodology

Data collection

The data used in this study are from the 2003/2004 micro-enterprise survey that was carried out by CARE International in collaboration with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in the Midlands and Masvingo provinces of Zimbabwe. The survey was conducted by randomly selecting 450 rural micro enterprises from the two provinces (200 from Masvingo province and 250 from the Midlands province). However 440 of these were successfully interviewed.
A questionnaire was drafted and administered to collect information about the following three groups of variables:

A) Characteristics of the entrepreneur, including: years of education of the entrepreneur (Education); years of work experience of the entrepreneur (Experience); motive for initiating enterprise; age, sex, marital status and religion of household head; is owner formally employed elsewhere.

B) Characteristics of the firm: location of the firm (growth point, distance from nearest town, type of surrounding communities etc); size of firm; legal status of the firm (how is it registered); firm life in years; capital-labour ratio (K-L): reported total capital stock of the firm divided by the total number of workers in the firm; Earnings: total monthly revenue of the firm less expenses; availability of credit for the firm including the leverage ratio; permanence of work site: whether the shop location is perm-anent or temporary; average hours worked in shop by the entrepreneur; total number of workers in the firm.

C) Entrepreneurial Dynamics: permanence in the sector: whether entrepreneur plans to stay forever in the micro enterprise sector or plans to move to other sectors of the economy; plans to expand: whether firm plans to expand or not; clients: the nature of clientele for the firm (their major characteristics) – whether local or not, income group, major occupation of clients and size; initial financing of the business: source(s) of starting capital – ranges from personal savings, borrowing from either formal or informal credit markets; financing problems: whether owner sites credit availability as a business problem or not; business problems in its current state: the kinds of business problems the firm is currently facing.

Data analysis

Analytical tools

The basic analytical tool that was used in this study is cluster analysis. This was then followed by a logit regression model. Cluster analysis was used for data reduction to group firms with similar characteristics together by minimizing the variability within each group and maximizing variability across groups. This was then used to determine the main factors underlying the heterogeneity of micro-enterprises by looking at the factors that vary a lot

Table 1. Cluster centres: All variables.

Variable	Cluster				
	1	2	3	4	5
Education	.64 (7.70)	.67 (8.02)	.66 (7.89)	.52 (6.42)	.36 (2.94)
Experience	.41 (25.07)	.37 (22.03)	.29 (17.54)	.62 (37.16)	.66 (39.32)
Firm life	.22 (7.12)	.12 (4.38)	.10 (3.75)	.66 (7.77)	.45 (22.86)
Voluntary entry	.64	.87	.98	.89	.18
Agribusiness commodities	.21	.26	.78	.88	.67
Capital-Labour ratio (Million dollars)	.11 (2.36)	.61 (12.51)	.06 (0.11)	.56 (11.44)	.06 (2.96)
Earnings (Million Dollars)	.59 (1.77)	.42 (1.26)	.24 (0.72)	.41 (1.25)	.29 (0.87)
Exit or stay in business	.00	.95	.99	.98	.99
Expand business	.00	.68	.58	.64	.56
No problems	.11	.09	.20	.19	.18
Credit problems	.94	.81	.96	.92	.96
Financing initial	.08	.24	.05	.11	.07
Financing new	.06	.99	.01	.00	.06
Workers	.10	.37	.09	.26	.07
Site	.25	.68	.10	.85	.16
N	64	30	140	97	109
Percent	14.55	6.82	31.82	22.05	24.77

Note: Mean values when centres are converted back to their original means are in parentheses.

between clusters (groups). Regression analysis was then used to ascertain the variables that determine the inclination to deal in agribusiness commodities by these firms.

Cluster analysis

The Wald clustering method assigns observations with similar entrepreneurial and firm characteristics into progressively larger endogenously determined clusters by minimizing the sum of the within-group variance of all clusters (Anderberg, 1980). Assuming that there are i = 1, n observations with j = 1, …, k variables for each i, and that the number of clusters ranges from 1 (where all i are assigned to the same cluster) to n (where each i has its own cluster), we minimize the error sum of squares, thus:

$$W = (x_{ijm} - \mu_{jm})^2$$

Where:
x_{ijm} = the sum of the jth variable for the ith of n_m observations in the mth cluster

μ_{jm} = the mean value of variable j in the mth cluster.

The iterative process begins with g = n clusters that each consist of a single observation (n_m = 1) and calculates that the distance of the n observations from the n cluster centres is zero. In the next step, two clusters are combined such that the error sum of squares is minimized and there are m = n – 1 clusters, where n – 2 clusters have a single observation and one cluster has two observations. The process continues as more distant points are forced to share a common centre until n_m = n and m = 1. The optimal number of clusters is selected from the n Ward values (W) that were generated in the process, and each observation is assigned to the nearest centroid (Kim and Mueller, 1998).

The logit model

After cluster analysis, the factors that were found to be in the same cluster as whether or not a firm deals in agricultural commodities are entered as explanatory variables in a logit regression model that take the dummy variable on whether or not a firm deals in agric-ultural commodities as the dependant variable. The empirical regression model that was run can be represented as follows:

$$DealAgri = \sum_{i=1}^{i=n} F_i$$

Where:

DealAgri = A binary dependant variable representing whether firm deals in agricultural commodities or not, and:
F_i = n explanatory variables

RESULTS AND DISCUSSION

Cluster analysis

Results of the clustering process are shown in Table 1. For continuous variables, the mean values for the five clusters and their values when converted back into their original range are also given. Tables 2 to 4 provide information of firm and entrepreneur characteristics by cluster. The following is a summary discussion of the results presented in Tables 1 to 4.

Cluster 1: Very prosperous, low capital intensity, firms – Entrepreneurs in this category revealed very low involuntary entrance (17%) and very high desire for independence, high pay and continuing family tradition as their

Table 2. Motivations for leaving previous jobs and starting business.

Motivation	Clusters				
	1	2	3	4	5
Why did you leave your last job?					
Laid off or business closed (%)	13.7	26.7	19.5	9.9	13.3
Contract ended (%)	3.3	4.6	6.3	5.7	6.0
Pay too low (%)	25.6	18.2	31.8	17.4	25.4
To be independent (%)	49.3	44.1	35.1	58.5	42.9
Retired (%)	1.9	1.5	0.9	1.7	1.7
Illness or injury (%)	1.9	1.2	2.7	0.9	4.5
Family responsibilities (%)	4.1	3.8	3.7	5.9	6.2
No response (%)	17.7	14.9	22.0	30.3	24.7
Total (%)	100	100	100	100	100
Why did you start this business?					
Fired or laid off (%)	2.8	7.4	3.5	0.6	1.5
No other work (%)	5.2	10.7	15.2	13.2	15.7
To be independent (%)	52.5	41.0	41.8	59.2	44.6
Family tradition (%)	12.7	8.4	9.9	14.4	13.3
Complement family income (%)	10.8	13.3	13.8	10.9	12.9
Higher pay than salaried (%)	33.3	23.3	27.8	24.7	24.1
Flexible hours (%)	1.7	2.3	3.7	2.9	3.5
% of Sample	**14.5**	**7.0**	**31.8**	**3.9**	**18.1**

Table 3. Main business problems.

Problem	Cluster				
	1	2	3	4	5
Lack of clients	53.6	48.2	56.3	63.7	61.7
Lack of credit	12.5	19.4	9.2	9.2	5.4
Lack of economic resources	18.4	22.7	21.2	13.2	17.1
Low earnings	40.9	42.7	43.6	47.7	47.8
Problems with authorities	7.2	19.7	6.7	16.1	4.4
Excessive competition	43.0	52.4	44.9	53.4	45.9
Problems with workers	2.0	2.3	0.6	2.3	1.1
Late payment	13.4	13.9	12.2	8.6	9.1
Raw materials	3.1	3.6	3.6	2.3	2.9

main motives for starting rural micro-enterprises (Table 2). With a mean age of 39 years, 78% of the entrepreneurs were salaried employees either before starting the micro-enterprise or currently (Table 1) . They have low capital but are relatively large lucrative firms. The entrepreneurs indicated that they have relatively high levels of both formal and informal on the job training. These firms have got high earnings and low threats of competition and are therefore among the least likely to exit and the most likely to expand (Table 4).

They however, deal in agribusiness commodities to a very limited degree and thus making then of lower interest to this study.

Clusters 2 and 4: Highly capitalized firms – Paradoxically, both clusters have much higher capital labour ratios but lower earnings than cluster 1 firms (Table 1). This is probably due to overcapitalisation and inefficient resource use – substantial amounts of capital could be locked in low turnover stock. Although cluster 2 does not much deal in agricultural commodities, cluster 4 does to a very large extent. The mean cluster ages are 35 years and 47 years respectively. For cluster 4, most (around 74%) of the owners were once salary employ ees for large firms or were civil servants (Table 4). It is for these entrepreneurs that the life cycle hypothesis

Table 4. Firm and owner characteristics by cluster.

As a percent of cluster	Cluster				
	1	2	3	4	5
Site					
Mobile	3.1	41.8	2.8	37.9	1.5
Permanent	44.5	27.8	21.5	35.1	22.7
Clients					
Big Firms	6.2	5.1	2.5	7.8	3.1
Public	81.8	85.3	89.2	78.9	89.9
Financing to start firm					
Bank	2.2	2.1	1.0	2.2	0.6
Personal savings	60.9	61.5	52.5	51.1	51.4
Credit (suppliers and clients)	4.7	3.8	2.3	4.8	3.7
Do not need financing	15.4	9.5	26.3	19.4	32.7
Additional financing					
Do not need	67.1	63.4	73.9	56.3	75.4
Too costly	15.0	13.7	13.1	17.2	11.0
Do not know how to apply	1.6	2.9	4.5	0.6	3.6
Financing form					
Bank	5.9	5.8	1.5	10.3	2.9
Private loan	4.2	6.8	3.3	5.8	2.7
Credit (Supplier-clients)	4.5	2.9	2.3	7.5	2.5
Plans					
No change in firm	63.4	57.8	62.6	75.58	85.4
Expand firm	29.9	29.9	19.9	19.2	10.2
Shut down the firm	6.2	11.2	16.5	5.2	4.3
Size of last firm					
Self employed	7.7	7.8	8.3	8.6	10.2
1-5 employees	29.1	22.0	28.7	25.9	29.6
6-10 employees	11.7	6.5	8.2	6.9	9.4
11-15 employees	5.3	3.9	4.2	4.6	4.1
16-50 employees	9.2	8.4	10.7	6.3	8.0
50+ employees	27.3	4.3	25.8	25.9	19.3
Never employed	9.5	8.4	14.0	21.3	19.2

works best, that is, workers enter salaried employment to gain experience and capital and then leave to start up their own businesses. Firms in this cluster are large and were started using capital from savings or from employment terminal benefits. They do not need additional external funding. The firms are large and characterized by a long firm life. In terms of gender, firms in this cluster dominantly belong to males (83%).

Cluster 3: Young entrepreneurs and start-ups – These are the youngest entrepreneurs with the shortest firm life and the second lowest levels of capitalization. Some of them are even mobile shops. The two main motives of starting up micro-enterprises were lack of suitable employment or they left their jobs because of low sala-

ries (Table 2). For Gokwe (a district in the Midlands province) the majority of the entrepreneurs started up businesses to take advantage of high demand for agribusiness and other commodities by cotton farmers in the district. It is for this reason why this cluster has an overall high degree of involvement in agribusiness commodities.

Cluster 5: Old owners of long firm life firms with little capital – These are clearly of the older cohort and have an average firm life of 23 years (Table 3). They have few plans to expand and have stabilized at a small size. They have low levels of formal education but vast experience. They supply basic traditional agricultural inputs and are sometimes buyers of small quantities of

Table 5. Results of the logit regression model.

Variable	Coefficient	Significance
Intercept***	0.919	0.012
Education***	-0.856	0.041
Experience***	0.601	0.005
Male***	0.813	0.039
Earnings***	-0.417	0.047
K-L***	0.015	0.019
Voluntary***	0.548	0.008

R^2 Adjusted = 0.61

Note:

The Dependant variable is a dummy variable of whether or not firm deals in agricultural commodities. It equals 1 if yes and 0 if not.
The variable "male" represents whether firm is male owned or not and is equal to 1 if yes and 0 if not.
The variable "voluntary" represents whether owner voluntarily started the micro-enterprise or was forced by circumstances. 1 = yes and 0 =no.
K-L is the capital labour ratio. It is the amount of capital divided by the number of employees.
Earnings refer to profit after tax.
*** Means relationship is significant at 5% level of significance.

agricultural output such as maize and groundnuts.

Synopsis

The use of cluster analysis has allowed the grouping of rural micro enterprises according to their characteristics and to explain the heterogeneity of micro enterprises and the characteristics of micro enterprises that are highly correlated with their likelihood to deal in agribusiness commodities. Firms were found to vary greatly in size, capital – labour ratio, the reasons for entry into business and the probability of staying in business for a longer time. This knowledge helps to establish the prime movers to the development of a lucrative, stable and prosperous rural micro enterprise sector in the country and this will in turn increase the incomes of the rural poor and boost employment.

Logit regression analysis

Table 5 shows the results of a regression model that was run to ascertain the determinants of Zimbabwean micro-enterprises' proclivity to deal in agricultural commodities. It is important to note that this model was developed following results from cluster analysis. Those variables that do not have any influence on agro-dealership (that are not related to agro-dealership) have been left out of the analysis.

Results generally show that entrepreneurs who are male and are in business voluntarily and have been in business for a long time and hence have firms with a long firm life are more inclined to agro- dealership. These are the firms with high levels of capital but their earnings per capital invested are not high. This is partly consistent with the wealth-utility function. Agro-dealership is often considered to be risky due to the seasonality of demand and supply of agricultural inputs and outputs and also the perishable nature of agricultural output. According to the wealth-utility function, those individuals with high wealth levels derive higher utility from risky income than those who have low wealth levels and they are therefore risk preferring. In this study firms with high capital endowments have a higher inclination to deal with risky agribusiness commodities due to their lower levels of risk aversion than low capital firms.

What however becomes striking is the negative relationship between agro-dealership and firm earnings.

The relationship implies that those firms that deal in agribusiness commodities have a high probability of having low earnings than those that do not. This is probably because agricultural products have lower profit margins as compared to other commodities and also because of the low demand for agricultural inputs during the survey period as a result of input donations from Non-Governmental Organizations and the government and the input credit scheme by some output marketing companies such as Cottco. This finding is consistent with the fact that firms in the fourth cluster (of the cluster analysis carried out earlier) have "lack of clients" and "low earnings" as their major business problems.

The R square was 0.61, which is too high especially for cross sectional data. This is however not surprising since the regression model was preceded by cluster analysis

Conclusions

The study has divided micro-enterprises into 5 groups that show the underlying factors to their heterogeneity. Zimbabwe's micro- enterprises were found to be highly diverse in terms of their capital-labour ratio. This is the major driving force to their size and their intention to expand. The capital-labour ratio is also important in determining whether firms deal in agribusiness commodities or not, with high capital-labour rations firms having the greatest inclination towards agro-dealership. This suggests that provision of credit to micro- enterprises to increase their capital base would not only increase their ability to grow bigger but will increase their proclivity to agro-dealership.

Zimbabwe's micro-enterprises were also found to be highly diverse in their "reasons for being". This ranged widely from voluntary to circumstantial with those firms that entered voluntarily being highly successful and having a good capital base and the ability to expand while those that entered due to forcing circumstances are struggling and are contemplating leaving business. The micro-enterprise sector thus does serves as a refuge for those unable to get salaried jobs.

Although agro-dealer firms were found to have high levels of capital, their earnings were relatively low. This was found to be due to the "crowding out" effect from input donations from government and NGOs and also the input credit scheme by input companies. It is recommended therefore that profitability can be increased if direct donations of farm inputs to farmers are avoided or micro-enterprises are used as intermediaries for these donations at a profit. Again input credit schemes should be managed by micro-enterprises so as to avoid direct competition between input manufacturing firms and micro-enterprises.

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