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Determinants of profit efficiency of micro and small enterprises

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Abstract

Ethiopia is implementing Plan for alleviating poverty in both rural and urban through Micro and Small scale enterprises as veritable vehicles. The main objective of this study was to analyze determinants of profit efficiency of leather products manufacturing MSEs. The study relied on cross-sectional data collected from 95 Micro and small enterprises owners and Managers (Addis Ababa). Two Econometric models, namely profit translog stochastic frontier and a firm-specific inefficiency models were used. The parameters in stochastic profit frontier and inefficiency models were estimated simultaneously, using FRONTIER 4.1 computer program. Results of the profit frontier model showed that capital, labor cost and "other inputs" had a positive influence on the profitability of MSEs while the cost of raw material had a negative effect. The analysis also showed that all firms (MSEs) were not operating on the profit frontier and scored a mean profit efficiency of 73 percent. The result showed a mean profit efficiency score of 0.73 and witnessing an inefficiency of 27 percent lagging behind the best practice or the frontier. The efficiency was ranging from 0.1 to 0.98 score showing a wide variation of efficiency among the MSEs. The major sources of inefficiency identified were: limited access to credit facilities, inadequate institutional linkage, firm size, and lack of experience in management. Among these, lack institutional linkage, limited access to credit and firm size were the major constraints that determine profit efficiency. Therefore the study recommends that, MSEs need access credit, diversifying their products, led by professional managers employ multiple level of promotional efforts and linked with institutions.

Key Words: **1.** MSEs 2. Efficiency 3. Inefficiency 4. Stochastic 5. Frontier 6. profit loss

Background and Rational of the Study

Micro and small enterprises are recognized as one of the engines of the Growth of entrepreneurs and the nation at large and are recognized as the natural home of entrepreneurship in many countries. In Ethiopia, the MSEs Sector is the second largest employment-generating and accommodating sector next to the agriculture sector. During the past decade, there has been an explosion of interest in how micro and small enterprises (MSEs) can help offer jobs, lessen poverty, and supply the indispensable goods and services

people need to enjoy an adequate standard of living and maintain basic human dignity. In most swelling countries, like Ethiopia, MSEs signify the massive majority of firms; progeny a considerable portion of both total employment and output in the country. Given their significant economic role, one might expect MSE growth to drive up overall increases in output and income levels of their respective employees in particular and the country in general.

In many scenarios, though, their major economic input appears to be one of retaining rather than generating new employment and income for the destitute. The massive majority of countries depend on the dynamism, resourcefulness and adventuresome of private enterprises (to which most small scale manufacturing enterprises belong) to activate, maintain the process, and form the base for private sector coxswain economic growth. In this concern, micro and small scale manufacturing industries are performing an ever-increasing role in the manufacturing industrial structure of Ethiopia. Expansion and development of the sector increase industry and agricultural productivity through supplying agricultural inputs and generating demand for agricultural outputs. Additionally, small scale manufacturing industries play a crucial role in inspiring other sectors of the economy, namely trade, construction and services and in plummeting unemployment. The basic data on industrial output, input, employment, fixed assets, and outlay are of supreme importance of designing and formulating industrial development programs, strategies and policies. In unindustrialized nations, the informal sector that large
constitutes micro and small enterprises is the major source of employment and income for the urban inhabitants. According to ILO (2002) estimations, the stake of informal employment (not including agriculture) or to the total non-agricultural employment accounts for nearly half or more in all regions of the developing world and about 72 per cent in sub-Saharan Africa (SSA). Most micro enterprises are self-employed type with a low graduation rate in higher size categories and their innovative activities are limited (Kiggundu 2002) cited in Che Rose, Kumar and Li Yen L. (2006). This is largely due to the harsher environment they operate in. Unreliable enforcement of contracts, excessive regulatory and administrative requirements, limited access to finance, and inadequate infrastructure services all impose disproportionately high transaction costs on MSEs of doing business generally, and for innovative activity in particular (Ernst 2004). Even though MSE sector plays a significant role in creating jobs, the emphasis employment generating capacity of micro and small scale enterprises has been given less attention by policy makers and development planners in Ethiopia (MIT 1997).

Research Methodology

The main objective of the Study is to analyze the Determinants of Profit Efficiency micro and small enterprises manufacturing leather and leather products in Addis Ababa. This study involved the Micro and Small Enterprises in Addis Ababa (Capital city of Ethiopia) regardless of their specific locations in the City. A cross-sectional data with explanatory research design was employed. The sample involved MSE managers as a unit of analysis in with a cross sectional data were collected from the 95 MSEs. A semi-structured questionnaire was employed to explore the data from the respondents. The collected data were then analyzed using both descriptive and inferential analysis methods. In the first place to characterize the socio demographic and economic characteristics of the MSEs descriptive analysis such as frequencies and percentages were used. In order to addresses the major objective of the study i.e. measuring efficiency and analyzing determinants of Efficiency, inferential analysis methods such correlation, stochastic frontier and inefficiency model analysis were employed. The dependent variable i.e profit efficiency was continuous and

it was measured continuously and the explanatory variables were measured categorically using dummy and multiple level categories.

The Stochastic Profit Frontier Model was used for measuring the profit frontier and profit efficiency of Micro and Small Enterprises in this study.

The Profit Function and Stochastic Frontier model Specification

According to (Sadoulet and Alain de Janvry, 1995) A profit function, under mild 'regularity conditions' is a logical extension of the production function Predictability conditions necessitate that the function must be non- negative, monotonically increasing in output, convex and homogeneous of degree zero in all prices. To estimate the profit function, in the neoclassical theory, it is assumed that the farmer is operating on the frontier and the price of inputs and outputs are known. But in reality some of the farmers operate below and some above the frontier.

Result and Discussion

Socioeconomic Characteristics of Micro and Small Enterprises (Objective 1)

In the first place it imperative to characterizing and draw insightful information about the socioeconomic characteristics of micro and small enterprises in the study area. In line with this, the research investigates variables such as sex of the manager, firm size, which is measured in terms of the number of members and employees MSEs have, source of capital firms started business with, firm age or experience, educational level of business managers and the form of business organization MSEs are organized in and other related ones.

The descriptive statistics revealed that 72.6% of the respondents of MSE's managers were male and the rest 27.4 were female managers. This statistic depicts like other Government owned business enterprises in Ethiopia, the majority of MSEs are still male lead. As far as the managerial education level of the MSEs, firm size and firm age were concerned. The result shows a minimum educational level of the manager was found to be 5th grade

completed and the maximum education attained was degree. Firm size was measured in terms of the number of members and Employees of the MSEs. Therefore, the minimum firm size measured in terms of the number of permanent employees and members of the enterprise were 3 members and employees and maximum were 20 members and employees with a mean firm size of 8.36 and standard deviation of 3.68. The age or the experience of MSEs in the study area was the other variable of interest the result affirmed that the minimum age or experience of the firms in the study area was 2 years and maximum experience was found to be 10 years with a mean experience of 4.55 and standard deviation of 1.8 years of experience.

The other major variable the study explored was access to credit. The majority of the respondents got credit facility which accounts 60 (63) percent and the remaining 35 (37) percent had no access to credit. The research further sought another question regarding problems related to credit access. 42 (43.8) percent of the respondents replied that the major problem related to credit access was being asked a significant amount of collateral and they were requested to save 20% of the money they were borrowed from the bank as a security. Equal figure of the respondents i.e. 42 (43.8 percent replied that the other

major problem pertaining to access to credit was the high cost of interest they are charged regardless of their performance. On the other hand, 8 (8.4) percent of the respondents replied the amount of credit given to MSEs was very insignificant so as to expedite their efficiency.

The Model Results of Stochastic profit frontier Analysis: (Model 1 equation) Estimating the profit frontier Function

For the stochastic frontier profit function, the relevant data collected were: Average Daily labor cost used in the manufacturing of Leather and leather products Cost of raw material, and other variable inputs for manufacturing (tax, transportation, electricity and other miscellaneous costs) and the average was taken, current capital. Capital and family labor or members labor were treated as fixed inputs. For output, the relevant data collected included quantity of leather products produced, sales, profits and prices at which the leather products were sold for one year.

To see the relation between the dependent variable and independent or explanatory variables,Pearson correlation was applied. As the model result depicts all variables included in the model were significantly correlated with the dependent variable and within the independent variables themselves. Implying the explanatory variables were reasonably picked with an extensive literature review and study area context with due care.

Estimating the Trans log profit frontier Model

The results from both OLS and MLE revealed that all variables show the theoretical expected signs except labor cost which shows positive but insignificant signs to profit. However, the estimates of the final Maximum Likely hood Estimates (MLE) were used for analysis purpose as it is better than that of the OLS estimates. As a result, the OLS estimates are simply presented the two models or estimates for comparison purpose only and the whole part of the discussion is made based on the MLE.

As we could see below from the table all of the estimated coefficients of variables in the sample carry the theoretically expected signs in both OLS and MLE models and are statistically significant, except in the case of estimates associated with input cost of Labor (Table 1).

However, estimates of the cost of labor carried un-expected positive signs, and this is not surprising that many more similar studies have reported similar results. Among these; Theodora (2006) in Uganda tororo district and Oguandari Kolawole (2012) in Nigeria, rice profit efficiency, J. K. Bidzakin, S. C. Fialorand D Assuming- Brempon (2014) in their efficiency analysis in Northern Ghana cost of hired labor showed positive impact to profitability. This is because leather and leather products manufacturing are labor intensive and the majority of the activities such as designing, cutting, sewing and other related activities which are done more of manually need a close attachments of the employees which takes substantial and considerable time. This again resulted in necessitating labor and labor productivity may outweigh cost paid to the daily workers. Therefore, the estimates

of the cost of labor have a positive sign and a statistically significant impact on profitability. From this finding, one can deduce that for jobs like small leather and leather products manufacturing activities, farming and related laborious activities labor plays a very significant role to scale up productivity and profitability as well.

Another most important factor of production in the profitability analysis was the cost of raw material. A negative and a statistically significant value have been depicted at 1 % significance level. The implication is when micro and small scale enterprises increase raw material by 1 percent; they decrease their profitability by 3.6 percent. In leather and leather manufacturing, the majority of the cost is allocated to raw material purchasing. Raw material purchase for leather primarily constitutes a lion's share of the variable costs. This is due to the artificial increment of raw material cost from time to time by the suppliers. The focused group discussion with experts and organizers complements this result as the majority of the respondents reaffirmed that suppliers are creating an artificial shortage. The problem is coupled with a limited number of suppliers in the city, particularly and the country at large. The descriptive statistics again witnesses that 44.2 percent of the respondents mentioned that they are suffering a lot from a very a swift price increment of raw materials. Therefore, the cost of raw material affects profitability negatively and significantly at 1% significance level.

One possible reason for this would be that Micro and Small Scale Enterprises are at their infant stage so that they could not properly manage the cost of raw material and the price is skyrocketing and upswing every time. Due to this reason the efficiency of micro and small scale enterprises downswing.

A positive, however, statistically insignificant result of other costs has been reported from the lower table. This variable includes the average costs of electricity, tax, transportation, rent and other related variables aggregated with their respective price. The sum of these variables affects profitability positively; however, it does not contribute significantly. The possible justification for this finding was MSEs in leather and leather products manufacturing were incurring a minimum amount of tax as they are paying only turn over tax (TOT) which accounts a less significant cost, electricity and rent cost that varies time to time, but very insignificant as government supply of water, electricity and rent house (shed) for most MSEs with least price. As a result this set of a variable contributes positively to profitability as hypothesized in chapter three. On the other hand, Capital revealed a theoretically and empirically expected result. It contributes positively and statistically significantly to profitability of leather and leather products manufacturing micro and small scale enterprises at 1% significance level. A 1 percent increment in capital had soared profitability by 1.7 percent. Capital is measured at the current price of machines, tools, equipment and related used in the manufacturing process to produce leather products. The result showed a significant positive contribution of capital to profitability. This result can be substantiated by many researches in many profit efficiency analyses in agriculture and Banking industry. Theodora (2006), Awudu Abdulai and Wallace E. Hufman (1998) in their examination of rice inefficiency in Northern Ghana, Muhammad etal (2012) in their study of profit efficiency of organic vs. conventional rice –wheat production in Punjab, and Pakistan and Saleem Shaik Albert J. Allen Seanicaa Edwards and James Harris (2009) in their analysis of market structure, Conduct Performance hypothesis Revisited using Stochastic Frontier Efficiency Analysis have similar findings related to the variable. They all have found a positive and statistically significant result which implies the higher the capital firms acquire the more the profitability they achieve.

Table 1: The MLE estimates of the Model 1(equation 11) Results

Variables	Coefficient	Standard error	T-ratio	P-value
Beta 0 (constant)	-1.398	1.929	-2.063	0.04**

Beta 1 ln(p1)	1.389	1.013	1.372	0.174
Beta 2 (lnp2)	-3.587	0.797	-4.498	0.000***
Beta 3 (lnp3)	0.069	0.869	0.079	0.94
Beta 4 (Z1)	1.701	0.455	3.742	0.000***

Measuring /estimating Profit efficiency of MSEs: Trans log Model a Stochastic Frontier Model

To determine the level of profit efficiency **two major hypotheses** were set and examined to determine whether leather and leather products manufacturing Micro and Small Scale enterprises were operating on the frontier or not. If they were not operating on the frontier level, the most important part of the research was to investigate how far was each enterprise operating from the frontier? In line with this, the response to this question can be gleaned from the value of (γ). In this result cases, the value of γ was close to one (0.90) indicating that there is inefficiency or that enterprises were not operating on the frontier and the null hypothesis is rejected implying there is inefficiency. The next impressive question and analysis; how far away a given MSE was operating from the frontier is the theme of the section. The frequency distribution of firm specific efficiency scores for the micro and small scale enterprise is presented. The result depicts that micro and small scale enterprises have attained an average 73 percent level of profit efficiency. Therefore, Micro and small scale enterprises are 27 percent efficiency far away from the frontier level. This value of 27 % represents the gap that can be made by the MSEs if they improve both their technical and allocative efficiencies.

The first null hypothesis was tested using the gamma test: There is no inefficiency of profit ($\gamma = 0$). $\gamma = 0$, t-calculated = 23.7 while t-value from table=1.960 therefore, the null hypothesis was stated as ($\gamma = 0$) to infer that there are no inefficiency or MSEs operate at frontier level.

The decision: $\gamma \neq 0$. This indicates that there was significant profit inefficiency among micro and small scale enterprises in the study area as confirmed by the significance of the gamma (γ) estimate. The estimated gamma parameter (γ) of model 12 (MLE) of 0.90 was highly significant at 1% significance level. This infers a one-sided random inefficiency component strongly dominates the measurement error and other random disturbance. This means that about 90 % of the variation in actual profit from maximum profit (profit frontier) among MSEs mainly resulted from differences in MSE's operational practices rather than random variation and random shocks.

A wide variation in the level of efficiency is observed across the study area ranging from 10 percent to 98 percent with a mean profit efficiency of 73 percent. However, it is worth noting.

This wide variation is not exceptional to Ethiopia or to this study. Many similar results have been sworn by other researchers elsewhere around the globe. Theodora (2006) in her study of profit efficiency of rice in three districts, Abdulai and Huffman's (2000) study of rice farmers in four districts in Northern Ghana reported a wide variation in the level of efficiency for rice farmers that ranged from 02 percent to 100 percent and 16 percent to a maximum of 95.5 percent respectively. In Asia and Africa intensive research activities have been undertaken, and the researchers obtained similar results. Tsue, Lawal and Ayuba (2012) in their study of profit efficiency of catfish farmers in Nigeria showed a wide variation of efficiency of farmers ranging from 10 percent to 99 percent, moreover, Nganga, Kungu, DeRider and Herrero (2010) in their study of profit efficiency of small holder milk producers in Kenya reported a wider variation of efficiency score ranging from 20 percent to 79 percent. On the other hand Bidzakin, Fialor and Brempong (2014) in northern Ghana while they studied the small scale maize producers using a stochastic profit frontier analysis reaffirmed similar result showing a wide variation with a minimum of 11 percent and maximum of 100 percent efficiency and mean efficiency of 61 percent. Ali and Flinn (1989) obtained a

minimum of 13 percent and a maximum of 95.5 percent for rice farmers of Gujranwala district, Pakistan. Other authors, including Ali and Sha (1994), and Wang et al., (1996b) for Punjab, Pakistan, North-west Pakistan, and China, respectively registered similar variant. While Wang et al., (1996b) reported efficiency levels ranging from 6 per cent to 93 per cent with a mean of 62 per cent and Ali et al., (1994) registered a mean profit efficiency of 75 per cent with a range of 4 per cent to 90 per cent. Studies by Rahman (2002, 2003) that covered rice farmers in Bangladesh also reported a wide variation in profit efficiency, ranging from 3.3 percent to 93.7 percent with a mean of 60 per cent of modern Amman rice.

These similarities may be a reflection of the low level of economic transformation of many of the third world agricultural economies and small scale manufacturing operations. In addition to the aforementioned studies, this variation is very common in different researches so far conducted elsewhere in the world.

Table 2 Profit Efficiency score estimated Model 12 (Objective 6)

A decile efficiency scores	No. observations	Percent
0.10-0.20	1	1.1
0.21-0.30	3	3.2
0.31-0.40	3	3.2
0.41-0.50	3	3.2
0.51-0.60	9	9.5
0.61-0.70	4	4.2
0.71-0.80	21	22.1
0.81-0.90	33	34.7
0.91-1.00	18	18.9
Total	95	100

Determinants of MSEs Profit Inefficiency Model 2

In line with objective number **7**, estimated results based on model 12 are presented. The purpose of this part was to analyze the major factors that elucidate profit inefficiency in the study area.

The variables were included in the model with extensive theoretical and empirical literature review. Apart from this, some of the variables were picked and included in the model based on the nature of the study and industry context. These are: educational level of the manager, FirmAge in Micro and Small scale business (measure with the absolute number of years since establishment) access to credit, Firm size

(measured by the number of employees), Previous Experience the MSE Manager (dummy), business diversification and institutional linkage.As far as one can see from the table below, the results also show that the estimated coefficient on **education** carry the expected and hypothesized negative, but statistically insignificant coefficient. This implies that with a magnitude more education brings about a decrease in inefficiency (increase in efficiency) in leather and leather products manufacturing process. This result was consistent with Maganga Abdi-Khalilf and Greenwell (2012) in central Malawi Potato efficiency, Theodora (2006) Uganda rice farmers, Lockheed et al., (1980), Ali and Byerlee (1991), Ali and Flinn (1989), Bravo-Ureta and Rieger (1991), Abdulai and Huffman (2000) for rice farmers in Ghana and Laudia (2011) in Nigeria maize profit efficiency, Abdulai and Huffman (2000) reported similar results for rice farmers in Northern Ghana, Ali and Flinn (1989), Wang et al., (1996b) and Rahman (2002, 2003) reported similar results for farmers in Pakistan, China and Bangladesh, respectively. Therefore, this result implies that when business managers have achieved higher education, they will introduce new technologies and expertise skills so that it contributes to scale up their productivity and thereby their efficiency. Thus, giving education to MSE managers in particular would be very beneficial in terms of reducing inefficiency.

Access to credit is expected to ease the financial constraint, enhance the acquisition of the much-needed inputs, raw materials and improve revenue and subsequent profits. Indeed, the results showed that access to credit is a significant factor in reducing inefficiency in profits.

This result was consistent with many researchers in agriculture and other service business operations. Theodora (2006) in Uganda rice profit efficiency, Awudu and Huffman (1998) in their examination of profit efficiency of rice producers in northern Ghana reported similar findings. This result implies that when micro and small enterprises manufacturing leather and leather products got access to credit, they will enhance efficiency through the purchase of most needed raw materials; introduce technology and increases working capital. Therefore, access to credit is the most important variable in leather manufacturing so as to enhance profit efficiency.

It depicted a negative and statistically significant effect to determine profit efficiency of MSEs in the study area at the 5 percent significance level.

Results regarding institutional linkage revealed the expected and the hypothesized negative and statistically significant coefficient at **5** percent significance level. This implies that when firms got either vertical or horizontal linkages with institutions, they would have got access to credit, support, and training, other facilities and coordination so that it contributes to their productivity and profit efficiency. Therefore, institutional linkages play a very significant role in improving firm's efficiency and run down inefficiencies. Micro and small scale firm's task are interconnected in its daily activities for raw materials, training and infrastructure as well.

Therefore, having institutional linkage plays a very significant contribution for profit efficiency as it decreases the cost of production and thereby enhances efficiency of firms.

Firm Age was another important variable in the model hypothesized to affect profit inefficiency positively. The estimated coefficient of the variable showed a contradicting result as far as inefficiency was concerned.

It reveals a positive, however, statistically insignificant result. This implies when firms get older and older efficiency decreases and inefficiency soar up. This result was not unique for this research as it reaffirmed other research findings so far done in agriculture and manufacturing sectors. Bidzakin, Fialor and Asuming-Brempong (2014) in their study of maize profit efficiency in Northern Ghana found a similar result. Maganga, Abdi-Khalilfand Greenwell (2012) in central Malawi Potato efficiency found a positive impact on profit inefficiency. Keramidou (2011) in his research on efficiency drivers in Greece sausage manufacturing reported similar positive result and statistically insignificant coefficient, Shaki and Dawud (2012) in their analysis of efficiency variation in manufacturing firms presented a positive and significant result of firm age on profit inefficiency, whereas, Mengiste (1998) in his study of Age-size effect on firm growth and productive efficiency reported a similar result but insignificant. One possible argument is when firms get older and older they would have been less flexible to new technologies and be unable to manage their variable costs. This results in running down their efficiency level. On the other hand, **product diversification** had a negative and statistically significant influence on profit inefficiency. This result affirms that MSEs which diversify their business to different lines were found more profitable than their counterparts because if firms diversify their business, they will allocate their costs efficiently and compensate their inefficiency or profit loss. This result confirms the principle of "don't put all eggs in one basket). The estimated coefficients in-line with MSEs Manager's **experience** depicted the expected negative sign and was statistically significant at **10 percent significance level** in the study area. The result was consistent with many Scolarly Research Findings. Bidzakin, Fialor and Asuming-Brempong (2014) in their study of maize profit efficiency in Northern Ghana found a similar result. Maganga, Abdi-Khalilf and Greenwell (2012) in central Malawi Potato producers found a statistically significant negative coefficient for inefficiency implying experience in management enhancing profit efficiency and hampers profit inefficiency. Theodra (2006) in Uganda rice profit efficiency found similar results. laudia (2011) in Nigeria got similar results. She found a negative and statistically significant result for maize producers. The studies reviewed by Ali and Byerlee (1991) reported similar results and Rahman (2002) registered similar results for Bangladesh rice farmers. Sharma et al., (1999) studying allocative and economic efficiencies in swine production in Hawaiian farmers had similar results. The results imply that those firms with previous business experience will be better performers than those without. Whereas this is so, education, quality of expert support services and training given to the MSEs would supplement or in some cases substitute it.

The last but not the least profit inefficiency determinant was **firm size** measured by the number of members and employees the MSE has. The result revealed the expected negative and statistically significant influence on profit inefficiency implying as that as the number of firm size increases, the productivity and efficiency mount. The result showed a theoretical and empirical literatures and what has been hypothesized in chapter three. Several empirical studies in agriculture, Banking and manufacturing shows that relatively efficient firms in developing countries lean towards to be large (for example, Pitt and Lee, 1981; Haddad and Harrison, 1993;Mengistae, 1995; Brada, King, and Ma, 1997; Lundvall and Battese, 1998) found similar findings. An influential theory linking firm size to technical efficiency is Jovanovic's (1982) version of the passive learning model of firm dynamics. His model predicts that larger firms are more efficient than smaller ones. A selection process leads to an outcome in which efficient firms grow quickly and survive, whereas, inefficient firms go rancid or even exit the industry.

However, a positive coefficient between profit efficiency of firms' efficiency and size might also arise if relatively efficient firms have a superior cost structure, or if larger firms have more competent management, both of which would allow them to gain market shares.

Table: 3 Determinants of profit Inefficiency model result

Variables	Coefficients	Standard Error	T-ratio	P-Value
Constant	0.787	0.750	1.049	0.297
Education 1(δ_1)	-0.00042	0.020	-0.021	0.983
Credit (δ_2)	-1.228	0.488	-2.52	0.012**
Institutional links (δ_3)	-2.467	1.194	-2.10	0.04**
Firm age (δ_4)	0.179	0.139	1.30	0.194
Experience (δ_5)	-1.43	0.79	-1.81	0.07*
Product Diversification (δ_6)	-0.52	0.62	-0.84	0.403
Firm size (δ_7)	-0.176	0.086	-2.05	0.044**

Source: field survey data (Model 12 result).

*, **, *** shows the significance level at 10%, 5% and 1% respectively

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