Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.4, No.12, 2013

Institutional Credit and the Profit Efficiency of Micro and Small Scale Traders: Evidence from Faisalabad

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Abstract:
In a country like Pakistan, where the people generally have shortage of capital due to low savings as a consequence of low income, financial institutions play an important part to finance the working capital requirements of the business. Data Envelopment Analysis was used in this study to find the efficiency scores of the borrowers. There after, Tobit regression was used in the second stage to explore the determinants of the efficiency. A total of 85 traders of micro and small scale were interviewed to fill the questionnaires. Mean Technical Efficiency was recorded at 0.78. Average Propensity to Consume (APC), Interest Rate (IR) and Number of times credit was taken (NTC) were found to have a negative impact on the Variable Returns to Scale Technical Efficiency (VRSTE). Micro level traders were more efficient than Small scale traders. Traders working in a rented shop were significantly more efficient than those who were running their business in an owned shop. Traders who utilized the loan for actual purpose were more efficient than those who partially or bulk amount of loan utilized for non productive purpose. Therefore it is recommended the financial institutions to work on screening policy and training workshops.
Key Words: Efficiency, Institutional Credit, Data Envelopment Analysis, Tobit Model

Introduction

Banks play an important part in providing working capital to the businessmen. Access to the credit may affect a business positively or negatively. If the loan is utilized properly for its actual purpose, it may increase the efficiency of the business. But if this loan is miss utilized either due to lack of managerial skills or due to its fungible use, it may affect the business negatively.

There are various definitions of micro entrepreneur, Small and Medium Scale (SMS) in Pakistan. Pakistani government defines it as an enterprise that provide work for up to 250 persons, its paid capital amount is up to 250 million Pakistani Rupee and its total sale is up to is also 250 million Rupees per year. In his presentation by Anjum Ahmad (SMEDA Pakistan 2009) described the definition of micro, small and medium enterprises according to the different institution as, State Bank of Pakistan (SBP) does not define micro and medium size entrepreneurs, however it defines small scale entrepreneur as an entrepreneur having a capital assets of 20 million Pakistani Rupees. Federal Bureau of Statistics (FBS) defines small scale entrepreneur as an enterprise that have less than 10 employees. However FBS does not describe micro and medium level business. Small and Medium Enterprise Bank (SME Bank) characterizes the small scale business that have productive assets up to 20 million. Whereas medium size business have productive assets pp to 100 million. PSIC defines the small scale business as a business having a fixed inventory up to 20 million. The definition of Micro, Small and medium business by Small and Medium Enterprise Development Authority (SMEDA) is the most comprehensive. Micro level business has been defined as an enterprise that has less than 10 employs and has productive assets of less than 2 million. Small scale entrepreneur has 10 to 35 employs and average value of stock of 2 to 20 million. While medium size firm hire less than 100 employees and have productive assets of less than 4 million Pakistani Rupee. European Commission defines the micro level business as an enterprise that provides work up to 9 persons. Small scale enterprise provides work up to 10 to 99 persons and medium size enterprise provides work from 100 to 250 persons. Where as the large scale firm higher more than 250 labors.

Banking sector development in Pakistan started soon after the independence in 1947. Central bank of Pakistan known as State Bank was established in 1948. Pakistan has been ranked 2nd in South Asia by the World Bank in terms of the efficiency and the performance of banking sector of the country. A total of 68 banks are registered in the country. Five top banks capture the 50% share in the market. Three banks on average entre in the market every year.

The case study for this research is Faisalabad District. Faisalabad is the 3rd largest city of Pakistan after Karachi and Lahore in terms of population while it is the 2nd most congested city after Karachi according to the 1998 census. The reason of choosing Faisalabad is the rapid economic growth in the city during the last few decades. Eight Bazaars of Faisalabad around the famous Ganta Ghar are well-known in the country for their investment as

well as consumer goods.

Objectives of the study

First task of this study is to compute the efficiency scores of different traders using credit.

- To find the shifters of the efficiency scores of the borrowers.
- To give suggestions in the light of the results to the policy makers.

Review of Literature

Akpalu, et al. (2012) explored that mean technical efficiency was found to be 40% indicating that output could easily be doubled or in excess of doubled without make using of further inputs. Efficiency of the enterprises increased by 11% by using microfinance. Osotimehin, et al. (2012) explored that financial limitations and low management skills hinder the efficient performance of micro scale and small scale enterprises in Nigeria. Ayaz and Hussain (2011) revealed that institutional credit played the most important role in enhancing efficiency of the farmers in Faisalabad. Coefficient of credit access was found to be -0.14 showing the importance of institutional credit in the agriculture sector. Mean technical efficiency was found to be 0.84 or 16% inefficiency using the SFA technique on a sample of 300 farmers. Islam et al. (2011) explored the efficiency of the beneficiaries and non beneficiaries of microfinance of the Rice farmers in Bangladesh using DEA approach. Mean score for the technical efficiency was recorded at 72%, for Allocative it was 66% and for Economic efficiency it was 46%. Efficiency scores of microfinance borrower and non borrowers were considerably different from each other. Sumelius, et al. (2011) computed the profit efficiency of different rice farmers in Bangladesh. Cob-dugless stochastic profit function frontier analysis was carried out to find the profit efficiency and loss in profit using the data of 360 farms in the growing season of 2008 to 09. It was found that the profit efficiency of the microfinance borrowers was 68 percent, where as for the non borrowers it was 52 percent. That showed significant improvement in the efficiency due to the borrowing. Ayaz, et al. (2011) found the efficiency scores of the different farmers in district Faisalabad using the Data Envelopment Analysis technique. Mean efficiency of the over all farmers was 0.78 or 22% inefficiency. efficiency scores were then regressed by different farm related variables through Tobit regression. Credit access was a significant positive factor to increase the efficiency score. Oni, et al. (2011) explored the determinants of the efficiency of poultry farmers using micro credit in one of the states of Nigeria applying SFA technique on a sample of 115. micro credit was found to have a positive and the significant impact on the technical efficiency. Saleem and Jan (2011) stressed the need to adopt new technology in the agriculture sector that requires credit. Cobb-Douglass linear regression was used on the data from 1990 to 2008. credit used for cede, fertilizer, pesticides, irrigation and tractors were strongly related with the agriculture gross domestic product. Impact of credit on agriculture production was found to be more than 80%. Thereby it was concluded that credit access had a very significant role in increasing agriculture productivity. Akanni, (2007) investigated the effect of microfinance on small scale Poultry business in South West Nigeria. Out of the total sample, 29% took loan from co-operative societies. Education level, business experience and number of birds in the farm were positive and significant. Funds intensity was highest for usage of inputs while it was lowest for the business experience. Trillo, et al. (2005) used Stochastic Frontier Production function approach to find the inefficiencies of different micro enterprises. Entrepreneurs who took loan from banks or through formal way were found to be more efficient than those who relied on their family members or friends etc through informal way. One of the reason behind was the screening policy by the banks. Bhasin and Akpalu, (2001) explored the efficiency of wood-processors, tailors and hair dressers. Major factors that affected their efficiency were found to be age, experience of the business, education level, training programs and credit. Credit participation had a positive and the significant impact on the efficiency of all the three categories of micro entrepreneurs.

Data and Methodology

Data Description: Data was collected from different beneficiaries of credit from Faisalabad using Simple Random Technique from 85 micro and small scale traders.

Variables of the Econometric Analysis

Variables of the 1st Stage: To find the efficiency score of each trader profits per month have been taken as the output where as cost on different factors of production have been taken as the inputs. Cost has been taken due to two reasons, firstly because it represents the quality of input and secondly to remove the heterogeneity in the data. One output and five inputs have been taken to apply DEA. Net profit of each trader has been taken after subtracting interest from it and has been used as the output. Cost on labour has been taken in Rupees per month. If the shopkeeper is himself running the shop, then opportunity cost equivalent to 8000 has been added in cost of labour. Interest of the capital that has been borrowed per month plus the opportunity cost of the capital that is owned has been taken as the 2nd input. Opportunity cost of the capital has been calculated by taking 8% deposit

rate offered by the commercial banks on average. Rent of the building has been taken as the 3rd input. If the trader has his own shop then opportunity cost has been taken equivalent to market rent. Cost on utility bills has been taken as the forth input. Traders usually face electricity bills only. Cost on payment to the supplier has been taken as the 5th input. It has been measured by taking the average value of the stocks. Transportation cost has been summed up in it as the usually the producer supplies the product by own and includes the transportation cost in the price of that product. Those who bear transportation cost then selves, their cost has been summed up in payment to the supplier.

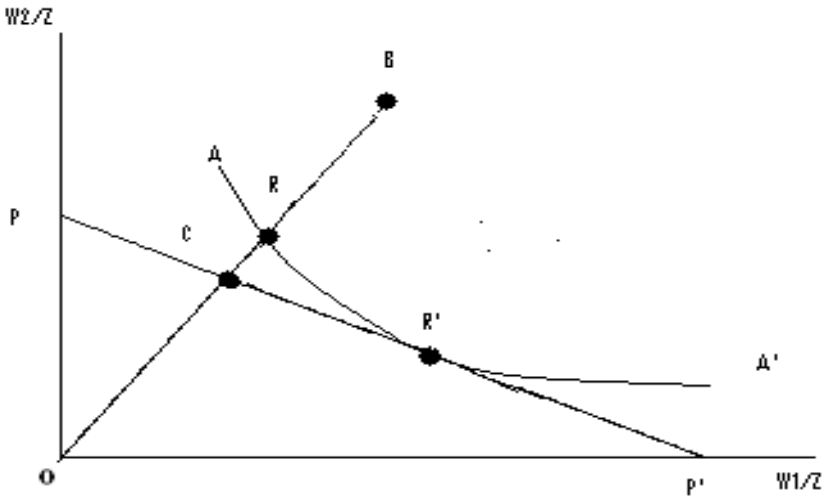
Variables of the Second Stage, Regression: Different variables were kept as the regressors in the 2nd stage to find the determinants of efficiency. Number of times credit (NTC) has been taken or rescheduled by the borrowers, Lending interest rate in percentage at the time of first time borrowing were kept as the regressors. Loan utilization has been quantified by creating dummy variable into three categories as utilized the loan to a great extent, some extent and not at all for the actual purpose. Out of which only two categories were kept in the model to avoid dummy trap. Shop ownership, type of customer, scale of the business have also been quantified by creating dummy variable. However education and business experience have been taken in years.

Approaches of measuring efficiency: Berger and Humphey describe two approaches, Parametric and Non-parametric approach to measure efficiency. Parametric approach requires functional form and it assumes disturbance term. It is calculated by Stochastic Frontier Analysis. Non-parametric approach requires no functional form and it does not assume any disturbance term. It is calculated by Data Envelopment Analysis.

Data envelopment analysis: Term of Data Envelopment Analysis was first introduced by Charnes et al 1978. But its concept has been taken from the work carried out by Forrell 1957. It is a non parametric technique which gives productive efficiency scores of each producer or entrepreneur. Non-parametric technique does not assume any specific shape of Frontier curve but on the other hand it does not estimate any relationship or the equation between input and output. It may b used to compare the efficiency across producers or entrepreneurs. There are mainly two types of DEA, one which is based on the CRS (Constant Return to Scale) and the other which is based on VRS (Variable Return to Scale). Data Envelopment Analysis can be run by either cost minimizing method or output maximizing method. In cost minimizing method, output is fixed and on that output, cost is minimized. Where as in output maximizing method cost is kept fixed and output is maximized.

Input Oriented DEA:

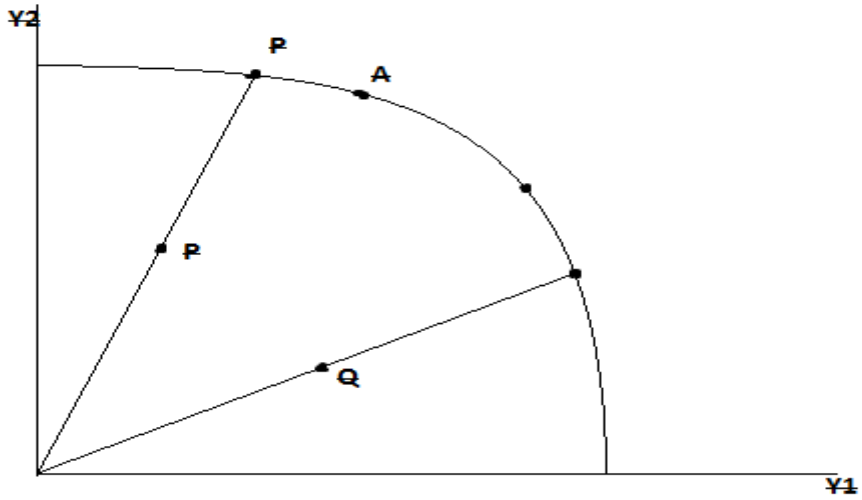
Figure 1: Input Oriented Technical Efficiency.



Source (Coelli 1998)

Above Figure 3.1 shows, points R, R / and B yield the similar level of production using different quantity of inputs w_1 and w_2. The points R and R / signify efficient producers, whereas B is an inefficient entrepreneur, reason being is that it is feasible and very much possible to yield the output level of B by using combination of input of firm R. the point R is radial contraction of point

Output Oriented DEA
Figure 2: Output Oriented DEA.



In the above figure 3.2, X exes and Y exes represents the production of Y1 and Y2. Concave shape negatively slopped curve is the Production Possibility Frontier Curve (PPF), which represents maximum attainable different combinations of production of Y1 and Y2 by using same level of inputs. Points on this PPF are efficient points of production. Points above this PPF are unattainable at given inputs. Whereas on the left or below this PPF are inefficient as shone by the points P and Q as the production on these points is possible by using lesser inputs.

Tobit Regression: 2nd stage regression was used in this study keeping efficiency scores as the depended variable. As the efficiency scores take the values from 0 to 1. So it is left censored at 0 and right censored at 1. So applying OLS on such model may lead to biased results. Therefore Tobit model is best fit on such functional form. Tobit model was first introduced by James Tobin in 1958 which describes the relationship between non negative depended variable and explanatory variables or vectors. Tobit model assumes error term to be normally distributed. However E-views provides further option of the error term to be either logistic or skewed in nature of the censored regression. Applying OLS on an equation having censored depended variable gives inconsistent estimators. Such slope coefficients estimated by OLS are downward biased. Whereas intercept obtained by OLS is upward biased. It has been proven by Amemiya (1973) that Maximum Likelihood estimators proposed by James Tobin are quite consistent. Following equations were estimated by using Tobit Regression.

$VRSTE = \beta_0 + \beta_1(NTC) + \beta_2(IR) + \beta_3(GPU) + \beta_4(PPU) + \beta_5(Micro) + \mu$
$VRSTE = \beta_0 + \beta_1(APC) + \beta_2(TCus) + \beta_3(BExp) + \beta_4(Edu) + \beta_5(BOwn) + \beta_6(Employ) + \mu$
VRSTE = Variable Returns to Scale Technical Efficiency.
CRSTE = Constant Returns to Scale Technical Efficiency.
BOwn = ownership of business premises. IR = Interest Rate.
BExp = Business Experience in years. NTC = Number of times credit is taken.
TCus = type of customer. APC = Average Propensity to Consume.
GPU = fully utilized the loan for the productive purpose.
PPU = partially utilized the loan for the productive purpose.
Micro = dummy variable (1) if the shopkeeper is micro entrepreneur and microfinance borrower and 0 for small scale trader.
NTC = Number of times credit is taken.

Results and Discussion

Descriptive Analysis: Majority of the borrowers are not satisfied with the amount of loan that was offered to them, as it was too less than their expectation. About 43.5% of traders were satisfied with the amount of loan, while 56.5% of traders are not satisfied with the amount of loan. Majority of the borrowers did not receive loan at right time because of documentation and banking procedure. Only 22 borrowers received loan at right time out of total 85 borrowers. Hence, the situation results in negatively affect the performance of the firms. A very small proportion of the borrowers were of the opinion that their savings improved by borrowing. Just about 28% borrowers were of the opinion that their savings improved by borrowing and about 71% thought that their savings did not improve. Again the reason of which is the fungible use of the loan. Terms and conditions were

ideal according to the 42.35% of the borrowers. Whereas about 18.8% borrowers were of the opinion that terms of loan were satisfactory. However, about 38.8% borrowers were not satisfied with the terms of loan. Loan affected the business of the 18.82% borrowers to a great extent in a positive way. Reason of which was that most of them used the loan for actual purpose. About half of the borrowers felt that their business was affected to some extent by loan as most of them partially used the loan for actual purpose. About 30% of the borrowers had no improvement in their business by the loan due to the fungibility. A large majority of the borrowers were satisfied with the attitude of bank staff. However, about 25% borrowers were not satisfied with the attitude of bank staff. Minimum business experience of any trader is 4 years. So the traders chosen for the sample have good experience. Average experience is about 20 years and average total experience is 22 years. Among the traders 74% were retailers whose customers were general public. Where as 26% were wholesaler whose customers were retailers. Among traders 75 are running their business as sole where as just 10 are involved in partnership out of total 85 traders. A high percentage of 71.76% of the respondents do not maintain their business record.

Table 1: Actual Utilization of Loan

Actual Utilization of Loan	1	2	3	4	5	6	7	Total
Frequency	25	17	5	7	9	18	4	85
Percentage	29.41	20	5.88	8.24	10.59	21.18	4.71	100

1. Utilize for actual purpose. 2. Fulfillment of domestic need.
3. Marriage. 4. Construction, repair and renovation of house.
5. Purchase of fixed assets. 6. Pay off previous liability.
7. Others –Investment.

As the results show that just about 30% of the borrowers used the loan for actual purpose. The actual purpose was to fulfill their working capital requirements. The rest of the borrowers used bulk amount of the loan for fungibility. More than forty percent of the borrowers used their loan on either fulfillment of domestic needs or paying of previous liabilities.

Table 2: Reason of Miss utilization.

Reason of Miss utilization	1.	2.	3.	4.	5.	6.	7.	Total
Frequency	10	7	8	15	9	5	6	60
Percentage	16.67	11.67	13.33	25	15	8.33	10	100

1. Poor financial condition. 2. Not willing to invest in running business.
3. More profit in other business. 4. Social pressure.
5. Loan amount not sufficient. 6. Loan not provide at right time.
7. Other

As there are several reasons of miss utilization of loan. But among major reasons as evident by the above table, poor financial condition, social pressures and insufficient loan amount caused the borrowers to use the loan for non-productive purpose.

Table 3: Interest Rate.

Interest Rate	Minimum	Maximum	Mean	Std. Deviation
At the time of borrowing	7	18.37	10.50	2.82
Current	17.52	18.44	18.32	0.19
Average IR	18.76	22.45	20.66	1.48

Currently interest is charged at the rate of about 18%. Therefore there is not much variation in the current interest rate. Loans taken few years ago were charged interest rate of single digit. So there is enough variation in the interest rate at the time of 1st time borrowing. Average interest rate has been calculated by taking the average of interest rates charged at different times while rescheduling the loans.

Table 4: Information of the Respondents.

	Minimum	Maximum	Mean	Std. Deviation
Age	30	64	47.02	7.62
Education	5	14	8.88	2.89
Family Size	4	15	7.02	2.30
Number of Earners	1	5	1.49	0.84
Income	25000	170000	67188.24	26880.91
APC	0.46	0.96	0.83	0.11

Age of the respondents ranges from 30 years to about 64 years, shows that they belong to middle and high middle age groups. Education of the traders has been found quite low. Most of the traders are under metric as shone by the average. Family size is on higher side where as most of households have 1 to 2 earners in their family. Average Propensity to Consume is 0.81, which means that Average Propensity to Save is 0.17.

Table 5: Ownership of Building

Ownership	Business Premises			House		
	Owned	Rented	Total	Owned	Rented	Total
Frequency	35	50	85	72	13	85
Percentage	41.18	58.82	100	84.71	15.29	100

Most of the traders are running their business in a rented building. However a large number of respondents have their own house.

Application of DEA: Results of Data Envelopment Analysis are reported in Table 6 and Table 7. efficiency scores have been calculated by taking profits per month as output where as cost on labour per month, rent of the building per month, utility bills per month, interest of the stocks per month and the payment to the supplier per month have been taken as the inputs.

Table 6: Results of DEA

Descriptive Statistics	CRSTE	VRSTE	SE
Mean	0.701929	0.788871	0.892106
Std. Deviation	0.184543	0.153	0.163551
Minimum	0.318	0.473	0.466
Maximum	1	1	1

The results show that the mean score of Technical Efficiency with constant returns to scale is 0.70, Technical Efficiency with variable returns to scale is 0.78 and Scale Efficiency is 0.89. Technical Efficiency with constant returns to scale has a larger variance as the standard deviation and the range from minimum to maximum efficiency is high as compared to Technical Efficiency with variable returns to scale and Scale Efficiency.

Table 7: Distribution of the Returns

Operating Under	IRS	CRS	DRS	Total
Frequency	31	31	23	85
Percentage	36.47	36.47	27.06	100

According to the Table 4.18, 23.06% of the firms are operating under Decreasing Returns to Scale, whereas, 36.47% firms are functioning under Constant Returns to Scale, and about 36.47% of the firms are working under Increasing Returns to Scale. Traders working under Increasing Returns to Scale need to invest more in order to reach Constant Returns to Scale point. Where as shopkeepers operating under DRS are over utilizing their resources so therefore need to make better use of their resources to reach Constant Returns to Scale.

Tobit Regression: As the efficiency scores lie between 0 – 1, so censored Tobit Regression has been used for this study keeping Efficiency scores as depended variable. Different loan related and business related variables have been taken as the explanatory variables.

Table 8: Impact of Credit Related Variables on VRSTE

Dependent Variable: VRSTE				
Method: ML - Censored Logistic (Quadratic hill climbing)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
Number OF TIMES CREDIT	-0.018603	0.011144	-1.669354	0.0950
INTEREST RATE	-0.015416	0.008714	-1.769171	0.0769
MICRO LOANS	0.069729	0.041901	1.664130	0.0961
GPU	0.173297	0.062586	2.768924	0.0056
PPU	0.091236	0.051843	1.759865	0.0784
C	0.967826	0.152035	6.365816	0.0000

Above table shows the results of different variables related to borrowing on Variable Return to scale Technical Efficiency (VRSTE). Number of times a trader has taken a loan is negatively related with the efficiency and it is significant at 10% level of significance. The reason of which is the non productive use of loan which forces them to either reschedule the loan or they have to take another loan in order to return the previous loan. Lending interest rate at the time of 1st time borrowing is negatively related with the efficiency. As traders availed the loan facility at lower rate of interest used the loan more efficiently than those who had borrowed at higher interest rate. Interest rate has a significant impact on the efficiency at 10% level of significance. Traders who had borrowed around half a million were found to be more efficient than those who had borrowed an amount of more than a million.

Micro borrowers were about 0.07 more efficient than small level borrowers and it is significant at 10% level of significance. Traders whose business was greatly affected by the loan were significantly more efficient than those who were least affected by the loan even at 1% level of significance. Reason of which was that they fully utilized the loan for actual purpose, Whereas, those who were affected by the loan to some extent were significantly more efficient than those who were least affected at 10% level of significance. as they partially

utilized the loan for actual purpose. Therefore it can be concluded that least affected by the loan were least efficient because of fungible use of the loan to great extent. Intercept is also significant at even 1% level of significance.

Table 9: Impact of Business Related Variables on VRSTE

Dependent Variable: VRSTE				
Method: ML - Censored Logistic (Quadratic hill climbing)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCUS	0.023361	0.047699	0.489764	0.6243
BOWN	-0.146905	0.035878	-4.094588	0.0000
LOG(EMPLOY)	-0.086015	0.046873	-1.835072	0.0665
APC	-0.387971	0.157282	-2.466720	0.0136
RECORD	0.043483	0.054672	0.795346	0.4264
LOG(BEXP)	0.065007	0.036946	1.759506	0.0785
C	1.047379	0.173220	6.046539	0.0000

Retailers whose customers were general public were insignificantly little more efficient than the wholesalers whose customers were retailers even at 10% level of significance. as shone by the coefficient of TCus in the above table. Ownership of Business Premises (BOwn) is significantly related with efficiency even at 1% level of significance. Traders having their owned shops were less efficient than those who are running their business in a rented building as shown by the negative sign. Traders working in a rented building use their capital preferably on business rather than on purchasing building, consequently it helps them to be more efficient. Number of employees or in other words size of the business has a negative impact at 10% level of significance on efficiency. Resources are being less efficiently used in larger size business. Average Propensity to consume is also significantly related with efficiency at 5% level of significance. Traders having high APC and having low APS, as trading requires heavy capital intensive technique. So, low APS or high APC negatively influence the efficiency. Keeping business record improves efficiency but insignificantly. Relevant business related experience is a positive factor for efficiency. As efficiency improves by gaining more experience and it is significant at 10% level of significance. Intercept is also significant at even 1% level of significance.

Conclusions and suggestions

Conclusions: Traders who had fully utilized the loan for the actual purpose to fulfill the working capital requirements of the business were most efficient among borrowers. Whereas those who partially utilized the loan for actual purpose were more efficient than those who completely utilized the loan for non productive purpose. Microfinance borrowers were more efficient than those who were small scale borrowers because small scale traders after the inclusion of loan in the business reach the stage of Decreasing returns to scale. Interest rate at the time of first time borrowing was negatively related with the efficiency. as the traders who took the loan at lower rate did establish and strengthened their business compared to those who took the loan at higher interest rate. Number of times credit was taken was also negatively related with efficiency due to the fact they made fungible use of the credit so therefore the loan was to be rescheduled time and again. Average Propensity to Consume (APC) was negatively and significantly related with efficiency. Among borrowers higher APC forces to make more fungible use of the credit. Business experience among borrowers was a positive determinant of efficiency. Reason behind is that more experienced borrowers make better use of the loan. A large majority of the borrowers were quite unsatisfied for being provided the loan late and an amount less than to their expectation. More than one third of borrowers fully utilized the loan for non productive purpose. About one third of the borrowers partially utilized it and less than one third of the borrowers used it to meet the requirements of the working capital.

Policy Recommendations: Interest rate should be tried to decrease. There should be workshops arranged for the borrowers to make best use of the credit and resources. Proper inspection should be done by the banks and the Microfinance Institutions to ensure the productive use of the credit. Microfinance institutions need to increase upper loan limit up to about 500000. whereas commercial banks should give loans from 500000 to 1 million on providing personal guarantee. Recovery of loans given on personal guarantee may be ensured by making laws of punishment etc. Like most of the commercial banks, return of loans should be in one go rather than installments to the MFI's.

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