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Abstract

Unincorporated enterprises significantly contribute to India's GDP and generate large scale employment. Lack of access to formal credit often constrains enterprises to scale up. Understanding factors influencing access to formal credit of unincorporated enterprises is important which may help enterprises to improve performance and become credit worthy. For creditors, present analysis may help to broad base the criteria in selection and disbursement of credit to enterprises. The present paper explores the factors which influence access to formal credit of unincorporated enterprises across states in India. Results show that various operational and economic characteristics influence the access to formal credit. The analysis indicates that size of an enterprise (measured in terms of number of workers, total assets, etc.), gross value added, turnover, maintenance of written and bank account, years of operation, internet usage, female entrepreneur, registration under various acts/authorities, ownership type, enterprise type, type of activities (manufacturing, services or trading), enterprises facing problems, government assistance, state specific variables etc. are statistically significant factors.

Key words: Unincorporated enterprises, outstanding loan liabilities, access to formal credit, informal credit, Probit Model, India

JEL Classification: E44, E51, G20, G21, L53

1. Introduction

Over the last five decades Micro, Small and Medium Enterprises (MSME) sector turns out to be the most dynamic and vibrant sector of the Indian economy. It has significantly contributed in generation of employment and economic development with a vast network of about 63.39 million enterprises (MMSME 2018). According to the Annual Report of the Ministry of MSME (2017-18), MSME sector contributes about 45 percent of India's manufacturing output, over 28 percent of the GDP, and more than 40 percent of the total exports from India while generating employment for about 111 million people (MMSME 2018). Also, according to 73rd round survey of the National Sample Survey (NSS), unincorporated non-agriculture enterprises (excluding construction) have created 36.04 million jobs in the manufacturing sector, 38.72 million jobs in trade, and 36.22 million jobs in other services sector during 2015-16.

In order to support MSMEs financially, the government of India has implemented various credit schemes such as Credit Guarantee Trust Fund for Micro and Small Enterprises (CGTMSE),[1] Credit Linked Capital Subsidy Scheme, Interest Subsidy Eligibility Certificate (ISEC), etc.[2] Despite numerous efforts taken by the government through various policies and programmes, access to formal credit still remains a challenge for small and medium enterprises. As per the latest speech of Governor of the Reserve Bank of India, access to credit and formalisation are the major challenges faced by the MSME sector in India (ASSOCHAM 2020).[3]

Access to credit enables enterprises to expand economic activities, create jobs, facilitating economic growth and reducing inequality. As per the Economic Survey of 2017-18 (MoF 2018), data on credit disbursed by banks clearly shows that MSMEs receive only 17.4 percent of total outstanding credit from the formal sector despite significant contribution in terms of value addition and employment generation. Limited access to credit may have limited growth potential of unincorporated enterprises.

According to International Finance Corporation (2018) total addressable demand for external credit for MSME sector in India is estimated to be Rs. 36.7 trillion, out of which Rs. 10.9 trillion is estimated to be supplied by formal sources of finance. Therefore in the MSME sector, the overall addressable *credit gap* is estimated to be about Rs. 25.8 trillion.[4] About 75 percent and 80 percent of the addressable credit demands by micro and small enterprises respectively are currently not met by the formal sources.

Furthermore, access to formal credit is not evenly distributed across enterprises operating in different activities. According to the NSS's 73rd round survey of unincorporated enterprises, nine activities hold 93 percent of total outstanding loans from formal sources of credit

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[1] According to MMSME (2017), about 13 lakh proposals with credit guarantee of over Rs. 56000 crore have been approved during 2014-16. Also as per the Credit Linked Capital Subsidy Scheme Rs. 987.72 crore of subsidy has been released during 2014-16 to 15,684 MSEs (Medium and Small Enterprises).

[2] Earlier also there have been various policies to improve the financial access to MSMEs such as Priority Sector lending (PSL), Credit Guarantee Scheme, etc.

[3]. Total credit outstanding from NBFCs and banks to MSME sector was found approximately 16.6 lakh crore at the end of September 2019. Also, Scheduled commercial banks accounts for 90% of the share of total loan outstanding (ASSOCHAM 2020).

[4] In order to estimate the near-term addressable debt demand, the study excludes enterprises that exclusively seek informal finance and thus cannot be served by formal institutions or enterprises that would also not qualify for near-term formal credit. For more details please refer to IFC (2018, Page 26 and 60).

(Appendix Table A1). Manufacturing activities have lower outstanding loans from formal sources of credit as compared to trade and service sectors. In services, 'real estate, rental and leasing activities' holds 62 percent of outstanding loans. This implies that access to formal credit is not uniform across sectors and within a sector across activities. Enterprises under nine activities (Appendix Table A1) constitute 70 percent of total enterprises those have obtained loans from formal sources. In other words, 70 percent of enterprises those have taken credit hold 93 percent of formal credit. The same set of activities hold 69 percent of informal credit and 78 percent of credit from both formal and informal sources. Activities which are deprived of loans from formal sources obviously look for informal sources of credit, though costs of informal credit (interest rate) are high. It is also to be highlighted that access to formal sources of credit (to unincorporated enterprises) varies across states (Appendix Table A2). Spatial heterogeneity (across States) in accessing formal credit is another aspect which requires attention of policy makers.

Therefore, understanding factors influencing access to credit of enterprises from formal sources is important which may help enterprises to improve their performance to become credit worthy and/ or for creditors it may help to broad base the selection criteria to disburse credit more homogenously.

In the next section, we review existing literature on the subject and identify the research gaps. It is followed by description of data in section 3. In section 4, we present various characteristics of enterprises which may influence their access to formal credit. In section 5, we present methodology of data analysis and analyse the results. We draw our conclusions in section 6.

2. Literature Review

Access to credit plays an important role for enterprises to scale up the operation and participate in larger value (supply) chains of activities which may help them to grow in the long run. Also access to formal credit may play an important role in influencing the decision of entrepreneurs to become a formal entity (de Paula and Scheinkman 2010, Araujo and Rodrigues 2016).

However, lack of access to finance significantly causes constraints on the growth of the small business (Binks and Ennew 1996). There is a rich literature on access to credit and the constraints faced by small or medium enterprises (e.g., Stiglitz and Weiss 1981, Saito and Villanueva 1981, Binks and Ennew 1996, Petersen and Rajan 1994, Tendulkar and Bhavani 1997, Beck et al. 2006, Love and Peria 2005, Beck and Demirguc-Kunt 2006, Ayyagari et al. 2008, Beck et al. 2008, Carpenter et al. 2002, Berger and Udell 2006, Banerjee et al. 2017).

According to Stiglitz and Weiss (1981) credit rationing is the result of asymmetric information between borrowers and lenders and it leads to problems of adverse selection and moral hazards. The existence of asymmetric information has a major consequence in financing and this aspect is well established in literature (Binks and Ennew 1996, Malhotra et al. 2007). Saito and Villanueva (1981) suggests that small enterprises face credit restrictions mainly because of higher transaction costs of lending which includes default costs and administrative costs. Similarly, Tendulkar and Bhavani (1997) argues that the limited access to credit for small firms happens because of high lending costs, behavioural risk and production risk. Another study by Beck et al. (2006) suggests that the major financial obstacles of firms are size, ownership, age (i.e., firms who are relatively older report less financial obstacles). However, the analysis by

Morris et al. (2001) suggests that the problem of credit constraint for small enterprises arises because of organisational and institutional failure. The study by Zavatta (2008) also proves that high risk and transaction costs, asymmetric information, and lack of collateral are the major factors restricting credit access of small enterprises. Furthermore, according to the study by Banerjee et al. (2017), access to formal credit (via microfinance) can have long lasting positive impacts[5] but it takes some time to accumulate these credit benefits as their exists heterogeneity in the returns to micro finance.

Existing literature suggests that the factors determining the credit choice behaviour of the firms can be broadly divided into some groups: firm's location, firm's characteristics, owner's characteristics and ownership type (Coleman 2004, Akoten et al. 2006, Beck and Demirguc-Kunt 2006, Nikaido et al. 2012, Bhavani and Bhanumurthy 2014, Nikaido et al. 2015, Safavian and Wimpey 2008, Chittenden et al. 1996, Nguyen and Luu 2013, Ayyagari et al. 2010). Particularly the size of the firm is found to be the most reliable determinant of financial obstacles and credit choices faced by the firms (Devereux and Schiantarelli 1989, Beck et al. 2004, Beck et al. 2006).

Love and Peria (2005) explores the trends and patterns of firm financing in India and claims that differences in financing patterns arise because of firm's size, sector (manufacturing, trading and services), ownership (private, foreign private firms, national, State or municipal govt.), export orientation, and, in particular, region, debt to asset ratio, interest coverage ratio. Other studies which analysed the factors influencing credit choice within the Indian context are Nikaido et al. (2012), Nikaido et al. (2015), and Bhavani and Bhanumurthy (2014). The factors which may impact entrepreneur's access to formal credit are summarised in Table 1 (based on literature review).

As per our understanding available literatures specific to Indian context are based on the older unit level data of unincorporated enterprises surveyed by NSS (National Sample Survey). For example studies by Bhavani and Bhanumurthy (2014), Nikaido et al. (2015) and Nikaido et al. (2012) are based on unit level data of 62nd round NSSO survey (July 2005 and June 2006). Also their analysis did not capture the state specific (spatial) features. Hence, the present study analyses the variables those have been already identified by various other studies and also explore new variables which may influence the credit choice behaviour of the Unincorporated Non-Agriculture Enterprises (excluding construction) in India. Present study is based on unit level data of 73rd round survey of NSSO (July 2015 to June 2016).

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[5] For those individuals who are well suited for entrepreneurship.

Table 1: List of the factors which can influence access to credit from formal sources

Indicators	Expected Sign	Studies
Operational Characteristics		
Years of operation	Positive	Love and Peria (2005); Ayyagari et al. (2010); Chittenden et al. (1996); Akoten et al. (2006)
Owner's education	Positive	Bhavani and Bhanumurthy (2014); Nikaido et al. (2015); Nikaido et al. (2012); Ayyagari et al. (2010); Coleman (2004)
Maintain Account[6]	Positive	Bhavani and Bhanumurthy (2014); Nikaido et al. (2015), Nikaido et. al (2012)
Type of Enterprises – Own Account and Non-Directory Enterprises (Directory Enterprises form the reference category for enterprise type)	Negative	Bhavani and Bhanumurthy (2014); Nikaido et al. (2012)
Type of ownership- Proprietary units, Partnership units and Limited companies **OR** private, foreign and govt. units	Positive (Partnership units, Limited companies and govt. companies more likely to take loan from formal sources)	Bhavani and Bhanumurthy (2014); Mehnaz and Wimpey (2008); Love and Peria (2005)
Registration with any government agency or, under any Act.	Positive	Bhavani and Bhanumurthy (2014); Nikaido et al. (2015), Nikaido et al.(2012); Mehnaz and Wimpey (2008);
Female owner	Negative	Nikaido et al. (2015); Nikaido et al. (2012)
Sector- Manufacturing, Trading or Services	Depends[7]	Beck et al. (2006); Love and Peria (2005)
Industry type : mineral based industry, more capital intensive industries (Agriculture based industries for the reference category)	Negative (More capital intensive industries are less likely to receive formal credit because of credit constraints)	Nikaido et. al (2015)
Whether enterprise undertake any work on contract	Positive for Mineral Industries.[8]	Nikaido et al. (2015)
Location of the Enterprises	Depends	Nikaido et al. (2015); Nikaido et al. (2010); Ayyagari et al. (2010); Akoten et al. (2006)
Diversified activities or Mixed activities[9]	Positive	Nikaido et. al (2015), Nikaido (2012); Love and Peria (2005)
Economic Characteristics		
Size of Firm		
Sales Turnover	Positive	Bhavani and Bhanumurthy (2014); Nguyen and Luu (2013); Nikaido et al. (2015); Mehnaz and Wimpey (2008); Ayyagari et al. (2010)

[6] Maintenance of written accounts indicates transparency of an enterprise which increase the chances of getting formal credit.

Number of workers	Positive	Nikaido et. al (2015); Nikaido et al. (2012); Nguyen and Luu (2013), Chittenden et al. (1996); Mehnaz and Wimpey (2008);
Gross Value added	Positive	Nikaido et al. (2012)
Land to Fixed Asset Ratio	Positive (but in their study negative sign was found)	Nikaido et al. (2015)
Value Added to Fixed Asset Ratio	Positive	Nikaido et al. (2015)
Fixed Assets or Total Assets or owned assets	Positive	Chittenden et al. (1996); Nikaido et al. (2015); Bhavani and Bhanumurthy (2014); Love and Peria (2005)
Proportion of owned assets in total fixed assets	Positive	Bhavani and Bhanumurthy (2014)
Labour Productivity	Positive	Ayyagari et al. (2010)

3. Sources of Data

The primary sources of information on various indicators of operational and economic characteristics of unincorporated non-agriculture enterprises (excluding construction) are the quinquennial surveys conducted by the NSSO (National Sample Survey Office). As mentioned earlier our study is based on unit-level data of the 73rd round survey of NSSO conducted during July 2015 to July 2016. This survey collects information on the operational characteristics of the unincorporated non-agriculture enterprises such as their nature of operation,[10] type of ownership,[11] type of enterprise,[12] employment particulars,[13] problem faced in operation, status of registration under various statutory authorities, government assistance received, access to ICT (Information Communication and Technology) etc. Furthermore, the economic characteristics include operating receipts and expenses, GVA (Gross Value Added), owned and hired fixed assets, compensation to workers, outstanding loans amount etc. For more details refer to the Key Indicator Report of NSS 73rd Round (July 2015-June 2016).[14]

The total number of enterprises covered under 73rd round survey is 2,90,113 of which 41,182 (14.19%) enterprises have outstanding loans from different financial sources. There are few options for entrepreneurs to organise their business, and registering under the Indian Companies Act is one such option (known as corporate entities or companies). Other options are firms (partnership), association of persons (AOPs), body of individuals (BOIs), proprietary

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[7] We can't generalise whether manufacturing sector have higher chances to get formal credit or trading or services sector have higher chances to get formal credit.

[8] For more details refer to Nikaido et al. (2015)

[9] An enterprises carrying number of activities simultaneously for which the accounts are not separable then this enterprise will be treated as pursuing mixed activities.

[10] The Enterprises may operate more or less throughout the year or in seasons or intermittently throughout the year hence accordingly they are classified as perennial, seasonal and casual.

[11] Enterprises are classified as proprietary, partnership, Self-Help Group, Trusts and others. Proprietary enterprises are those enterprises where individual is the sole owner of the enterprise. Partnership is defined as *"relation between persons who have agreed to share the profits of a business carried on by all or any one of them acting for all"*

[12] Enterprise Type classified as Own Account Enterprise and Establishment.

[13] Average number of full time and part time and skilled workers (this includes male, female and transgender)

[14] Key Indicators of Unincorporated Non-Agricultural Enterprises (Excluding Construction in India; NSS 73rd Round Report (July 2015- June 2016).

enterprise, charitable entities, self-help groups, trusts and others (Mukherjee and Rao 2019). For the present study, we have restricted sample of enterprises to proprietary enterprises and partnership firms only, we have 39,534 sample enterprises. There are 17,096, 19,894 and 2,544 enterprises where loans are outstanding from formal only, informal only and both from formal and informal sources of credit respectively. Formal sources of loan include central and state-level term lending institutions, government (central, state and local bodies), commercial banks, co-operative banks and societies, micro-finance institutions and other institutional agencies. Informal sources include loans from the money lenders, business partner(s), suppliers/contractors, friends and relatives and other sources of loan.

Out of total samples of 36,990 enterprises where loans are outstanding either from formal or informal sources, we have further limited sample of enterprises by dropping states where number of observations (enterprises taken loans from either formal or informal sources) are less than 300. Therefore, ultimately we have 35,960 observations of enterprises where 16,532 enterprises (or 46%) have taken loan from solely from formal sources and 19,428 enterprises have outstanding loans from solely from informal sources. Details of average size of outstanding liabilities across different sources of credit are given in Appendix Table A3. We have selected Haryana and West Bengal as base states out of 23 states (Appendix Table A2). The criteria used to select the base state(s) is the median of state-wise percentage of enterprises having outstanding liability of loan from formal sources of credit. The estimated median is 43.9 percent and it coincides with two states – Haryana and West Bengal.

Furthermore, in sampling the unorganised non-agriculture enterprises in India, the NSSO divided the enterprises into two categories i.e. Own Account Establishment (OAE) and Establishment. The establishments are further divided into Directory Establishment (DE) and Non-Directory Establishments (NDE) by the following definitions (adopted from Mukherjee and Rao 2019):

1. Own-account enterprises (OAEs) are those which are run without any hired worker employed on a fairly regular basis.
2. An Establishment is one which employs at least one hired worker on a fairly regular basis. Paid or unpaid apprentices, paid household member/ servant/resident worker in an enterprise are considered as hired workers.
   a. Non-directory establishments (NDE) have one to five workers (household and hired taken together).
   b. Directory establishments (DE) have six or more workers (household and hired taken together

4. Factors Influencing Access to Formal Credit

In order to understand the factors which may influence access to formal credit of enterprises, we have carried out two-sample t-test for mean equality for various operational and economic characteristics (Table 2 and 3).

4.1 Operational Characteristics

Credit choice across enterprise type and ownership type

Our t-test results for mean equality suggests that enterprises taking formal credit are more likely belong to "directory establishment". Similarly, enterprises predominantly have taken loans from informal sources of credit are "own account enterprises". This result is also supported by the existing literature. Coming to the ownership type, as suggested in existing literature, partnership firms are more likely to take credit from formal sources of credit as compared to proprietary enterprises, though the difference between the mean values is small. Also, mean equality test for proprietary-female (proprietary enterprises[15] owned by female owners) is statistically significant but again there is not much difference between the mean values.

Credit choice across different activities

It has been observed that enterprises having access to formal source of credit are more likely to be engaged in services as compared to manufacturing and trading activities. Enterprises engaged in manufacturing and trading activities are relying more on informal sources of credit. In other words, access to formal sources of credit is relatively better for service sector as compared to enterprises engaged in manufacturing and trading.

Credit choice by enterprises having different ICT facilities

According to the report of Reserve Bank of India (2019), digitalisation via Digital Public Infrastructure Action Plan may help the enterprises in reducing the challenges they face in accessing formal credit.[16] In our study, we found that enterprises having access to formal credit are more likely to use internet and computers. In other words, access to computer and internet facilities may help enterprises to access information which could enable them to comply with statutory requirements of information to prove credit worthiness to financial institutions.

Credit choice by enterprises with respect to other variables

Factors such as maintenance of written statement of account, bank account, year of operation, registration under any act with the government[17] significantly and positively influence access to formal credit of enterprise. These results are also in line with the existing literature. Though in literature entrepreneur-specific factors (e.g., level of education, age, socio-economic status etc.) have identified, we have not taken into account these factors as the respondents of the questions covered in the NSSO's 73rd round survey are not necessarily the owners of the enterprises.

4.2 Economic Characteristics

There is a significant difference between the average size of outstanding loan from formal and informal sources (Table 3). The average outstanding loan from formal sources is 19 times higher than that of informal sources. One possible reason could be the relative size of the enterprises (in terms of employment, turnover and investment) having access to formal credit are higher as compared to enterprises having an outstanding loan from informal sources. Larger enterprises have larger prospects to obtain credit from formal sources and being larger in size (operation), the demand for credit is also expected to be higher. Another possible reason could

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[15] Proprietary enterprises are those enterprises where individual is the sole owner of the enterprise.

[16] According to the recommendations of the RBI (2019), new technological interventions for MSME lending can help in increasing their access to formal sources of credit.

[17] As, per our data 74.5 % of the enterprises who have taken loan from formal sector are registered under any act with the government.

be usually low rate of interest charged by formal sources of credit as compared to informal sources. As per our findings, on average informal sources charge 1.71 times higher interest rate as compared to formal sources.

Size of the enterprises

There are significant differences among the enterprises having access to credit from two sources of credit in terms of turnover, gross value addition, market value of the asset and number of workers. We find that average annual turnover and annual gross value added are 3.93 and 3.33 times higher respectively for enterprises having outstanding loans from formal sources. In other words, relatively larger enterprises have better access to formal sources of credit.

Furthermore, the size of an enterprise can be assessed by market value of total asset[18] (owned and hired) which is also known as capital base. We find that market value of total asset is almost 5 times higher for the enterprises taking credit from formal sources as compared to those taking credit from informal sources.[19]

Productivity

The average market value of total asset per worker is found to be 2.7 times higher for enterprises having outstanding loans only from formal sources vis-à-vis those enterprises having access to only informal credit. Similarly, annual gross value added (GVA) per worker is 1.46 times higher for these enterprises (Table 3). These findings are in line with findings of other studies (Ayyagari et al. 2010). Enterprises having access to formal credit have higher labour productivity. Furthermore, average Gross Value Added (GVA) - Turnover ratio (GVA/Turnover) is also found to be significantly (statistically) higher for enterprises having access to formal credit only as compared to enterprises having outstanding loans from informal credit sources only.

Owned asset to total fixed asset ratio is higher for enterprises having access to formal credit as compared to enterprises outstanding loans from informal credit sources only. Again this finding is in line with the existing literature (Bhavani and Bhanumurthy 2014). Capital to labour ratio which measures the factor intensity of an enterprise shows that enterprises having access to formal credit are comparatively more capital intensive. However, this finding is in contrary to findings of Nikaido et al. (2015). According to Nikaido et al. (2015), capital intensive industries are less likely to receive formal credit because of credit constraints.

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[18] Total Assets include market value of owned and hired assets excluding land and including building, plant and machinery, transport equipment, tools and other fixed assets, software and database, ICT (Information Communication and Technology) equipment and capital work in progress.

[19] Similarly, the significant differences are found for the market value of owned and hired assets i.e. enterprises taking loan from formal sources have 7.33 and 1.66 times higher owned and hired assets compared to enterprises taking loan from informal sources.

Table 2: Comparison of O*perational Characteristics* of Enterprises having Outstanding Loans from Formal and Informal Sources

Description	Credit from only formal sources	Credit from only informal sources
Total Number of Observations	16,532	19,428
Maintenance of Account[20]		
Having Bank Account/ Post Office Savings Bank Account***	0.944	0.666
Maintain Books of Account***	0.367	0.180
Type of Activities		
Manufacturing only***	0.211	0.251
Trading only***	0.304	0.391
Services only ***	0.434	0.309
Type of Enterprise		
Own-Account Enterprise***	0.306	0.479
Directory Establishment***	0.157	0.061
Non-Directory Establishment***	0.534	0.456
Type of Ownership		
Proprietary***	0.932	0.958
Partnership***	0.067	0.042
Proprietary- Female**	0.068	0.073
Other Variables		
Assistance Received from government ***	0.115	0.007
Years of Operation***	9.88	9.333
Registered Enterprises***	0.747	0.498
Enterprises using Internet***	0.181	0.065
Enterprises using computer***	0.222	0.085

Source: Computed by authors based on NSSO 73rd round unit level data
Note: ***, **, * imply the two-sample t-test for mean equality significant at the 0.01, 0.05 and 0.10 levels respectively.

Table 3: Comparison of Economic Characteristics of Enterprises having Outstanding Loans from Formal and Informal Sources

Description	Credit from only formal sources	Credit from only informal sources
Loan and Interest Rate		
Average Amount of Outstanding loan (₹)*	19,39,100	99,202.99
Average Interest rate per month (%) ***	1.795	3.084
Size of the enterprise		
Average annual turnover per enterprise (₹)***	56,37,346	14,30,902
Average annual gross value added (₹)***	11,57,593	3,46,821
Average market value of total asset (₹) ***	24,32,689	4,81,097

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[20] Maintenance of written accounts indicates transparency of an enterprise which increase the chances of getting formal credit.

Average market value of owned asset (₹)***	21,09,488	2,87,558
Average market value of hired asset (₹)***	3,23,171	1,93,539
Average market value of annual investment (₹)[21]***	81,537.02	17,362
Average number of total worker[22] ***	5.499	3.125
Ratios		
Gross Value added per turnover[23] (₹)***	0.413	0.396
Owned Asset to Total fixed Asset Ratio***	0.748	0.679
Annual Gross Value added per Worker[24]***	1,59,165	1,09,163
Capital to labour ratio (Average market value of total assets per worker in ₹)***	1,33,662.4	49,304.58

Source: Computed by authors based on NSSO 73rd round unit-level data
Note: ***, **, * imply the two-sample t-test for mean equality significant at the 0.01, 0.05 and 0.10 levels respectively.

In the following section, we have used the multivariate approach to understand factors influencing the decision of an enterprise to access credit from formal sources as compared to informal sources.

5. Multivariate Analysis

In order to estimate the factors affecting access to formal credit, we have used bivariate heteroskedastic probit model[25]. 'Hetprobit' is a generalisation of the probit model and fits a maximum-likelihood probit model.

The variables and the estimated model are described as follows:

y_i, i= 1, 2,….n, is a binary outcome variable taking on the value 1 if success (i.e., accessed credit from formal sources) and 0 if failure (i.e., having outstanding loan liabilities from only informal sources of credit). In the given probit model, the probability that y_i takes on the value 1 is modelled as a nonlinear function of linear combination of the k independent variables $x_i = (x_1, x_2, …, x_k)$,

$$Pr(y_i = 1|x) = \Phi(x_i'\beta)$$

Where, β represents the constant k- dimensional vector and Φ() is a standard normal cumulative distribution function with variance 1.

By assuming Φ() *to be a cumulative distributive function* with variance (σ^2) which is a function of independent variables, heteroskedastic model generalise the probit model. According to Harvey (1976) 'hetprobit' models, variance is the multiplicative function of p variables $z_i= z_1, z_2, z_3,….,z_p$ with n observations each.

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[21] Annual Investment is the market value of net additions to the owned assets (excluding land) during last 365 days.

[22] The total number of workers includes full time and part-time working owner, formal hired worker, informal hired worker, helper/apprentice and other workers.

[23] This is the ratio of annual gross value added to annual turnover.

[24] As per the Key Indicator report of NSS 73rd round the annual GVA per worker was estimated as Rs. 1,03,744 at all India level for those enterprises who were engaged in market production activities

[25] We have used Stata (version 14.0) command 'hetprobit' for estimating the probit model.

$$\sigma_i^2 = \{\exp(z_i^2 \gamma)\}^2$$

Hence, the success of probability as a function of all independent variables can be written as follows:

$$\Pr(y_i = 1 | x, z) = \Phi\left(\frac{x_i'\beta}{\exp(z_i'\gamma)}\right) \tag{1}$$

Furthermore, let y be the $n \times 1$ vector of all observations of y_i, let X be the $n \times k$ matrix whose i^{th} row is x_i' and finally Z to be the $n \times p$ matrix with i^{th} row of z_i'. Therefore now the log likelihood function can be written in the following form.

$$\ln L(\beta, \gamma \,|\, y, X, Z) = \sum_{i=1}^{n} y_i \ln\Phi\left(\frac{x_i'\beta}{exp\,(z_i'\gamma)}\right) + (1 - y_i)\,\ln\left(1 - \Phi\left(\frac{x_i'\beta}{exp\,(z_i'\gamma)}\right)\right).$$

In order to get maximum likelihood estimate given this set of n observed values of y, x z random variables, one has to maximise this function over the possible choices of $(\beta, \gamma) \in R^{k+p}$.

Therefore, we have run the following binary choice heteroskedastic probit model by using this methodology:

Model 1 specification

$x'\beta = \beta_0 + \beta_1$ lngva $+ \beta_2$ proprietor $+ \beta_3$ owe $+ \beta_4$ lnasset $+ \beta_5$ maintain_account $+ \beta_6$ internet $+ \beta_7$ bankaccount $+ \beta_8$ yearoop $+ \beta_9$ reg_nos $+ \beta_{10}$ femaleowner $+ \beta_{11}$ rural $+ \beta_{12}$ manuf $+ \beta_{13}$ trade $+ \beta_{14}$ govtassist $+ \beta_{15}$ probfaced $+ \beta_{16}$ state dummies[26]

$z'\gamma = \gamma_0$ lnasset $+ \gamma_1$ lngva

Model 2 specification

$x'\beta = \beta_0 + \beta_1$ lnworker $+ \beta_2$ gvaturn $+ \beta_3$ proprietar $+ \beta_4$ owe $+ \beta_5$ lnasset $+ \beta_6$ maintain_account $+ \beta_7$ internet $+ \beta_8$ bankaccount $+ \beta_9$ yearoop $+ \beta_{10}$ reg_nos $+ \beta_{11}$ femaleowner $+ \beta_{12}$ rural $+ \beta_{13}$ manuf $+ \beta_{14}$ trade $+ \beta_{15}$ govtassist $+ \beta_{16}$ probfaced $+ \beta_{17}$ state dummies

$z'\gamma = \gamma_0$ lnasset $+ \gamma_1$ gvaturn $+ \gamma_2$ lnworker

Dependent variable:
formalcredit: 1 if the enterprise has outstanding loan liability solely on account of formal sources of credit, 0 otherwise

Operational characteristics:

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[26] We have considered states with more than 300 observations.

owe: 1 if the enterprise is "own account enterprise" and 0 otherwise (establishment form the reference category for enterprise-type)

proprietor: 1 if type of ownership is "proprietary" and 0 otherwise (partnership form the reference category for ownership type)

internet: 1 if the enterprise use internet and 0 otherwise

maintain_account: 1 if the enterprise maintains books of accounts, 0 otherwise

bankaccount: 1 if the enterprise maintains any bank/post office savings bank account, 0 otherwise

yearoop: years of operation (as on 2016)

reg_nos: no. of acts/ authorities[27] under which the enterprise is registered

femaleowner: 1 if the enterprise is owned by female, 0 otherwise

rural: 1 if the enterprise is located in rural area, 0 otherwise

manuf: 1 if enterprise is engaged only in manufacturing activities, 0 otherwise (service sector form the reference category for activity type)

trade: 1 if enterprise is engaged only in trading activities, 0 otherwise (service sector form the reference category for activity type)

govtassist: 1 if the enterprise has received government assistance[28], 0 otherwise

probfaced: 1 if the enterprise has faced any problem in its operation[29], 0 otherwise

lnworker: log of total workers (full- time and part-time; male, female and transgender)

Economic Characteristics
lngva: log of annual gross value addition
gvaturn: ratio of annual gross value added (GVA) to annual turnover
lnasset: log of market value of total asset

State-specific factor:
State Dummy: 1 for the relevant state, 0 otherwise

The regression results of the above models are given in Table 4 and the basic statistics of the data set are summarised in Appendix Table A4.

The results are as per our expectations. As size of an enterprise increases (in terms of market value of total asset and total number of labours), probability of having access to formal credit increases. Our results from both the models also suggest that as market value of total assets increases, probability of having access to formal credit also increases. Similarly, as total number of workers increases, probability of getting formal credit increases. In terms of type of enterprise, both the models show that the probability of accessing informal credit is high for own account enterprises (OAE) as compared to directory establishments (which employ more than six workers). This shows that directory establishments are more creditworthy as compared to OAE. Also, gross value added and gross value added per turnover significantly and positively influence the enterprise's access to formal credit.

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[27] Type of registration under any act/authority includes Shops and Establishment Act, Municipal Corporation/ Panchayats/ Local Body, VAT/ Sales Tax Act, Provident Fund Act, Employees State Insurance Corporation Act, Registered with SEBI/ Stock Exchange and any other industry-specific Act/ Authority.

[28] Assistance from government includes subsidy, financial loans, machinery and equipment, skill development, raw materials, marketing and others.

[29] Problem faced by the enterprises includes erratic power supply/power cuts, shortage of raw materials, shrinkage/fall of demand, non-availability/high cost credit, non-recovery of financial dues, non-availability of labour as and when needed, non-availability of skilled labour as and when needed, labour disputes and related and others.

Turning to operational factors, the results show that proprietary enterprises are more likely to have access to formal credit as compared to partnership firms which is in contrary to findings of earlier studies. The possible reason could be the skewness of the data towards proprietary enterprises. As per the data, about 94.58 percent enterprises with outstanding loan liabilities are proprietary enterprises. Similarly, enterprises located in rural areas are more likely to take formal credit.

The results also show that enterprises operating for longer periods, getting assistance from the government, maintaining books of accounts and having bank or post office savings accounts are more likely to get formal credit. Moreover, enterprises that are relatively registered under various acts/authorities of the government have higher probability of getting formal credit. In other words higher the number of registration under various acts higher will be the probability of getting formal credit.

If enterprises are facing problems during last 365 days of operation, they are less likely to obtain formal credit. Perhaps due to problems, credit worthiness and profitability of the enterprises fall. Furthermore, enterprises engaged in only manufacturing or trading activities are less likely to have access to formal credit as compared to enterprises engaged in services sector. This shows that manufacturing and trading sector are relatively deprived of formal credit as compared to services sector.

Another, most interesting finding of the study is that female entrepreneur (as compared to their male counterpart) are more likely to have access to formal credit, which is in contrary to findings of the earlier studies. Earlier studies based on the older data set (mainly 62th round of NSSO) indicate that female owners are less likely to receive formal credit but in our study, we have found that female owners are not deprived of formal credit, in-fact their chances of getting formal credit are higher than male entrepreneurs. This could possibly due to recent policies and dedicated credit lines schemes launched by the Government of India to promote women entrepreneurship. For example, Bhartiya Mahila Bank (BMB)[30] is established in November (2013) with the objective to promote the financial and economic empowerment of women in India. Furthermore, during 2014 schemes such as Pradhan Mantri MUDRA and Jan Dhan Yojna also have overlapping objectives with that of BMB. Other women entrepreneurship related policies include TREAD (Trade Related Entrepreneurship Assistance and Development scheme for women) initiated during 11th plan, Mahila Vikas Nidhi, Mahila Samiti Yojana etc.[31]

One of the barriers to formal credit is the lack of access to information related to credit schemes and programmes. Lack of information sometimes may force enterprises to opt for informal sources of credit. This problem could be resolved via adoption of internet and various ICT platforms. Our results show that enterprises using computer and internet facilities are more likely to get formal credit. This indicates the potential of digital platform in expanding the formal credit network via eradicating the information asymmetries that exist in credit market. Aggarwal and Raj (2019) find that growing use of internet and increasing adoption of

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[30] Which is now a part of SBI (State Bank of India).
[31] Various policy initiatives have been taken by the government to promote the women entrepreneurship by providing access to finance. Some recent policies are Cent Kalyani Scheme, Udyogni Scheme, Dena Shakti Scheme, PNB Mahila Udyam Nidhi Scheme , PNB Mahila Samridhi Yojna, Mudra Yojana Scheme for women etc.

smartphone results in creating awareness and adoption of Fintech lending[32]. Furthermore, in order to promote ICT (Information and Communications Technology), the government of India have launched various policies which may help enterprises to get access to various credit lines of the formal credit sources. Some of these policies are National Policy on Information Technology (2012), National Cyber Security Policy (2013), National Telecom M2M (Machine to Machine) Roadmap 2015, Digital India (2015), Bharatnet, and the National Digital Communication Policy (2018) etc. In addition, we have considered location of the enterprise (within household, outside household etc.) and mixed activity variables but we have not found significant impacts of these variables.

The results show that as compared to enterprises located in Haryana or West Bengal, enterprises located in Uttarakhand, Delhi, Rajasthan, Uttar Pradesh, Bihar, Assam, Gujarat, Andhra Pradesh, Tamil Nadu, Puducherry and Telangana are less likely to have credit from formal sources. Similarly, enterprises located in Jammu and Kashmir, Himachal Pradesh, Odisha, Karnataka and Kerala are more likely to have access to formal credit as compared to enterprises located in Haryana or West Bengal. Enterprises located in Punjab, Jharkhand, Chhattisgarh, Maharashtra and Madhya Pradesh are equally likely to have formal credit as enterprises located in Haryana or West Bengal.

We have also run alternative specification in regression models (refer to Appendix Table A5) which show that as annual turnover per total assets (output to capital ratio or capital productivity) and owned asset to total asset ratio increases probability of enterprises having access to formal credit increases. This finding is also supported by Bhavani and Bhanumurthy (2014) which suggest that higher the proportion of owned asset in total asset better will be access to formal credit. Similarly, as gross value added per unit of total asset and market value of land in total fixed asset increases probability of obtaining formal credit decreases. These findings are in line with the findings of Nikaido et al. (2015). Also, capital to labour ratio is found to have positive and significant impact on dependent variable but coefficient and marginal effects are quite negligible which shows that impacts are not much strong.

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[32] Also as per their study the problem of lack of formal credit facilities can be solved by Fintech lending or Digital lending platform such as Point-of-scale lending, P2P (peer-to-peer) lending, digital mortgage etc.

Table 4: Regression Results

Description	Model 1			Model 2		
	Coef.	S.E.	M.E.	Coef.	S.E.	M.E.
lnworker				0.032***	0.008	0.030
gvaturn				0.015***	0.005	0.021
lngva	0.047***	0.006	0.042			
proprietar	0.063***	0.015	0.059	0.065***	0.017	0.054
owe	0.047***	0.010	0.045	0.045***	0.011	0.037
lnasset	0.060***	0.007	0.055	0.084***	0.008	0.066
maintain_account	0.050***	0.010	0.048	0.068***	0.012	0.057
internet	0.027**	0.011	0.025	0.040***	0.013	0.033
bankaccount	0.416***	0.042	0.349	0.472***	0.045	0.349
yearoop	0.001***	0.000	0.001	0.002***	0.000	0.002
reg_nos	0.027***	0.005	0.026	0.037***	0.006	0.031
femaleowner	0.069***	0.016	0.066	0.060***	0.016	0.051
rural	0.047***	0.008	0.044	0.050***	0.009	0.042
manuf	-0.111***	0.014	-0.104	-0.128***	0.016	-0.105
trade	-0.125***	0.015	-0.117	-0.138***	0.015	-0.114
govtassist	0.602***	0.068	0.482	0.683***	0.071	0.480
probfaced	-0.052***	0.009	-0.050	-0.062***	0.010	-0.052
Jammu & Kashmir	0.072***	0.024	0.069	0.078***	0.026	0.066
Himachal Pradesh	0.225***	0.034	0.212	0.254***	0.038	0.210
Punjab	-0.038*	0.022	-0.036	-0.034	0.024	-0.028
Uttarakhand	-0.117***	0.029	-0.107	-0.123***	0.032	-0.100
Delhi	-0.313***	0.045	-0.258	-0.341***	0.047	-0.250
Rajasthan	-0.121***	0.024	-0.111	-0.124***	0.026	-0.100
Uttar Pradesh	-0.203***	0.028	-0.180	-0.238***	0.031	-0.186
Bihar	-0.191***	0.032	-0.169	-0.208***	0.035	-0.163
Assam	-0.250***	0.041	-0.214	-0.274***	0.043	-0.208
Jharkhand	0.011	0.019	0.011	0.014	0.021	0.012
Odisha	0.151***	0.023	0.144	0.177***	0.026	0.149
Chattisgarh	0.022	0.029	0.021	0.021	0.033	0.018
Madhya Pradesh	-0.034	0.026	-0.032	-0.047	0.030	-0.039
Gujarat	-0.263***	0.036	-0.225	-0.294***	0.039	-0.222
Maharashtra	0.009	0.014	0.008	0.003	0.016	0.003
Andhra Pradesh	-0.160***	0.023	-0.145	-0.176***	0.025	-0.141
Karnataka	0.048***	0.015	0.046	0.064***	0.017	0.054
Kerala	0.220***	0.026	0.208	0.249***	0.028	0.208
Tamil Nadu	-0.115***	0.018	-0.107	-0.126***	0.020	-0.103
Puducherry	-0.306***	0.045	-0.253	-0.347***	0.049	-0.253
Telangana	-0.254***	0.034	-0.219	-0.274***	0.035	-0.210
_cons	-1.797***	0.194		-1.612***	0.151	
lnasset	-0.034***	0.009		-0.068***	0.008	
lngva	-0.036***	0.011				
gvaturn				0.139***	0.040	
lnworker				0.054***	0.017	
Number of Observations	35670			35,829		
LR chi²	110.94***	df:35		129.7***	df:36	
Log likelihood	-18812.28			-18959.48		
Pseudo R²	0.437			0.439		
chi² for Ho: lnsigma2=0	72.47***	df: 2		77.11***	df: 3	

Source: Computed by authors

Notes: ***, ** and * imply that the estimated z-statistic is significant at the 0.01%, 0.05% and 0.10% levels, respectively; SE is standard error; ME is marginal effect; df is degree of freedom.

6. Conclusions

Five most interesting results come out from the present study - first, enterprises owned by female are more likely to have access to formal credit. This could be because of various policy initiatives taken by the government to promote the women entrepreneurship.

Second, the study finds that manufacturing sector is relatively deprived of formal credit. Manufacturing activities have lower outstanding loans from formal sources of credit as compared to trade and services sectors. Also, regression results show that probability of getting formal credit is less for manufacturing enterprises. Therefore, government may consider special policies to promote and provide access to formal credit to manufacturing enterprises.

Third, the enterprise facing problems (such as erratic power supply/power cuts, shortage of raw materials, shrinkage/fall of demand, non-availability/high-cost credit, non-recovery of financial dues, non-availability of labour as and when needed, non-availability of skilled labour as and when needed, labour disputes and related problems) during last 365 days of operation, are less likely to have access formal credit. Perhaps these problems reduce credit worthiness (financial sustainability) of enterprises which drive them to informal credit sources.

Fourth, the enterprises getting assistance from the government such as subsidy, financial loans, machinery and equipment, skill development, raw materials, marketing and others are more likely to have access to formal credit as compared to the enterprises that are not getting any support or assistance from the government. This shows the importance of government interventions in terms of supporting enterprises help enterprises to access formal credit.

Fifth, findings of the study highlight the potential of ICT in expanding formal credit network via reducing the information asymmetries that exist in credit market. Barriers to formal credit often arise due to unawareness of financial products or services. Lack of credit information sometimes also force enterprises to opt for informal sources of credit. This problem could be resolved by adoption of computer and internet. Our results show that enterprises using internet facilities are more likely to have access to formal credit. Hence, initiatives of the Government of India to promote access to ICT may help in expanding formal credit network among the unincorporated enterprises.

Furthermore, variables such as annual gross value added, annual turnover, maintenance of written statement of accounts, bank account, market value of total asset, rural area, year of operation, registration under various acts/authorities and establishments (mainly directory establishments) significantly and positively influence the access to formal credit. These results are also supported by the existing literature. We have also found that large enterprises (in terms of size of employment and assets) have better access to formal credit. Similarly, enterprises having more capital productivity and higher value of owned assets to fixed assets are more likely to obtain formal credit. Hence, enterprises should focus on increasing their productivity, assets values, turnover, gross value addition etc. in order to improve their credit worthiness. Also, maintenance of written account, bank account and registration under various government acts and rules increase their transparency which improves their credit worthiness.

The results show that as compared to enterprises located in Haryana or West Bengal, enterprises located in Uttarakhand, Delhi, Rajasthan, Uttar Pradesh, Bihar, Assam, Gujarat,

Andhra Pradesh, Tamil Nadu, Puducherry and Telangana are less likely to have access to formal credit. Similarly, enterprises located in Jammu and Kashmir, Himachal Pradesh, Odisha, Karnataka and Kerala are more likely to have credit from formal sources as compared to enterprise located either Haryana or West Bengal. Enterprises located in Punjab, Jharkhand, Chhattisgarh, Maharashtra and Madhya Pradesh are equally likely to have access to formal credit as enterprises located in Haryana or West Bengal.

Appendix

Table A1: Major Activity-wise Share in Outstanding Loans and Number of Enterprises (%)

Variable Description	Percentage Share in Outstanding Loans by Sources of Credit			Percentage Share in Number of Enterprises by Source of Credit		
	Formal	Informal	Both	Formal	Informal	Both
1. Manufacturing of Food Products	1.12	4.67	11.34	6.50	4.21	4.95
2. Wholesale and Retail Trade and Repair of Motor Vehicles and Motorcycles	1.41	4.29	1.43	3.38	3.14	2.67
3. Wholesale Trade, except of Motor Vehicles and Motorcycles	3.62	7.98	10.36	3.82	5.50	6.41
4. Retail Trade, except of Motor Vehicles and Motorcycles	8.01	26.98	22.81	33.37	23.49	29.64
5. Transportation, travel agency , tour operator activities	4.53	5.81	3.27	6.81	20.64	10.97
6. Accommodation and food service activities	4.54	8.11	12.14	11.49	7.65	8.69
7. Real estate, rental and leasing activities	62.05	2.43	0.91	2.23	2.81	2.75
8. Educational activities	5.12	5.45	11.71	1.67	3.69	3.34
9. Human health, social work and veterinary activities	2.68	2.84	3.93	1.05	2.47	1.57
Total (1 to 9)	93.08	68.57	77.91	70.32	73.58	70.99
Others	6.92	31.43	22.09	29.68	26.42	29.01
Grand Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computed by authors using NSS 73rd round unit-level data

Table A2: State-wise Number of Enterprise by Sources of Credit

State	Number of Enterprises by Source of Credit			
	Formal Only (A)		Informal Only (B)	Total (A+B)
Andhra Pradesh	980	(33.0)	1994	2,974
Assam	109	(22.6)	374	483
Bihar	199	(23.6)	643	842
Chhattisgarh	258	(54.3)	217	475
Delhi	143	(26.0)	407	550
Gujarat	296	(29.2)	718	1,014
Haryana	402	(43.9)	513	915
Himachal Pradesh	828	(85.6)	139	967
Jammu & Kashmir	460	(62.0)	282	742
Jharkhand	614	(47.0)	691	1,305
Karnataka	1,717	(56.7)	1,310	3,027
Kerala	2,436	(71.2)	987	3,423
Madhya Pradesh	329	(51.2)	314	643
Maharashtra	1,591	(58.6)	1,124	2,715
Odisha	801	(55.2)	650	1,451
Puducherry	123	(24.4)	381	504
Punjab	443	(53.1)	391	834
Rajasthan	453	(41.4)	640	1,093
Tamil Nadu	1,760	(36.8)	3,024	4,784
Telangana	447	(30.6)	1,015	1,462
Uttar Pradesh	524	(24.4)	1,623	2,147
Uttarakhand	276	(49.9)	277	553
West Bengal	1,343	(43.9)	1,714	3,057
Sub-Total	**16,532**		**19,428**	**35,960**
Median		43.9		
Grand Total	17,096		19894	36,990

Source: Computed by the authors using NSSO's 73rd round unit-level data.

Note: Figures in the parenthesis show the percentage in total number of enterprises having outstanding loan liabilities from either formal or informal sources.

Table A3: Average Amount of Outstanding Liabilities across different sources of credit

Sources of Credit	Number of Observations	Average amount of Outstanding Liabilities
Only from Central and state level term lending institutions	173	₹8,27,410
Only from government (central, state, local bodies)	954	₹8,70,159
Only from commercial banks	10,478	₹27,93,096
Only from co-operative banks and societies	2,672	₹3,97,672
Only from micro-finance institutions	1,718	₹1,83,632
Only from other institutional agencies	979	₹4,49,250
Only from money lenders	7,335	₹1,24,094
Only from business partner(s)	63	₹9,67,616
Only from suppliers/contractors	2,736	₹83,465
Only from friends and relatives	9,436	₹68,772
Only from others	501	₹1,57,334
total	35,960	₹9,45,064

Source: Computed by authors using NSSO's 73rd round unit level data

Table A4:   Basic Statistics

Variable	Mean	Std. Dev.	Min	Max
Whether the enterprise is own account enterprise during last 365 days? (owe, yes =1; no=0)	0.399	0.499	0	1
Whether the enterprise if proprietary enterprise? (proprietar, yes = 1; no=0)	0.946	0.226	0	1
Whether the enterprise use internet during last 365 days? (internet, yes =1; no=0)	0.119	0.323	0	1
Whether the enterprise maintains books of accounts? (maintain_account, yes =1; no=0)	0.266	0.441	0	1
Whether the enterprise maintain any bank/ post office savings bank account? (bankaccount, yes =1; no=0)	0.794	0.405	0	1
Years of operation as on 2016 since the year of initial operation? (yearoop) (years)	9.584	8.292	0	1
Number of acts/authority under which the enterprise is registered with the government? (reg_nos) (nos.)	0.999	1.035	0	8
Whether the enterprise is owned by female? (femaleowner, yes =1; no=0)	0.075	0.263	0	1
Whether the enterprise is located in rural area? (rural, yes=1; urban=0)	0.549	0.498	0	1
Whether the enterprise is engaged in only manufacturing activities? (manuf, yes =1; no=0)	0.233	0.423	0	1
Whether the enterprise is engaged in only trading activities? (trade, yes =1; no=0)	0.351	0.477	0	1
Whether the enterprise received any assistance from the government during last three years? (govtassist, yes =1 ; no=0)	0.057	0.232	0	1
Whether the enterprise face any problem in its operation during last 365 days? (probfaced, yes=1 , no=0)	0.501	0.500	0	1
Log of gross value added annually (lngva)	12.375	1.260	4.787	20.204
Log of total number of workers (all types i.e. part time and full time, including working owner) (lnworker) (nos.)	0.926	0.812	0	6.912
Ratio of Annual Gross Value Added and Annual Turnover (gvaturn)	0.404	0.5101	-74.5	18.895
Log of market value of total assets (lnasset)	12.592	1.527	4.174	22.805

Source: Computed by the authors using NSSO's 73rd round unit-level data.

Table A5: Regression Results

	Model A1			Model A2		
	Coef.	S.E.	M.E.	Coef.	S.E.	M.E.
lnworker				0.124***	0.015	0.048
gva_k[33]				-0.047***	0.007	-0.017
output_k[34]				0.004***	0.001	0.001
land_totalasset[35]				-0.002*	0.001	-0.001
lnturn[36]	0.018***	0.006	0.013			
lngva	0.052***	0.008	0.046			
k_l[37]	2.71E-07***	3.59E-08	2.53E-07			
owned_asset[38]	0.199***	0.023	0.177			
proprietar	0.042***	0.015	0.037	0.117***	0.035	0.045
directory[39]	0.028**	0.014	0.025	0.161***	0.036	0.062
maintain_account	0.058***	0.011	0.051	0.199***	0.021	0.077
bankaccount	0.443***	0.044	0.353	1.038***	0.023	0.353
internet	0.059***	0.013	0.052	0.154***	0.027	0.060
reg_nos	0.029***	0.005	0.026	0.118***	0.009	0.045
femaleowner	0.079***	0.017	0.070	0.106***	0.030	0.041
manuf	-0.120***	0.015	-0.105	-0.315***	0.020	-0.119
trade	-0.138***	0.017	-0.121	-0.366***	0.018	-0.138
rural	0.028***	0.008	0.025	0.059***	0.016	0.023
govtassist	0.655***	0.070	0.477	1.494***	0.048	0.479
probfaced	-0.054***	0.009	-0.048	-0.152***	0.016	-0.058
Jammu & Kashmir	0.098***	0.026	0.087	0.239***	0.056	0.092
Himachal Pradesh	0.281***	0.040	0.244	0.707***	0.062	0.265
Punjab	-0.024	0.023	-0.021	0.035	0.052	0.014
Uttarakhand	-0.095***	0.030	-0.083	-0.201***	0.064	-0.076
Delhi	-0.328***	0.046	-0.258	-0.675***	0.068	-0.232
Rajasthan	-0.102***	0.024	-0.089	-0.173***	0.047	-0.065
Uttar Pradesh	-0.198***	0.027	-0.168	-0.468***	0.040	-0.170
Bihar	-0.193***	0.032	-0.163	-0.433***	0.058	-0.157
Assam	-0.232***	0.040	-0.192	-0.611***	0.072	-0.214
Jharkhand	0.011	0.019	0.010	0.022	0.045	0.008
Odisha	0.164***	0.024	0.146	0.369***	0.044	0.142
Chattisgarh	0.025	0.030	0.022	0.082	0.069	0.032
Madhya Pradesh	-0.016	0.028	-0.014	-0.034	0.063	-0.013
Gujarat	-0.287***	0.038	-0.232	-0.544***	0.051	-0.194
Maharashtra	0.046***	0.016	0.041	0.109***	0.034	0.042
Andhra Pradesh	-0.131***	0.020	-0.113	-0.353***	0.035	-0.131
Karnataka	0.089***	0.017	0.079	0.187***	0.034	0.072
Kerala	0.293***	0.033	0.255	0.603***	0.034	0.230
Tamil Nadu	-0.070***	0.016	-0.062	-0.228***	0.031	-0.086
Puducherry	-0.273***	0.042	-0.221	-0.746***	0.071	-0.252
Telangana	-0.212***	0.030	-0.178	-0.549***	0.045	-0.196
_cons	-1.529***	0.153		-1.133***	0.049	
lnturn	-0.064***	0.008				
k_l	2.63E-07***	3.72E-08				
gva_k_annual				0.021***	0.004	
output_k_annual				-0.002***	0.000	
Number of Observations	35670			35,918		
LR chi²	118.450***	df: 36		7219.61***	df: 36	
Log likelihood	-18635.550			-19231.28		
Pseudo R²	0.454			0.444		
chi² for Ho: lnsigma2=0	138.660***	df:2		67.480***	df: 2	

Source: Provided by authors**; Notes:** ***, ** and * imply that the estimated z-statistic is significant at the 0.01%, 0.05% and 0.10% levels, respectively; SE is standard error; ME is marginal effect; df is degree of freedom.

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[33] Gross value added per capital (capital is the total market value of asset excluding land)
[34] Output per capital (here output is the annual turnover)
[35] Market value of land to total asset value
[36] Log of annual turnover
[37] Capital to labour ratio
[38] Market value of owned assets to total assets ratio
[39] 1 if directory enterprise and 0 otherwise

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